Bioarchaeology and Social Theory
Series Editor: Debra L. Martin

Jennifer F. Byrnes
Jennifer L. Muller *Editors*

Bioarchaeology of Impairment and Disability

Theoretical, Ethnohistorical, and Methodological Perspectives

Springer

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Series editor

Debra L. Martin
Professor of Anthropology
University of Nevada, Las Vegas
Las Vegas, Nevada, USA

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Jennifer F. Byrnes · Jennifer L. Muller
Editors

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Editors
Jennifer F. Byrnes
Division of Social Sciences
University of Hawai‘i–West O‘ahu
Kapolei, HI
USA

Jennifer L. Muller
Department of Anthropology
Ithaca College
Ithaca, NY
USA

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Foreword

This is an exciting moment in the growth and development of bioarchaeology. Bioarchaeologists such as the editors of this volume, Jennifer F. Byrnes and Jennifer L. Muller, are pushing ever further into new frontiers. This collection of studies begins a productive dialogue between bioarchaeology and critical disability studies (CDS). The bridging of these two disciplinary approaches is so novel that these chapters are filled with possibility, convergence and tension. The 14 chapters presented here take on method, theory and data in ways that are decidedly innovative and boundary-pushing. The authors are clear about why disability studies have been a difficult area to break into and these difficulties include the diverse and conflicting definitions of disability and impairment in contemporary populations with the attendant heightened challenge of defining it in ancient and historic populations, often basing assessments only on skeletal remains. The same goes with variation in cultural contexts within which disability may be acknowledged or not. It is difficult to do this in contemporary cross-cultural contexts, and doing so for archaeological ones is even more challenging. The editors of this volume have urged their authors to move towards rectifying these and other challenges posed by this approach. They have also prodded the authors of various chapters to move from subjective descriptions of skeletal maladies to objective and even quantifiable assessments by using clinical standards and modifying those for skeletal data.

This approach is different from the emerging scholarship on the bioarchaeology of care although some of the chapters do integrate ideas about how individuals who are different may have been cared for. The chapters in this volume grapple with creating and tinkering with a social model of disability that views disability as a signifier imposed upon individuals by society. To understand this, one has to examine the ideological and sociopolitical underpinnings of who is deemed to be normal and who is labeled as disabled. The social model of disability is challenging to work within because it is often difficult to bridge the biology-culture schism. As the editors suggest in their opening chapter, if we see disability as a form of social identity that is only partially based on biological differences, it opens up ways to integrate a wider range of theoretical approaches that include things such as inequality theory, gender theory and structural violence.

Readers will be drawn into the debates, critiques, observations and promotions of critical disability studies in Part I of the volume. In taking this theoretical approach on, the editors have wisely invited scholars from other disciplines to help think through the challenges that bioarchaeologists face in adopting a CDS approach. For example, a physical therapist provides a way to think about how disabilities are differentially experienced by individuals. The section ends with a provocative case study from South Asia regarding microcephaly by a disability histories scholar.

Part II of the volume covers case studies that utilize ethnohistoric and archival information to explore "ability, disability and alternate ability" and provides ways to integrate historical documents into questions about disability in different cultural contexts. This is followed by a series of case studies that rely more on bioarchaeological data and in particular these case studies grapple with both qualitative reconstruction of context as well as presentation of skeletal data that is quantitative and precise. From the exploration of back pain in past populations to osteoarthritis, the authors carefully reconstruct convincing portraits of how individuals with pathologies that likely affected the quality of their daily lives were treated.

The final part of the book pulls from many of the themes and theoretical approaches discussed through the text to present three case studies that place interpretations of disease and disability into a richly configured set of cultural contexts in order to discuss the poetics or meaning that cultures make regarding certain pathologies.

This collection of chapters speaks to a growing interest in pushing the boundaries of what can be said about the presence and absence of skeletal pathologies. These case studies provide a more nuanced way of thinking about the paleopathology paradox, where it has been proposed that we may be missing many of the sickest individuals who die because some may leave no skeletal indicators. The focus on trauma, injuries and extreme forms of pathology that do leave distinctive and interpretable changes on bone contribute to fleshing out other ways of discussing frailty and resilience in individuals, households, groups, communities and regions. It is an impressive set of chapters and they challenge bioarchaeologists to be ever more diligent in mining many different sources of information in order to reconstruct a more holistic way of thinking about people's pain and suffering in the past, and how this may have impacted community behavior and the cultural activities that made things better or worse for individuals depending on their identity and/or life history moment.

Understanding disability, injury, healed traumas and other pathologies permits bioarchaeologists to contribute to the broader anthropological conversations that attempt to explain human behavior in all its variety and temporal depth. Thus, these kinds of studies demonstrate that bioarchaeology is of central importance to the anthropological enterprise.

Debra L. Martin
Series Editor, University of Nevada, Las Vegas

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About the Editors

Jennifer F. Byrnes is an Assistant Professor in the Division of Social Sciences at the University of Hawai'i–West O'ahu, USA. She received her B.S. in Biology from the State University of New York College at Geneseo (2006), and M.A. (2009) and Ph.D. (2015) in Anthropology from the State University of New York at Buffalo. She has received training in bioarchaeology and forensic anthropology. She co-organized a symposium, of which this volume is a product of, entitled *Embodying Impairment: Towards a Bioarchaeology of Disability* at the American Association of Physical Anthropology 2015 Annual Meeting. She has most recently published articles in the *Journal of Forensic Sciences* on a collaborate project with the Defense POW/MIA Accounting Agency as well as another research article which presented the practical considerations of portable X-ray fluorescence with osseous materials. She has ongoing research investigating the traumatic injuries and paleopathology of the adult skeletal remains exhumed from the Erie County Poorhouse in Buffalo, NY.

Jennifer L. Muller is an Associate Professor in the Department of Anthropology, Ithaca College, Ithaca, New York, USA. She received her Ph.D. from the Department of Anthropology, State University of New York at Buffalo in 2006. Muller's research embraces the holism of anthropological study, integrating theoretical perspectives and methodologies from the cultural, biological, and archaeological subfields of the discipline. Her research has specifically focused on how discrimination-based inequities impact human biology in African diasporic populations and among the institutionalized poor. Foundational to this research is the understanding that the body is both biological and social, and that the insidious and pervasive attributes of structural violence may assault the body in a multitude of ways. Muller also examines postmortem structural violence; the idea that discriminatory practices continue to harm the poor and marginalized after death. Muller's dissertation focused on the relationships between traumatic injuries and inequality in the W. Montague Cobb Human Skeletal Collection housed at Howard University in the District of Columbia, USA. Her research on the institutionalized poor has included bioarchaeological and/or historical analysis from New York State poorhouses, including: the Monroe County Poorhouse, Rochester; the Erie County Poorhouse, Buffalo; and the St. Lawrence County Poorhouse, Canton.

Contributors

Shilpaa Anand Department of English, School of Languages, Linguistics and Indology, Maulana Azad National Urdu University, Hyderabad, Telangana, India

Jenifer L. Barclay Department of Critical Culture, Gender, and Race Studies, Washington State University, Pullman, WA, USA

Jonathan D. Bethard Department of Anthropology, University of South Florida, Tampa, FL, USA

Jane E. Buikstra School of Human Evolution and Social Change, Arizona State University, Tempe, AZ, USA

Jennifer F. Byrnes Division of Social Sciences, University of Hawai‘i–West O‘ahu, Kapolei, HI, USA

Aviva A. Cormier Department of Archaeology, Boston University, Boston, MA, USA

Elizabeth A. DiGangi Department of Anthropology, Binghamton University, Binghamton, NY, USA

Stephanie Evelyn-Wright Archaeology, University of Southampton, Southampton, UK

David A. Ingleman Department of Anthropology, University of California, Santa Cruz, CA, USA

Sarah Inskip Faculteit Archaeologie, Universiteit Leiden, Leiden, The Netherlands

Edward D. Lemaire Centre for Rehabilitation Research and Development, Ottawa Hospital Research Institute, Ottawa, ON, Canada

Helen Meekosha School of Social Sciences, The University of New South Wales, Sydney, NSW, Australia

Jennifer L. Muller Department of Anthropology, Ithaca College, Ithaca, NY, USA

Kimberly A. Plomp Department of Archaeology, Classics, and Egyptology, University of Liverpool, Liverpool, UK

Susan E. Roush University of Rhode Island, Kingston, RI, USA

Russell Shuttleworth School of Health and Social Development, Deakin University, Geelong, VIC, Australia

Ann L.W. Stodder Office of Archaeological Studies, The Museum of New Mexico, Santa Fe, USA; Department of Anthropology, The University of New Mexico, Albuquerque, USA

Lynne P. Sullivan McClung Museum of Natural History and Culture, University of Tennessee, Knoxville, TN, USA

Janet L. Young Canadian Museum of History, Gatineau, QC, Canada

Sonia Zakrzewski Archaeology, University of Southampton, Southampton, UK

Chapter 1
Mind the Gap: Bridging Disability Studies and Bioarchaeology—An Introduction

Jennifer F. Byrnes and Jennifer L. Muller

Bioarchaeology—the meticulous study of archaeologically derived human remains—provides us with an empirical dataset that can be used to explore how past variations in social organization affected human bodies. Over the past decade, several scholars have emphasized that the biocultural potential of bioarchaeology can only be realized through the integration of social theory and multiple lines of empirical evidence (e.g., Sofaer 2006; Agarwal and Glencross 2011). Bioarchaeologists now routinely draw on social theories to address a diversity of complex issues, ranging from gender and sex (e.g., Joyce 2000; Geller 2017; Hollimon 2011), to age (e.g., Gowland 2006), and ethnicity and ancestry (e.g., Zakrzewski 2011). Until recently, bioarchaeologists have been more reluctant to study disability as a social issue (Battles 2011; Boutin 2016; Schacht 2001). This edited volume emphasizes an interdisciplinary approach that will challenge and empower bioarchaeologists to explore disability in the past.

There are at least three reasons for the apparent general lack of bioarchaeological interest in social disability. First, there are varying and conflicting definitions of "disability" and "impairment" (cf. Shakespeare 1999). This can be addressed by clearly defining terms when they are used, which each of the volume authors do. Second, in the absence of well-developed context, it can be difficult to retrodict what would have been considered disabling and/or impairing in past societies (cf. Dettwyler 1991). The solution to this problem is robust cultural contextualization, which is again a hallmark of each of the chapters in this volume. Third, few

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J.F. Byrnes (✉)
Division of Social Sciences, University of Hawai'i–West O'ahu,
91-1001 Farrington Highway, Kapolei, HI 96707, USA
e-mail: jfbyrnes@hawaii.edu

J.L. Muller
Department of Anthropology, Ithaca College, 953 Danby Road, Ithaca,
NY 14850, USA
e-mail: jlmuller@ithaca.edu

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methods have been developed to quantify impairment in the human skeleton (cf. Waldron 2000). By modifying clinical methods, the chapters in Part III develop repeatable protocols for quantifying impairment in bioarchaeological contexts.

A Brief Introduction to Disability Studies and Theory

The World Health Organization estimated that approximately 15% of the current global population—over one billion people—is considered disabled (WHO 2011). Because many contemporary disabled people face discrimination and marginalization, critical history scholars have argued that it was an ethical imperative to investigate the lived experience of disabled people in the past (Goodley et al. 2012; Davis 2013a; Nielsen 2012). Cultural and medical anthropologists have helped to shape this discourse (e.g., Reid-Cunningham 2009; Rapp and Ginsburg 2012; Kasnitz and Shuttleworth 2001). The dominant theoretical discourse in disability scholarship surrounds two competing models, referred to as the medical model and the social model.

The origins of the medical model of disability can be traced back in time to the Industrial Revolution, during a time of increasing professionalization and standardization in the field of Western medicine (Davis 2013b; Siebers 2008). The medical model of disability pathologized mental and physical impairments, which were identified as functional limitations. Impairments could be short or long term, present at birth or acquired, aesthetic or functional. This could include any physical, emotional, or mental state that was perceived as a deviation from an idealized 'normal' in Western society. The medical model of disability viewed disabled people as patients in need of treatment (Siebers 2008). The limitations of this model include a lack of consideration of socio-cultural factors that may either compound or neutralize the disabling power of impairments. The medical model has dominated the public understanding of disability due to its prestigious and firm roots in the field of medicine. Although, medical professionals continue to assess severity of impairments, make decisions, and assign individuals a 'disability' status ranking (Roush and Sharby 2011), recently the legitimacy of the medical definition of disability has been questioned. The World Health Organization (WHO) has made efforts to break down the traditional medical model by integrating environmental factors for assessing functionality and disability in the *International Classification of Functioning, Disability and Health* guidelines (ICF) (2001–present). However, across the medical discipline, their guide is used to varying degrees (Álvarez 2012).

The social model of disability suggests that disability is not simply a matter of mental or physical impairments in individuals; disability is viewed as an imposed social construct. By shifting the scholarly gaze from individual defects to social process, the social model of disability has demonstrated that modern disability is a product of social injustice (Barnes 1991; Oliver 1990; Finkelstein 1980). However, this model is limited by essentially the same problem as the medical model: implied disconnect between the biological and cultural (Shakespeare 2013; Goodley et al.

2012; Goodley 2011; Siebers 2008). Nevertheless, the social model of disability is the dominant theoretical perspective in disability studies and is associated with the social justice movements. As a result, many activists and researchers fear that if the medical model's prediction of a link between impairment and disability were to be demonstrated, then the recent successes of the disability rights movement would be reversed (Oliver 2004; Shakespeare 2006). Emerging from critiques of the social model of disability, multiple researchers have recently proposed various methods where the social model could be hybridized with modern theoretical approaches, such as dismodernism and post-structuralism (reviews can be found in Shakespeare 2013; Watson et al. 2012; Goodley et al. 2012; Davis 2013a; Swain et al. 2014).

Recognizing disability as a form of social identity acknowledges that it is not entirely biologically constructed, but is an elastic social category subject to social control and capable of affecting social change (Davis 2013c; Siebers 2008). Because disability identity is unstable, it may anchor itself into the status of other identities. Historically, disability has been tied to other minority identities in order to justify exclusion and oppression of these groups (e.g., women, people of color). In this sense, disability functions as an othering factor, which confers inferior, marginal, or minority status. Disabled people are often unacknowledged as being othered in the collective social consciousness (Siebers 2008).

Bioarchaeology and Disability

The study of impairment/disability as social identity has been neglected within bioarchaeological research. However, bioarchaeologists are well situated to contribute to disability histories; through their critical reading of mortuary and archival records they can interpret past embodied experiences. Bioarchaeologists' training in human variation, steeped within synthetic evolutionary theory and coupled with the biocultural synthesis, lend to critical interpretations of corporeality and corporeal difference. One cultural means of understanding non-normative corporeal difference is through the impairment/disability paradigm. However, corporeal difference may also culturally manifest as alternative ability, human variation that is socially embraced, or simply not acknowledged. With this understanding, bioarchaeology may assist in the re-examination of social exclusion and oppression in the past through the body. In turn, disability studies and its theoretical concepts can contribute to discourse on physical impairment and disability through bioarchaeology, just as gender studies have contributed to understanding peoples in the past (Geller 2017; Joyce 2009).

In the 1980s, bioarchaeological research on impairment and disability focused on case studies from antiquity (e.g., Dickel and Doran 1989; Frayer et al. 1987; Trinkaus and Zimmerman 1982). Dettwyler's (1991) critique of these efforts ushered in a period of quelled discourse on disability within bioarchaeology and paleopathology. Interdisciplinary research in disability theory prompted a limited number of publications in the 1990s (e.g., Finlay 1999; Hubert 2000). Within Finlay's special journal edition *Disability and Archaeology*, Knüsel (1999) presented three case studies of individuals who were identified as having physical impairments. Knüsel used mortuary context to deduce that preexisting stigmata, such as that associated with leprosy, dictated whether or not an impairment was interpreted as a disability. However, Knüsel did not distinguish disability from impairment and used the terms interchangeably. Additionally, Roberts' (1999, 2000) concluded that the observation of impairments in skeletal remains was a prerequisite for discussions of disability in the past. Although both Roberts and Knüsel acknowledged the compounding discriminatory powers of marginalized social identities, neither engaged directly with the theory of social intersectionality. In the often cited edited volume *Madness, Disability and Social Exclusion* (Hubert 2000), Waldron (2000) pointed out that disabled people are underrepresented in the archaeological record and suggested that they are both overlooked by archaeologists and made invisible via issues predicted by the osteological paradox (Wood et al. 1992).

Bioarchaeologists have recently demonstrated a renewed interest in disability studies (e.g., Southwell-Wright 2013; Tilley and Oxenham 2011; Tilley 2015; Boutin 2016). Three recent case studies illustrate current trends in this discourse, including an emphasis on contextualization. For example, van Duijvenbode et al. (2015) presented a case study of a male skeleton excavated from a pre-Columbian site in Venezuela, which was differentially diagnosed with a unilateral congenital aural atresia. According to the authors, this condition would probably have caused a visible malformation of the soft tissue of the ear and unilateral hearing loss. By noting a lack of deviancy in the burial, the authors argued that, in life, this person was integrated into his society. However, an unusual find of deer antlers, placed adjacent to the skull, was interpreted as the societal recognition of physical difference and impairment. In another recent archaeological study of disability, Marsteller et al. (2011) study of pre-Columbian Andean sickness ideology drew on ethnographic and ethnohistorical accounts to provide a richly contextualized example of the perception of people with impairments in a pre-modern society. Analysis of six female skeletons identified evidence of mucocutaneous leishmaniasis. This disease can produce disfiguring facial lesions similar to leprosy. Although historical evidence indicates that in contemporary European contexts leprosy was often stigmatized, the authors suggested that these Andean women were not socially marginalized likely due to "heterogeneity in past attitudes towards sickness across cultures" (2011: 31). In another example that demonstrates the importance of context, Lovell (2016) used mortuary context to infer that a man buried in a Roman cemetery was not disabled, despite a physical impairment that affected his mobility.

Boutin's (2016) case study analysis from the Peter B. Cornwall Collection advocated for the incorporation of a Bioarchaeology of Personhood model in order to investigate the social construction of disability. Boutin asserted that human variation outside of that considered normative "may have been a particular aspect of personhood that was socially mediated" (2016: 19). Adapted from archaeologies of personhood (Clark and Wilkie 2006), Boutin's model has great potential to further explorations of disability in the past because its guiding principles include interdisciplinary and critical contextualization of bioarchaeological research. The bioarchaeology of personhood suggests that it is necessary to interrogate the notion that the self is fixed across time and space, and advocates for explorations into alternatives to western notions of personhood, and therefore, disability. This theoretical framework acknowledges the nonstatic social and biological trajectories within the human lifespan approach, and ideas of personhood beyond the birth–death continuum, including postmortem agency. Boutin's incorporation of intersectionality and situational priority in the embodiment of identity(ies) validates the need to incorporate various lines of evidence for interpretations of disability in the past, including the body, the mortuary context, and the documentary archive. The Bioarchaeology of Personhood model fits well with the scope of this volume; the varied biocultural presentations of ability or disability display the vast array of human variation and its relationship to social identities in the past.

While the focus of this volume is not on care of those individuals with impairments, several chapters address the Bioarchaeology of Care model (Tilley and Oxenham 2011; Tilley 2015) and its associated Index of Care (Tilley and Cameron 2014). Tilley's definition of disability stressed that disability is both contextual and situational, noting that impairments are "given meaning by both the individual and the community in relation to the lifeways in which it is experienced" (2015: 3). The living body is the ever-evolving product of both biology and culture. It follows that ideologies and attitudes towards pathologies and trauma alter the social impacts of these or resulting variations in form and function. The incorporation of social theories within this volume (i.e., social, medical, interactional, biopsychosocial) may serve to enhance our understanding of caregiving behaviors in the past. Moreover, by proposing specific methodologies for the assessment of impairments, the contributions of this volume can be used to facilitate Steps 1 and 2 of the Index of Care, which require analysts to determine whether impairments required care and/or were disabling. Therefore, this volume's content is complementary to the Index of Care model and can be seen as fitting into a larger scholarly movement towards conceptualizing impairment, disability, and care in the past.

This volume contributes to a growing trend in bioarchaeology research, which draws on social theory to explore disability in the past. Because bioarchaeological research on disability has been intermittent and minimal for decades, it has remained underdeveloped (Battles 2011; Boutin 2016). Therefore, many gaps still remain in the theoretical bridge between low-level generalizations of empirical bioarchaeological evidence and high-level generalizations of social theory—gaps which this volume intends to fill. In archaeology, low-level generalizations are commonly linked to high-level generalizations through middle-range theories, which are built through analogical reasoning, often involving actualistic study (Trigger 2006). Each of the chapters in this volume contribute to the development of middle-range theory in bioarchaeology.

Organization of the Volume

Earlier versions of a number of the chapters in this volume were presented at the 2015 American Association of Physical Anthropologists' annual meeting in the *Embodying Impairment: Towards a Bioarchaeology of Disability* symposium co-organized by Jennifer Byrnes, Jonathan Bethard, and Jennifer Muller. The contributions to the resulting volume are drawn from a diversity of scholars, embracing a range of disciplinary specializations and perspectives. The focus throughout the volume is engagement of social theories towards interpretations of impairment and disability in the past. Scholars employ various methods in order to accomplish this, including documentary, iconological, ethnographic, archaeological, and skeletal research to explore the historical, social, and biological variables that impact disability. The rich interdisciplinary theoretical and methodological discussions presented in the volume inform our understanding of the role of disability in the construction of social identity and vice versa. As such, the volume explores what it means to be disabled and/or impaired within particular temporal and cultural contexts.

This volume intends to problematize and complicate investigations of disability and impairment in the past through the incorporation of social theories and ideologies from a number of disciplines. The definitions that bioarchaeologists tend to employ are steeped in Westernized concepts of the body; concepts which are not culturally universal. As such, this volume does not privilege a singular definition of impairment and of disability. Rather, volume contributors were asked to explicitly define these terms as they used them within their chapters. Interrogation of the terms 'impairment' and 'disability' does not diminish the bioarchaeological and paleopathological value of these terms. Rather, it is precisely within this critical discourse that we may come to establish shared frameworks for the analysis of disability from the bioarchaeological record. While individual chapters may vary in the ways they employ terminology, realization that there are various cultural and individual understandings of disability is itself an important step in creating standards for use in cross-cultural comparisons.

This volume is divided into four sections: Part I Theoretical Perspectives on Impairment and Disability; Part II Ethnohistorical Interpretations: Ability, Disability, and Alternate Ability; Part III Quantitative Methods in Impairment and Disability: Bioarchaeological Approaches; and Part IV Case Studies of Impairment and Disability in the Past.

Part I: Theoretical Perspectives on Impairment and Disability

The chapters in the Theoretical Perspectives section provide various disciplinary perspectives on impairment and disability. Scholars from the disciplines of disability studies, medical anthropology, and physical therapy are represented here. Chapter discussions involve theoretical foundations that are grounded in these areas of study, and demonstrate the applicability of these disciplinary perspectives to investigations of disability in the past.

Shuttleworth and Meekosha (Chap. 2) vibrantly engage with Critical Disability Studies (CDS), proposing a theoretical marriage between this field and bioarchaeology. The authors present multiple models for understanding how disability can align with the aims of bioarchaeology. They also discuss how CDS and bioarchaeology, due to their inherent disciplinary foci, diverge in their definitions of impairment. Furthering the theoretical development of bioarchaeology of disability, the authors explore how select Foucauldian concepts (e.g., biopower) may be conceptually helpful. Lastly, the authors critically present and analyze notions of care in CDS and bioarchaeology, and provide a thoughtful critique of the Bioarchaeology of Care.

Roush (Chap. 3), a physical therapist, presents a medical perspective on disability and highlights some considerations for using the biopsychosocial model within the WHO's *ICF* to understand disability. Roush discusses the nature or types of disabilities that can be experienced, and environmental and personal factors that influence *how* individuals experience disability. As well, Roush illustrates how these factors play a role in disability through the use of many applied examples and narratives. By presenting a side of the medical field that appreciates the breadth of human diversity, the reader gains appreciation for the wide variety of external and internal factors that may influence an individual throughout the life course.

In the final chapter in this section, Anand (Chap. 4) addresses the need to interrogate normative frameworks of disability and be inclusive of culturally contextualized notions of corporeality and corporeal difference. As a disability histories scholar, Anand advocates for bioarchaeologists to increase their critical reading of non-Western histories and alternatives to the impairment/disability paradigm. Anand also problematizes the assumption that a history of disability framework has necessarily followed an evolution from religious/charitable to medical to social models. In fact, Anand argues that forcing explorations of corporeal difference to fit into one of these models may impede our understanding of alternative epistemologies of corporeal differences. Anand employs a critical history approach to the study of the *chuhas*—children with microcephaly—of the Shah Daula shrine in Pakistan. Anand's review of historical literature, both documentary and fictive, reveals the intricacies of cultural understanding of the *chuhas*, their microcephaly, their presence at the shrine, and their relationship to women's reproduction and infertility. Anand's chapter underscores the importance of understanding corporeal difference from various epistemic locations.

Part II: Ethnohistorical Interpretations: Ability, Disability, and Alternate Ability

Fundamental to bioarchaeological investigations is the critical contextualization of skeletal remains using all resources available for analysis. In many studies, the mortuary context is crucial to providing clues to the social and physical environments in which past peoples lived and died. Many skeletal archives are not associated with a written one, either because it has not been preserved or never existed. However, whenever possible, bioarchaeological studies of the comparatively recent past should integrate a critical examination of historical documentation into their interpretations. Section two, Ethnohistorical Interpretations: Ability, Disability, and Alternate Ability, discusses both broad and specific examples of impairment and/or disability in the past. The chapters incorporate written, ethnographic, and iconographic evidence. The historically contextualized analyses demonstrate the temporal, spatial, and cultural fluidity of definitions regarding impairment and disability. In addition, these historical and ethnographic examples can be used to develop analogical reasoning and assist the researcher to see past their modern biases.

Barclay (Chap. 5) and Ingleman (Chap. 6) problematize the assumption of impairment-associated stigmatization. Both exemplify critical departures from colonial perspectives. Barclay provides historically rich illustrations of how enslaved African-Americans uniquely perceived their bodies or minds by presenting a review of West African precolonial cultural perceptions of impairment and/or disability. Barclay uses the theme of "differently abled" in order to delve into how physical or mental differences were, in many cases, empowering in West African cultures. Arguing that these positive cultural understandings of specific impairments resonated across the Atlantic to the New World, Barclay explores how impairments contributed to the cultural pluralism within slave communities in spite of the negative beliefs impressed upon their bodyminds by their Western captors. The use of multiple layers of information across time, space, and ethnicities provides a glimpse into the depth of human cultural diversity, how quickly cultural change occurs and how historical echoes can be experienced in the present.

Through critical analysis of iconographic and primary, secondary, and derivative historical sources, Ingleman (Chap. 6) provides a contextualization of the eighteenth-century Jamaican Maroon leader, Kojo. In his investigation, Ingleman specifically presents conflicting historical accounts regarding a possible pathology to Kojo's vertebral column. Ingleman does not argue the validity of accounts regarding Kojo's possession of a "hunchback." Instead, he addresses whether a kyphotic vertebral column would have been considered a disability, or even an impairment, by Kojo's contemporaries. Although the skeletal remains of Kojo have not been recovered, Ingleman's analysis provides vital lessons for the bioarchaeologist. We must be cautious in inferring disability and its stigma through the lens of our current societal views. The presence of particular pathology/ies does not necessarily obstruct individuals from attaining a position of power within their society.

Contrasting with the research presented by Barclay and by Ingleman, Muller (Chap. 7) discusses how societal views regarding impairment and disability may have influenced the demographics and mortuary context of a nineteenth-century poorhouse cemetery. Muller specifically addresses the evolving role of children in American society and its impact on child institutionalization in the Erie County

Poorhouse, Buffalo, New York. In 1875, legislatures and philanthropic "child-savers" called for the removal of children from New York State poorhouses. However, certain "defective" children were exempt from this legislation, and were more likely to remain in the poorhouse compared with those deemed "healthy and intelligent." Muller employs Foucault's concept of biopower to discuss New York State's management of government-dependent children. Muller argues that future interpretations of the demographics and pathologies observed in the 66 child skeletons excavated from the poorhouse cemetery can only be understood within the context of societal ideologies regarding healthy/defective and teachable/unteachable children.

Part III: Quantitative Methods in Impairment and Disability: Bioarchaeological Approaches

An essential component of documenting pathologies in the past is the creation of standards that permit comparisons across skeletal assemblages. The third section of this volume presents, critiques, and evaluates the formulations and applications of new methodologies, which have the potential to quantify impairment in skeletal samples, and therefore, enhance our discussions of disability. However, impairment may not equate to disability, and this distinction is important to maintain and discuss within the context of the population under investigation. The placement of specific impairments within the context of an individual's society can bring to light lived experiences based on individual social identities. This can contribute to the development of existing discourses on disability in the past and within bioarchaeology.

Plomp (Chap. 8) addresses the clinical significance of traumatic and degenerative spinal pathologies. Understanding back pain, its various etiologies, resulting impairment, and disabling potential in living populations is necessary for the exploration of its significance in the past. Plomp provides detailed information from clinical research which addresses the frequency of pain associated with some commonly observed lesions in archaeologically derived skeletal remains, including: osteoarthritis of the spine, disc herniations, spondylosis, spondylolysis, and spondylolisthesis. Plomp's summation demonstrates that clinical data on spinal lesions can assist paleopathologists in their interpretations of pathology, pain, and its potential for disability.

Drawing on clinical literature and data derived from the Osteoarthritis Initiative (OAI) (Nevitt et al. 2006), Young and Lemaire (Chap. 9) develop an innovative methodology for assessing osteoarthritis of the knee in skeletonized remains: the Clinical Archaeological Osteoarthritis Scale (CAOS). Two archaeological skeletal samples—Ontario Iroquoian and Inuit—curated at the Canadian Museum of History were analyzed using the CAOS. Young and Lemaire suggest that because the clinical literature indicated that males and females experience osteoarthritis knee pain differently, it is important to understand the culturally specific gender roles and physical environments associated with different societies in the assessment of impairment and disability.

Stodder (Chap. 10) introduces a new method that should be added to the bioarchaeologists' toolkit. Since 1990, more than 1600 researchers have collected morbidity and mortality data associated with over 300 diseases and injuries (www.healthdata.org) to develop the Global Burden of Disease study (GBD). The GBD quantifies health loss, with the ultimate goal of improving health for the world's populations. Stodder focuses on one aspect of the GBD: Disability Weights (DWs), which quantify health loss associated with various conditions and sequelae. Stodder argues that DWs have the potential to be a valuable addition to our integrative analyses as it permits quantification of individual pathologies and injuries. Stodder illustrates the potential application of the DWs to bioarchaeological analyses, using two Ancestral Puebloan skeletal assemblages. Stodder's chapter demonstrates that DWs are particularly helpful for understanding impairment and disability in the past because they assess chronic conditions that paleopathologists often observe in the skeletal record.

Byrnes (Chap. 11) quantifies impairment associated with traumatic injuries for a late-nineteenth and early twentieth century skeletal sample from Buffalo, New York. After first presenting a theoretical framework that integrates intersectionality and disability theories, Byrnes proceeds to summarize the relevant historical context and presents a modified clinical method for assessing impairment that is applied to the skeletal sample's appendicular traumatic injuries. She concludes that this poorhouse cemetery sample included the remains of some of the poorest and most disadvantaged peoples in Buffalo at the time, including large numbers of immigrants. By exploring the intersections of biology and multifaceted social identities, Byrnes reveals how poor and working-class immigrants became disabled by their society. This chapter demonstrates that it is necessary for bioarchaeologists to develop new methods to assess impairments in the skeleton in order to test hypotheses predicted by social theories.

Part IV: Case Studies of Impairment and Disability in the Past

The last section of this volume includes chapters with case studies of impairment and disability in the past. In recent decades, bioarchaeological investigations of individual skeletons, in the form of osteobiographies, have contributed an increasing body of scholarship to the discipline. Such studies (e.g., Robb 2002; Sofaer 2006; Stodder and Palkovich 2012) permit the interpretation of skeletal remains of one person and their particular contextualized identity and life history. Included in this last section of the volume are sophisticated, context-rich osteobiographies that are used to make compelling arguments of impairment and/or disability in the past, while still maintaining theoretical dialogue as the foundation within their discourse.

Cormier and Buikstra (Chap. 12) persuasively argue that the remains of a woman excavated from the Elizabeth site in the Lower Illinois Valley during the Middle Woodland period (50 BC–AD 400) provides skeletal evidence of impairment. The individual was skeletally determined to have achondroplasia, Leri–Weill Dyschondrosteosis, and an active infection at the time of death. She was also pregnant with a full-term fetus at the time of her death. The authors provide a detailed description of the skeletal remains differential diagnoses, functional limitations, mortuary context, as well as comprehensive cross-cultural understandings of dwarfism. They conclude that it is not possible in this particular instance to say for certain that she either self-identified or was socially identified as being disabled due to her physical limitations. However, utilizing Tilley and Cameron's Bioarchaeology of Care Index (2014), the authors state that she had support or accommodations within her community as evidenced from her survival to full-term during her pregnancy.

Bethard and colleagues (Chap. 13) commence their discussion with a critical review of the key concepts employed by legislative bodies, disability studies scholars, and bioarchaeologists in their assessments of disability. The authors advocate for the incorporation of disability studies literature in order for bioarchaeologists to understand the contestation in defining the terms *impairment* and *disability*. Bethard and colleagues also emphasize the importance of mortuary context and treatment in bioarchaeological and paleopathological discussion of disability, especially in cases in which the documentary archive is lacking. To illustrate these points, the authors provide an osteobiography of an adult female from the Mississippian period (AD 900–1600), excavated from the DeArmond Mound in East Tennessee. This skeleton presents with a musculoskeletal impairment, which the authors argue would have impacted mobility in life. In addition, careful examination of mortuary treatment suggests a lack of postmortem stigmatization.

Zakrzewski and colleagues (Chap. 14) discuss the concepts of impairment and disability as they relate to an osteobiography developed for an early Anglo-Saxon burial cluster from Great Chesterford, Essex. Focusing on a cluster of atypical burials located in the center of a larger cemetery, the authors propose that their mortuary treatment was related to social identity, but probably not due to marginalization. The authors go on to explore how demographics, liminality, visibility, and etiology contributed to perceptions of disability, or not. Observable paleopathological markers are used as a starting point to develop a holistic understanding of what those pathologies could have meant in the past context. By contextualizing their skeletal analyses, they arrive at a nuanced understanding of what would have been considered impairing and/or disabling within that particular society.

Acknowledgements We wish to extend our gratitude to our colleagues, who have contributed to this volume. This includes the chapter authors who have carefully engaged with social theories and clinical and historical literature to add to the interdisciplinary focus of the volume. We especially acknowledge those authors outside of bioarchaeology who thoughtfully articulated their own discipline's theories, ideologies, and practices with the anthropological analysis of human skeletal remains. We thank all of the external reviewers whose insightful comments have added immensely to this body of work. We also acknowledge Katherine Dettwyler and Russell Shuttleworth for the valuable comments provided during the 2015 *Embodying Impairment: Towards a Bioarchaeology of Disability* symposium. We thank Deb Martin, Bioarchaeology and Social Theory editor, as well as Teresa Kraus and Hana Nagdimov from Springer for all of their assistance in helping this volume come to fruition.

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Author Biographies

Jennifer F. Byrnes is an Assistant Professor in the Division of Social Sciences at the University of Hawai'i–West O'ahu, USA. She received her B.S. in Biology from the State University of New York College at Geneseo (2006), and M.A. (2009) and Ph.D. (2015) in Anthropology from the State University of New York at Buffalo. She has received training in bioarchaeology and forensic anthropology. She co-organized a symposium, of which this volume is a product of, entitled *Embodying Impairment: Towards a Bioarchaeology of Disability* at the American Association of Physical Anthropology 2015 Annual Meeting. She has most recently published articles in the *Journal of Forensic Sciences* on a collaborate project with the Defense POW/MIA Accounting Agency as well as another research article which presented the practical considerations of portable X-ray fluorescence with osseous materials. She has ongoing research investigating the traumatic injuries and paleopathology of the adult skeletal remains exhumed from the Erie County Poorhouse in Buffalo, NY.

Jennifer L. Muller is an Associate Professor in the Department of Anthropology, Ithaca College, Ithaca, New York, USA. She received her Ph.D. from the Department of Anthropology, State University of New York at Buffalo in 2006. Muller's research embraces the holism of anthropological study, integrating theoretical perspectives and methodologies from the cultural, biological, and archaeological subfields of the discipline. Her research has specifically focused on how discrimination-based inequities impact human biology in African diasporic populations and among the institutionalized poor. Foundational to this research is the understanding that the body is both biological and social, and that the insidious and pervasive attributes of structural violence may assault the body in a multitude of ways. Muller also examines postmortem structural violence; the idea that discriminatory practices continue to harm the poor and marginalized after death. Muller's dissertation focused on the relationships between traumatic injuries and inequity in the W. Montague Cobb Human Skeletal Collection housed at Howard University in the District of Columbia, USA. Her research on the institutionalized poor has included bioarchaeological and/or historical analysis from New York State poorhouses, including: the Monroe County Poorhouse, Rochester; the Erie County Poorhouse, Buffalo; and the St. Lawrence County Poorhouse, Canton.

Part I

Theoretical Perspectives on Impairment and Disability

Chapter 2
Accommodating Critical Disability Studies in Bioarchaeology

Russell Shuttleworth and Helen Meekosha

Introduction

Bioarchaeology is the study of human skeletal remains within their biological and cultural contexts. Bioarchaeology draws its perspectives from a range of disciplines most notably osteology, paleopathology, physical anthropology, cultural anthropology, history, and also includes demographic and environmental analyses (Martin 2013). This discipline can in fact draw its conceptual perspectives from any scholarly discipline if that field of study enables it to assist in providing a more holistic contextualization of the human skeletal remains that are its central data. Disability studies has been put forth by some archaeologists and bioarchaeologists as potentially useful for their disciplines (e.g., Cross 1999; Southwell-Wright 2013; Byrnes et al. 2015). Southwell-Wright (2013), for example, argues that the social model of disability can assist archaeology's conceptualization of impaired and disabled people in the past. Yet how relevant might the critical study of disability actually be for bioarchaeology?

In this chapter, we examine the social model and several other models of disability in terms of their congruency with the aims of bioarchaeology and how they might be useful for this discipline. Recently, critical disability studies (CDS) has been touted as offering new ways of thinking about disability (e.g., Meekosha and Shuttleworth 2009; Shildrick 2012). Given the currency of this development, we further appraise several lines of thought employed by CDS and indicate points of convergence and tension between bioarchaeology and the critical study of dis-

R. Shuttleworth (✉)
School of Health and Social Development, Deakin University, Locked Bag 20001,
Geelong, VIC 3220, Australia
e-mail: r.shuttleworth@deakin.edu.au

H. Meekosha
School of Social Sciences, The University of New South Wales, Sydney,
NSW 2052, Australia

J.F. Byrnes and J.L. Muller (eds.), *Bioarchaeology of Impairment and Disability*,
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ability. Foremost among these is the contrast between CDS's constructionist understanding of impairment-related concepts and bioarchaeology's foundational focus on the causes and effects of disease processes as possibly indicative of impairment. We also explore whether Foucauldian concepts such as biopower and subjugated knowledges and histories might be useful for a bioarchaeology of disability. Finally, we discuss the notion of care as it is being taken up in both CDS and bioarchaeology. Suffice to say, in this chapter we do not offer definitive analysis of the issues we raise and simply open a discussion between bioarchaeology and CDS.

Bioarchaeology: Toward Engaging with Disability Studies

Until recently, much of archaeological and bioarchaeological literature has focused on the clinical description of pathological features of an individual's skeletal remains or broader effects of disease or diet on population health. This paleopathological focus had meant marginalization of "the actual experience of impairment and disability" (Southwell-Wright 2013: 75). As Southwell-Wright observes, "This medical, rather than social, perspective pervades much of the paleopathological literature to date" (2013: 76) and points to the origins of the discipline in clinical medical practice. Perhaps as a result of these origins, Southwell-Wright (2013) notes that even in more recent bioarchaeological research, impairment and disability are still often conflated in this literature.

Yet, almost two decades ago, the *Archaeological Review from Cambridge* published a special issue on disability that attempted to initiate an explicit disability discourse in archaeology (Finlay 1999). Archaeological cases involving the human skeletal remains of individuals with certain impairments were analyzed, sociocultural contexts were deemed important to incorporate into these analyses and features of the social model of disability were discussed as potentially offering assistance in developing an archaeology of disability (e.g., Shakespeare 1999; Cross 1999; Roberts 1999). In that volume, Cross notes, "archaeology, which has been ready to embrace race and gender issues, has done little to incorporate disabled perspectives into models, beyond working from Hevey's ableist paradigm and treating disabled people as objects, a material resource like other archaeological remains" (1999: 23). Even with the publication of this special disability issue, a focus on archaeology and bioarchaeology in disability did not effectively gain much ground.

Recently, however, there has been a renewed initiative with calls for archaeological and bioarchaeological study of disability and integration of anthropological, historical and other perspectives, most notably disability studies, within this focus (e.g., Battles 2011; Southwell-Wright 2013; Metzler 2006, 2013). Heather Battles (2011) has called for the integration of relevant multidisciplinary perspectives on the body such as disability studies into bioarchaeology. Southwell-Wright (2013) asserts that the social model of disability can be useful for archaeology and bioarchaeology with its differentiation between impairment and disability. The precursory symposium of the current volume also evidenced a keen interest in exploring the relevance of disability studies perspectives for bioarchaeology. This opening up to disability studies perspectives seems part of a larger trend in bioarchaeology for multidisciplinary and holistic analyses of human skeletal remains in their social and cultural contexts. But how applicable are trends and concepts in disability studies, and more recently CDS, to this holistic integration occurring within bioarchaeology?

Models of Disability and Bioarchaeology

Lennard Davis has shown how the idea of the "normal" does not emerge in European culture until the early to mid-nineteenth century (1995: 24–27). He traces its beginnings as an ideology of the middle-way for the bourgeoisie through the development of the statistical norm to "the new ideal of ranked order powered by the imperative of the norm…[and] supplemented by the notion of progress, human perfectibility and the elimination of deviance" (1995: 35). Employment of the norm in public health and industry has been key to this concept's proliferation in everyday life which negatively highlights physical, cognitive, intellectual and sensory differences. It was against the pervasiveness of normative perceptions of disability as deficiency that scholars in disability studies were partially responding to in the 1970s and 1980s with the various socio-political models that located disability in oppressive socioeconomic and political structures (DeJong 1979; Oliver 1983; Hahn 1985). These models of disability were also born out of the constraints of the medical model, focusing as it does on deficits and abnormality of bodies. The emerging disability studies and associated models relegated pathological categorization of impairment to biomedicine and primarily focused on the social prejudices and barriers to the access and participation of people with impaired bodies (Hughes and Paterson 1997). These socio-political models of disability have been effective in mapping inequalities and materialist barriers to participation in many modern societies, particularly those of Anglo-European origin.

Recent trends in bioarchaeology may open up a space for convergence with socio-political perspectives on disability. Bioarchaeology has recently witnessed a turn toward theories of human behavior including social theories to provide interpretational frameworks for data collected from human remains (Martin 2013; Soafer 2011). While critical theory has been employed less than more generic social theory in bioarchaeology, there has been some use of critical concepts. For example, Klaus (2012) shows how the concept of structural violence can be employed productively in the bioarchaeology of violence. Martin (2013) provides a strong case for using a political-economic perspective on the production of inequality and how analysis of skeletal remains within context can reveal the embodiment of inequality (see Gravlee 2009). Barrett and Blakely (2011) provide a good example of the latter from a biocultural and social inequality perspective on enslavement of African-Americans in colonial New York. Evaluation of skeletal remains in the bioarchaeology of inequality is often tied to analyses of an individual's or a group's health and impairment status and can provide a critical window onto a past society's distribution of resources, status distinctions, and disabling effects; an analysis can of course be made more definitive if the context can be fleshed out with burial and mortuary evidence, artifacts, and/or textual accounts.

As noted, several researchers have recently suggested that disability studies perspectives might be productive in studying impairment and disability in the archaeological and bioarchaeological record. Southwell-Wright (2013) critiques early disability studies theorists for tending to analyze disability through a materialist Marxist lens that is not relevant to the past beyond industrialism. He nevertheless argues that employment of the social model can help combat reductive approaches within archaeology and, by extension, bioarchaeology. Southwell-Wright and other archaeologists such as Metzler (2006: 203), focus on the social model's separation of impairment from disability. Both researchers effectively understand impairment to mean "the medical or anatomical phenomenon, while "disability" describes the social construct loaded upon the former; hence, disability is culturally specific, and variable over time and space" (Metzler 2013: 5).[1] Further, Southwell-Wright (2013) perceives that the concept of disability as social construct provides an "emic" perspective to disclose how others responded to people with impairments in their community, which has utility for archaeological and bioarchaeological investigation across historical time periods and different cultures. We concur with this aim, albeit the extent to which the concept of disability can be considered emic is debatable. While not advocating a strictly materialist perspective, we would argue for more explicit acknowledgment by archaeologists that disability employed as a critical concept necessarily entails an evaluation of to what extent adverse responses to people with impairments occurred within a community.

In an analysis of the archaeology of disability in the Roman Empire and Roman Britain, Southwell-Wright shows the usefulness of employing both archaeological and historical textual sources in analysis of impairment and disability within their social and cultural context. Cautioning that the textual data is only reflective of the attitudes of elite males, he acknowledges their weight in describing "the marginalization of individuals with impairments" in Roman society (Southwell-Wright 2013: 78). By employing both textual and archaeological sources, Southwell-Wright challenges the oft-cited belief in the pervasiveness of negative attitudes toward certain impairments in the Roman world and makes the case for a more contextual conclusion: the response to certain impairments such as dwarfism, scoliosis, tuberculosis, and signs of trauma likely shifted over time and was variable depending on cultural values and social contexts (e.g., socioeconomic status).

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[1] It can be argued, of course, that anthropologists had implicitly recognized the culturally variable response to impairment before the emergence of sociopolitical models of disability (e.g. Hanks and Hanks 1948; Douglas 1966).

An example from Roman Britain illustrates the variability Southwell-Wright posits. In discussing funerary rituals and burial practices in Roman Britain, there are normative funerary rituals with “supine, extended inhumation burials, often coffined and in some cases with grave goods provided for the individual depending on their age or gender” (Southwell-Wright 2013: 84). In contrast are what are termed “deviant” burial practices including burial of the body in isolated contexts, weighing the body down with rocks, burial face down and prone and after-death decapitation burials with the head often placed by the legs. While there has been much speculation that these burial practices were for marginalized individuals, such as gladiators, beggars, and disabled persons, there has actually been no consensus in what these deviant practices mean. Southwell-Wright describes four studies of skeletal evidence from individuals with various types of dwarfism: three sets of remains show funeral rites not considered as unusual or deviant, while only one individual showed signs of a deviant burial with the individual being buried in an isolated pit. This kind of variability in the archaeological and bioarchaeological record constitutes a problem for blanket evaluations of disabling attitudes in a society toward individuals with certain impairments. The social model’s critical intent, which is to map marginalization based on impairment, is difficult to achieve in practice given the incompleteness and uncertainties of the historical and bioarchaeological record, albeit a critical evaluation may be more likely in recent historical periods when the kinds and amount of evidence available tends to be greater.

Such appears to be the case with a bioarchaeological study conducted at the site of the Erie County Poorhouse in New York State. Muller’s research on impairment, disability, and children in this institution in the late nineteenth century (Chap. 7) combines historical and skeletal analyses of the remains of 66 children disinterred from this site. Through detailed analysis, Muller shows that the diseased and impaired children of poor and vulnerable women were more likely to end up in the cemetery, with the removal of “healthy” children to orphanages or by adoption. In another study at this same site, Byrnes (Chap. 11) compiled hospital records and skeletal analyses of 207 individuals; she provides a complex intersectional analysis of skeletal remains that evidenced impairments. Using these lines of evidence, Byrnes argues that foreign-born males, particularly immigrants from Ireland, who were more apt to seek relief and whose occupations were most often unskilled laborers in a time when safety precautions were minimal, experienced the highest rate of traumatic injury and impairment. Muller and Byrnes’ work suggests the marginalizing socioeconomic forces that were operating in the US in the mid-nineteenth century and how impairment and disability can intersect with other social categories. Thus, even with relatively recent cases, critical evaluation of disability in the archaeological and bioarchaeological record may require a nuanced and intersectional analysis.

Are there any other models of disability that might be useful to bioarchaeology with the potential for analyzing adversity in response to impairment in the past? Recently, Lorna Tilley in making the case for a bioarchaeology of care distinguishes between a critical approach to disability and an interactional understanding comprised of “biological, psychological and social elements,” which perceives disability as "being produced through interaction between physical and/or cognitive dysfunction and the cultural and physical environment" (2015: 70). In this move, Tilley distances herself from critical approaches to disability,[2] choosing to draw from a more broadly interdisciplinary disability studies, Tom Shakespeare's interactional perspective (2006) and the World Health Organization's (WHO) *International Classification of Functioning, Disability and Health* (ICF) (2003, 2011). Yet, the ICF has been criticized on a number of counts. Hammell (2004) employs a Foucauldian perspective to critically interrogate the ICF's classificatory practices as a means to assess deviance from normal functioning. The social modelists Michael Oliver and Colin Barnes argue that, "the concept of participation is included in the ICF scheme but underdeveloped and is still linked to individual circumstances or "personal factors" rather than firmly tied to the social and political organization of society" (2012: 26). Goodley provides another critical perspective, arguing that the explicit universalism underlying the interactional model, WHO's *World Report on Disability* (2011), "risks whitewashing over the specifics of disability" (2014: 18). As Goodley cogently argues, "While mindful of the cultural relativism of the category of disability, the report has to pull disability out of the local into the register of more global appeal" (2014: 17). Thus, the ICF may perhaps be useful for bioarchaeology as a classificatory measure of individual functioning within a universal, albeit Western-derived scientific frame. Yet, its usefulness as a measure of social participation and a critical tool in the present or the past is questionable.

In the late 1990s and early 2000s, Kasnitz and Shuttleworth (1999, 2001; see also Shuttleworth and Kasnitz 2006a, b; Shuttleworth 2004) developed a sociocultural model of impairment-disability meant for ethnographic research cross-culturally that was explicitly critical, drawing both from socio-political models of disability and anthropological perspectives. This model recognized the need to provide an emic understanding of local contexts, but also saw it as necessary to balance local understanding, meanings, and values with recognition of the human deprivation and suffering that many disabled people endure. Kasnitz and Shuttleworth proposed that the perception of anomalous embodiment (Douglas 1966) is a more open conceptual space than a strictly socio-political model of disability, with which to theorize social responses to those who manifest bodily differences, or in Garland-Thomson's terms (1997) "extraordinary bodies" (also see Shakespeare 1994; Devlieger 1999). In this way, symbolism and culture are more explicitly brought to the fore than in a strictly materialist understanding of disability.

In Kasnitz and Shuttleworth's schema, those persons exhibiting various forms of anomalous embodiment may be integrated in the social group or held in high esteem, perceived as individually impaired or impairing the group in some way, yet still integrated and valued, or may alternatively be deemed and responded to as disabled in the socio-political sense of the term—all mediated by sociocultural

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[2] In fact, Tilley takes her argument further by implying that the political sensitivity of the disability rights movement and disability scholarship has been a primary factor that has adversely impacted the development of a bioarchaeology of disability. In other words, bioarchaeologists have been afraid to counter critical perspectives on disability.

contexts (e.g., religious rituals, subsistence activities) and social categories (e.g., gender, age). In addition, an impairment, while in modern Western societies is perceived as implying a problem with individual bodily structure and function, in non-Western societies may not necessarily be about an enduring pathological process at all (e.g., the birth of twins, a baby's top teeth coming in first) (Shuttleworth and Kasnitz 2006a). This schema was proposed as a critical tool with its own cultural history, which may be useful in some cases to elucidate and critique disabling structures and practices cross-culturally.

While aware that many impairments in and of themselves can present difficulties for the individual in performing activities and participating in social life, Kasnitz and Shuttleworth's primary focus was to discern sociocultural responses to anomalous embodiment and impairments. From an interactional perspective (WHO 2003, 2011; Shakespeare 2006) this focus might be seen as overly biased toward the social and cultural at the expense of the biological. Yet, it does fit the purpose of a critical heuristic tool to assist in ascertaining the extent of social marginalization, taking into account mediating cultural contexts and social categories. Of course, optimal application would require detailed ethnographic corroboration of disabling responses. Despite this limitation, Kasnitz and Shuttleworth's model has some utility for bioarchaeology as a sensitizing schema that acknowledges cultural complexity and intersectional identities when analyzing disabling structures and inequalities in the past.

Critical Disability Studies and Bioarchaeology

Disability studies was founded in its critique of institutions such as medicine and capitalism with the terms of critique being primarily materialistic and adversarial (Meekosha and Shuttleworth 2009). While acknowledging its foundations in socio-political models of disability, CDS moves beyond a strictly materialist critique of the disabling social, economic, and political structures to interrogate notions of history, culture, discourse and embodiment employing a broader range of critical theories than disability studies—for example, post-modern, post-structural, critical race theory, queer theory (Meekosha and Shuttleworth 2009; Shildrick 2012). In addition, CDS explicitly contests the universalizing of Western scholarship and engages with indigenous knowledges and scholarship (Meekosha 2011). CDS also problematizes dichotomies such as individual/social models of disability and impairment/disability, which have dominated debates in disability studies, and incorporates the analysis of intersectionalities (Meekosha and Shuttleworth 2009; Shuttleworth and Meekosha 2013; Goodley 2014; Shildrick 2012). The aim of CDS is not only to critique disablism, which although focused on adverse responses assumes disabled people as "other"—but also ableism, "a naturalised understanding of being fully human [which]…is articulated on a basis of an enforced presumption that erases difference" (Campbell 2009: 5; also see Goodley 2014).[3] In what follows, we discuss several developments in critical disability discourse that may be pertinent to engagement between CDS and bioarchaeology.

The Construction of Impairment

One notion that has especially come under increasing scrutiny in CDS is impairment, as, like disability, it is perceived as a constructed concept. In a strictly social model approach to disability, impairment is assumed. But with the advent of CDS, there is sustained interrogation of impairment and disability as discursive constructions, which imply certain power relations. Early disability studies scholars had advanced the argument that the power and pervasiveness of biomedicine shaped the response to disabled people's problems of living (e.g., Gill 1989; Hahn 1985). Indeed, the medical model was a prime target of disability studies' critique. While there was a sensibility in these scholars' work that the language around impairment was problematic, because of the relegation of the impaired body to biomedicine in disability studies, there was not a sustained critique of the constructive power of medical discourse and impairment as a concept. It was at the turn of the millennium that the notion of impairment began to be more scrutinized in the disability studies literature (e.g., Corker 1999; Hughes 2000; Tremain 2005a).

The "naturalness" of impairment was increasingly challenged, as Tremain (2005a) employing a Foucauldian, post-structural perspective argued, "That the discursive object called "impairment" is claimed to be the embodiment of a natural deficit or lack…conceals the fact that the constitutive power relations that define and circumscribe "impairment" have already put in place broad outlines of the forms in which that discursive object will be materialized" (2005a: 11). The medical nomenclature of impairment, pathology, abnormality, and deficit has especially been targeted as having detrimental effects for disabled people. As Hughes argues, "a sociological account of impairment seeks to augment the armoury of the social model by developing one of its weaknesses, namely the cultural critique of medicine" (2000: 555). He goes on to show the various ways in which medicine has contributed to the "aesthetic invalidation of disabled people" (2000: 555).

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[3] There are complex reasons why we have begun employing the term CDS instead of disability studies, which we cannot sufficiently address here (see Meekosha and Shuttleworth 2009). Suffice to say that disability studies as a term to describe a critical approach to disability is losing its cogency, with many scholars who minimally employ critique now using the term to self-describe themselves. In contrast to a strictly 'post-conventional' CDS (e.g., Shildrick 2012), our vision explicitly incorporates both the critical materialist understanding that was the hallmark of a socio-politically defined disability studies and also opens up to the range of critical enquiry associated with post perspectives.

What does critique of a medical understanding of impairment and related terms imply for engagement between CDS and bioarchaeology? Empirical bioarchaeological research on impairment and disability requires evidence of pathological changes to bone structure in skeletal remains discovered at archaeological sites (Tilley 2015). This foundational analysis, bequeathed by the medical orientation of paleopathology, is needed in order to identify any particular skeletal remains as evidencing pathological changes in bone structure that could be impairing for the individual. Further analyses may attempt to situate these human remains within the specifics of culture and history, but this will often depend on the associated evidence of spatial, ethnographic, iconic, artifactual, documentary, and historical data. While interpretive contextualization of skeletal human remains is the ideal in bioarchaeology, is it possible to square its foundation on signs of pathology to an orientation meant to critique not only normative social structures, but also the physiological and anatomical norms and pathological references that negatively construct and categorize individuals and groups?

Many CDS scholars, of course, recognize that an impairment, construed as an individual deficit by the biomedical construction of the body, can in fact often be functionally limiting (e.g., Siebers 2006; Meekosha and Shuttleworth 2009). As has been acknowledged, especially by feminist disability studies scholars (e.g., Meekosha 1998) even if all social barriers were removed, many people with impairments would nevertheless still experience discomfort, pain, and/or limitations in functioning. However, even those scholars who acknowledge the corporeal limitations accompanying many impairments may still balk at direct references to pathology being employed by bioarchaeologists to found their objects of study.

Can alternate readings of the pathological body offer insight into how to transcend this apparent impasse? Some scholars are increasingly advancing the idea of human bodily variation to diminish the focus on impairment as deficiency. A less dominant formulation within disability studies emerged in the 1990s that reframed "disability" as human variation (e.g., Scotch and Schriner 1997, 2001). That is, impairment introduces variation into many of our institutional systems, which are set up for a restricted range of characteristics. These scholars argued that while the social and minority group models based on the ideas of discrimination, access, and rights can effectively challenge many explicit barriers, those based on lack of fit between institutions and people with certain impairments outside the normative range require accommodation to variable bodies. More recently, this issue has taken a decidedly bioethical turn with an emerging discourse on the ethics of biodiversity (e.g., Garland-Thomson 2012, 2015; Sparrow 2015; Wasserman 2015). For example, Garland-Thomson (2012, 2015) has called for "conserving disability" as a natural form of human variation, one "that promotes and protects human biodiversity" (2015: 15) and a genetically open future.[4] In this view, impairments are conceived as "potentially generative resource[s] rather than unequivocally restrictive liability" (2012: 239). From another angle, Overboe notes that genetic engineering and improvement of the species is more about the desire for power under the guise of progress, which implicitly devalues diversity and disabled "expressions of life" (2006: 223). He argues that the medical diagnosis of his condition as "cerebral palsy" with "spasms," which is imposed on him "fails to capture their vivacity" (2006: 230). For these two disabled academics, "conserving disability" as human species diversity and highlighting the lived vivacity of bodies constituted as deficit by biomedicine are presented as crucial ethical concerns.[5]

The currency of these ideas within CDS calls for a bioarchaeology that is critically reflexive about its foundational use of pathologizing nomenclature and remains open to alternate conceptions of impairment, some of which while not yet standard in "scientific" discourse, are nevertheless imaginative interpretations from which "scientific" explorations initially stem. Relating to reflexive practice, the interpretive archaeologists Shanks and Hodder observe:

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[4] Disability scholars vary in their strictness in distinguishing between impairment and disability. For example, Garland-Thomson (2015) and Scotch and Schriner (1997, 2001) in their discussions of human variation and biodiversity incorporate impairment into their use of disability. The authors of the present chapter maintain the distinction between impairment and disability when possible for analytic and political purposes, while recognizing the constuctedness of these terms. As in Kaznitz and Shuttleworth's schema, we view impairment as the negative cultural perception of an individual's embodiment, which in Western societies has been influenced by biomedicine and is primarily considered in terms of its impact on individual functioning, but which in many non-Western cultures can include meanings that transcend the individual or bodily and behavioral function. We have also previously argued that the social model and its separation of disability from impairment is only "one of a number of separate tools in our analysis … [which aims for] a more complex understanding of disability oppression in our work" (Meekosha and Shuttleworth 2009: 51). Being CDS scholars we understand that these concepts cannot encompass the complex relationships between biology, society, culture, and psyche that exist in disabled people's actual lives. We further acknowledge that the meanings of these terms may in the future shift according to cultural, political, or scientific reformulations.

[5] The conceptual move to biodiversity espoused by Garland-Thomson is not without its critics in CDS. Lennard Davis (2013), for example, maintains that, the neoliberal notion of diversity must exclude those persons who cannot choose their identity, which is epitomized by those with impairments without cure. As he argues, "disability (along with poverty) represents that which must be suppressed for [neoliberal] diversity to survive as a concept … (which ultimately seeks sameness)" (2013: 13). Drawing from Davis among others, Friedner and Weingarten (2016) also critique this discourse for not acknowledging the biopolitical underpinnings of the move toward biodiversity and the management of bodies in the twenty-first century. This process is driven by marketplace capitalism and obsession with individual choice and ignores the "economic, social, and political factors that exist in relation to different forms of disability" (4), which flattens out these different forms in equal contribution to human diversity and thus paradoxically works to "erase difference" (4). While these are important considerations, we do not have the space to address them here within the context of an engagement with bioarchaeology.

> An awareness of discourse implies an attention … to the way archaeology designs and produces its pasts … and involves a shift from validation to signification, from anchoring our accounts in the past itself (divorced somehow from our efforts in the present to make sense of it) to the ways we make sense of the past by working through artefacts. (1995: 28).

This is an acknowledgment that discourse not only structured past human experience, behaviors and cultures evidenced by the patterns in the archaeological record, but also structures the archaeologist's own production of the past (see also Kelley and Hanen in Cross 1999). By the same token, CDS should concede that identifying morphological changes in bone structure is crucial for a bioarchaeology of disability. The determination of pathology, or in more biodiversity sensitive terms variant human corporeality, in human skeletal remains from archaeological sites and the assessment of probable functional impact is a necessary initial step in an inquiry process—one that can eventually lead to critical analysis and interpretation of disabling or abling responses within the historical, social, and cultural contexts of an individual's life.

The Employment of Foucauldian Approaches to Disability

The past decade has seen widespread employment of Foucauldian analyses in CDS (e.g., Gabel and Peters 2004; Tremain 2005b; Sullivan 2005). What makes some of Foucault's ideas useful to CDS is their de-familiarization of modern institutions and practices as benevolent and caring (Foucault 1978; Burchell et al. 1991). Foucault conceives the emergence of power relations in modernity as biopower, "a set of procedures and practices that objectivize and attempt to measure, predict and manage phenomena and processes having to do with the life of the human species and its individual variances in terms of a norm" (Meekosha and Shuttleworth 2009: 57). Are there useful possibilities for Foucauldian approaches in a critical bioarchaeology of disability in recent history?

Archaeology has employed Foucault productively in prehistoric contexts, often drawing on his idea of bodily inscription, "the literal marking of society on the body of the individual" (Meskell 2007: 27), which is conducive to the study of material remains and artifacts. Archaeological and bioarchaeological research on disability has so far used Foucault's concepts minimally in their analyses. However, Foucault's notions such as those related to biopower might be applied to many historical situations during the past several centuries in societies where disabled people have been socially objectified, categorized, and separated from the social group, such as in poor houses and hospitals where they can sometimes share space with the poor and destitute. An archaeology and bioarchaeology attuned to these kinds of concepts in their work with human remains from historically relevant sites in conjunction with documentary and any accompanying mortuary and artifactual evidence might be a critical avenue to pursue.

Yet there are also inherent tensions between any alliance between Foucault and bioarchaeology. Foucault's focus on discourse can seem at odds with the necessary foundational analyses of bioarchaeology. In addition, Foucault's later genealogical approach explicitly interrogates the past to show the discontinuities and divergences from a coherent historical narrative. As he puts it, genealogy is "a form of history which can account for the constitution of knowledges, discourses, domains of objects, etc., without having to make reference to a subject which is either transcendental in relation to the field of events or runs in its empty sameness throughout the course of history" (1980: 117). As Shakespeare has cogently observed, "The work of Foucault on homosexuality shows that we need to abandon the idea of a linear development through time of a taken-for-granted category of identity" (1999: 101). With his idea of subjugated knowledges, Foucault further highlights a plurality of historical knowledges, in effect a plurality of pasts, which genealogy should emancipate from hegemony "of a theoretical, unitary, formal, and scientific discourse" (1980: 85). This suggestion of alternative histories casts doubt upon the search for historical certainties and mythical origins. Post-processual archaeology has especially grappled with this sense of alternative pasts (Hodder 1992; Rowlands 2007). In one sense, the excavation of local prehistories contributes to the goal of revealing a plurality of pasts. As Rowlands (2007) notes, however, this excavation has occurred in the context of a comparative and universalizing "project of Western origin" (2007: 66–67) that, while perhaps relevant for the project of colonialism, "reveals the limitations of the archaeological project on a global scale" (2007: 67). Despite the ever-present possibility of a retrospective critique of one's purposes for seeking an alternative past, the usefulness of applying a genealogical approach in bioarchaeology would be to open up to a diversity of subjugated histories. As Anand (Chap. 4) has argued, genealogy "would … inform bioarcheology differently from the way traditional histories do."

Foucault's notion of subjugated knowledges would especially seem to fit well with the marginalized histories of disabled peoples. Yet Metzler's (2006, 2013) painstaking work on impairment and disability during the European Middle Ages is mainly drawn from sources such as medical and legal texts and social and economic sources. As she argues, we may be able to gain a historical sense of the images of and attitudes toward disability, but the voices of disabled people themselves are for the most part silent within these texts (Meltzer 2013: 3). Metzler's study of "disability in the Middle Ages … [is] a cultural history, a study of mentalities, focusing on social attitudes rather than on personal testimonies and identities" (2013: 3). This obviously constitutes a problem for the historian who desires to unearth disabled people's voices and not their representation by others. We may be able to trace an outline of these knowledges by their absences, but the question is to what extent can subjugated histories of disabled people be made visible without their own voices? Of course, this limitation does not necessarily disqualify historical research on impairment and disability, or archaeological and bioarchaeological research, as lived experience is carved within historical trajectories and sociocultural contexts that may be traceable in varying degrees.

The Bioarchaeology of Care and Critical Disability Studies

If, however, left with skeletal remains which evidence pathology and impairment but appear to be denuded of much of their social and cultural contexts, are bioarchaeologists consigned to solely analyze and interpret this evidence through the discursive frame of the causes and effects of diseases? Some bioarchaeologists have not given up on construing social and cultural contexts so easily. Tilley (2015) and others (Tilley and Oxenham 2011) argue for an approach that while carefully analyzing the morphological changes to skeletal remains, in some cases cautiously infers such human behaviors as caregiving. That is, for some individuals whose skeletal remains indicate progressive and enduring changes in bone structure and consequent impairment, some level of caregiving was probably necessary for their survival.

Tilley and Oxenham (2011) propose a bioarchaeological theory of care that includes informed speculation on psycho-social, as well as emotionally, supportive care. These ideas reach fruition in a four-stage bioarchaeology of care methodology for researchers to follow, and an index of care (Tilley and Cameron 2014; Tilley 2015). In the first stage, the bioarchaeologist describes in detail indicators of pathology and provides a differential diagnosis. The second stage seeks to discern if the person was able to participate in daily activities within their communities or whether care was necessary by identifying the impact of disease on the functioning of the individual. In the third stage, the bioarchaeologist develops a model of care that details the minimum needed for the individual to survive. If enough evidence has been generated, the final stage would synthesize analysis from previous stages to provide an interpretation of caregiving and social norms and values within the particular culture at the time.

Setting the terms for a bioarchaeology of care is an ambitious project and, in her recent book, Tilley goes into great detail to explore theories of human care, speculation on whether caregiving occurs among nonhuman primates, and she also discusses possible reasons for its minimal use in bioarchaeology. Tilley (2015) acknowledges that both the terms disability and care are presently contentious. While providing a reasonable contextualization of current debates around use of the term “disability,” she does not explicitly refer to the problems that disabled rights advocates and disability studies raise in employing the term “care” to denote the assistance that many require in order to function and perform everyday activities. Tilley, a former nurse who acknowledges her biases toward caregiving, however, implies dependency as the underlying concept that may have driven bioarchaeologists’ past reluctance to focus on caregiving in the human skeletal record. An assumption of dependency has in fact been a core point of contention for the disability rights movement embodied most tellingly in the concept of independent living.

Dettwyler (1991), in an influential article that referenced disability studies’ texts and echoed the problems that the disability rights movement raised with disabled people being viewed as dependent, argues against reading compassion into analyses of care in the bioarchaeological record. She claims that some osteologists and paleopathologists were reading compassionate care into skeletal remains that showed signs that the individual was impaired. Tilley (2015) persuasively reveals the gaps in Dettwyler's argument, that, in fact, the researchers she was citing were not going beyond the available evidence to assert compassion, but were making relatively conservative interpretations of the evidence. Tilley's careful rendering of the index of care is meant to systematize and make any bioarchaeological interpretations of caregiving more rigorous. In fact, as shown above, Tilley's index of care is conservatively restricted in making interpretations of caregiving within what is known of the norms and values of the particular culture at the time. Within this conservative context, in optimal cases what is attempted is a fleshing out of the social identity and broad "personality traits which possibly played a part in the subject's management of disease experience" (Tilley and Cameron 2014: 8) and the lifeways of the group that may have promoted caregiving. Intentions and motivations of caregivers, such as compassion, will in most if not all cases be impossible to ascertain.

How does this bioarchaeological focus on care mesh with a critical reading of the concept of care and caregiving as played out in the disability rights movement, disability studies, and the current CDS discourse? As implied above, within disability studies, the care relationship between carer and disabled person has historically been viewed as an asymmetrical relation with power inevitably in the hands of the former (Hughes et al. 2005: 261). Disability studies scholars have argued that the disabled person who requires care was often treated as a passive recipient, dependent, and at the mercy of services outside their control (Hughes et al. 2005). This critique was an impetus for the development of consumer, user-directed care in the US, UK, Canada, and now Australia.

User-directed care is an attempt to empower the disabled recipient by putting them in control of their own care. This development, however, has itself come under critical fire within CDS. Drawing inspiration from the feminist ethic of care, critics such as Hughes et al. (2005) and Watson et al. (2004) contend that user-directed care organized as simply an instrumental service errs by extracting the relational aspect from the care dynamic. Recently there have been a number of attempts to bridge this gap between the self-control of consumer-directed care with an ethics of care that takes into account the relational dynamics involved. There is a move to conceptualize care in more nuanced and relational ways. Hughes et al. (2005) suggest that a post-feminist perspective emphasizing embodied interdependence and reciprocity within the caring relationship would work, not only to undermine the hegemonic masculine agenda, but also the hierarchical structure within the current dynamic of care. Others such as Fisher et al. (2015) have explored the notion of the enhancement of relationships through mutual recognition within the caregiving relationship. Kelly (2013) presents an argument for what she terms "accessible care," which attempts to bridge the divide between an independent living approach to care and the feminist perspective. From Kelly's point of view, "Care in this context, is positioned as an unstable tension among competing definitions, including that it is a complex form of oppression" (2013: 1). What these various perspectives on care in disability studies and CDS show are the multiple senses the term can currently invoke. In fact, an understanding of care does not easily fit into any prefigured categories of oppression, instrumental care of or for a body, emotional investment or mutuality within the care relationship; perhaps care has invoked a complex of affects and multiple meanings throughout human history.

Within the bioarchaeology of care, there is also conceptualization of the dynamic between carers and care-recipient. For any interpretation of caregiving that results from application of this index, Tilley and Cameron argue that, "caregiving is understood as a purposive interaction in which caregivers and care-recipient have made the decision to participate; the giving and receiving of care are the products of agency" (2014: 6). Their index of care is assumed within a broad definition from direct hands-on support to accommodation. Tilley and Cameron's claim is framed within an interactional model of care: that caregiving is an interactional process, which both parties have taken up and are invested in.

While a materialist disability studies secured firmly in a modernist view of power relations and oppression might have questioned how much agency "care-recipients" can exercise, the more recent care discourse in CDS has problematized this constrictive understanding of care. A focus on interdependency and reciprocity within the care relationship (Hughes et al. 2005) broadens the sense of agency involved. In this view, agency is conceived as relational (Burkitt 2016). As Burkitt argues, agency is no longer simply "conceptualized as an absolute power but has to be understood as a matter of degree. In interrelation, interdependence, and interactions with others, interactants are always active and passive, powerful and yet vulnerable to various degrees" (2016: 336). This focus is of course not meant to deny the legitimate concerns within disability studies and CDS about the cultural and socio-structural constraints that have often restricted disabled people's choices within care relationships. But at the relational and interactive level there is a convergence of sorts between CDS and bioarchaeology. The temporal constraints imposed on bioarchaeology in studying the past, however, limit knowledge of the agentic intentions of the care-recipient similar to how understanding the motivations of the caregiver are limited. Disabled people are always agents in their own care, but beyond "broad personality traits" (Tilley and Cameron 2014: 8) evidence for both their relational agency and their control within the care relationship will be hard to come by. CDS, on the other hand, has an easier task in analyzing the contemporary dynamics of agency exerted by disabled people in the care relationship. Nevertheless, the bioarchaeology of care as conceived by Tilley and colleagues represents a significant addition to our knowledge of the lives of those with impairments in the past. Understanding how caregiving was structured and attended to within the lifeways of a particular group and the broad character traits that the care-recipient may have had (e.g., resilience) provides part of the history of response to impairment and may inform our current models of care.

Conclusion

This discussion of the utility of disability studies and CDS for bioarchaeology would not be complete without mentioning the important CDS principle of engaging with other cultures' perspectives on impairments and disability (Meekosha and Shuttleworth 2009). As CDS scholars living in Australia, we note that archaeologists and Aboriginal people have in recent years begun to work in collaboration after a long period of mistrust. One such example is at Lake Mungo in the Willandra Lakes World Heritage area. This kind of collaboration fits well with both the current discourse of engagement in CDS and trends in archaeology (Murray 2011). Acknowledgment of Indigenous perspectives on their ancestors' human skeletal remains and allying these perspectives with archaeological and bioarchaeological narratives is even more critical in the case of those individuals who may have been impaired, often as the result of invasion and colonization. Indigenous knowledge today may provide important clues to the social response to and lived experience of these individuals in the past.

Certainly, the use of models of inequality and marginalization of people with impairments can be employed as heuristic tools for critical analysis, but with caution, especially when the archaeological, historical, and ethnographic evidence is limited. The difference in funeral rites and burial practices for people with dwarfism in Roman Britain as discussed by Southwell-Wright suggests the status variability that can exist in a society for people evidencing anomalous embodiment or impairment of a particular kind. Even when multiple forms of data support an argument of inequality or marginalization as in Muller (Chap. 7) and Byrnes' (Chap. 11) research, the convergence of forces and categories intersecting with impairment (e.g., poverty, immigrant status, gender) often provide a complex picture in which disabling structures are difficult to analytically tease out from the cultural meanings and sociohistorical processes that construct other marginalized identities. Recognizing the mediating influence of sociocultural contexts and other identity categories in any response to impairment (Shuttleworth and Kasnitz 2006a) and providing a nuanced intersectional analysis is, however, becoming requisite in CDS scholarship. In addition, CDS's engagement with Indigenous knowledges and other critical points of view such as the ideas of Foucault provide an array of perspectives that might be considered by bioarchaeologists in their research on impairment and disability.

It is, however, important to remember that in the spirit of the Frankfurt School, most critical theory is oriented toward changing present society and has emancipatory aims (Horkheimer 1986); and indeed even Foucault's (1984) primary aim was to provide a critique of modernity. Some models and concepts employed in disability studies and CDS may be useful in interrogating and understanding the past, but this will implicitly occur via a critical perspective on the present. Barrett and Blakely provide commentary on both sides of the point,

> As scholars we are embedded within the cultural, political, and social contexts of our time and place as we seek to understand the complexity of the past. We are guided by questions in the present in our search to understand the past. Taking this into consideration, scholarship may more effectively engage in critique of the present through understanding the processes that influenced and transformed the lived experience of past people's (2011: 212–13).

That critique of the present can change our understanding of the past can be illustrated by returning to the convergence between a critical approach to disability and care with that of interpretation in the bioarchaeology of care. Despite Tilley's distancing herself from critical disability perspectives, it is evident that the bioarchaeology of care has been conceptualized with sensitivity toward the "agency" of disabled people; an agency championed by disability rights activists and scholars that initially focused on a lack of power within the caregiver/care recipient dyad, but which has expanded more recently in CDS to include a sense of relationality and interdependency. In short, recognition of disabled people as employing agency has been incorporated into bioarchaeology's interpretive schema of caregiving in the past. The extent to which bioarchaeological understanding may influence CDS's critique of the present and our current models of care are currently a question mark. Yet, while the caveat remains that we can never know the actual motivations, intentions, and feelings involved for impaired individuals and their presumed caregivers studied by bioarchaeologists in the skeletal record—that certain persons were valued enough to be provided care or accommodation for does present convincing evidence that marginalization is just one of the pasts that can be written for this population.

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Chapter 3
Consideration of Disability from the Perspective of the Medical Model

Susan E. Roush

I have had an interest in disability-related issues my entire life. That interest led me to a career as a physical therapist, and more recently to explore the academic discipline of Disability Studies. My physical therapy education and practice are firmly embedded in a western perspective, with both occurring in the United States. Physical therapists in the United States work with individuals across the life span to facilitate movement that has been affected by health or medical conditions. They work with babies, children, adolescents, and adults of every age to facilitate function with people who have bone/joint/muscle problems or neurological conditions. A physical therapist may work with an individual who has broken a bone to regain strength and motion after a cast comes off, or after surgical joint replacement. Carpal tunnel syndrome, sprained or torn ligaments, and amputations are other examples of these muscle/bone/joint conditions. Physical therapists also work with babies and toddlers, and their families, to facilitate neurological development. Other neurological conditions for which physical therapy is indicated include stroke, Parkinson's disease, multiple sclerosis, and spinal cord injuries. Treatment for cardiac (heart) and pulmonary (breathing) conditions, and wounds and burns also fall into the purview of physical therapy practice in the United States.

To become a physical therapist in the United States, a person needs a 4-year undergraduate (college) degree after which they can apply to a physical therapy program. Like medical school admission, acceptance into a physical therapy program is highly competitive. Accepted applicants then undertake three additional years of education, including extensive internships; graduates hold a Doctorate in Physical Therapy (DPT) degree and are licensed to practice by state.

Becoming a physical therapist requires a significant commitment of time, focus, energy, and resources. These commitments necessarily develop practitioners who are grounded in a medical model of disability. The differences between a medical

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S.E. Roush (✉)
University of Rhode Island, 25 West Independence Way, Kingston, RI 02881, USA
e-mail: Roush@uri.edu

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and a social model of disability are not obvious to many physical therapists or other medically trained professionals. It was only when I was forced to step out of that medical culture with my own disability, did its shortcomings become salient to me. Karen Nakaura (Personal communication, July 23, 2015) captures that difference succinctly when she observes that "rehabilitation and disability studies are related to each other in the same way gynecology is [related] to Women and Gender Studies." These disparate perspectives on disability speak to the complex and multiple meanings that disability can have. Indeed, disability is an extremely nuanced human experience that can be understood in myriad ways.

The purpose of this chapter is to explore, from the perspective of the medical model, the many sociocultural and personal factors that can influence the lives of persons with disabilities. In some cultures, a disability can be understood simultaneously as a 'gift from God' and shameful punishment for moral lapse or sin (Leavitt and Roush 2010; Olkin 2002). Disability can be viewed as inspirational, but only if people act like they do not have it (Garland-Thomson 2016). People with disabilities represent the largest minority group in the United States of which anyone—at any time—can become a member (Smart 2001). The social construct of disability occurs within an environment that reinforces an individual's responsibility to overcome it (Oliver 1990). Indeed, disability can be viewed from multiple perspectives, including personal, medical, social, political, and as this book explores, through a bioarchaeological lens.

The most comprehensive model of disability used in health care today is the *International Classification of Function, Disability and Health* (ICF), which is described as a *biopsychosocial* model (WHO 2014). The ICF was developed by the World Health Organization (WHO 2001, 2014), although the basic ICF concepts were developed by Nagi (1965, 1969, 1991) in the 1960s. Nagi conceptualized disability as consisting of four components: pathology, impairment, functional limitation, and disability. A pathology is defined as a physiological or anatomical deficit, for example, arthritis of the hip joint. The corresponding impairment is the immediate effect of that deficit on the body. In the example of hip arthritis, the impairments may be pain, loss of motion, and strength. The functional limitation relates to the impact of the impairment on activities. Disability is the resultant loss of participation in an expected societal role. In keeping with the hip arthritis example, the functional limitation may be inability to walk up and down stairs, and the disability may be inability to continue in certain types of employment that require one to access stairs to perform one's job.

The ICF has been refined over the years and is currently conceptualized as "a classification of health and health-related domains" (WHO 2014; CDC n.d.). Note the change in orientation from a disability model to a health model. In keeping with this change, the 2014 version of the ICF replaces the terms pathology with *health condition*; impairment with *body functions and structures*; functional limitation with *activity*; and disability with *participation*. Figure 3.1 provides the conceptual interconnections among these ICF components. This model also incorporates the critical elements of environmental and personal factors; examples of these are given in Table 3.1. The inclusion of environmental and personal factors in the ICF as

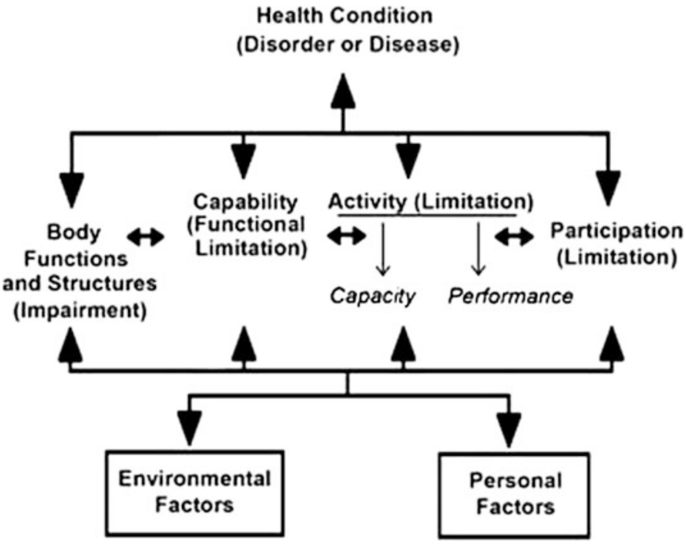

Fig. 3.1 Basic elements of the WHO's International Classification of Function, Disability and Health (ICF) [Reprinted with permission from Roush and Sharby (2011)]

basic components is significant. Such formal recognition codifies the reality that disability will impact every person, family, and community uniquely.

A transformative strength of the current ICF is this acknowledgement of variation and recognition of the powerful role the environment and personal factors play in living with a disability (Hurst 2003; Stone 2012). While most components of the ICF remain grounded in the medical model, the importance of the environment and personal factors are congruent with other disability models. For example, the social model of disability places the environment and society at the center of its disability theories (e.g., Oliver and Sapey 2006). The moral model, which situates disability in the context of a relationship with a higher being, may inform personal factors. For example, belief in a God may provide significant motivation and give meaning to the disability experience (Olkin 2002).

While the most recent ICF broadens the understanding of disability, the model has many critics. In an analysis of the ICF, occupational therapists Hemmingsson and Jonsson (2005) noted "major shortcomings regarding the subjective experience of meaning and autonomy …[and] limitations in capturing different kinds of participation in a single life situation" (2005: 569). Roush and Sharby (2011) note that attention toward contextual factors that create or contribute to disability is typically nominal. Solli and da Silva (2012) challenge the claim that the ICF is truly holistic. As well, Kumar and Smith (2005) note examples of the violation of accepted ontological principles, including incongruent and incorrect classifications, and oversimplification. Badley (2008) furthers this discussion, noting the lack of a clear differentiation between 'activity' and 'participation'. There has also been criticism related to the ICF's stated foundation of biopsychosocial theory; Imrie (2004) and

Table 3.1 Examples of contextual factors that are considered in the determination of disability through the ICF

Personal factors	Environmental factors
1. Age	1. Physical environment
2. Gender	2. Access to transportation
3. Race/ethnicity	3. Access to services
4. Comorbid conditions	4. Access to medical services
5. Sexual orientation	5. Adapted equipment
6. Education	6. Social attitudes
7. Work history	7. Stigma
8. Income	8. Community resources
9. Motivation	9. Government policies
	10. Attitudes of health professionals
	11. Health of the economy
	12. Availability of caring family

Reprinted with permission from Roush and Sharby (2011)

Conti-Becker (2009) note the lack of development and consistent application of biopsychosocial theory in the ICF.

Furthermore, although the model is currently conceptualized as a health model and not a disability model, functionally it remains fully situated in the medical world. The model's starting point is defined medically, such as pathology (original language) or health condition (current language). While the model includes environmental and personal factors, in reality, health care in the United States rarely fully incorporates these elements in their interactions with, or treatments for, patients. Lack of attention to these elements may contribute to the large unmet health needs of adults with disabilities that have been documented in developed countries such as Canada (McColl et al. 2010).

When attempting to facilitate a broader understanding of disability in health care settings, one obstacle is met immediately. The economic realities of health care today work against efforts to address environmental and personal factors. While a physical therapist may increase an individual's mobility with an individualized set of exercises or by fitting the patient with a wheelchair, there probably would not be time to attend to and/or advocate for an increased number of curb cuts in that patient's neighborhood. Also, most third-party payers (e.g., private insurance, Medicaid, and Medicare) reimburse for treatment of a 'problem'. Good physical therapy practice, for example, requires the development of a 'problem list', with associated short- and long-term goals to 'solve' that problem (American Physical Therapy Association 2014). As long as reimbursement is conceptualized in this way, it is unlikely that personal and environmental factors in the ICF will be fully utilized in practice.

The infinite variation in the reality of disability is what Dettwyler (1991) cautioned bioarcheologists about in her reproach to avoid sentimental or stereotypical inferences about human remains that physically suggest a disability. She clearly writes about the multiple ways in which the lived experience of disability can be realized. She provides as an example, Romito 2, and indicates his dwarfism may have contributed to his high status, but may also have had no effect on his status, or he was highly regarded in spite of his dwarfism. All three of these scenarios were possible, as they are possible today. Indeed, in one individual's life, all three could happen simultaneously. A person with dwarfism could be considered an authentic and valued voice advocating for civil rights for persons with disabilities, may also have difficulty accessing public places because of inaccessible transportation and/or buildings, and be a highly successful architect who practices his/her profession with a high utilization of technology.

What are the key environmental and personal factors that can influence how an individual will experience disability? The relationship between disability characteristics and how they interact with the environment and personal interests is fundamental. If a disability compromises one's ability to participate in personally meaningful activities, its impact is usually negative. If, however, the person is able to find meaning in their life (even though *how* that is accomplished may look different from typical), then the impact of a disability may be minor. This holds true even if the disability is significant. Adjustment is a balance between the consequences of a disability and how those consequences are perceived. Using ICF language, does a 'Health Condition' cause changes in 'Body Functions and Structure'? If so, are these changes linked to modifications in the 'Activities' the person can do, and are these changes in activities significant enough to alter a person's ability to 'Participate' in a meaningful life? The inability to perform certain 'Activities' does not automatically lead to limited Participation. If the person is still able to participate in ways that hold personal meaning for him/her, the social effects of the disability may be minimal. For example, a person with a spinal cord injury has a health condition that has changed his/her body's structure and function. That change may mean the person cannot perform multiple activities, such as standing, walking, running, and toileting. However, if those lost activities do not interfere with a person's participation, the ICF would say a person can have a fulfilling life. The environment can improve or limit the activities a person can perform, and subsequently improve or limit his/her participation. For example, if our hypothetical person with a spinal cord injury uses a wheelchair for mobility, they may not be able to utilize public transportation if there are no accessible buses/subways, which in turn may limit his/her participation in employment.

Superimposed on these environmental factors are personal characteristics that can further improve or limit an individual's ability to participate. For the purposes of this chapter, these characteristics will be organized into three categories: (1) features of the disability, (2) individual characteristics of the person, and (3) the social environment. It is important to note that many of these characteristics can be associated with significant stigma. This stigma may be felt most strongly by the person with a disability, but also can permeate others' perceptions as well. These 'others' can be close family or friends, or can be societal. For example, if a parent perceives (even unconsciously) that having a child with a disability is shameful, that child may grow up tainted by that shame and have fewer opportunities to fully participate. Also, if people using wheelchairs are perceived as incapable of working, shopping or socializing, it is unlikely curb cuts and elevators will be a high priority. The power of these personal characteristics is not always negative, and may indeed serve as an advantage. For example, if a child grows up with parents who are disability rights activists, that child may be more likely to recognize and work to change disability-related and other social injustices.

Disability Features

Time of onset is the first disability feature to be considered. Disabilities can be either congenital (present at birth) or acquired later in life. The former tend to be associated with greater stigma, although research suggests that persons with congenital disabilities may have a higher quality of life than those with acquired disabilities (Roush et al. 2003). Why would this be the case? Several factors seem to come into play but they are grounded in the perspective that being nondisabled is better than being disabled, i.e., the state of not having a disability has a premium value (Wright 1983). Wright (1988) calls this society's "fundamental negative bias" when it is assumed that all aspects of having a disability are deleterious. Based on this perspective, if a person acquires a disability, they were, at least, once "normal." Although they may have slipped out of that valued status, they had it at one time, which confers a higher status. With congenital disabilities, the person has never held the valued status and may be viewed as lacking some fundamental feature of what it means to be a person. As noted previously, in Western cultures, the quality of life of those with acquired disabilities may be lower than those with congenital disabilities (Roush et al. 2003). Those with congenital disabilities have only experienced the world as a person with a disability. Consider, for example, a person with cerebral palsy who uses crutches to ambulate because of a mobility impairment. What may appear to be a slow and laborious gait to others, is the only way this person has ever walked; it is natural to them. With an acquired disability that affects walking, a comparison can be made between walking 'normally' and walking with a disability or to getting around in a wheelchair. This comparison can result in viewing the latter as a 'loss'.

Time of onset can impact the disability experience in a second way. Specifically, a disability may interfere with attainment of developmental milestones (Drench et al. 2011). For example, it is understood that if a child is to develop 'normal' speech they must have 'normal' hearing. If hearing is absent during the critical period for language development, language will not develop typically afterwards, even if hearing is acquired later, for example, through a cochlear implant. Consider other developmental milestones, for example, developing a sexual identity. Exploration of sexuality through romantic relationships typically begins in adolescence. Kulick and Rydstrom (2015) note the importance of this sexual development, indicating that "…sexual agency is a decisive marker of adult status in society" (2015: 6). A disability can limit the opportunities for a teenager with a disability to experience this typical development. In his work exploring the sexual intimacy of men with cerebral palsy, Shuttleworth (2000) identified "sociosexual isolation during formative years" (2000: 265) as a major impediment to the development of intimacy in adult relationships. For example, teens may not have the opportunity to learn the etiquette of flirting or practice holding hands or kissing if they are isolated by physical accessibility, societal attitudes, or parental protection. Without these building blocks, the person may not develop a sense of his/her self as a sexual being, and as someone who is sexually attractive to others. Later life milestones such as choosing and committing to a life partner may be less likely. Indeed, the Information and Education Council of the United States states "[s]exuality education is a *lifelong process* [italics added] of acquiring information and forming attitudes, beliefs and values" (Sexuality Information and Education Council of the United States, accessed July 11, 2016). Wade (2002) also notes that "[lack of] access to information about sexuality by [disabled] youth … subsequently serves to increase the likelihood of abuse and sexually transmitted disease and it limits access to education about what constitutes a meaningful relationship" (2002: 19).[1]

Developing a career and associated financial independence is another example of the importance of developmental milestones in context of a disability. Consider the person who acquires a disability in their late teens or early 20s, likely before they have completed their education and perhaps before they developed a strong work ethic that would support substantial employment. This is a different circumstance from someone who acquires a disability in his/her 40s or 50s who has a strong work history. Those in the latter situation will have likely developed transferable work skills and work-related networks to more easily allow for employment in other fields or with other employers.

Education in many professional fields provides a clear example of the advantages that can be associated with acquiring a disability in midcareer. Professional education is typically regulated through accreditation agencies and standards are founded on the idea that all students must be competent in all areas of potential future practice to graduate and be eligible for licensure (e.g., Commission on Accreditation in Physical Therapy Education 2016). A disability, however, may prevent a student from showing competence in some aspects of practice even with accommodations. Someone who has already completed their education and has a license, however, is in a much more advantageous position because s/he may be able to select a practice setting in which the impact of his/her disability is minimized. For example, a physical therapist who uses a wheelchair could develop a practice working only with people who have hand injuries or conditions.

The next two disability features to discuss, type of onset and visibility, speak to variation in response to a disability as opposed to features that confer a specific advantage or disadvantage. Concerning type of onset, disability may happen quickly, for example, with a spinal cord or traumatic brain injury. Other disabilities

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[1] Accessed on-line; page numbers not given.

develop over time with a gradual onset of symptoms, for example, in conditions such as multiple sclerosis or muscular dystrophy. Sudden onset may be advantageous if it is viewed as a static condition that will not progress. While the onset of such a disability may be traumatic, once recovery and accommodations are made, the condition will not appreciably change over time. This is in contrast to what occurs with a disability that develops over time. In these conditions, any adjustment will ultimately be followed by readjustment as the condition produces greater impairment over time. The advantage to disabilities that show this gradual onset is the time to prepare for future changes. In contrast, sudden onset disabilities do not provide this period of preparation. Whether one type is better than the other is specific to the individual and the mode s/he prefers for managing change.

The visibility of a disability is another feature that can influence the lived experience of those with a disability. Some disabilities are invisible to others, such as a learning or psychiatric disability, while others are visible. In his seminal work on stigma, Goffman (1963) coined the term ‘passing’ for those who are able to hide a stigmatizing (or less valued) characteristic and present themselves as a member of a non-stigmatized group. It would only be in certain situations that someone with a learning disability would not be able to ‘pass’, for example, during a high stakes, timed, academic-type test. Those with visible disabilities, however, would not be able to pass in typical interactions. The visibility of disabilities may come from the disability itself (e.g., an amputation or walking with a limp) or may be inferred through the use of assistive devices, such as a wheelchair. The contrast between visible and non-visible disabilities balances the stigma of being different (associated with visible disability) with an appearance that may be inconsistent with reality (associated with invisible disability). The use of accessible parking provides an example. Someone who uses an accessible parking space who has an invisible disability may be viewed suspiciously and thought of as someone who is ‘cheating’ the system. Other examples of the consequences of this inconsistency between reality and appearance can be seen in employment situations with individuals with mild intellectual disability. Someone who presents as not having a disability may be inadvertently (or casually) asked to perform certain duties that are beyond his/her abilities. When those tasks do not get done, or are done in an unacceptable manner, formal and informal consequences may result. Formally, employment may be terminated or, informally, the person may be viewed as someone who does not do his/her share of the work, i.e., they may be viewed as a ‘slacker’ and be excluded from the informal work environment.

As was the case with type of onset, the visibility of a disability will impact individuals differently. Some may deal better with a highly visible disability that gives others important clues as to their abilities. Others, however, would prefer to avoid the stigma associated with disability and are willing, or more adept at, negotiating those situations in which appearance does not match reality. In some circumstances, communication via the Internet, such as dating sites, may allow those with visible disabilities to initially pass, although subsequent communication (i.e., meeting in person) may reveal the stigmatized characteristic.

Individual Differences

Visibility, timing, and type of onset can dramatically influence the impact a disability has on a person. These circumstances, however, do not provide rules as to which condition allows for a ‘better’ or easier adjustment. Instead, there is interplay between these disability characteristics and how they relate to the individual. Individual differences play a significant role in the lived experience of disability. Three are discussed here: occupation, gender, and remaining resources.

The word occupation is typically associated with employment. Broader definitions of occupation are also appropriate in this context, for example “an activity a person spends time doing,” or “an activity in which one engages” (Merriam-Webster Dictionary n.d.). The American Occupational Therapy Association (2011) defines their practice as the “therapeutic use of occupations, including everyday life activities with individuals, groups, populations, or organizations to support participation, performance, and function in roles and situations in home, school, workplace, community, and other settings.”[2]

Given these definitions, leisure and other daily life activities (for example, obtaining and preparing food, keeping living spaces clean) are included. It makes sense that employment is an important consideration given its potential role in so many life activities, including a source of identity, an arena for social connections and, of course, as a vehicle for financial achievement which is tied to many other aspects of life. Employment status with a disability can be particularly salient depending on the role employment plays in an individual’s life. Is employment tied to a person’s identity, is it a source of financial security, does it offer social connections, or is employment a combination of all three? If a person acquires a disability that does not have a direct impact on his/her employment, employment may continue to meet these important roles. If, however, a disability disrupts employment (e.g., a person is unable to return to pre-disability employment, or has been unable to secure initial employment), these and other important roles will be disrupted.

The second area of occupation to be considered is leisure. Leisure activities can continue to provide a sense of accomplishment and pride for an individual if they are not affected, or minimally affected, by the disability. Leisure activities can also provide strong social communities where friendships are easily developed, and encouragement and positive reinforcement are common. Consider, for example, book clubs, knitting circles, or running groups where members look to each other for information (e.g., “There is a new yarn store opening soon, would you like to go?”) as well as validation (e.g., “That was a great insight you had about the mother in that book”). For an acquired disability, loss of these important expressions of identity may be keenly felt.

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[2] Accessed on-line; page numbers not given.

Gender is another important consideration. Gender-specific roles in developed countries are certainly less prescriptive in the twenty-first century compared to years' past, or when compared to the developing world (Leavitt and Roush 2010). In spite of this, gender roles continue to be important in terms of self-identity and societal expectations. This suggests that men and women can respond differently to the same disability. Women may be particularly vulnerable to disabilities that compromise physical appearance or their ability to bear and care for children. Men, on the other hand, may be most vulnerable to disabilities that disrupt their ability to financially provide for a family or that compromise physical strength. Adams (2013: 55) notes that "the passivity, vulnerability, and weakness [stereotypically] associated with disability effectively neuter the male body, stripping it of the qualities of an idealized heterosexual masculinity." Gerschick (2000) also notes "… for men with physical disabilities, masculine gender privilege collides with the stigmatized status of having a disability, thereby causing status inconsistency, as having a disability erodes much, but not all, masculine privilege" (2000: 1265). These considerations are, of course, based on stereotypes, but many people hold stereotypic views. It cannot be said that men or women adjust more easily to having a disability. It is the interaction between a person's perceived gender role and the disability's impact on ICF Activities and/or Participation that is important.

Remaining resources are the third major lifestyle category to be considered and include character and/or personality, intelligence, spiritual/philosophical base, family and community support, and money. How might these resources change the experience of disability? A person with an extroverted personality, someone with many friends and strong relationships with others will have more people on whom to rely for assistance. That assistance may be personal, but also societal. Curb cuts and Braille signage in public buildings allow people with disabilities to be included as a matter of course. These accommodations (preferably incorporated upfront and not via retrofitting) are important manifestations of the concept of Universal Design, Principle 2 of which states: "The design accommodates a wide range of individual preferences and abilities." (https://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm).

While these accommodations are required by statute, for example, the Rehabilitation Act of (1973) (US Department of Justice) and the 1991 Americans with Disabilities Act (US Department of Justice), it appears that knowing someone affected by the lack of accommodations is a critical component of their enforcement. The tipping point can be reached through many voices or through one or two very strong voices. Harriet McBryde Johnson's *Too Late to Die Young* (2005) provides an excellent example of the power of an individual's personality to effect change.

If a person lives in a rural community, there may not be the number of voices or voices that are powerful enough to fully implement these disability statutes. Without these accommodations, the independence of persons with disabilities may be compromised which likely will curtail their ability to fully participate. Or, being a part of a small, tightly knit, supportive community may be ideal for implementing accessibility accommodations. Other issues are associated with community resources and will be described below.

In addition to personality, it is recognized that intelligence and problem-solving skill are important considerations when looking at a person's ability to function with a disability. Specifically, a disability presents numerous opportunities to problem-solve. Whether it is figuring out how to put a wheelchair in the backseat of a car and then transfer into the driver's seat, or how to make a sandwich with one arm/hand, those who are better problem-solvers will more likely be able to adjust to a disability and participate more fully (Dreer et al. 2009).

Spiritual or philosophical beliefs can be particularly powerful for an individual or family member with a disability. In a survey of physical therapists across the United States, Oakley et al. (2010) provide evidence of the immediacy of spiritual concerns among those with disabilities. This study, utilizing a national survey of physical therapists found that over 60% had client-initiated discussions related to the meaning or purpose of their illness or condition. These beliefs can be both positive, for example, when the disability is perceived as bringing a special relationship with God, or negative, for example when a disability is perceived as punishment for past sins. Families who perceive the birth of a child with a disability as devastating and a failure provide a much different environment than those who process their grief and sadness in the context of a loving God who selected this family for the important work of caring for a child with a disability.

Examples of the role of family and community resources in the context of disability have been suggested earlier in this chapter. For most, family support, or lack of that support, is critical. This can be either families of origin or families of creation. If the most important people in one's life see a disability as a devastating occurrence, they are unlikely to be encouraging or helpful. In addition to providing encouragement, their help may be needed to take full advantage of any community resources. These resources can range from the quality and availability of medical services, to the availability of accessible transportation, and employment opportunities. Simply having someone available to make/return telephone calls or email can be extremely helpful.

The final resource to be considered is money and associated financial security. Many of the considerations discussed in this chapter can potentially be improved if a person has available and disposable income. It is an unfortunate truth that life is different for those who are financially secure and those who are not. This is especially true for individuals with disabilities, where financial means can eliminate or reduce some barriers. For example, financial support can be used for purchasing adaptive equipment, for covering tuition costs associated with further education, or employing a personal assistant as a driver or home aide. The systems of support set up for persons with disabilities in the United States often come with the conundrum of losing benefits if employment income exceeds a minimum. One of the most important of these benefits is health care. If a person were able to afford their own health care insurance, they would be free to work as much or as little as their disability allowed.

Social Environment

The social environment in which a person with a disability lives can have a profound impact on quality of life. Consideration can be given to the extreme example of killing persons with disabilities in Nazi Germany in the context of World War II. There are, however, more subtle and contemporary dynamics related to the social environment for persons with disabilities. Indeed, any discussion of variability in the response to disability would not be complete without consideration of the Social Determinants of Health. The World Health Organization (2015) defines these as:

> …the conditions in which people are born, grow, live, work and age, including the health system. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels, which are themselves influenced by policy choices. The social determinants of health are mostly responsible for health inequities - the unfair and avoidable differences in health status seen within and between countries.

Significant differences between an identified group and the general population in disease incidence, prevalence, morbidity, mortality, and survival time are referred to as health disparities. As Iezzoni (2011) summarizes, in comparison to those without disabilities, persons with disabilities in the United States have less education, lower incomes, and higher unemployment. They also are more likely to report having fair or poor health, be overweight or obese, use tobacco, and get minimal physical exercise. Perhaps these disparities are linked to remarkable disparities in health care access including access to preventative care and health promotion programs. They also show a lower rate for screening procedures such as mammograms and pap tests.

Thankfully, we do not see direct killing of people with disabilities that are motivated by eugenics. There are, however, occasional calls for the elimination of people with disabilities, for example by Peter Singer, a respected philosophy faculty at Princeton University (Staudenmair 2005). He advocates for "selective infanticide" which would give parents the right to kill a disabled baby up to 30 days after birth (Kuhse and Singer 1988). [Selected readings on Singer include Harriet McBryde Johnson's *Unspeakable Conversations* in the February 16, (2003) issue of the New York Times; and Peter Staudenmair's *Peter Singer and Eugenics* from the Institute of Social Ecology]. More subtle, but perhaps more powerful are the social determinants of health which allow us to see patterns of disadvantage for persons with disabilities that are strongly linked to well-being.

Narratives from a Physical Therapist

To illustrate many of the ideas presented in this chapter, I turn to the work and perspectives of Deirdre Robinson, a physical therapist with a strong interest in the bioarchaeology of care (Tilley 2015; Tilley and Oxenham 2011). She offers three narratives from her personal experience that illustrate many of the concepts presented here (Personal communication, July 11, 2016).

Example 1—The positive influence of spirituality From the perspective of a physical therapist with some cross-cultural clinical experience, I have observed large variability in functional outcomes for people with identical injuries or diagnoses. Some obvious factors that influence recovery include age of injury, strength of support systems and presence of comorbidities. Less quantifiable factors include the belief systems of patients, which are often culturally defined. One dramatic example is offered about a patient in the Intensive Care Unit who was to be weaned from her dependence on a ventilator. She had suffered a stroke and respiratory arrest that left her comatose for 6 days. As she regained consciousness, she was highly motivated to practice her sitting balance, initiate movement of her paralyzed side, and spend increasing time off the ventilator. One Friday, she was able to stand and pivot with assistance to sit in a chair and was eager to attempt to walk on the following Monday. However, over the weekend she was re-intubated and sedated and bedbound. Her vital signs were weak. Multiple tests were run with no explanation for her dramatic decline. As the sedation was gradually discontinued, she verbalized that her Rosary beads had been lost in her bed sheets, which had been sent to the central hospital laundry. She began to recover from this setback after a new set of Rosary beads were secured from the hospital clergy.

Example 2—The negative influence of spirituality Another example of the influence of belief systems on rehabilitation outcomes includes the pervasive influence of Karma on lowering expectations of children with developmental disabilities in Buddhist culture (personal experience in Bhutan). It is challenging for a Western therapist to understand the role of predetermination as a possible comfort to families in accepting significant limitations in children. The degree to which mothers are blamed for their children’s birth defects in Ghana and Peru is both disturbing and a clear barrier to rehabilitation. The default explanation for a child being born with Cerebral Palsy is often that the mother was sexually promiscuous and therefore, was being punished. This widely held belief contributes to maternal depression, lack of community support, and poor outcomes for children reaching developmental milestones.

Example 3—Utilizing additional resources to adapt to a disability One of the mysteries in our family has been the fact that only eight of my grandfather’s nine siblings emigrated from Ireland to the US between WWI and WWII. The family narrative was that my great uncle Tadeen could not swim, and was afraid of falling overboard on the trans-Atlantic voyage. This explanation never made sense, however, since the likelihood that anyone raised on a farm in rural Co. Kerry in the late nineteenth century could swim. It was not until I was working in Dublin as a Pediatric [physical therapist] that I learned from my great uncle’s closest neighbors that he was the smaller of a set of twins with a significant limp and inability to use one arm. It is likely that he experienced a stroke perinatally, and had hemiplegia with paralysis of his left arm and leg, which meets WHO definition of impairment as a problem in body structure or function. He also had a significant activity limitation, defined as difficulty with task execution, as he was unable to complete any two-handed tasks, which most Activities of Daily Life (ADL) require.

He met WHO criterion for a participation restriction, meaning that he experienced problems in involvement in life situations.

How did the features of his impairment intersect with features of the social fabric of an Irish rural farmer in 1916? Tadeen was unable to complete the traditional male tasks of cutting turf or harvesting hay; these tasks require bilateral arm strength and coordination. He was unable to climb a ladder and attend to leaks in his thatched roof, which could be catastrophic. Given that all of his siblings had emigrated and therefore had no immediate family nearby, how did he manage to survive? Essentially, he was able to specialize in completing a valuable task for his neighbors that he could barter for food, fuel, and roof maintenance. While the men were cutting hay or turf and the women were child-rearing and working in the fields, Tadeen made his rounds among the village houses, keeping the turf fires burning. Besides learning how to execute this task, Tadeen had to overcome some social stigma, since fire-tending was considered women's work. His flexibility in being able to complete a task that was not gender-appropriate may have secured his survival, allowing him to be a functional member of society. He was not disabled by his impairment and lived alone well into his eighties. One wonders if he would have been able to live independently in urban New England 100 years ago, had he emigrated from his rural homeland. This is just one illustration of how the degree of disability may be located at the intersection of impairment and social context.

Summary

Inferring impairment and disability into the past via human remains can uncover another layer of the vast array of human experiences across time and space. As was discussed here, disability can be understood through the biopsychosocial model or the ICF, incorporating various aspects of an individual's life to piece together how an impairment may fit into the broader societal structure. It is apparent from the chapter discussion and narratives that there are multiple factors at play in determining if and how a health condition may translate into a disability for any particular person. Different people may come to a physical therapist for treatment of the same 'problem', and the mobility or function gained is quite diverse depending on the other factors in a person's life (i.e., disability features, individual characteristics, and social environment). Armed with tools like the Index of Care (Tilley and Cameron 2014), bioarchaeology can promote interdisciplinary scholarship that may help elaborate what we know about past people and expand our understanding of disabilities within multiple contexts. This overview of some of the major contextual factors that can influence the lives of persons with disabilities provides multiple frames from which to consider this scholarly work. I look forward to future discussions from the field of bioarcheology and the insights it may provide about this complicated, nuanced construct we call disability.

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Chapter 4
Historiography of Disablement and the South Asian Context: The Case of Shah Daula's Chuhas

Shilpaa Anand

> *If the **doors of perception** were **cleansed** every thing would appear to man as it is, infinite.*
>
> —William Blake

Introduction

Disability history has grown to become a significant sub-field of disability studies in the last few decades. Historical studies within the disability studies paradigm are invested in studying histories of specific impairments (e.g., Buckingham 2002; Burch 2001; Davis 1995; Kudlick 2001; Trent 1994), of institutions of care and treatment (e.g., Byrom 2001; Finkelstein 2004; Stiker 2002), histories of social responses to impairment and disability (e.g., Barnes 1997; Baynton 2001; Longmore and Umansky 2001; Miles 1995, 2001; Poore 2007; Rose 2003; Stainton 2008; Stiker 2002; Yong 2007), as well as disability in general, and the development of disability governance (e.g., Fleischer and Zames 2001; Gerber 2003; Stone 1985). While recovering lost, hidden, or ignored histories, academic attempts to historicize disability have predominantly followed the trends of standpoint histories such as those of race, gender, caste, and other minority and marginalized groups. In keeping with these trends, histories of disability have adopted a framework of progression that assumes that disability has universally moved from schemes of charity with moral and religious commitments to medical ones and subsequently to more social–contextual understandings. Such historicism is motivated by the need to foreground a social model of disability driven by human rights commitments and a politics of identity (e.g., Barnes 1997; Baynton 2001; Fleischer and Zames 2001; Gerber 2003; Longmore and Umansky 2001). These histories act as critiques of past models of engaging with disability and offer oblique instructions to present and

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S. Anand (✉)
Department of English, School of Languages, Linguistics and Indology,
Maulana Azad National Urdu University, Hyderabad 500032, Telangana, India
e-mail: shilpaa.anand@gmail.com

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future engagement with disability thereby complying with the tacit framework of progression. Recent critiques of this historiography of progression argue for a rethinking of historical methodology (Barsch et al. 2013; Hamraie 2015), a critical examination of the models (charity model, medical model, social model) in disability theory (Barsch et al. 2013; Shakespeare 2014), and an interrogation of the models framework from culturally different epistemic locations (Miles 2000).

A second feature about disability histories is that they assume their object/s are self-evident—the objects may be impairments, impaired persons, institutions concerned with the impairment, and/or disability associated with the impairment. Disability is culturally constituted within Western society, and therefore the very concept of disability cannot be taken to be a universal; disability as a self-evident category does not exist in all cultural contexts (Ingstad and Whyte 1995; Rose 2003). This does not mean that blind people or people without limbs or those with varied intellectual capabilities are absent in some cultures but that disability as a 'way of knowing' or as a framing paradigm does not govern blindness, being without limbs, or having different intellectual growths, in all contexts. Recovering culturally contextual concepts pertaining to bodily difference, corporeality, personhood, and embodiment has become an important pursuit within disability studies and medical anthropology lately (e.g., Buckingham 2011; Devlieger 1995; Ingstad and Whyte 1995; Staples 2007) that may give us some insights into how alterity is perceived and conceived.

Shah Daula's *chuhas*[1] (translated from Urdu/Hindi as Shah Daula's rats or mice) were microcephalic youth who were present at a particular shrine (*dargah*) which is now in Pakistan. Colonial medical records of the South Asian region document the prevalence of Shah Daula's *chuhas* as a culturally specific medical condition and as evidence of culturally varied psychiatric conditions. Shah Daula, the patron saint of the shrine and the activities of the shrine, figure in colonial documents which describe religious practices peculiar to the Punjab region. Such records focus on the popularity of the shrine, the specialty of the patron saint, prevalent charitable practices, and the shrine's emergence as an important healing site (Eastwick 1883; Cust 1898). More recently the story of Shah Daula's shrine and the *chuhas* has been appropriated as part of disability history of the South Asian region. Miles' detailed recovery of Shah Daula's *chuhas* as part of disability history (Miles 1996, 2010) has enabled us to gain insights into culturally different ways of knowing and treating impairment and disablement. Miles' history of the *chuhas* qualified the phenomenon as suitable for global disability studies which is evident in the entry provided by Selim (2005) in the Sage Encyclopedia of Disability.

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[1] The phrase 'Shah Daula's*chuha*s' has been spelled variously as 'Shah Dowla'schuas', 'Shah Daulah'schuas', and so on. This paper adopts the spelling 'Shah Daula's*chuha*s' in keeping with the phonetic transcription of the Urdu word '*chuha*' meaning rat or mouse. However, where the components of the phrase have been spelled differently in various historical records and scholarly accounts as 'Shah Dowla' in some cases and as 'chua', the spellings used in those accounts have been retained in the references and within quotation marks as necessary.

The case of Shah Daula's*chuhas* may be of pertinence to bioarcheologists because of the cranial disfigurement that would be evident in the skeletal remains of the *chuhas*. The earliest accounts of the *chuhas* found in the medical records of colonial officials focus primarily on the formation of the head, "projecting mouth, extremely low forehead, and cranium long drawn out and tapering to the vertex" ('Shah Dowla's Mice' 1884: 271). Colonial accounts provide evidence of using skeletal remains of the *chuhas* for ethnographic analysis as well and remind us of the uses that phrenology[2] had in bolstering colonial authority over different parts of the world outside Europe and America.

The focus of this paper is then on uncovering not culturally different notions of disability but culturally contextualized concepts of corporeal difference. Disability is one conceptual framework by which corporeal difference has been characterized and a framework that has been particular to the historical experience of Anglo-American and European contexts (Anand 2013). The ideas of orientalism and culture-specific conceptualization referred to in this chapter are adopted with an interest in sounding the limits of epistemic frames and not in the vein of post-colonial criticism within which they have had long careers. Histories, archival records that act as sources for these histories, and literary narratives are examined. History and literature according to White (1973) may be subject to the same kind of analysis by virtue of the fact that both are composed as verbal structures that manifest linguistic and rhetorical aspects as well as employment.

Disability History of the South Asian Context

The scholarships of Buckingham (2002, 2011) and Miles (e.g., 1995, 1996, 1997, 1998, 2000, 2001) are among the most significant of contributions to documenting the disability history of the geographical region of South Asia that self-identify as interventions that adopt disability studies perspectives. While a variety of histories of primarily India (e.g., Bhatt 1963; Narasimhan and Mukherjee 1986) and Pakistan as well as other well-researched South Asian regions such as Sri Lanka and Nepal exist which focus on historical evidences of disability, a large number of them offer what would now be classified as medical histories of disability. Buckingham's essay (2011) on building an inclusive framework to develop the disability history of India urges historians to concentrate on factors that are peculiar to the Indian context citing caste, gender, poverty, and community concerns that would impact disability's emergence as a marginalized category. She emphasizes the need for disability subjectivity which would facilitate an expansion of epistemic structures

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[2] Phrenology was the practice of measuring skulls to determine the relationship between the shape and size of the cranium and the moral character as well as intellectual abilities of the individual. It was widely used in the eighteenth and nineteenth centuries in the British and other European colonies to assess the moral and intellectual nature of colonized communities. It was later discredited as a dubious science because of its scientific inaccuracy and later for its inherent racism.

and hopes for scholarship on disability history to parallel the rise in Dalit and Adivasi histories in the 1990s Indian context. Buckingham is invested in enabling disability histories of India through a framework similar to the subaltern studies approach[3] which in her view democratized intellectual discourse to bring to the fore debates on various kinds and forms of historical marginalization.

M. Miles' scholarship is useful in two significant ways. One, it opens up the landscape of South Asian disability history by offering a variety of avenues that one may explore—religious institutional practices and charitable ventures, folk narratives as records of popular responses to disablement, and the world of colonial medical discoveries and interventions. Shah Daula's*chuhas*, the primary illustration studied in this paper, may also be credited to Miles' historical landscape. Second, Miles' work enables us to engage with questions that arise when one undertakes the task of historicizing disability, a concept that is presumed to be universal, in cultural contexts that are not progenitors of that concept. Explaining his research imperatives and concomitant problems, Miles (2001) offers

> The initial motivation for studying historical responses to disabilities was to learn more about South Asian concepts of disability and the cultural baggage attached. There are, however, problems in trying to 'discover' the disability concepts of people long ago, especially those who spoke and thought in a variety of different languages. Fundamental concepts of fitness and unfitness, health and chronic infirmity, ability and lack of ability, are seldom subjected to analysis by ordinary people going about their daily business, or even by writers—such notions lie too deep for frequent review. One finds little direct discussion in Asian antiquity of the 'meaning of disability'(Miles 2001: 145).

The interest in learning about "South Asian concepts of disability and the cultural baggage attached" belies a commitment to knowing how corporeal difference may have been configured historically. He accedes that disability, the concept, is held in place by other "fundamental concepts", so our search is not at the level of what he calls "disability concepts" alone but at a deeper level. One could extend Miles' explanation to mean that the interest is in uncovering how corporeality is conceptualized in South Asian contexts and in due course learn of concepts of corporeal difference.

In a slightly earlier paper 'Disability on a Different Model: Glimpses of an Asian Heritage' (2000), Miles dwells on epistemic frameworks and narrative structures that are used in different cultural contexts to know oneself and the world around. Miles asks whether the models framework, a template forwarded within disability scholarship (primarily the medical model and the social model), is necessary at all to the writing of disability history of diverse cultural contexts. His reason for raising this question is based on his study of a variety of Asian historical instances and conceptual paradigms which defy being characterized as 'religious', 'bio-medical',

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[3] The subaltern studies approach refers to a variety of scholarly initiatives, primarily historical in nature, that began in the early 1980s spearheaded by Indian academics that challenged dominant histories which foregrounded a nationalist framework by documenting struggles of sociopolitically and socioculturally marginalized groups and minority communities.

or ‘social’. One such paradigmatic instance he draws on is taken from the Jaina tradition where there appears to be a concerted effort to root out revulsion expressed by a person at another’s disfigurement. As revulsion to disablement has been identified as a common feature of social responses to disability in many disability histories, Miles found it pertinent to dwell on this phenomenon. His study of the Jaina tradition reveals that one who wishes to qualify for being an advanced Jaina would have to attain the quality of ‘*nirvicikitsa’*. The practice of ‘*nirvicikitsa’* would enable one to feel no revulsion at the sight of disease, deformity or disfigurement of any kind in another human being. This ability to be indifferent, Miles cautions that we cannot confuse or conflate with the modern-day commitment of disability advocates to “piss on pity” (Charlton 1994). The Jaina form of indifference adhered to the idea of detachment which meant “all passion spent and all compassion absent” (2000: 607) and thus diverging from the modern-day disability activism that emphasizes compassion that is framed within the human rights discourse.

Miles warns of scholarly misidentification where similar situations or responses to similar situations in two different cultural contexts are often misread as being the same and therefore universal. Miles points us to the fact that present-day disability studies scholarship, if it were to embrace the models approach, limits us from knowing of concepts in the past that are related to what we now call disability or disablement. He observes that everyday life in Asian contexts in the past included disability and disablement in ways that were not explained or did not require explanation. These he feels should not be forced into explanatory models, “in common experience some facets of disability and disablement are absorbed within everyday life without demanding either a change of thinking or an explanatory model” (2000: 616). In a similar vein, Miles warns of misunderstanding narratives or stories as they exist in different cultural contexts by assuming that stories have the same purpose in all cultural contexts. He emphasizes the distinctive instructive value of stories in certain Asian contexts where the gain is in the narrative itself and not so much in the content of the narrative. The story itself may perform a corrective function, not the moral derived from the story.

In the light of Miles’ inferences on the conceptualization of disablement, a re-examination of the historical discourse of Shah Daula’s *chuhas* would enable us to critically reflect on the prevalence of “cross-cultural misidentification” (Miles 2000: 615) which echoes Edward Said’s (1978) ideas about Orientalism and how it worked to subjugate other epistemic systems and forms. In the course of this paper, Miles’ work on the *chuhas* would also be subject to the scrutiny using his notes on studying disability on a ‘different model’ as well as Said’s views on the discursive effects of Oriental knowledge production. The latter half of this paper investigates a short story on the *chuhas* with the intention of exploring Miles’ suggestion that everyday phenomenon of disability, devoid of models of explanation may tell us something of the culturally different conceptualizations of corporeality and corporeal difference.

Shah Daula's *Chuhas* as Objects of Disability History

Miles' study of the *chuhas* places them firmly within the discourse of disability studies by identifying the dargah as the primary focus so that we attend to the social context of the *chuhas*, the persons with impairment, and in due course learn of the attitudes that were prevalent toward them, in earlier times. Miles is also interested in recovering the context of intellectual disability in South Asian regions and how that tells us something about cultural responses to a universally occurring condition, microcephaly. Miles consciously distances himself from the medicalized aspects of the medical accounts and draws our attention to the social focus so as to bring a disability studies understanding to the study of the reactions to the 'mental retardation' of the microcephalic *chuhas*, thus bringing the *chuhas* from a medical history or a history of psychiatry of South Asia to a disability history of South Asia. The historical object of inquiry for the medical and psychiatric histories was the condition itself, its diagnosis and conclusive establishment either as a well-known impairment, microcephaly, or, as a culturally specific psychosis. For Miles, the historical object of inquiry is the social–contextual responses to the impairment which include care and the contours of care-giving practice as well as the functioning of the shrine which maintained the *chuhas* to facilitate the lucrative practice of begging. In a revised and updated version of the essay, Miles (2010) describes the lives of the *chuhas* in terms of 'independent living' and 'semi-independence,' once again drawing on the disability movement-oriented disability studies framework, and in a way, offering another new truth about the *chuhas*. Miles' studies (1996, 2010) are also invested in doing a critical history of the head-shaping debate as well as the dubious science of phrenology that fed racist and orientalist mindsets in Europe. He concluded in his later study that the presence of the *chuhas* at the shrine could be viewed in the light of charitable practices of the shrine.

Said (1978) has argued that histories of non-Western contexts were framed in terms of discourses that were familiar to the West to the extent that these histories documented the East as if they were "adjacent" to the West and as pale imitations of them. Since Miles and Selim's attempts to present Shah Daula's*chuhas* as peculiar phenomenons of disability of South Asia draw on archival sources that come ingrained with orientalist attitudes and narratives, their accounts, though critical on occasion, carry with them the normativity of their sources. The analysis below highlights some of the factors that make the Shah Daula history one such 'copy' or pale imitation of disability history of the West (Said 1978).

Of Rational Explanations and Irrational Practices

Miles and Selim depend on the medical reports that appeared in the *Indian Medical Gazette* which present the *chuhas* as evidence of region-specific medical phenomenon between the latter half of the nineteenth century and first quarter of the twentieth century. A report that appears in the *British Medical Journal* as well as the *Indian Medical Gazette* in 1884, titled ‘Shah Dowla’s Mice’, classifies the *chuhas* as a “class of idiots” (271) found at a shrine in the district of Gujarat in Punjab, who have a “peculiar mouse-like conformation of their cranium” and a characteristic appearance consisting of “projecting mouth, extremely low forehead, and cranium long drawn out and tapering at the vertex” (‘Shah Dowla’s Mice’ 1884: 271). This report responds to and attempts to dispel the commonly held view that the peculiar shape of the cranium is due to the head being forcible shaped during infancy. The rest of the report cites two authorities: one, an asylum report of the Punjab Lunatic Asylum, and two, a statement by a Surgeon General, as confirming that the “malformation” is congenital and that there is no evidence to believe that the shape of the head is caused intentionally. The report’s intention is clearly to recognize that the condition of the *chuhas* is a congenital deformity and therefore of significance to the medical community.

Ewens’(1903) detailed account in the *Indian Medical Gazette* provides notes on the *chuhas* that he met at the shrine and summarizes the many legends that abounded locally about the presence of the *chuhas* at the shrine. He refers to them as “idiots” and documents in clinical terms the physiological and psychological characteristics of the *chuhas*. The focal point of this entry is to establish the medical genealogy of microcephaly among the *chuhas*. Ewens’ investigated aspects of heredity by looking for evidence of prevalence of microcephaly among the family members of the *chuhas* and he found that there was little or no trace of family heredity.

The report of the medical superintendent, Lodge Patch (1928), which appears in the *Indian Medical Gazette*, provides a detailed account of the *chuhas* under the title “Microcephaly: A Report on ‘the Shah Daula’s mice.’” The framing of this report shows that the aim was to provide a rational account to dispel stories of superstition and rumor that surrounded the shrine. This report frames the incidence of the *chuhas* within a larger medical logic aiming to establish facts about Shah Daula, the saint, and dispelling a variety of theories about the presence of the *chuhas* at Shah Daula’s shrine. Lodge Patch’s report included a review of the medical literature from 1868 to 1903 which offered three explanations for the prevalence of the *chuhas* at the shrine—one, that iron clamps were pressed down on the heads of children to create *chuha*-like characters; two, the number of *chuhas* at the shrine was a result of sexual intercourse between the *chuhas* present at the shrine and the childless mothers who visited the shrine in search of the boon of a child; and three, that it was “maternal shock or suggestion” (Lodge Patch 1928: 297) which affected the unborn child and led to its birth as a *chuha*. Lodge Patch further reviews the medical literature on ‘microcephalic imbeciles’ and in this section seeks to argue that there is nothing peculiar about the *chuhas*, they just belong to the class of microcephalics that are present in different parts of the world. The report also comments on how animal associations are made to different imbeciles in certain parts of the world:

> Eastern imagination has coined the name "*chuha*" but the similarity of microcephalics to the lower animals has frequently been remarked by Western alienists. Pinel… describes a young female idiot of eleven years who bore a most striking resemblance to a sheep both in her appearance and in her mode of living (Lodge Patch 1928: 298).

Lodge Patch's intention appears to be to rationalize the story of the *chuhas* in the face of accounts of superstition and mystery that surrounded the *chuhas* in documents recording life in Punjab or other asylum reports that presented the *chuhas* as being a peculiarly Indian form of mental derangement. His details of the condition of microcephaly concur with prevalent medical knowledge that the skull conforms to the size of the brain and not the other way round. This fact most likely assisted him in making a stronger case for there being little correlation between altering the size of the skull to alter one's mental development. Microcephaly, Lodge Patch concurred, was congenital and had little to do with theories of persistence of atavism. Further, he argues that microcephaly does not always correspond with imbecility or idiocy. To substantiate, Lodge Patch offers evidence from his observations and interactions with wandering *chuhas*:

> A certain number of *chuhas* can get about the country alone, speak quite well, and take care of themselves. One such was found wandering about the Mall in Lahore and was examined at the Mental Hospital. His cranial circumference was slightly over 18 inches, but in appearance he was a typical *chuha*. He gave an excellent account of himself; said he was a "pir" and prayed at the houses he visited; he stated that twenty-five years ago he had been at the shrine of Shah Daulah and returned to Gujrat occasionally; he denied ever having had sexual intercourse as he was a holy man above such things. He accepted only food and refused a monetary offering. He was scrupulously clean in his dress and person. He had a very shrewd idea of the prices of food-stuffs, knew that there were sixteen annas in a rupee and eight pice in a two-anna bit, and probably had a greater degree of intelligence than most villagers in the Punjab (Lodge Patch 1928: 299).

Lodge Patch's brief ethnography serves to establish microcephaly as a form of imbecility or feeble mindedness while also affirming that microcephalics were high-functioning imbeciles, as is evident in the above description.

These medical entries designate a variety of other practices and 'rumors' as irrational. A major part of Lodge Patch's report appears to be aimed at explaining the problems related to misconceptions about the *chuhas*' heads being created artificially. He observed that one reason for sustaining the myth could have been a practice of aesthetics among the women and men of Sindh and Multan who believed that applying pressure to the heads of infants would rid them of any boniness that was visually undesirable. Nevertheless, this practice, he confirms, would not affect the cranium nor the functioning of the brain in any way. He reasons that the two stories may have become linked to create a kind of sensationalism around the shrine, among the locals. The stories around the shrine included rumors that the youth on the premises had been tortured with the application of iron caps. Priests at the shrine, he speculates, had let the stories accumulate so as to benefit their business of begging with the *chuhas*. Lodge Patch explains that the *chuhas* were primarily used as beggars and had immense commercial value as "solicitors of alms". The begging business, Lodge Patch speculates, may have been sustained through the circulation of other rumors like "any woman who refuses a dole to these wretched creatures will incur the displeasure of Shah Daulah and her next child will be born in the form of a *chuha*" (Lodge Patch 1928: 301).

In another account, a correspondence between two members of a scholarly society, published in the *Journal of the Royal Asiatic Society of Great Britain and Ireland* (1896) on the veracity of these head-shaping practices, a report by Mohammed Latif who is identified as a "new member" (Cust and Latif 1896: 574) of the Royal Asiatic Society is presented by the secretary of the Society in a bid to dispel the rumors about the shrine. Mohammed Latif, it seems, fulfills the role of 'native informant' by making inquiries in and around the shrine and concludes that the shape of the heads of the *chuhas* had nothing to do with artificial shaping practiced by the keepers of the shrine on the youth but was merely a case of coincidence. These young *chuhas* just happened to be "extraordinary creatures" (Cust and Latif 1896: 575) meaning that they were just born that way. The Cust-Latif correspondence is one instance of the many accounts that populate the journals of the time wanting to demystify the presence of the microcephalics at the shrine.

'Cross-Cultural Misidentification'

Miles' observation about 'cross-cultural misidentification' reflects in many ways Edward Said's concerns with orientalist records characterizing and representing the East as if it were a mere extension of the West and thereby mischaracterizing and misrepresenting the East as Orient, an invented space. One of the central ideas of Said's *Orientalism* (1978) is that the orientalist discourse succeeded in presenting the East/the Orient/the non-West as an "imitation West" (322). Religions of the Orient were described in terms of Christianity or in relation to Christianity. The Orient was characterized in the terms with which the West described itself. Descriptions of Shah Daula's *chuhas* do not escape this pattern. In Lodge Patch's discussion of how the *chuhas* came to be at the shrine, one of the theories he elaborates is of maternal impression, that microcephalic *chuhas* may have been born to women who had been exposed to the sights of other *chuhas* at the shrine. While Lodge Patch expresses his reservations about believing in the scientificity of this theory, he does offer similarities between Christian beliefs of maternal impression that act as a veiled justification for why the theory could in fact be sustained:

> It is recorded in Genesis xxx. that Jacob entered into an agreement with Laban that he would work for him and look after his herds of cattle and flocks of sheep, if he were allowed to take as his share all such cattle and sheep as were spotted, speckled, and ring straked with white. "And Jacob took him rods of green poplar, and of the hazel and chestnut tree; …. And he set the rods … in the gutters in the watering troughs when the flocks came to drink, that they should conceive when they came to drink. And the flocks conceived

> before the rods, and brought forth cattle ring straked, speckled, and spotted." … as in the case of Laban's cattle, it is just possible that a pregnant mother may be affected by external influences, and these may have an effect upon the appearance and the destiny of her unborn child (Lodge Patch 1928: 297–298).

Lodge Patch's comparison suggests that maternal impression as an explanation for the presence of a remarkable number of *chuhas* at the shrine could hold because such notions were also prevalent within his context. His knowledge of the bible enables him to establish that this view of maternal impression has universal purchase. In doing so, he casts the phenomenon of the *chuhas* into a religious mold.

The presence of the *chuhas* at the shrine, a matter of great intrigue and an aspect that seemed to be at the heart of many such medical records, is continually framed within religious discourse. The shrine is a place of benevolence, a site of the patron saint who was devoted to the care of animals and animal-like creatures, the pirs administered activities of the shrine, and the *chuhas* facilitated collection of alms that may have been an important income of the shrine and that the shrine was the center of 'healing' for many afflicted believers who came to it for reprieve.

Characterizing the *chuhas* as objects of charity is another way in which these colonial accounts frame them in religious terms. Ewens (1903) and Lodge Patch (1928) describe in detail the ways in which the *chuhas* were mobilized to collect alms for the upkeep of the shrine. Keepers of the *chuhas* would lead them through the streets with the intention of collecting charitable donations by onlookers intrigued or sympathetic to the visual impact the *chuha* had on them. These reports convey the sense that the *chuha* acted as multiple visual cues for the onlooker. Charitable pity may have been only one of the effects. According to popular beliefs, as reported in these documents, a woman who did not give alms to the *chuha* or his keeper, in case he or she was accompanied by one, ran the risk of giving birth to a *chuha* the next time she was pregnant. Recent scholarship, however, informs us that locating healing shrines within the binary discursive paradigm of 'rational/irrational' is unproductive because of the multiple complex roles these shrines play in the everyday lives of its visitors and inhabitants (Davar and Lohokare 2009; Ranganathan 2014).

Chuhas as Manifestations of Culturally Specific Psychiatric Conditions

Asylum registers and psychiatric case notes of the time ran concurrent to the reports that appeared in the *Indian Medical Gazette*. Based on these institutional records, psychiatry scholars classified the *chuhas* as a culture-specific form of mental derangement. Published in 1912, A.W. Overbeck-Wright's book, *Mental Derangements in India: Their symptoms and treatment,* acted like a handbook of psychiatric diagnoses along with case notes from asylums.[4] A major section of the book catalogues a list of conditions that are indexed as Indian forms of mental derangement. Overbeck-Wright was the superintendent of the mental asylum in Agra and may have been considered an authority on Indian strands of mental conditions. By the time he published his second book on the same subject, *Lunacy in India* in 1921, an updated version of the previous book, he also held positions in scholarly bodies such as 'Member of the Medico-Psychological Association of Great Britain and Ireland' and was 'Lecturer on Mental Diseases to King George's Medical College, Lucknow' and was a lecturer in the Agra Medical School as well.

Overbeck-Wright, in a chapter titled 'Brief Discussion of the Main Differences between European and Indian Psychoses', under the subheading 'Psychoses Peculiar to India', commented on the absence of variation in the 'mental diseases' of the 'Eastern and Western races' and proceeded to name 'Shah Daula's mice' as one of the "very few forms" that was peculiar to India. He describes them as a category of "microcephalic imbeciles of comparatively uniform type"(1912: 99) that were found in large numbers in the Punjab region. The *chuhas*, as per his account, were hired out to *faquirs*[5] at the shrine who took them around for begging. His position as an official of the mental asylum enabled him to document, as follows, the physical and mental capacity of the *chuhas*:

> A large percentage of them appear, however, to be deaf and dumb, and strabismus is common among them, indicating probably some error in refraction or other visual defect. They are capable of being taught simple employments, and are by no means immodest or indecent, and as a rule show none of the revolting tendencies or depraved appetites so commonly seen among other types of imbeciles (Overbeck-Wright 1912: 100).

Overbeck-Wright's account was descriptive unlike Lodge Patch's argumentative one. He speculated that the *chuhas* may have predominantly "sprung from the lowest classes" (1912: 100) and recorded the different theories of origin associated with the *chuhas,* including the one about infertile mothers coming to the shrine to fulfill vows that would help them bear children. He retained the other popular theory as well, about the use of iron clamps to change the shape of children's heads in their infancy so that they would serve as companions to alms collectors at the shrine. In relation to the third theory of mental influence on pregnant mothers having caused the birth of *chuhas*, Overbeck-Wright suspects that women staying at the shrine for a few days were given access to one of the male microcephalics by the "guardians of the shrine" so that they may give birth to a *chuha* and thus "maintain the reputation of the tomb" (1912: 100). Overbeck-Wright's account confirms microcephaly as a kind of psychiatric condition, but also highlights cultural variance as a striking feature of the phenomenon. While the medical records dismissed the cultural specificities of the shrine and the *chuhas*, psychiatry ascribed

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[4] Overbeck-Wright followed this book up with an updated version in 1921 titled *Lunacy in India*. The description of Shah Daula's *chuhas* is retained as is in the second book, showing that he found little that was new to add to his previously existing account.

[5] A religious ascetic who is known to live only on alms.

a higher status to them. It is perhaps due to Overbeck-Wright's account that later histories of the *chuhas* (e.g., Miles 1996) owe the identification of the shrine as a site of healing and institution of care.

In his first history of the *chuhas*, Miles' essay (1996) in the journal, *History of Psychiatry*, had offered a fairly dense review of literature of the various medical and psychiatric accounts of the Shah Daulah shrine and the *chuhas*. Miles' historical narrative, in that essay, however, frames the story of the *chuhas* in terms of 'care and formal services' available to people with intellectual or developmental disabilities. The essay comments on the development of modern institutional care occurring only in the early part of the twentieth century in northern India and details aspects of traditional care facilities prior to the spread of colonial modern interventions. Miles notes that "*pirs* and shrines were the resources ordinary people used for counseling and help with problems that were beyond them or were perceived in religious terms" (1996: 585). The Mira Datardargah near Ahmedabad, in India, which dates back to the sixteenth century, obtains special mention as the go-to place for "mental health problems". It is the recorded histories of 'care'[6] at such *dargahs* and other places of service attached to religious institutions in parts of north India that led Miles (1996) to conclude that

> the first place where formal, on-going care was instituted for some people with severe mental retardation, in the formerly Indian territory that now constitutes Pakistan, was at the shrine of Shah Daulah in Gujrat. Possibly this was the earliest institution in the Indian sub-continent devoted to care specifically for some form of mental retardation. Very probably it is the earliest such institution that has continued to function through the present century. This care was not offered to all categories of severely retarded persons, but specifically to those with microcephaly (Miles 1996: 586).

Disability on a Different Model?

Flora Annie Steel's short story, 'Shah Sujah's Mouse'[7] (1893) is about how a *chuha* from the shrine of Shah Sujah, who was wandering and begging for alms, rescues the narrator's lost child. Flora Annie Steel, a British woman who lived in Punjab, wrote extensively about local people in her fiction and non-fiction work. She was, we are told, invested in educational reforms in the area and had interacted with the women in the region. Her story is not bereft of orientalist overtones similar to those in the medical reports. She likens the *chuhas* at the shrine to the biblical Samuel in

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[6] The psychiatry discourse in modern-day Pakistan, as Miles admits, regards the gathering of the *chuhas* at the shrine as part of superstitious or as matters of 'blind faith'. These rationalist views that are part of the discourse of modernizing Pakistan or 'developing' Pakistan would also be views that dominate twentieth century discourse and practice of psychiatry and medicine in most parts of South Asia.

[7] Shah Sujah is either another name for Shah Daula that was prevalent locally or may be accepted as a fictionalized name used by the author for Shah Daula.

the temple. The story is narrated from the point of view of a British mother of a young child who is in India[8] with her husband because of his official service in the colonial government. Written in a sentimental vein, the story captures the emotions of a mother's love and loss of her child. Sonny is lost and found later by the *chuha* only to die later because of a severe fever. The story relates the affection that Sonny develops to the mute *chuha* who has the ability to draw all the squirrels in the garden to him by whistling a tune.

Steel's story, as well as Manto's story discussed later, gathers together affective states of women affiliated to the shrine and their mental distress. The story dwells on the social ostracism faced by women who were unable to bear children, which remain under-emphasized in the archival and medico-psychiatric records (Ewens 1903; Lodge Patch 1928; Overbeck-Wright 1912). This fictionalized account, commenting on the differences between the colonial-official conceptualization of the *chuhas* and the local ones sharply draws into the picture the figure of the *chuha*'s mother: "These mouse-like ones belong to Shah Shujah's shrine, because they are the firstlings of barren women made fruitful by the saints' intercession. Therefore, from their birth they bear the token of the mother's vow, dedicating them to his service" (Steel 1893: 79–80).

Saadat Hasan Manto's short story, first written in Urdu, titled '*Shah Dule ka Chuha*' (literally 'Shah Daula's mouse') was later translated into English (Manto 2008) with the title 'The Mice of Shah Daula' and takes as its central theme the suffering infertile mother who had visited the shrine in the hope of a boon of fertility. Salima, the young woman, is distraught because of her inability to bear a child. Not only Salima, but also her mother and her mother-in-law were as troubled. Salima, the protagonist who is keen to undertake any action if it enables her to bear a child, agrees to visit the shrine of Shah Daulah though her friend has warned her that as per the customs of the shrine, the woman seeking the boon of fertility must submit her firstborn to the service of Shah Daulah. Being unable to have a child, consumed Salima's life. She has also been warned that the child born to her may have a very small head, but that does not daunt her. In fact, she believes that it would not matter whether the child had crossed-eyes or a flat-nose; she would not love it less because of that.

At the shrine, Salima encounters Shah Daula's *chuha*. At first she shudders at the sight of the human *chuha* who physically manifest signs of "mental enfeeblement" with a leaking nose and strange behavior. Soon the antics of the *chuha* make Salima laugh for a moment before she dissolves into tears at the thought of how this child may be the victim of exploitation at the hands of the shrine-keepers. As the story progresses, we find that Salima submits her firstborn Mujib, to the service of the shrine, under pressure from her friend to keep the promise she had made at the shrine. Mujib, it must be noted, is not a *chuha*, not microcephalic, but owed to the shrine on account of the promise made by Salima. On returning home, Salima contracts, as a result of her grief, a delirious fever due to which she dreams that

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[8] Pre-partition India.

Shah Daula was a “large mouse gnawing, with its razor edged teeth, at her flesh” (Manto 2008: 91). She hallucinates that her son enters a mouse hole and while she pulled at his tail, larger mice grab his snout so firmly that she cannot pull him out. The hallucinations multiply and she sees in her fevered state, the girl *chuha* from the shrine, mice everywhere in the house and herself as a *chuha* of the shrine. All these episodes end in inconsolable tears.

In due course Salima has another child, a girl and later two boys. When she visits the town of the shrine for a wedding, she goes in search of her Mujib but on not finding him convinces herself that he may have died. Salima, on returning home, organizes a memorial for her son and obtains some closure on the matter. Then, one day she meets him. He is the *chuha* performing antics on the street to collect alms, brought around by one of the shrine-keepers. She recognizes him because of the unmistakable mark on his cheek and is overjoyed. She rushes into the house with him, embraces him, and tells him she is his mother. He responds with more antics, unaware of what had caused her emotional outburst. Salima, in a last bid to own the son she had once lost, tries to buy him from the keeper but in the interim, her Mujib runs off, nowhere to be found.

Manto’s location and perspective as a writer are different from Steel’s. His fiction, primarily his short stories, is critically acclaimed for their insightful and ironic vignettes of pre-Partition and Partition India. What his story uncovers for us is the extent to which the phenomenon of the *chuhas* is intertwined with the disabling experiences of the mothers who dedicated their children to the shrine. The story may also be received as an example of the kind of disability experience that Miles (2000) refers to; one that is above and beyond models and explanations, where disability emerges as an aspect of everyday life which is negotiated in multiple ways:

> There remain some aspects of disablement which by their marginal, liminal or interstitial nature, are not easily absorbed when they surface in everyday life, nor do they fit easily into available models. They are not this, they are not like that, there is something that is sensed but is not easily explained or cannot be pinned down at all (Miles 2000: 616).

Infertility, this *un-pin-downable* aspect of disablement, has long remained a contentious subject at the intersection of feminist and disability politics. Feminist discourses have challenged and critiqued reproductive practices in different ways—as detrimental to the individuality of being woman, as a patriarchal imposition that disallows women from being decision-makers about their own bodies, and as a way of biologically gendering women (Thompson 2002). The very conceptualization of infertility as a disabling condition (Inhorn and Bharadwaj 2007) may be viewed with suspicion by feminists who would argue that such conceptualization enforces patriarchal control over disability discourses. Nevertheless, if one of the contemporary imperatives of inclusive disability research is to decolonize this academic field or free it of Anglo-American hegemony by sounding the limits of academic frameworks that are controlled by western notions of disability and impairment, it would be necessary to recognize the academic discomfort of studying infertility in terms of disablement as also driven by western and first world feminist discourses.

The contribution of anthropologists to this debate on culturally located conceptualizations of involuntary childlessness needs to be duly acknowledged here (Ginsburg and Rapp 1991; Inhorn and van Balen 2002). Marcia Inhorn and Aditya Bharadwaj in their paper titled ‘Reproductively Disabled Lives: Infertility, Stigma, and Suffering in Egypt and India’ (2007) allege that infertility is managed differently within the rights discourse in the Euro-American context. The presence of reproductive-rights discourse manifest in these parts is bolstered by the idea that individuals have a choice in reproduction which may not be prevalent in non-Euro-American societies, “becoming a parent is rarely a choice for most men and women in non-Euro-American societies, where reproduction, both biological and social, is a cultural imperative, and where parenthood, for both women and men, is an integral aspect of adult personhood” (Inhorn and Bharadwaj 2007: 79). Inhorn and Bharadwaj (2007) also argue that infertility has not been “conceptualized, theorized, or politicized as a form of bodily disablement” within the disability rights discourse. They add

> in many non-Euro-American societies, individual agency is often subsumed within larger collectivities such as the family, and thus strategies of everyday resistance are not openly political within cultural constraints framing and offering differing opportunities for action and expression (Inhorn and Bharadwaj 2007: 79).

In Salima’s case, we see that the subject of childbearing is shared by many of her family members; she is, in a way, a ‘familial body’ (Cohen 1998). Being infertile was a socio-corporeal phenomenon that may have well resulted in these women becoming mentally distressed. Salima’s disablement cannot be adequately explained in terms of models we are familiar with in the disability studies discourse. Miles argues that the idea that models must necessarily explain disability is misplaced and when enforced disposes us of the “marginal, liminal and interstitial nature” (2000: 616) of disablement that constitutes history.

Conclusion

What can bioarcheology gain from disability historiography? Undertaking a bioarchaeology of disability requires an understanding of concepts adopted by disability theory and a sense of disability history. Cross-cultural studies of disability, as discussed earlier in this chapter, have criticized the universality that the concept disability is imbued with, demanding a more inclusive approach to theorizing corporeality and corporeal differences instead. If bioarcheology’s interest in the study of disability is to examine skeletal material contextually, then it is imperative for the field to take a critical view of disability history as recommended by this paper. Disability histories of South Asia may inform bioarcheologists of being mindful of the social context of the *chuhas* at shrines similar to Shah Daula’s while interpreting skeletal remains of the *chuhas*. Knowing the normative patterns of disability historiography would enable bioarcheologists to reach beyond normative narrative frameworks that occlude our perception, and make visible other stories such as disablement manifest in the unbearable grief of the *chuhas* mothers. Acting as an advisory to the recently emerged field, bioarcheology of disability, this paper argues for a critical reading of existing histories and makes a case for culturally contextual histories that may reveal not only historical social responses to familiar disabling conditions, but concepts of corporeal difference particular to those contexts.

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Part II

Ethnohistorical Interpretations: Ability, Disability, and Alternate Ability

Chapter 5

Differently Abled: Africanisms, Disability, and Power in the Age of Transatlantic Slavery

Jenifer L. Barclay

Introduction

In her classic manifesto *Claiming Disability*, Simi Linton highlights how words and phrases about disability "serve as metacommunications about social, political, intellectual, and ideological transformations that have taken place [around it]" (1998: 9). Linton critiques language that medicalizes and thus individualizes various impairments, but she also blasts euphemisms like "physically challenged" or "special" as reflections of the "do-gooder mentality endemic to the paternalistic agencies that control many disabled people's lives" (1998: 14). "Differently abled" is yet another of these patronizing phrases adopted by nondisabled people in the 1980s and 1990s to challenge stereotypes of disabled people as incompetent. As Susan Wendell explains, however, this phrase actually exacerbates the perceived "Otherness" of people with disabilities by "reinforcing the paradigm of humanity as young, strong and healthy, with all body parts working 'perfectly.'" Despite being freighted with negative connotations, "differently abled" does also encompass the provocative idea that "a person with a disability may have abilities that the nondisabled lack [by] virtue of not being disabled" (Wendell 1996: 79). From this angle, "differently abled" disrupts traditional power dynamics and destabilizes the naturalized concept of "ability" (including assumptions about which characteristics comprise this quality and how people identify and value them). This (re)orientation underscores that not all impairments or embodied forms of human difference are or have been "disabling" and exclusively viewed through the lens of pity or contempt across time and cultures. By adopting an approach that centers this more positive dynamic and rejects standard deficit model thinking about disability, this essay considers some examples of more empowered interpretations of embodied difference in the cultural and historical

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J.L. Barclay (✉)
Department of Critical Culture, Gender, and Race Studies, Washington State University,
Pullman, WA 99164-4010, USA
e-mail: jenifer.barclay@wsu.edu

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context of West Africa and the African Diaspora during the era of the transatlantic slave trade.

In some precolonial West African cultures individuals with bodyminds[1] that would be considered impaired or disabled by present-day western standards and marginalized in society were, instead, linked to spiritual power, accorded a great deal of respect and social standing, and thoroughly integrated into daily community life. In other words they were perceived by family and community members more along the lines of being "differently abled" in a positive sense. Historical examples that capture this more empowered understanding abound, ranging from social perceptions of those living with blindness, dwarfism, and physical differences throughout the region to the phenomenon of *àbíkú* in Yorubaland or *ògbánge* in Igboland–spirit children trapped in a cycle of birth, death, and rebirth whose experiences combine spiritual, psychological, and physical elements especially when the cycle is broken and they survive into adulthood. Even beyond the continent, as the transatlantic slave trade forcibly uprooted and dispersed millions of West Africans throughout the New World, some carried this understanding of people with differently abled bodyminds with them. Individuals with various physical, psychological, and sensory "impairments" continued to be revered and associated with spiritual and social power, particularly as conjurers and as leaders in slave and maroon communities (e.g., Chap. 6). Even folklore like the various iterations of trickster tales that took root in New World slave communities reflected a deeper underlying cultural logic that complicates and sometimes outright inverts binaries of strength/weakness and ability/disability. Ideas about impairment, disability, and embodied forms of difference, then, were an important but long overlooked facet of the "Africanisms" or cultural retentions that resounded in slave communities throughout the Americas and Caribbean and gave shape to the hybrid cultures that emerged (Parks 1919; Hurston 2009; Herskovits 1941; Mintz and Price 1992; Berlin 1996; Midlo Hall 2005).

My intent here is not to romanticize impairment and disability or invent yet another facet of an "Africa that never was" (Hammond and Jablow 1992). Nor is it to homogenize the complex, heterogeneous cultures that make up West Africa or ignore the marginalization and violence that some disabled people faced in these same societies. Rather, my goal is to simply provoke a discussion about the culturally *and historically* contingent nature of "extraordinary bodies" and, I would add, minds (Garland-Thomson 1996). Such an endeavor rejects the assumption "that all disabled people are oppressed everywhere" because this forecloses on the possibility of "critical engagement with the varying attitudes and behaviors toward disabled people and how these are mediated by a host of socio-economic, cultural, political, personal, situational and many other variables, themselves dynamic and changing" (Grech 2012: 59). Rethinking ahistorical assumptions challenges us to

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[1] I deliberately use the phrase "bodymind" to challenge the pervasiveness of the naturalized and deeply Eurocentric Cartesian split between the body and the mind in the modern world. This also calls attention to the uncomfortable compartmentalization of psychological, developmental and intellectual disabilities in relation to those deemed physical and/or sensory.

seek more clarity into which embodied qualities constituted impairment, disability, and ability at different historical moments and in different cultural spaces. It also highlights the ways in which today's dominant definitions of disability and impairment—forged in Europe and the United States largely through the prism of medicine and abnormality—often limit our capacity to interpret and even recognize the cultural meanings and social values attached to differently abled bodyminds prior to European contact and colonization. Using a historical lens troubles the intertwined, shifting relationships between impairment, disability, ability, and power and allows us to begin asking important questions. When did embodied forms of difference come to be seen as impairments and, in turn, disabilities in different societies? How often did impairment or disablement (in a non-indigenous sense) empower individuals in precolonial nonwestern societies? What social, political, economic, and intellectual forces ultimately overwhelmed and obscured these more empowered interpretations and when? Finally, could more historically accurate interpretations of indigenous knowledge that cast embodied difference or disability as strengths be leveraged in the present to promote equality, accessibility, opportunities, and social integration for disabled people?

Literature Review

Much of my thinking is inspired by the burgeoning field of Disability Studies with its important critique of the medical model of disability and emphasis on the socially constructed ideas *about* various conditions that stigmatize disabled people and produce structures of inequality. Despite the wealth of work on disability coming out of the interdiscipline, anthropology and history rarely interface. Historical scholarship has been especially attuned to mapping and contextualizing disability and impairment over time (Stiker 1999; Longmore and Umansky 2001; Burch and Joyner 2007; Schweik 2009; Nielsen 2012; Boster 2013; Barclay 2014a, b; Burch and Rembis 2014). This "new" disability history, however, rarely ventures into global contexts outside of the United States and Europe, with few exceptions (Mirzoeff 1995; Livingston 2005; Scalenghe 2014; Kennedy 2015). Medical anthropology, on the other hand, examines how culture shapes ideas about impairments and disabilities in societies around the world, but often has a problematic relationship with history. Early works that embraced historical analysis followed the same Eurocentric contours as disability history by examining western contexts like the United States (Ablon 1984; Groce 1985). At the same time, groundbreaking work focused on nonwestern societies often bypassed deep ethnohistorical analysis of embodied differences in precolonial contexts, opting instead to examine how nonwestern views of impairment shape the daily experiences, social position, and medical and rehabilitative treatment of disabled people in the present (Ingstad and Whyte 1995).

In addition to the ways in which disability history and anthropology could benefit from cross-disciplinary exchanges, more careful historical analysis stands to challenge pervasive ahistorical assumptions that embodied forms of difference were almost always perceived as negative. Most scholarship on disability, with only a few rare exceptions (Bauman and Murray 2014), hones in on negative interpretations of impairment to examine the structures of power that leave disabled people marginalized and oppressed. For instance, Shuttleworth and Kasnitz—whose influential work differentiates impairment from disability—provide only a negative frame for both of these terms. As they explain, “impairment is a *negatively construed*, cultural perception of a bodily, cognitive, or behavioral anomaly in terms of function or some other ethnopsychological status” while disability is “a *negative social response* to a perceived impairment” (2004: 141, emphasis mine). Devlieger (1995) and Burck (1999), despite their careful attention to cultural specificity, also emphasize only negative social perspectives of impairment. In their respective studies of Songye and Shona societies, both seem to concur that the main cultural difference regarding impairment between western and nonwestern cultures revolves around how each explain this “problem.” In contemporary Central and Southern Africa, they argue, impairments are not viewed as an *individual* problem (as in western societies) but rather as problems related to dysregulation and dysfunction in family or social relations. In both cases, though, the emphasis is on how the people in their respective studies construct impairments only as problems. Devlieger does note the presence of “ceremonial” children who enjoy a higher social status because of their perceived differences. He quickly dismisses the thought that this might reflect an empowered view of impairment, however, by suggesting that these children would only be considered “medical phenomena” in western societies (not “impaired” or “disabled”) because they were twins or born breech (1995: 95–96). Scholarship on disability in nonwestern contexts, then, rarely focuses on positive or historical interpretations of those with differently abled bodyminds.

Recent scholarship is beginning to challenge some of these assumptions in ways that have important implications for historical thinking about differently abled bodyminds in precolonial West African societies and in enslaved communities throughout the New World. Kim Nielsen (2012) demonstrates that people living with various kinds of embodied difference in colonial and early America were not devalued, stigmatized, and hidden away by their communities. Instead, their care was community-based and they contributed to society and families as they could, with no judgment passed on them when they could not perform certain aspects of their duties. Siobhan Senier likewise examines the writings of Mohegan medicine people to investigate the claims that “traditionally, disability was not seen as such.” Though Senier concludes that Mohegan identity ultimately trumps disability identity, she notes that “despite a colonial history that has pressed them to do otherwise, Mohegan people have treated disability either matter-of-factly or as a valued capacity” (2013: 214). Battles also highlights the importance of historical specificity, calling on scholars to recognize “the most pernicious of… orthodoxies [that] naturalizes disabled people’s contemporary social marginality and poverty by depicting them as fixed, historical conditions that have been present in most, even all, past human societies” (2011: 113).

Proponents of critical global disability studies echo these sentiments in their calls to "decolonize disability" and problematize the inherently western epistemology of Disability Studies (Meekosha 2011). These scholars expose how the social model of disability is "laden with priorities, value judgments and historical perspectives that are by no means neutral or transparent" (Barker and Murray 2010: 228) and question how "colonial constructions of, and approaches to, disability seep into and make up the contemporary disability landscape (including the transmission/imposition of knowledge and practices)" (Grech 2012: 54). It is clear that greater historical research into precolonial West African beliefs about impairment and disability can contribute in important ways to this intellectual project. Also, beginning to account for the diffusion of some of these beliefs into New World slave societies via the transatlantic slave trade allows this model to be fine-tuned so that it moves beyond a presumably unidirectional flow of ideas about disability from the former colonizers to the former colonized. As the illustrious author Chinua Achebe reminds us, "African societies of the past, with all their imperfections, were not consumers but producers of culture" (Killam 1973: 74). The legibility of West African views on those with differently abled bodyminds on the continent and in New World slave societies, however, begins to emerge only when African ontologies and systems of knowledge are legitimized and placed at the center of analysis.

Africanizing "Impairment" and "Disability"

In their important collection *Africanizing Knowledge: African Studies Across the Disciplines*, editors Toyin Falola and Christian Jennings call for Africanists to "critically modify the ways in which they 'do' scholarship" by privileging African voices and systems of knowledge while taking care to not essentialize the continent's many diverse cultures (2002: 1). Such an approach, they argue, requires scholars to rethink dominant western standards and frameworks "when African experiences and contexts suggest that they might be inadequate for African Studies" (2002: 2). The notions of "impairment" and "disability" appear to be precisely the kind of concepts that do not hold up as universal, transhistorical categories of analysis. These terms convey a sense of lack, limitation, disempowerment, and negativity that fails to adequately capture perceptions of some people with embodied differences as empowered in precolonial West African societies. These labels are also rooted in "the biologization inherent in the Western articulation of social difference" that does not translate across time and space (Oyěwùmí 2005: 10). Indeed, precolonial West African societies did not draw on the imperatives of western scientific discourse, liberal individualism or bio-power to frame and discipline bodies through hierarchical systems of classification. Yet the trajectory of western cultural and geopolitical hegemony in the modern era has attempted to make "all the world… look the same, simplified, reduced and homogenized, which in turn permits the sale of one's own epistemologies to everyone, everywhere. What does not fit is removed, rejected, or resisted…" (Grech 2012: 57).

Africanizing knowledge about impairment and disability, then, demands greater attention to African cosmologies, ontologies, and epistemologies, but it also requires a more critical assessment of scholarship about disability across the continent today and in the past. It is true that conditions like congenital disabilities, twins, children born breech, or children whose top front teeth came in first among others were historically met with infanticide and abandonment in some societies (Devlieger 2000: 162). Persistently foregrounding only these brutal responses, however, runs the risk of echoing the "civilizing" rhetoric of colonialism and "does little to reverse the demonising [sic] of majority world cultures and their people" (Grech 2012: 60). Claims that the "standard African" response to those with disabilities is to see them as hopeless and helpless (Desta 1995) exacerbate these sentiments. Even worse are arguments that these negative perceptions derive from "traditional systems of thought… that can safely be called superstition" or, more crudely, that Africans explain embodied differences as products of "witchcraft, juju, sex-linked factors, God-mediated and supersensible forces" (Abosi and Koay 2008: 5). These interpretations not only perpetuate the myth that those with differently abled bodyminds were always viewed negatively across the continent and across history, but they also reify narratives of a primitive, barbaric Africa where, in this case, disabled children were ruthlessly slaughtered.

Some important starting points in Africanizing knowledge about embodied forms of difference include grappling with the role of spirituality and the place of corporeality in precolonial West African cultures. Recent historical scholarship on the Asante of Ghana and Nsukka Igbo of Nigeria breaks, to some extent, with the narrow proscriptions of western academic methodologies to privilege rigorous analysis of indigenous knowledge and beliefs systems. This approach reveals that social power was not always manifested in the physical world alone but also in the spiritual realm (Akyeampong and Obeng 2005; Achebe 2005). This has important implications for thinking about how some people who would be classified as "disabled" today were historically empowered in some West Africans societies because of their perceived connection to a "nonhuman or spiritual/invisible realm" where the material body was largely irrelevant (Achebe 2005: 26–27). The work of African feminists who challenge the applicability of western gender categories and standards to West African societies is especially useful here in advancing a conceptual framework more relevant to exploring and understanding historical perspectives on bodily difference and differently abled bodyminds in West African societies (Oyěwùmí 1997; Achebe 2005; Oyěwùmí 2005).

Oyèrónké Oyěwùmí, in particular, articulates a broad, powerful critique of the biological determinism or "body reasoning" that undergirds western systems of social organization and classification. She argues that, as a result of this "bio-logic," visual assessment of bodies and their categorization into groups (by gender, race and —I would emphatically add—disability) dominates in western societies and produces a particular structure for comprehending reality. This epistemology, however, does not translate to West Africa because "relative to Yoruba society [in this case], the body has an exaggerated presence in Western conceptualizations of society" (2005: 4). The somatocentricity of western cultures, particularly for determining social hierarchies and power, also privileges the visual and the role of sight (manifested in one's "worldview") which contrasts sharply with Yoruba culture's tendency to draw on multiple senses, especially hearing, in developing and enacting their "world-sense" (2005: 14). For these reasons and because of the importance of the spiritual realm, "the body is not always enlisted as the basis for social classification" in Yoruba culture and, indeed, "the body is not always in view and on view for categorization" (2005: 14). By centering African perspectives and a Yoruba "world-sense," Oyěwùmí crafts a powerful critique of western gender systems. These ideas, however, also provide a radical new frame for producing more accurate knowledge about embodied differences in precolonial West African societies.

A final, critical piece in suggesting how scholars might begin Africanizing historical knowledge about "impairment" and "disability" in the context of West Africa also comes from Oyěwùmí's insightful work and involves the role of language. In positing that western dichotomies like male/female (and, by extension, black/white, abled/disabled) are not adequate for grappling with West African systems of knowledge, Oyěwùmí demonstrates how this reality is all too often lost when researchers shoehorn African principles and understandings into English language translations. As she explains *vis-à-vis* gender in Yoruba culture

> In most studies of the Yoruba, the indigenous categories are not examined but assimilated into English. This practice has led to serious distortions and quite often to a total misapprehension of Yoruba realities. The implications of this situation are not just semantic, however, but also epistemological in that they have affected the type of knowledge that has been produced and who has done the producing in Yoruba written discourse. A thorough analysis of the language is essential to the construction of knowledge about the Yoruba in English. (Oyewùmí 1997: 28)

This is particularly relevant to those interested in cross-cultural and transhistorical analyses of disability, especially considering that there is typically no equivalent of the word "disability" in many African languages. This alone begs for a more African-centered approach to understanding embodied human differences that reckons with the hegemony of Western constructions of "disability" and accounts for the local historical context. What follows are a handful of examples that reflect the more positive, empowered views of those with differently abled bodyminds that existed in some West Africa societies historically as well as a tentative examination of how this world-sense echoed in New World slave societies.

Social Power and Differently Abled Bodyminds in Precolonial West Africa

Dozens of variations obviously exist across the societies of West Africa that extend from today's nations of Senegal to Nigeria and inland across Mali, Burkina Faso, and Niger. Ethnic groupings, language, religious beliefs, histories, social institutions, political structures, and economies encompass just some of these many variations. Despite the diversity of this region today and in the past, certain broad patterns and similarities also make it distinct. This was especially the case regarding indigenous religions because while the "names and methods of worship were different… many assumptions were common such as the role of ancestors, the power of spirits, divination and the worship of gods." Another important "unifying feature in most of precolonial Africa" was a concept of community in which "social cohesion and intimate relations between individuals were the key to living in a society" (Falola 2003: 55). These broad cultural contours strongly suggest the possibility that shared ideas about embodied differences reached across precolonial West Africa. Given the overlapping religious practices of the region historically, the practice of casting those with embodied differences as spiritually potent was probably not an isolated concept. Rather, it was more likely part of a larger system of shared spiritual ideas within which distinctive bodyminds were read as "differently abled"—not as weak and pitiful but as strong and powerful in a different way. This has clear implications for reevaluating the social power of those who embodied certain forms of difference. The ethos of community and kinship that undergirded many precolonial West African societies furthermore meant that at least some individuals who would be defined as impaired or disabled today were simply accepted and absorbed into society with little fanfare.

An interesting starting point to consider these more empowered perceptions of embodied difference is the epic tale of Sunjata, based on thirteenth-century events in the life of the celebrated warrior who founded the Mali Empire that lasted over two centuries. Still told by griots across West Africa, Sunjata's story "is an integral part of a Mande world-view… [and] on the broadest level, the name Sunjata is a symbol of Mande cultural identity… [that] conjures up images of a glorious past, heroic behavior [sic] and moral values that serve as a cultural matrix for Mande peoples" (Durán and Furniss 1999: xxviii–xxix). This oral tradition details Sunjata's heroism as he organized, rallied, and led Mande-speaking people in a revolt against Sumanguru Kante. The Suso had asserted their independence as the Ghana Empire waned and Sumanguru, a powerful sorcerer and Suso leader, sought to expand his control over nearby Manding where Sunjata's father was a chieftain. After a series of twists and turns, Sunjata ultimately becomes the hero of this epic tale, using strength and magic to defeat Sumanguru and unite the smaller Manding kingdoms into the Mali Empire. In numerous iterations, Sunjata's epic narrative pivots in important ways on various forms of embodied difference, particularly physical deformities.

Embodied difference factors into Sunjata's story from the very beginning. His mother, Sukulung, was "an ugly hunchback" and an old woman who had already given birth to 40 children when she became pregnant with Sunjata. This pregnancy lasted for seven years and Sunjata was born "a cripple and a glutton," "deformed and shapeless" though most griots "generally do not suggest any reason for [his] lameness" (Durán and Furniss 1999: ix, 63, 97). Though his father promised his kingship to his firstborn son and Sunjata was born before his brother, he was robbed of his inheritance and simply lived with his mother, crawling for the first several years of his life. In the meantime, diviners warned Sumanguru of the presence of a child who was a threat to his sovereignty but he failed to recognize Sunjata as that child. In one telling, when Sunjata's father died he left Sukulung with nothing to care for her "crippled" son and small daughter so she beseeched Sumanguru to help her son stand so he could attend a circumcision ritual with the rest of his age-set. Without knowing that this child would be his future downfall, Sumanguru instructed his ironsmiths to fashion two iron canes for Sunjata to use. It took "three full-grown men" to carry each iron staff to Sunjata who laughed when he saw them because he knew they would not help him rise. When he took the iron canes in his hands and pressed down on them with his strength to stand, they buckled under his might and he threw them across the courtyard (Durán and Furniss 1999: 61–62). It was ultimately his mother—a woman described as weak, old, ugly, and hunchbacked—"who [was] the rock upon which he finally pull[ed] himself to a standing position" (Durán and Furniss 1999: xiii). In Bamba Suso's version of the tale, this defining moment caused "the griots [to] say, 'The Lion has risen… the Lion of Manding has arisen, the mighty one has arisen'" (Durán and Furniss 1999: 6).

The fact that Sunjata eventually rises to a standing position could be read as yet another version of an "overcoming narrative" of disability. This interpretation, however, rests on the belief that ablebodiedness is always appreciated as "normal" and "superior." Read through a different lens, this moment in the epic instead dramatizes the ways in which assumptions about embodied forms of difference lead some to underestimate those with differently abled bodyminds, denying them strength and power. That Sunjata, the powerful Lion, ultimately arose by leaning on his aged, deformed mother lends further support to this interpretation. In the end, it is Sukulung who embodied the strength and stability her son needed to stand, making her stronger than the two forged iron rods that took three men each to carry. This particular moment also speaks to Sunjata's close relationship with his mother; in fact, later in the narrative Sunjata declines the opportunity to become king of the new empire to "care for his aged and infirm mother" (Durán and Furniss 1999: xiii). In the Sunjata epic, embodied forms of difference reflect the more positive aspects of the phrase "differently abled" and trouble the relationship between disability/ability, weakness/strength and assumptions about how social and physical power is manifested. This is especially notable considering that Sunjata, a figure with clear "impairments," remains an important national symbol for Mande peoples. Scholars Durán and Furniss explain that for millions of Mande-speaking people Sunjata is "comparable… to Richard the Lionheart for the English," an interesting comparison between one nonwestern and one western legend—the former a "crippled" figure who crawled for the first several years of his life and the latter still regaled for his perfect physique, physical strength, agility, and intellect (1999: xi).

Many other examples of individuals with differently abled bodyminds who were empowered and deeply connected to the spirit world emerge from the histories of various West African ethnic groups. One Yoruba creation story explains how the Supreme God Olorun charged Obatala, the "artist god," with the task of creating human figures out of clay. As he went about his work one day, Obatala got drunk on palm wine—probably because the trickster Eshu fooled him into overindulging

—and created human figures with “twisted limbs, hunched backs and other deformities” as well as those who were blind and albinos (Lynch and Roberts 2010: 96). Ever since, Obatala holds people with these embodied differences sacred, granting them positions of importance in his shrine as priests and priestesses (Nichols 1993: 38–39). In addition to their empowerment by virtue of direct ties to Obatala, their visibility in Yoruba cosmology is also striking. As the author Wole Soyinka put it, “Europeans tend to hide such people, whereas Yoruba religion actually accounts for them” (1997). Little People were also viewed as particularly powerful in many precolonial West African societies. The Mendi, Akan, and other ethnic groups along what was once the Gold Coast reportedly saw Little People in this light and the Yoruba considered them to be *eni orisa*, the possessions of the gods (Adelson 2005: 8–9). Seventeenth-century traveler narratives confirm that Little People were often significant figures in royal courts and servants to the king. One traveler noted that the Yoruba saw them as “uncanny in some rather undefined way, having a form similar to certain potent spirits who carry out the will of the gods” (Hall 1927: 305). This was also the case among the Akan, where a system of spirits known as Mmoetia was comprised of Little People and an occasional “giant” (Bannerman-Richter 1987). The Mmoetia are herbalists and healers of the body, mind and spirit, but they are also believed to be attached to deities and able to cause a great deal of mischief for individuals or punish people for their transgressions (Opokuwaa 2005: 26–27).

In addition to those whose embodied difference visibly marked their material bodies, others were viewed as empowered in a spiritual sense and treated with great care and respect because of their less visible forms of difference. In the 1930s, anthropologist Margaret Field described traditions among the Ga in the Accra region of Ghana in their treatment of people she referred to as “idiots” or “feebleminded.” In a passage worth quoting at length, Field explains

> They are always treated with the greatest kindness, gentleness and patience, are kept very clean and well-dressed, and are given daily good food at a low table with a white calico cloth while the rest of the family squat on the ground round a common dish… Not only do [es] his family care for him but all the neighbours [sic] help to keep an eye on him. If he shambles into any compound he will probably be given food and if he eats it messily his face will be cleaned for him before he is sent home. (1961: 183)

While it might be easy to interpret this through the lens of pity, as a charitable act for an intellectually disabled member of the community, Field’s further elaboration on this practice suggests something more. This treatment, according to her, was especially common for individuals who were “incapable of speech” or “of grotesque appearance” because their community understood them as close relations to or even “the reincarnation of” a deity (1961: 183). Providing them with food and care, then, was motivated by deep respect for their spiritual status, not by condescension and pity. Similar practices also existed elsewhere in the region for those with other forms of bodymind difference. In Igbo- and Yorubaland, children born with certain physical marks who developed seizures or forms of madness in which they heard voices were (and sometimes still are) thought of as *àbíkú* or *ògbánge* children. "Spirit children" who are literally "born to die," these children presumably have deep, strong connections with specific deities that pull them back to the spirit world unless a diviner or healer intervenes to interrupt the cycle of birth, death, and rebirth that will plague their mothers, in particular. *Àbíkú* or *ògbánge* children often receive special treatment from their mothers who coax them to stay in the material world where, because of their perceived spiritual power, they have license to create special songs and dances that they perform in festivals. If they survive to adulthood, *àbíkú* or *ògbánge* simply become ordinary members of society because it is believed that their parents' kindness convinced them to stay in the material world. If they die, however, their corpses were sometimes "mutilated" or marked in some way to be more readily identifiable as *àbíkú* or *ògbánge* when they are once again reborn (Achebe 1986; Nichols 1993).

These examples begin to make visible how certain types of bodies deemed "impaired" or "disabled" by present-day western standards were read through a much different filter in precolonial West African societies. To be sure, each society possessed its own unique cultural lens through which individuals read and understood numerous forms of embodied differences. Beliefs about them also certainly changed and shifted over time, particularly in response to local and regional events like the spread of Islam and Christianity, the rise and fall of the great West African empires of Ghana, Mali and Songhai from the ninth to the late sixteenth centuries, contact and commerce with Europeans, and the advent of the transatlantic slave trade among many other events. At the same time, though, regional patterns of spirituality and the community ethos shared by many West African societies likely guaranteed at least some sustained cohesion regarding empowered perceptions of those with differently abled bodyminds that shaped their lives, experiences, and social standings. From the very outset of West Africans' contact with Europeans—an encounter that ultimately led to centuries of violence and exploitation that shaped the entirety of the modern world—it is clear that West Africans conceptualized some forms of embodied difference as powerful and positive. It seems logical, then, that as the centuries-long crucible of racial, chattel slavery violently produced the African diaspora in the Americas, these distinctive characterizations of what constituted "ability" and "strength" would continue to structure enslaved peoples' ideas about embodied difference.

New World Echoes of Differently Abled Bodyminds

As enslaved people from a range of West African societies were swept into the transatlantic slave trade, they took their cultural practices, attitudes, and beliefs into the New World, passing them down to descendants who carried them on in altered forms with varying degrees of intensity. These cultural retentions included agricultural techniques, religious beliefs and rituals, healing practices, music, art, language, clothing, and hair styles among many other aspects of day-to-day life. West African perceptions of the differently abled bodymind were inherent to these practices and beliefs, particularly considering how these sentiments were bound to broad patterns of spirituality and a distinctive community ethos that characterized precolonial West Africa. Also, as the transatlantic slave trade dehumanized and commodified enslaved Africans, it took an enormous toll on their sense of identity (Smallwood 2007) and their bodies (Mustakeem 2016; Kennedy 2015). The violence of the Middle Passage and New World systems of slavery, then, virtually guaranteed that the bodymind loomed large in enslaved people's consciousness. Because so many complex, dynamic slave societies developed throughout the African Atlantic over three-long centuries based on the cultural practices of dozens of ethnic groups, it would be impossible to provide any sort of exhaustive genealogy of views toward and experiences of enslaved people with differently abled bodyminds. It is possible, however, to begin examining these issues in slave communities of the African Diaspora—in this case primarily in North America—to initiate a conversation and provide some examples on which future scholarship might elaborate and build.

Conjuring provides a unique window into New World slave communities that reflects distinct strands of traditional West African religious beliefs, particularly for its emphasis on the invisible, spiritual realm and the power and status of people with differently abled bodyminds within this practice. Targets of conjuration often experienced blindness, deafness, paralysis, madness, fits and other conditions that only spiritual healers could treat. Not surprisingly, many conjurers exhibited various forms of physical and sensory difference that linked them to the spiritual realm and reflected their power. Sometimes referred to as "two head doctors," conjurers were often marked by unusual features such as light or different colored eyes, red eyes, albinism, physical deformities or birthmarks, or the peculiarity of "blue gums" (Anderson 2002). Aunt Darkas—an "old conjure doctor" in Georgia—was completely blind yet could "go ter [sic] the woods and pick out any kind of root or herbs she want[ed]." As opposed to rendering her pitiable and weak, Aunt Darkas's blindness instead empowered her, conveyed the sense that she had other ways of knowing, and suggested that she possessed a more penetrative type of "vision" that extended into the spiritual world (Heard 1941: 249). This was also the case for one infamous conjurer on the Poplar Farm near St. Louis, Dinkie, who contemporaries described as a "full blooded African" about fifty years old who had lost one eye and was "a very ugly man." Because so many believed in the strength of his otherworldly powers, Dinkie was feared within and outside the slave community, including among Whites in the area who "tipped their hats to the old one-eyed negro" and let him "pass without a challenge." Dinkie "hunted, slept, was at the table at mealtimes, roamed through the woods, went to the city, and returned when he pleased" yet he never worked or received a flogging. As one slave explained, Dinkie was "his own massa" because he "got de power" and "knows things seen and unseen" (Brown 1880: 70–75; Blassingame 1979: 113). Even beyond the actual conjurers themselves, protective measures that one could take against conjuration gained power if a person with a differently abled bodymind procured them. Lucky rabbits' feet, for instance, worked as charms to ward off spells and many enslaved people believed that those of "de graveyard rabbit" were the best, especially if the rabbit was “kilt by a cross-eyed [person]” (Moses 1941: 144). These historical examples reflect the perceived spiritual strength and social power of those with differently abled bodyminds at work in North American slave societies. Similar sentiments also extended to enslaved Little People in North America and, in one particularly telling case, reflect stark differences between the cultural frameworks used to interpret their physicality.

Considering the widespread reverence of Little People across precolonial West Africa, it should come as no surprise that New World slaves continued to hold them in high esteem. This hold over appears to have functioned in an especially interesting way in the life of one enslaved woman, Emeline, a house servant for the “cultured southern family” of Judge Kimball in Mobile during the antebellum period. Kimball purchased Emeline from a slave trader because “her deformity enlisted [his] sympathy” (Thomas 1938: 376). His pity for Emeline also extended to her two children as Kimball allowed his daughter to teach all three to “read, write and speak perfect English”—an unusual educational opportunity for an enslaved family (Thomas 1938: 376). Even as Emeline secured these nominal privileges for herself and her children, however, she was pursued and courted by a free black man, Sam Brown. Desperate to marry Emeline, Brown relentlessly wooed her and put himself up as collateral until he paid Judge Kimball in full for her and her children’s freedom. The once-enslaved Brown came to the United States where he gained his freedom via the West Indies, a region of the Caribbean heavily populated by Yoruba transported there as slaves (Eltis 2004: 32–33). Brown’s dogged persistence in courting Emeline and the risks he took in gambling his own tenuous freedom to secure hers suggest that he was likely Yoruba and that Little People continued to be significant in the Yoruba “world-sense” that reached across the Atlantic and extended into American slave societies. This is even more likely given the tenacious nature of Yoruba kinship practices that “were able to persevere even in societies where the Yoruba comprised a tiny percentage of the slave population” (Roberts 2004: 254–255). If this was, indeed, the case with Sam Brown’s background, Emeline stood at an interesting crossroads between two very different cultural systems with two very different interpretations of the meaning of her extraordinary body. Fetishized by Brown on the one hand and pitied by Kimball on the other, Emeline gained her family’s freedom at a time and in a region where this was incredibly rare even as she secured an education for herself and her children (from a judge’s daughter) at a time when enslaved blacks were legally denied literacy (Thomas 1938: 376). The same West African perspective that cast people with differently abled bodyminds as spiritually empowered appears to have echoed in Emeline’s experience, profoundly shaping some of the contours of her life. This perspective, however, also resounded in other, more ephemeral dimensions of American slavery as well.

In a much broader sense, slave folklore epitomized the unique, empowered capabilities accorded “differently abled” people, particularly in the trickster tales. Riffing off of African characters like “the Hare or Rabbit in East Africa, Angola, and parts of Nigeria; the Tortoise among the Yoruba, I[g]bo and Edo peoples of Nigeria; and the spider throughout much of West Africa including Ghana, Liberia, and Sierra Leone" (Levine 1977: 103), trickster tales spread throughout slave societies in the Caribbean and Americas during the era of Atlantic slavery (Abrahams 1985). These personified animals took on different forms, but the stories themselves often retained one essential theme: the weak overpowering the strong through their cunning and wit as opposed to their physical strength and ability. In other words, the "trickster figures of animal tales were weak, relatively powerless creatures who attain their ends through the application of native wit and guile rather than power or authority" (Levine 1977: 103). In North American slaves' versions of these tales, the trickster Br'er Rabbit consistently outsmarts larger more powerful animals like Br'er Fox and Br'er Wolf, reflecting the longstanding West African cultural tradition of recasting perceived weakness as a form of strength. These tales make clear that tricksters fulfill "a need for healthy commerce between what is above and what is below [perception]" and through common patterns they collectively expose "a culture's inner workings" (Pelton 1980: 2). As the Malian philosopher Amadou Hampate Ba explains about the nature of African oral traditions as a whole "it may baffle the Cartesian mind accustomed to dividing everything into clear-cut categories. In oral tradition, in fact, spiritual and material are not disassociated" (as cited in Oyewumi 1997: 28). The diffusion of the trickster tales throughout the African Diaspora bespeak a deeper cultural logic about embodied difference that inverts and sometimes outright breaks the "either/or" binary between disability/ability and weakness/strength, replacing it instead with a "both/and" model in which bodies and minds can be *both* weak *and* strong at once or, in some cases, in which embodied "weakness" is, quite literally, strength and social power.

Conclusion

Much work clearly remains to be done in excavating and analyzing the more empowered, positive interpretations of embodied forms of difference that existed across precolonial West African societies. Even more work is necessary to trace the geographical and chronological routes along which these understandings diffused through the societies of the African diaspora, produced by the transatlantic slave trade that, itself, engendered an entirely new, dynamic set of ideas about racialized and commodified bodies. Recognizing how individuals who embodied difference in one way or another were sometimes perceived as "differently abled"—possessing abilities that others lacked by virtue of not being disabled—nevertheless provides an important first step toward moving in this direction. This recognition envisions an ontological space free of the inherent negativity and pathology that characterizes the medicalized, individualized categories of "impairment" and "disability" rooted in the present moment and derived from western cultural imperatives. Adopting this perspective begins to expose, challenge, and provide a potential pathway out of the bind of ahistorically, uncritically projecting the categories of impairment and disability—with all of their attendant values—onto the past and across cultures. To be sure, this endeavor will always remain woefully incomplete and discussions will undoubtedly mirror the wider ideological debates about African cultural retentions that reach back to the work of W.E.B. DuBois, E. Franklin Frazier, Melville Herskovits, and Zora Neale Hurston. Nevertheless, this is an important project to pursue because it stands to open up new frameworks of understanding and greater, more accurate insights into disability and embodied forms of human difference across time and cultures. Historical knowledge always enables us to better understand our present moment; in this case, adopting an African-centered perspective and reclaiming the positive aspects of "differently abled" bodyminds not only challenges us to imagine how we might put such information to good use today but also to reflect on why it is that we so rarely attempt to see the more empowered dimensions of "disability."

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Chapter 6
Kojo's Dis/Ability: The Interpretation of Spinal Pathology in the Context of an Eighteenth-Century Jamaican Maroon Community

David A. Ingleman

Introduction

According to Coogan (2014), "[t]he history of the hunchback runs from ancient history to present day, and across cultures, sometimes as a marginal figure, sometimes as a central one" (74). This suggests that people with spinal pathologies were culturally marked in totally unrelated societies. However, the lack of universal, formulaic, or static patterns confounds simplistic correlations between pathologies, body differences, impairments, and disabilities. The exceptional and infamous case of King Richard III demonstrates this. In 2013, bioarchaeologists announced that the man William Shakespeare had referred to as the "crook-back'd Tyrant" did indeed have severe idiopathic adolescent-onset scoliosis. However, because of his elite status, had he desired to project physical symmetry, he could have commissioned tailored suits of clothing and armor (Appleby et al. 2014; Buckley et al. 2013). This finding rendered obsolete generations of Ricardian speculation and ushered in a new era of better-informed discourse, thereby underscoring the potential of bioarchaeology to open critical new vistas into social history when viewed through the lens of social disability theory. This chapter highlights a less well-known and non-European historical example that reveals the importance of critical scholarship, cultural context, and creativity in the interpretation of paleopathology in terms of ability.

The famous eighteenth-century Jamaican Maroon leader Kojo, alias Cudjoe, is well-known for liberating his people, challenging the social order, and ultimately influencing the course of history, perhaps even hastening the end of slavery in the

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D.A. Ingleman (✉)
Department of Anthropology, University of California, 1156 High Street,
Santa Cruz, CA 95064, USA
e-mail: ingleman@ucsc.edu

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British Empire. Despite the fact that Kojo was one of the best-documented African Jamaicans of his time, his physical appearance remains a matter of debate. Was Kojo a "hunchback" as some writers have suggested (e.g., Dallas 1803: I:53; Mullin 1992: 54)? If so, how did his condition affect his identity? Or, did colonial historians seeking to diminish Kojo and his accomplishments invent his condition, as others have argued (e.g., Craton 1982: 87; White 1973: 312n28; Zips 1999a: 73, 115, 196, 2011: 192)? The objective "truth" in this case is unknowable because we lack the physical evidence necessary to determine whether Kojo had a spinal pathology. Instead, this chapter summarizes what is known and discusses possible Maroon perceptions of pathological conditions and body differences. This chapter suggests that, in the absence of additional evidence, there is no compelling reason to believe that a pathology or body difference, such as kyphosis,[1] would have disqualified Kojo from a Maroon leadership position. To the contrary, it is theoretically possible for body difference to have contributed to perceptions of alternate abilities. To be clear, the intention of this chapter is not to propose that Kojo did in fact have kyphosis, or any other pathology or perceived body difference. Simply, no potentially feasible hypothesis should be rejected a priori.

Before beginning this discussion, a note on terminology is required. Biological conditions considered medically anomalous will be referred to as pathologies or pathological conditions. The term body difference refers to any perceived somatic idiosyncrasy or variation from the societal norm, average, or ideal. Impairment is defined as a negative cultural perception of pathology or body difference, primarily in terms of functionality (cf. Shuttleworth and Kasnitz 2004: 141). Disability is defined as "a negative social response to a perceived impairment" (Shuttleworth and Kasnitz 2004: 141). The term alternate ability references the idea that people who would be considered disabled in some societies, are perceived in other settings as possessing extraordinary abilities that the general population lacks (cf. Chap. 5; Kennedy 2015: 48). In this chapter, the term dis/ability is used to emphasize the importance of social context in the assignment of ability, disability, and alternate ability.

Theory

Many people have, no doubt, become conditioned to accept modern disability stigma as an innate characteristic of the human psyche—a perhaps lamentable, yet demonstrably immutable, fact of life. This depressing conclusion is based on "highly questionable orthodoxies," which, as Gleeson observed, naturalize "disabled people's contemporary social marginality and poverty by depicting them as

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[1] Kyphosis refers to an exaggerated convex curvature of the spine.

fixed, historical conditions that have been present in most, even all, past human societies" (1999: 23). Recognizing the need for critical scholarship, Battles pleaded that "anthropological work on disability in the past must demonstrate its relevancy and usefulness to people today by challenging assumptions about the lives of people with disabilities in the past and denaturalizing the link between biological impairment [i.e., pathology] and social disability" (2011: 108). What follows is a modest contribution to that project.

Social disability theorists emphasize that disabilities are socially, and hence culturally constructed, as well as situational (Oliver 1990; Thomas 2007). In other words, a pathology or body difference that may appear to be a disabling impairment in one society might not be perceived as such from the vantage point of a different worldview (Reid-Cunningham 2009). The interactional model of disability departs from most other social disability models by recognizing that disability assignments most often stem from either real or imagined pathological conditions or body differences (Shakespeare 2013). An intersectional perspective on identity compliments the interactional model by proposing that the facets of one's identity (e.g., impairment, ethnicity, age, gender, etc.) intersect in ways that can compound social marginalization, and hence oppression (Cho et al. 2013). While it is arguable that the greatest contribution of the intersectionality lens has been a better understanding of oppression, and not identity (cf. Cho et al. 2013: 797), it can also be said that one of the most under-appreciated contributions of intersectionality is its ability to inform our understanding of how marginalization can be eclipsed. In other words, intersectionality can help explain how some people who were marginalized because of their identity were able to turn disadvantage into advantage. The interactional model of disability, combined with intersectionality theory, provides an adequate theoretical framework to begin to understand how body differences represent merely one aspect of identity that intersects with other inherently complex and dynamic facets of identity in the assignment of dis/ability (see also Chaps. 1 and 11). Therefore, paleopathological information must be culturally situated before interpretations of dis/ability are attempted, ideally by drawing on multiple independent lines of evidence.

The historical roots of perceptions of African American disability are intertwined with the violence of slavery and institutional racism (Baynton 2013; Kennedy 2015). During the eighteenth and nineteenth centuries, pro-slavery narratives backed by racist pseudoscience sought to justify the injustices of slavery and institutional racism by perversely claiming that Africans were biologically, culturally, and morally inferior to Europeans, and that enslavement compassionately provided salvation (e.g., Edwards 1793: II:128; Jarman 2011: 17; Kennedy 2015; Long 1774: 364–365). Demographic analyses have demonstrated that the inhumane conditions that enslaved people were forced to exist in greatly contributed to high rates of disease and injury (Kennedy 2015: 40–41). However, physicians of that time lacked the diagnostic tools needed to identify many pathological conditions, suggesting that some virulent diseases, such as tuberculosis, which can cause kyphosis and even death, are underrepresented in historical analyses (Kiple 2002: 142).

Racist ideas persisted in medical and scholarly discourse long after slavery was abolished (e.g., Davenport and Steggerda 1929), but beginning in the early twentieth century, anthropologists attempted to dismantle much of the racist theoretical architecture that their academic ancestors had helped to construct. African Americanists made it their work to find specific cultural “African retentions,” thus identifying, recovering, and validating African American culture (cf. Blakey 2001: 390–394). More recently, the dominant theoretical paradigm has shifted toward the creolist perspective (Mintz and Price 1992). This model argues the chaotic situations historically faced by African Americans, including the Jamaican Maroons, demanded creativity,[2] and that “retention” was not always the best choice. While African Americanists have abjured many racist ideas that were endemic to early scientific discourse, until relatively recently, African American scholars and social crusaders alike have typically “left stigma around disability unchallenged” (Jarman 2011: 9; cf. Bell 2011: 3). Thus, although scholars have tacitly acknowledged that pathologies, body differences, impairments, and dis/abilities existed in the past, they often neglect to study the role that dis/ability played in shaping history.

Historical Context

The Jamaican Maroons are primarily the descendants of enslaved Africans who escaped from bondage on plantations, and forged new, free societies in the mountainous Jamaican interior. Like the creole societies that were developing on nearby plantations, Maroon societies responded to their difficult situation by synthesizing diverse African, European, and indigenous American cultural traditions through the creolization process (cf. Besson 2016; Zips 2011). By the early eighteenth century, British intelligence reports suggested that there were at least two macro-Maroon groups in Jamaica, located in the Windward (eastern) and Leeward (western) sections of Jamaica. The Maroons raided plantations and consistently defeated the much larger and better-equipped forces deployed against them (Campbell 1988: 84–85). In 1739, the colonial government was finally forced to conclude a treaty with the Leeward Maroon leader “Captain Cudjoe” that officially recognized the Maroons’ freedom and forever changed their role in the British Empire (Campbell 1988: 84–85). Eventually, five major Maroon communities official recognition; the largest was Kojo Town (Campbell 1988: 165).

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[2] Theoretical models of culture change, including diffusion, evolution, and acculturation, continue to be the subject of considerable archaeological discourse (Trigger 2006). The concept of cultural creativity, which is often applied in ethnically diverse colonial settings, is considered a more agentive theoretical perspective, which envisions historical actors not simply as passively or reactively modifying their behaviors or beliefs, but rather actively enacting their social worlds (Silliman 2005).

Somewhat a Majestic Look: The Sketch of a Man

Historical Sources

At best, an incomplete picture of Kojo can be sketched based on the colonial archive alone (Besson 2016: 57n3; Campbell 1988: 46). However, some details are documented and others may be inferred. For example, Kojo's birthdate was not mentioned in colonial archival documents, but the name Kojo was, and still is, common in Akan-speaking areas of West Africa, signifying a male born on a Monday (Cassidy and LePage 1980: 135). Of course, this does not prove that Kojo identified himself as ethnically Akan or that he was even born on a Monday. However, it does suggest familiarity with the naming tradition. This knowledge could have also encoded important information to other Maroons. For example, among the Asante the days of the week are imbued with symbolic meaning; Mondays are considered lucky, but also associated with "impurity, chaos, disorder, and ritual violation" (Akutsu 1984: 235).

In addition to colonial records, Maroon oral traditions offer invaluable perspectives on Kojo's life and times, though their interpretation is not always straightforward. For example, modern Maroons in the Leeward village of Accompong Town celebrate January 6th as "Kojo Day," which they claim commemorates Kojo's birthday or, in some versions, the end of the war (e.g., Besson 2016: 97n18; Zips 2011: 114). However, the present celebration is merely the latest iteration of an evolving tradition and it would therefore be premature to conclude that January 6th is literally the anniversary of Kojo's birth. For example, oral traditions collected in the first half of the twentieth century suggest that Kojo's "brother[3]" Accompong, was then the focus of the ancestor-focused religion and annual festival (Kopytoff 1987; cf. Bilby 2006: 363). Nevertheless, the date of this celebration might also encode interesting information about the early Maroon creolization process and, hence, the society in which Kojo lived. Though some anthropologists have focused on African-derived elements of the celebration (e.g., Zips 2011), Besson has recently observed that January 6th corresponds to the date of the Feast of the Epiphany and further speculated that the Maroons appropriated this Christian festival to create a creole celebration (2016: 97n18). In many American colonies enslaved people were granted relative freedom on holidays, including Christmas, New Year's Day, and the Epiphany. The enslaved responded by creating elaborate creole traditions, such as masquerade (Bilby 2010: 205). In the English tradition the Epiphany, or Twelfth Night, was celebrated with merrymaking and an inversion of societal rules and structures. As Barringer and colleagues (2007: 42) aptly observed, "there are striking parallels between the masquerades of the Jamaican enslaved and some English medieval traditions,

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[3] Campbell (1988: 46–47) suggested this terminology might refer to a fictive kinship structure, reflecting African conceptions of clanship, rather than consanguinity.

notably the 'misrule' celebration of the 'King of Christmas,' when a person of lowly rank was given the status of ruler." Historical and ethnographic accounts from Cuba, Brazil, Haiti, New Orleans, and other places suggest that enslaved Africans and their descendants commonly marked January 6th with celebrations and ceremonies. For example, Haitian Vodou ceremonies dedicated to the ritual treatment of children considered sacred because of their unusual birth—including twins and polydactyl or "hunchback" children—commonly take place on January 6th (Houlberg 2005: 17, 20–21).

Records of Kojo's life before the Treaty of 1739 are generally sparse. A single manuscript indicates that, in 1690, Kojo's father led one of the largest successful plantation revolts in Jamaican history, providing the nucleus of the group that Kojo would later lead (Kopytoff 1973: 29–30). One Jamaican historian who claimed to have met Kojo wrote that, "about the year 1693," Kojo became the Maroon "generalissimo" (Long 1774: 340). The chieftaincy has tended to pass through kinship lines up until the present day (Zips 1999b: 229; cf. Kopytoff 1976: 95). However, beginning with the Treaty of 1739, Kojo became better known to the planter class and consequentially more visible in documentary records. For example, according to the diary of one European observer, during treaty negotiations "Capt. Cudjoe danced and showed a great many antic tricks, fell at [the British negotiator] col. Guthrie's feet several times; hugged him; and had a long conference with him" (Mullin 1992: 51). Post-treaty documents attest to Kojo's audiences with colonial administrators and his social visits with the plantocracy, including at least one pleasure sail (Campbell 1988: 151). None of these statements hint at pathology, impairment, or disability. In 1742, Kojo gained the trust of many in the plantocracy by suppressing an apparently Akan-led insurrection, which included some of his own men. Afterwards Kojo was promoted to the rank of "Colonel" (Campbell 1988: 150). Colonial documents and oral traditions generally agree that Kojo was an autocratic political and military leader; his word was literally the law (Bilby 2006: 214; Campbell 1988: 46; Kopytoff 1976: 89; but see Zips 1999b: 215–217).

Given the bias of the archive, it should not be surprising that colonial documents do not mention the specific date of Kojo death, his age at death, or his cause of death. Oral traditions, which tend to emphasize themes over chronology, are also ambiguous. Harris Cawley, an Accompong Town Maroon ex-Colonel, has suggested that Kojo died in his eighth or ninth decade, possibly around "1790-something" (Besson 2016: 112, 170). Cawley may have been reciting an oral tradition, or perhaps he was influenced by the text of the monument to Kojo in Accompong Town, erected by the Jamaica National Heritage Trust, which claims that "Kojo died at over 80" (see Bilby 2006, Figs. 2.6 and 2.7). The late Mann Rowe, another modern Accompong Maroon, variously claimed that Kojo died in 1793 or 1786 (Besson 2016: 117, 166). Perhaps the most reliable dopester of eighteenth-century Jamaica was Thomas Thistlewood, an English planter, who inscribed in his journal on December 6, 1764: "Today first heard that Colonel Cudjoe is dead some time ago" (Hall 1999: 134).

Primary Written History

Thistlewood's diary provides the only known firsthand account that mentions Kojo's physical appearance. In May 1750, about a month after he arrived in Jamaica, the 30-year-old Thistlewood recorded that he met Kojo, who "shook me by the hand, and begged a dram of us, which we gave him. He had on a feathered hat, sword by his side, gun upon his shoulder, &c [sic]. Barefoot and barelegged, *somewhat a majestic look*. He brought to my memory the picture of Robinson Crusoe" (Hall 1999: 14, emphasis added). Thistlewood first read Daniel Defoe's novel when he was about nine years old (Burnard 2004: 107), possibly in its original 1719 edition. The frontispiece of the first edition featured an image of a marooned Crusoe wearing a hat, muskets over both shoulders, sword at his side, barefoot, and barelegged up to the knee (Fig. 6.1). Thus, it is not clear whether Thistlewood was responding to Kojo's sartorial style, something he perceived about Kojo's physique, or his *joie de vivre*. As eloquently observed:

> Cudjoe and Crusoe link through a variety of associations: the mirroring echo of the names Crusoe/Cudjoe, and the visual resemblance that Thistlewood's [textual] sketch emphasizes…Cudjoe possesses, as does Crusoe, a distinctly 'hybrid' Caribbean identity….Both stranded in the Caribbean bush, Crusoe in his goatskins, Cudjoe in his scanty tattered finery, both present an appearance that speaks of life on the frontier productive of an identity outside the limits of conventional civilization yet irreducible to simple savagery, noble or barbaric (Mackie 2009: 132).

In May 1753, Thistlewood wrote: "Met Col Cudjoe just by the Styx Bridge. Shook him by the hand. He was afoot, several other Wild Negroes with him. Has on a beaver, feathered, and a large medal hung to chain about his neck" (Hall 1999: 57). Thistlewood again omitted a description of Kojo's physique and instead focused on his hat and ornamentation—perhaps because they were considered evidence of his sumptuary privileges. "Afoot," in this context, suggest that if Kojo did have a pathological condition at this time, it did not significantly impede his pedestrian mobility, at least not in the coastal region of southwestern Jamaica, where the River Styx is located. In sum, there is no suggestion of pathology, body difference, impairment, or disability.

In July of 1760, Thistlewood hosted a dinner party, including several planters and Kojo. Afterwards, in a parenthetical note, Thistlewood jotted in his diary that Kojo "*has a prodigious hump on his shoulders or back*, and not so tall as me" (Hall 1999: 110, emphasis added). It is impossible based on this vague description to provide a differential diagnosis, or even infer roughly how tall Kojo stood, because we lack information about Thistlewood's stature (Burnard 2004: 1–2). Thistlewood apparently perceived a body difference, but we can only speculate why he chose this occasion to mention it. Had Kojo's appearance changed, or did Thistlewood simply not consider it noteworthy before? It is important to observe that Thistlewood had a lifelong interest in medical topics and his diaries record information about some of the sequelae common to the men and women he enslaved, including references to "cripple Negroes" (Burnard 2004: 186; Hall 1999: 23n2, 41, 48, 58).

Fig. 6.1 Frontispiece to Defoe's (1719), *Robinson Crusoe. Courtesy* Beinecke Rare Book and Manuscript Library, Yale University

Notably, Edward Long, another Jamaican planter and historian who claimed to have "conversed with" Kojo (Long 1774: 344), never thought it important to mention a body difference, if he ever perceived one. This is especially interesting considering Long once remarked that, due to Jamaica's generally salubrious environment, "[a] crooked or deformed man or woman, unless such at the time of their birth, or distorted by some mischance, would here be a rarity to be gazed at" (Long 1774: 273). Long is also notable because of his description of a remarkable event that might have included Kojo. In 1764, Long witnessed a party of Maroons stage a public demonstration of their martial skills. The Maroons, according to Long, exhibited "amazing agility, they literally ran and rolled through their various firings and evolutions" (1774: 348–349). Long also mentioned that "their leader… [was] captain Cudjoe" (Long 1774: 348–349). This account is tantalizing because it appears to suggest that at that time Kojo was physically active and agile. However, "captain Cudjoe" may have been a different person from the famous Maroon leader. Elsewhere, and when clearly referencing the subject of this chapter, Long referred to "colonel Cudjoe" (Long 1774: 345).

Secondary and Derivative Written History

Decades after Kojo died, historian Robert C. Dallas wrote the most widely cited source that describes the Maroon leader's appearance. Though Dallas never met Kojo, his informants apparently included people who had firsthand and reliable secondhand knowledge of Kojo's life and times (Campbell 1988: 116). Dallas described Kojo's appearance during treaty negotiations in 1739:

> Cudjoe was rather a short man, uncommonly stout, with very strong African features, and a peculiar wildness in his manners. *He had a very large lump of flesh upon his back*, which was partly covered by the tattered remains of an old blue coat, of which the skirts and the sleeves below the elbows were wanting (1803: I:53, emphasis added).

Dallas' description matched precisely the frontispiece of his book, which was titled "Old Cudjoe Making Peace" (Fig. 6.2). Presumably commissioned by Dallas or his publisher, this image of Kojo was subsequently widely reproduced in countless publications and other media. Throughout the nineteenth century authors relied on Dallas to produce descriptions of Kojo as a powerful leader who was, unexpectedly, physically abnormal, diminutive, and corpulent. For example, the abolitionist Higginson (1860) remarked that while negotiating the Treaty of 1739 "[t]he formidable chief was not highly military in appearance, being short, fat, humpbacked" (216).

Interestingly, Dallas' account of Kojo's physical appearance, as well as derivative historical sketches, contrast sharply with the fulsome contemporary published descriptions of other Maroons (Dallas 1803: I:31–32, 49, 87–88, 149; contra Mitchell 1950: 2). Dallas, for example, opined that the "strength and symmetry" of the Leeward Maroons "far excelled the other negroes…being blacker,

Fig. 6.2 Frontispiece to Dallas (1803), *The History of the Maroons*, “Old Cudjoe Making Peace,” by J. Smith. *Courtesy* Beinecke Rare Book and Manuscript Library, Yale University

taller, and in every respect handsomer" (1803: I:87–88). Similarly, Bryan Edwards, a slavery proponent and a Maroon critic, maintained that the Maroons' "demeanor is lofty, their walk firm, and their persons erect. Every motion displays a combination of strength and agility. The muscles (neither hidden nor depressed by clothing) are very prominent, and strongly marked" (Edwards 1796: 39). Edwards, whose publication was accompanied by an image of an Adonis-like Maroon officer, offered an environmental explanation for the perceived Maroon phenotype: "their mode of living and daily pursuits undoubtedly strengthened the frame, and served to exalt them to great bodily perfection" (Edwards 1796: 39).

By the early nineteenth century, a trope was established: the Maroons were noticeably different and subtlety superior in form *vis-à-vis* enslaved African Jamaicans (cf. Nugent 1852: 563). For example, according to abolitionists Sturge and Harvey, "[t]he Maroons are a fine race of people, tall, and elegant in person, with features more European than the negros generally possess" (1838: 323). This discourse was shaped by the politics of slavery. Planters needed to explain away the achievements of Maroons as exceptions to the institutionalized rule of African disability, which consigned them to forced labor. They, therefore, noted that the mountainous regions the Maroons inhabited were cooler, and hence more European-like, than the coastal regions of Jamaica, where the sugar plantations were concentrated. Their environment, the enslavers reasoned, must have been a factor in the Maroons' remarkable success. In opposition to this, abolitionists appealed to Christian sympathies and argued that enslavement caused suffering, which prevented enslaved Africans from looking and behaving more like Europeans (cf. Kennedy 2015: 47).

Some of the discrepancies between historical descriptions of Maroon physique in general, and Kojo's appearance in particular may also be explained by events that occurred after Kojo's death. Generally, in the decades following Kojo's death the modern, Western idea of disability began to take shape. This emerging concept differentiated "normal" and "disabled" people primarily based on their respective abilities to perform labor in the rapidly industrializing world (Kennedy 2015). Specifically, following the Second Maroon War of 1795–96, the Trelawny Town Maroons were deported from Jamaica, first to Nova Scotia and then to Sierra Leone (Campbell 1988). Their exodus and exile left the Trelawny Town Maroons scattered across the Atlantic and by the mid-nineteenth century, in the words of Higginson, they had all but "vanished from popular memory" (1860: 222). The Maroons who remained in Jamaica were also increasingly targeted for assimilation into the emergent peasantry, especially after the abolition of slavery (Bilby 2006: 42–44, 46, 342–43, 349–350). Hence, to Romantics like Higginson, the Maroons fit the Enlightenment-era trope of the vanquished and vanishing "noble savage."

Throughout the twentieth century and beyond, anthropologists, historians, and other writers have maintained an interest in Maroon bodies. One persistent topic in this discourse has been speculation about the reason why early historical narratives described Maroon bodies as somehow exceptional. Environmental explanations were still offered (e.g., Beckwith 1929: 190, 194; Hurston 1938: 47; Stedman 1936: 23; cf. Ryden 2015: 164; Sheridan 1986: 166–169), but in the early twentieth century the discourse began to emphasize Maroon social and genetic isolation, and uniqueness (e.g., Martin 1972: 143; Stedman 1936: 23). For example, when the writer Morley Roberts visited the Accompong Maroons in 1927 with a small party, including “Mr. Steggarde [sic], a specialist in anthropometry,” he observed that “[s]ome, though negroid in type, were really beautiful” (1927: 40–41). Roberts further speculated that “[t]here might be an Arawak strain in them; certainly there was Carib blood” (1927: 41). Steggerda later wrote that the Maroons “have had little contact with the Whites for four or five generations, and constitute a nearly ‘pure stock’ of Negroes” (Davenport and Steggerda 1929: 6). Despite long-standing scholarly as well as popular interest, little modern biological anthropology research has been conducted in any Jamaican Maroon community and even less has been published (e.g., Cowan 1969: 76). However, one recent study suggests that modern Accompong Town Maroons are genetically similar to other Jamaicans—both populations are primarily descendent from sub-Saharan Africans, but also Europeans, Asians, and Native Americans (Madrilejo et al. 2015).

In the postcolonial era, the scholarly image of Kojo changed as writers proposed that Kojo’s deformity was only rhetorical, not corporeal. White (1973: 312n28), one of the first writers to explicitly do so, stated that Kojo:

> …has been caricatured by some Europeans as a squat hunchback, but if he had been physically handicapped it would have been *impossible* for him to partake of the rigorous, fast moving existence of the Maroons, let alone *emerge as their greatest leader*. It may be that he was barrel chested and so heavily developed were the muscles of his shoulders that he looked at first sight almost hunchback (White 1973: 312n28, emphasis added).

To make her case that Kojo could not have been “handicapped,” White reframed the familiar theme of linking low Maroon morbidity rates to their salubrious environment. She also assumed that a spinal pathology, which is retroactively non-diagnosable, would have necessarily impaired Kojo. However, it remains to be demonstrated that early Maroons who were perceived as unable to perform certain strenuous physical activities would have also been considered disabled and prevented from attaining leadership positions.[4] This logic appears to be rooted in and reinforce modern disability stigma.

Nevertheless, several other influential scholars have joined in the postcolonial critique and totally dismissed Dallas’ influential description and frontispiece. Craton, for example, described Dallas’ book as “[p]lantocratic propaganda” that “portrays Cudjoe as an ugly, dwarfish figure” (1982: 87). Zips, who perhaps epitomizes this school of thought, reasoned that Dallas’ “description of Kojo as a deformed cripple…(was one of several) obvious distortions of reality to suit colonial interests,” (1999a: 73). Zips imagined that Dallas, “needing to mitigate the

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[4] Though the author is unaware of other documented cases where a person with a spinal pathology became a Maroon leader, in 1634, a Maroon in Cartagena, located in the modern nation of Columbia, testified that a man referred to as “Francisco Criollo Corcovado” or “el Corcovado” guided him and other self-liberated people to the Maroon *palenque* of Limón. *Corcovado* translates as “hunchback” (McKnight 2009: 71–77).

supposed disgrace of not having won the war against the black rebels, portrayed the Maroon commander Kojo as an ugly, deformed, and altogether unhuman cripple" (1999a: 115). In a later publication, Zips characterized Dallas' description "of a clownesque, ugly and deformed Kojo" as "truly savage," which when seen "from a discourse-critical point of view…convey the true historiographic intention, namely to turn the very real (partial) loss of sovereignty into a moral victory on paper" (2011: 192, 196).

Attempts to remodel Kojo's historical image achieve the verisimilitude of critical analysis by disassociating him from the suggestion of pathology and body difference. While it is reasonable to assume that colonial historians stigmatized spinal pathology (cf. Kennedy 2015: 41–42), it may be more interesting to consider what Kojo's followers thought about body differences. Therefore, truly critical reanalysis should reflect on how much postcolonial, "critical" commentary suffers from uncritically examined disability stigma. In other words, did the early Jamaican Maroons equate body differences with being an "unhuman cripple"? Would it really have been "impossible" for Kojo to become the Maroons' "greatest leader" if he did have a spinal pathology?

Maroon Oral Traditions

Beginning in the second half of the twentieth century, Jamaican Maroons published statements in their own words that offer glimpses into *emic* perspectives on Kojo's body.[5] For example, Milton McFarlane's (1977: 24) book, *Cudjoe of Jamaica*, indicated that, according to Windward Maroon oral tradition, Kojo "grew up to be a tall and lanky general who sported a rough stubbly beard." Though the authenticity of some of McFarlane's text is questionable (Bilby 2006: 435n70), C.L.G. Harris, the then Colonel of the Windward Maroon village of Moore Town, endorsed McFarlane's book (Harris 1977: 7). Yet, if he accepted all of McFarlane's claims, it is perhaps curious that Harris described Kojo as "a short, deformed military genius" on his website (Harris 2009). Interestingly, Harris keeps a copy of Dallas' "Old Cudjoe Making Peace" hanging in a frame in his home (see Bilby 2006: 287, Fig. 6.3). Similarly, Harris Cawley, an ex-Colonel of Accompong Town, has a mural of Kojo, clearly inspired by Dallas' history, in his home (Besson 2016, Fig. 3.1e).

The late Frank Lumsden, former Colonel of the Charles Town Maroons, also contributed to a reimagining of Kojo through his art. Lumsden drew a picture of Kojo for use in a documentary film (Anderson 2012) that depicts Kojo as a muscular man with an erect posture, and more than a little reminiscent of Lumsden himself (Fig. 6.3).

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[5] For example, Namba Roy, an Accompong Maroon, wrote a historical novel about his ancestors that features body differences as a central theme (Roy 1986).

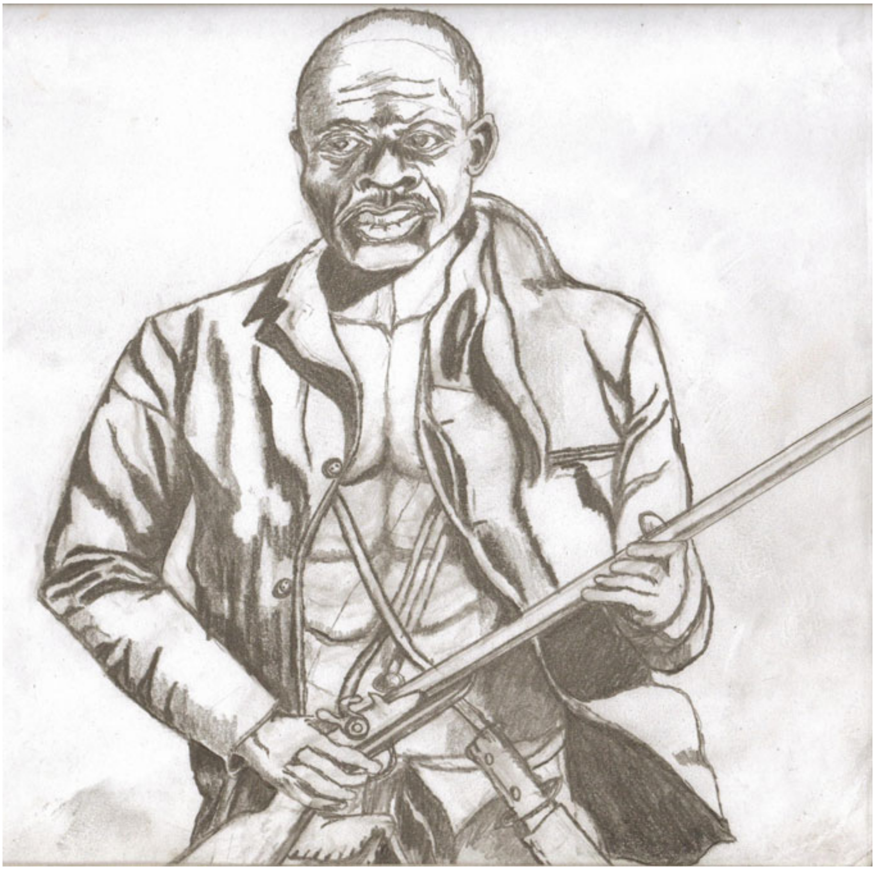

Fig. 6.3 “Cujdoe” by Frank Lumsden, from Anderson (2012). *Courtesy* Action 4 Reel Filmworks

Carey, a self-identified Moore Town Maroon, provided a more critical assessment:

> One of the important issues that Maroons have to deal with is the matter of the appearance of Cudjoe, as a short, heavyset man with a humpback. It is an image incompatible with how he is remembered as a Maroon warrior…he is considered to have been lean, muscular and nimble….The physical description of Cudjoe has been rejected by twentieth-century Maroons as being unacceptable for such a great warrior (1997: 322–333).

Nota bene, Carey perceived Kojo in retrospect—a perspective that cannot be the same as that of her Maroon ancestors who knew him in the flesh. After centuries of cross-cultural interaction and creolization, Jamaican Maroons have appropriated and responded to many aspects of the dominant European culture, which has itself transformed over time. These Maroon writers and artists were all born in the decades before Jamaica gained independence in 1962 and were educated in colonial schools. It would, therefore, not be surprising if their publicly presented historical memories of Kojo were articulated in response to their experiences with institutionalized colonial disability stigma. Hence, while Maroon oral traditions offer important, subaltern perspectives on the past, they should not be assumed to be static or independent of colonial discourses.

Body Differences in Africa and the Diaspora

At the time of the Treaty of 1739, most of the Maroons, or their immediate ancestors, had been born in West Africa (Kopytoff 1973: 18). Thus, we can assume that during the eighteenth century, West African epistemologies and ontologies generally exerted a strong influence on Maroon worldviews, indeed they still do. For example, African conceptions of disease etiology, which considered certain pathologies to be symptoms of spiritual conditions, might lie at the root of the Maroon belief that congenital physical pathologies can result from pregnant mothers mocking, laughing at, or feeling sympathy for people with body differences (Cohen 1973: 91).

Both in Africa and in the African Diaspora people with spinal pathologies were often marked for medical, ritual, and/or social treatment (e.g., Aiah and Guries 1995: 301; Chap. 5; Nicholls 1993: 35–36). However, efforts to identify homologies that link Diaspora practices to African traditions are often futile. The historically and ethnographically documented variety of responses to perceived conditions reflect the amazing cultural diversity, creativity, and dynamism ethnohistorically documented in West and Central Africa. This context is important because it both undermines misconceptions of "traditional" societies as bounded and static and speaks to the vast catalog of transcontinental cultural forms that were available to early eighteenth-century African American societies. It also frames creolization as a long-term trans-Atlantic process, rather than an isolated American event. As Ann Stahl has persuasively argued using archaeological data from the traditional Banda area of Ghana during the post-contact period, communities necessarily, and continuously take stock of all the potentials available to them for how to live life, including nontraditional options (Stahl 2002: 827). This formulation is particularly useful in underscoring the potential for community and individual agency in the historical performance of ethnogenesis, especially in ethnically diverse early Maroon societies.

Undoubtedly, the early Jamaican Maroon camps embraced significant ethnic and cultural diversity and, compared to enslaved African Jamaicans, had relative liberty to choose what types of societies they wished to create. However, Thornton (1992) has emphasized the role of elite agency by reminding us that the "rebels were not necessarily free to choose….the African background of soldiers, officers, and nobles… shaped the ultimate structure of the communities that resulted" (303). Ethnohistorical analyses have often focused on the substantial Akan, specifically Asante, contribution to early Maroon politics (e.g., Kopytoff 1973: 22; Zips 1999b, 2011). Much has been made of the fact that, at the time of the Treaty of 1739, many of the Maroon leaders were known by Akan names. However, there are also structural similarities, and possible homologies. For example, the early Windward Maroon leader Nanny, who oral traditions describe as either Kojo's "sister" or "wife," was a spiritual, military, and political leader (Zips 2011: 149). Zips argued that these Maroon political structures and personalities should be interpreted through the lens of traditional Asante power dynamics that emphasized the complementarity of male and female power (Zips 1999b: 216, 2011). Moreover, modern Maroons often specifically self-identify with the Asante, leading Dalby (1971: 36) to conclude that the Maroons "have for three centuries maintained their historical allegiance to the Ashanti." There were, of course, important cultural and socio-demographic differences between the Asante Empire and contemporary Jamaican Maroons societies. For example, during the early eighteenth century, Asante referenced a large and ascendant political and economic entity with a membership in the low millions. In contrast, the total Leeward Maroon population at the time of the Treaty of 1739 likely did not exceed 1000 (e.g., Mullin 1992: 295; Sheridan 1986: 157). While Maroon allegiance to the Asante was probably not strictly literal, the idiom was clearly resonant (Bilby 2006: 79–82; Krug 2014). Hence, it may be illustrative to understand the symbols and structures of power as they historically operated in Akan kingdoms, as well as how power intersected with dis/ability.

Traditional Akan proverbs suggest that physical pathologies and body differences have "never been considered a barrier to self attainment or personal development" (Yankah 2009: 2). For example, one Akan saying can be translated as "before the cripple challenges you to stone throwing, he would be sitting on a pile" (Yankah 2009: 4). The clear implication is that guile can overcome physical limitations. This cultural logic likely contributed to the development of the *Anansi*, or trickster genre of folklore, which is still popular in Jamaica and elsewhere in the African Diaspora (Marshall 2007; cf. Chap. 5). In *Anansi* stories, tricksters are typically portrayed as physically weak, but gain advantage over their adversaries by outwitting them. Another Akan idiom, which is a classic example of alternate ability, can be translated as "a lost eyeball retracts into the head," suggesting that lost eyes can see what they could not before (Yankah 2009: 3). It is tempting to imagine early Maroons, perhaps Kojo himself, deploying these very same idioms when discussing asymmetrical military campaigns and political strategies.

Ethnographic and ethnohistoric records suggest that Akan kingdoms traditionally restricted kingship to people whose bodies were "complete" and outwardly "unblemished." The king's perfect body was thought to be symbolic of his moral character and the kingdom's prosperity (Gilbert 2008: 172). Kings were required to maintain physical perfection and in the event that one fell ill he was obligated to abdicate his royal stool (Gilbert 2008: 173–177; Munyi 2012).

Interestingly, both written and oral texts suggest that, traditionally, the appointment of Maroon Colonel was for life, irrespective of at least certain illness (cf. Besson 2016: 69; Campbell 1988: 128). For example, Montague James, the last recorded chief of the Trelawny Town Maroons, who came to power in the late-1770s or early 1780s, was granted 18 months of "sick leave" abroad, "destination unknown, and at whose cost, not clear," after becoming "greatly impaired" during the strenuous execution of his duties (Campbell 1992: 90–91). After returning to Jamaica, James continued to lead the Trelawny Town Maroons, until his ultimate death, ca. 1811–1812 (Campbell 1992: 102–103). In addition, census records from the other four Jamaican Maroon communities that were never deported, dating from 1810–1841, indicate that most Maroons were considered by White census takers to be "Healthy," but were occasionally identified as "Aged," "Infirm," "Rheumatic," "Invalid," "Weakley," or "Superannuated," including Maroon Colonels and other officers (Votes of the House of Assembly of Jamaica 1810–1842). In 1830, for example, the Colonel of the Moore Town Maroon community was described as "Infirm," and half of the 14 other officers were described as either "Rheumatic," "Superannuated," "Infirm of limb," or "Zealous but aged" (Votes of the House of Assembly of Jamaica 1830). However, census records also suggest that if a Maroon colonel was considered impaired, he could be relieved of his responsibilities, without loosing his title. From 1810 until 1815, for example, the census records for the Maroon community of Accompong Town listed two colonels: John Foster, a septuagenarian who was described as superannuated, and Robert Austin, who was 11 years younger than Foster and apparently, succeeded him (Votes of the House of Assembly of Jamaica 1810–1815).

It is also critical to note that people with physical pathologies and body differences traditionally occupied prestigious roles in Akan courts. For example, kyphosis and other spinal pathologies were considered common, even ennobling, traits for official court gong-beaters and criers, or heralds (Bowdich 1819: 376–377; Clarke 1863: 113; Gilbert 2008: 178). In the Akan court, the atypical body of the herald, representing the wilderness, was customarily and purposefully juxtaposed with the perfect body of the king, which represented the town. The herald can be thought of as an analog, foil, or metaphoric representation of the king (Gilbert 2008: 173, 178). The duties of the court heralds were various, but included maintaining order in the court, ensuring the solemn execution of ceremonies and other court events, and, in conjunction with the linguist and the sword bearer, state diplomacy (Boahen 1973: 4). Rattray mentioned that, based on a creation myth, Asante court precedence ranks the herald first among these officials (1923: 263). Akan heralds, according to Obeng (1999), "are traditionally not well-respected due to beliefs about their disability. However, because of their institutional status, they can issue directives to people who may have higher social status than them outside the courtroom" (216).

Discussion and Conclusions

The issue of Kojo's physical appearance is reminiscent of another point of contention in the history of the Jamaican Maroons: the notion that Nanny possessed the ability to capture bullets or cannonballs fired at her, either in her buttocks or vagina, and fire them back at her enemy (Bilby 2006: 204–205). Perhaps because it was considered vulgar or obscene, many twentieth-century historians subsequently mentioned Nanny's magical ability to catch bullets. However, the poet-historian E. Kamau Brathwaite has critiqued this trend and claimed that mainstream scholarship uncritically "buttockicized" Nanny. Brathwaite argued instead that Nanny's the legend was invented by a colonial policeman, perhaps based on half-understood Maroon stories (see Bilby 2006: 204–205). Bilby persuasively rejected Brathwaite's revisionist position, citing a combination of Jamaican Maroon oral traditions, cognate oral traditions from Suriname Maroons, and African ethnographic analogies (2006: 205–213). In both Brathwaite's interpretation of Nanny's ability to catch bullets and postcolonial interpretations of Kojo's physical appearance historical information considered offensive or objectionable were rejected under the banner of critical scholarship.

It is also interesting to note that controversies surrounding the identities of historically documented Maroon leaders are not unique to Jamaica. For example, in 1995, anthropologist and gay rights activist Luiz Mott claimed that Zumbi, a seventeenth-century military leader in the Brazilian Maroon *quilombo* of Palmares, and a Brazilian national hero, was homosexual. Mott was quoted in an online magazine as claiming that documentary evidence revealed,

> Zumbi's nickname was sueca (Swedish woman), he never had a wife, he came from the Angolan ethnicity of 'quibanda,' where homosexuality was institutionalized, he was raised by a priest in Alagoas who called him 'my little nigger' and, when he was assassinated in 1695, his penis was cut off and shoved into his mouth (Funari and de Carvalho 2012: 259).

This claim was not received well by a segment of the Brazilian population, who in response directed violent protests at Mott. Perhaps the lesson is simply that Maroons are cynosural figures that have a certain cultural valence in contemporary society and scholarship. As such, reimaginings about historical Maroon leaders tell us less about historical identities than they reveal about the biases of modern people who think about them—*caveat lector* (cf. Funari and de Carvalho 2012: 262).

However, any historical figure, especially a prominent personality, has the potential to provoke dialog and debate between scholars and the public. A documentary film crew recorded what happened moments after bioarchaeologist Jo Appleby archaeologically exposed King Richard III's skeleton. Appleby told eager onlooker Philippa Langley that the spinal column had "a really abnormal curvature," suggesting "this skeleton, in fact, has a hunchback." Langley, a Scottish screenwriter and prominent member of the Richard III society, had previously challenged Shakespeare's claim that Richard III had a spinal pathology. In initial disbelief, at the physical evidence in front of her, Langley's jaw dropped and she stammered "No, no" (Bower and Woods 2013). It was the preponderance of the bioarchaeological evidence that eventually persuaded her that one could be both a king and have a spinal pathology.

In the case of Kojo, revisionists have tended to retroactively view ability in dualistic and essentially modern terms—either "normal" or "disabled"—and assume that spinal pathology would have disabled Kojo from becoming the exceptionally capable and successful man that he unquestionably was. By normalizing Kojo, well-intentioned postcolonial scholars may have inadvertently failed to appreciate Kojo's extraordinariness. In this case, self-described "critical" scholars have failed to account for the role of cultural creativity in the social construction of disability and alternate ability. This conclusion highlights an important point about scholarly practice: "critical" scholarship, no matter how well intentioned, should structure criticism empirically—based on an interrogation of multiple datasets—and should not resort to visceral reactions, which, all too often, reinforce pernicious stigmas. Bioarchaeology has unique potential to place empirical checks on similar abuses of history (cf. Appleby et al. 2014).

The contributions of this chapter are historical and anthropological. By viewing pathology and body difference through the lenses of critical social theory, intersectional identity theory, and the interactional model of social disability, this chapter has attempted to bring into focus a plausible alternative interpretation of how pathology and body difference could have been perceived by Kojo's contemporaries. According to this alternative reading of history, perceived body differences, as they intersected with Kojo's gender, ethnicity, and kinship linkages, could have helped enable him to attain a leadership position within Maroon society, rather than disable him. Therefore, this chapter underscores the often under-appreciated influence that dis/ability has had in shaping the course of history, which Kojo clearly did do. This chapter also makes a contribution to critical disability studies by challenging the assumption that people with body differences always have been, and thus will always be, societally marginalized. It may be concluded that, while paleopathological analyses can successfully identify some diseases and injuries, bioarchaeologists can only explore dis/ability with the aid of social theory and robust contextualization drawn from multiple, independent lines of evidence.

Because dis/ability can only be understood by detailed contextualization, the fragmentary historical record describing Kojo is unfortunate. Nevertheless, we may posit a plausible scenario in which pathology and body difference could have enabled, rather than disabled, Kojo. For example, kyphosis might have reminded some African-born Maroons of Akan heralds, and possibly contributed to a perception that Kojo had an innate affinity with the spirit world. Maroon oral traditions relate that some of Kojo's contemporaries possessed spiritual powers that enabled them to communicate with Africa (Bilby 2006: 59, 71–79; Kopytoff 1987: 468). If the Maroons believed that Kojo could directly spiritually communicate with Africa, then he may have been perceived as embodying African authority in Jamaica. When viewed in this light, we must also reconsider Kojo's role as the lead treaty negotiator and recall that diplomacy was one of the primary functions of Akan heralds (Boahen 1973: 4). It is impossible, of course, that kyphosis was the only quality that Kojo's fellow Maroons saw in him. Rather, the Maroons may have decided to forge a new sociopolitical system that allowed their most able leader, who also had a spinal pathology, to assume power. If this scenario was to be proven accurate, then Kojo's selection as the Leeward Maroon leader might be read as a creative response to a nearly impossible situation, where the old African ways were simply no longer tenable, but still symbolically important. Or, it could be said that Kojo heralded in a new world.

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Chapter 7
Rendered Unfit: "Defective" Children in the Erie County Poorhouse

Jennifer L. Muller

Introduction

Bioarchaeological analysis relies on the integration of all possible sources of data that add to the reconstruction of cultural and environmental contexts (Martin et al. 2013; Larsen 2015). As a result, bioarchaeological investigations are interdisciplinary, incorporating social theories and ethnographic study in their interpretations of the biological and social bodies of the past (e.g., Agarwal and Glencross 2011; Boutin 2016; Geller 2017; Goodman and Leatherman 1998; Martin et al. 2013; Sofaer 2006; Thompson et al. 2014). Current research within bioarchaeology includes in-depth analysis of the skeletal remains, mortuary context, artifacts, and when possible, the documentary archive.

Previously recognized as peripheral to our understanding of past human cultures and societies, children are currently an important area of investigation within bioarchaeology (e.g., Ellis 2010; Geber 2015; Lewis 2007; Perry 2006; Thompson et al. 2014). Children are essential active agents in society, who transmit cultural norms through their work and play. Ellis (2014) asserted that societies respond to the very specific role of children through investment in institutions and practices that change and/or adjust their environments. These practices and institutions may impact the adaptability of the child in coping with environmental, biological, and cultural stressors. Therefore, whenever possible, bioarchaeological investigations of children must integrate archival documents to inform our understanding of the role of institutions (e.g., schools, churches) on their lived experiences. Of course, this is particularly applicable to bioarchaeological analysis of institutionalized children (e.g., in orphanages, poorhouses, asylums) (Dougherty et al. 2005; Geber 2014; Higgins and Sirianni 1995; Sirianni and Higgins 1995). Archaeological research on institutions has been published in a number of volumes (e.g., Beisaw and Gibb

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J.L. Muller (✉)
Department of Anthropology, Ithaca College, 953 Danby Road, Ithaca, NY 14850, USA
e-mail: jlmuller@ithaca.edu

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2009; Casella 2007; Spencer-Wood 1996). However, much of the *bioarchaeological* research on United States institutions remains in the gray literature. One exception is the recent volume edited by Nystrom (2017) that specifically focuses on the bioarchaeology of dissection and autopsy, including evidence from poorhouses and medical institutions.

The United States history of institutionalization is intimately tied to the concepts of impairment and disability. Therefore, bioarchaeological and archaeological analyses of the institutionalized must contextualize these concepts (Southwell-Wright 2013). The comparatively new discipline of disability history provides an avenue for rich, critical, and interdisciplinary understandings of impairment and disability in past populations (e.g., Burch and Rembis 2014). The complexity of social identities and treatment of disabled children are important areas of investigation in disability studies. However, there is comparatively little discourse on childhood disability *history*. Anthropological research on childhood disability in the past is an imperative (Laes 2008). Laes (2008) produced a critical exploration of childhood disability in antiquity, incorporating "classic" texts, ancient iconography, and archaeological and osteological evidence. This included investigating the possibility of infanticide of children considered "disabled" and alternatives to infanticide such as hiding, "caring for," abusing, maiming for alms, jesting, and placing on display. Bioarchaeological research may add to the necessary contextualization for disability history through the mortuary context (e.g., van Duijvenbode et al. 2015; Chaps. 12 and 13). This context has the potential to provide important clues to how society values members who had been considered impaired and/or disabled. In addition, bioarchaeologists who analyze skeletal remains from the fairly recent past may also use historical archives for contextualization (Herring and Swedlund 2003).

Laes (2008) noted that the transference of the term "disability" to antiquity is problematic. In antiquity, the term "disability" did not exist and there was not necessarily a clear delineation among deformities, illnesses, impairments, and disability. For the same reasons, application of the term "disability" to the recent past presents difficulties. In this chapter, impairment is defined as any loss or variation, temporary or permanent, to the structure of the body and/or mental systems that create functional limitations (adapted from WHO 2001). This contrasts with disability, which is a cultural/societal construct. Society is responsible for disabling individuals who possess physical and mental impairments through the processes of isolation and exclusion from full participation in society (Anastasiou and Kauffman 2013). As revealed in this chapter, children were labeled as defective, diseased, deformed, and unteachable due to particular impairments. These children were disabled within the context of New York State society in the nineteenth and twentieth centuries, and in many cases, institutionalized.

Between 2008 and 2012, the State University of New York at Buffalo's Archaeological Survey disinterred 376 individuals associated with the Erie County Poorhouse cemetery, 66 of whom were children (Hartner and Perrelli 2014). This chapter focuses on the contributions of the documentary archive to enhancing our understanding of the impacts of societal views on children from the

Erie County Poorhouse. Careful historical contextualization reveals that changing ideas regarding the value of children in general and “defective” children in particular may have altered who would be represented in the poorhouse cemetery. This contextualization includes transformative ideologies regarding the value of children, from predominantly economic to sentimental (Mintz 2004) as well as attitudes of those in power towards children perceived as defective, diseased, and/or unteachable. Government policies, such as the Children’s Law of 1875, and additional practices pertaining to the removal of ‘healthy’ infants and children from the poorhouse may further complicate the analysis of the skeletal remains. Archival documents indicate that the children disinterred from the cemetery may not be representative of all children in the poorhouse and its associated hospital. In fact, the archival documents suggest that those buried in the cemetery may be disabled children—those who were rendered “unfit” for care by families or private institutions. This discussion of the archival documents is framed by Michel Foucault’s biopower, which hypothesized that power manages the right to life and survival of particular people within its purview.

Bioarchaeologists are now cognizant of Wood et al. (1992) osteological paradox and its implications for analyzing pathologies in skeletal remains. Since the publication of this seminal work, additional methodologies have been proposed for analyzing pathology data in bioarchaeological studies (e.g., DeWitte 2010; Marklein et al. 2016; Wilson 2014; Wright and Yoder 2003). This chapter underscores the value of archival research on impairment and disability and suggests its integration, when possible, with these proposed methodologies.

The Establishment of New York State County Poorhouses

In the early 1800s, industrialization of northeastern United States cities was accompanied by significant population increases. Much of the population growth was attributed to those who had emigrated from Europe in search of economic opportunity and stability. However, the United States was ill-prepared for the massive influx of workers, and periodic underemployment and unemployment were commonplace (Katz 1986). Coupled with the lack of economic and social support systems, many urban workers and their families, including those in Buffalo, New York, experienced bouts of destitution (Katz 1986).

At the commencement of the nineteenth century, poverty in the United States was generally managed at the state level (Katz 1986). Government municipalities struggled to assist the unprecedented number of paupers, relying on a variety of means to provide relief (Cable 1975; Folks 1902; Mintz 2004). Outdoor relief, consisting of charitable efforts to provide food, firewood, and other essentials, was the most frequently utilized form of service. In many circumstances, outdoor relief was not enough to sustain individuals and their families. Alternatively, the poor and destitute, including children, may have been farmed out to families who bid the lowest amount, placed under contractual pauper care, or indentured (Folks 1902).

The latter was particularly applicable to children. United States government authorities apprenticed children or bound them out as servants. The working child was not anomalous during this time period. In fact, children were valued for their economic contributions more than any sentimental attachments. Apprenticeship was a necessary step in establishing one's expertise in a trade. Folks (1902) suggested that child apprentices were likely to have been treated better than their counterparts in public assistance. Apprentices also fared better than other working children who toiled in factories beginning at three years of age (Cable 1975). These children endured long hours in harsh conditions; their developing lungs succumbed to respiratory diseases, and premature deaths were commonplace (Cable 1975; Mintz 2004). By the early twentieth century, the binding of children was no longer common practice since "[t]he bound child has often been alluded to as typifying loneliness, neglect, overwork, and a consciousness of being held in low esteem" (Folks 1902: 41).

In 1820s, New York State responded to increased poverty by establishing an indoor relief system. It was hoped that this poorhouse institutionalization would optimize the effects of the government's financial contributions in preventing death from homelessness and starvation (Katz 1983). Within the United States, poorhouses were first built in the larger cities. Yates (1824), Secretary of New York [State] (1818–1826) provided a comprehensive report on the state of pauper care and advocated for the building of additional almshouses as a solution to the pauper problem. With regards to children, his report states:

> Most of the children of paupers out of an almshouse are not only brought up in ignorance and idleness, but their health is precarious, and they frequently die prematurely. The reverse is the case in an almshouse. Their health and morals are alike improved and secured, and besides they receive an education to fit them for future usefulness (Yates 1824).

The report was favorably received and hence the county almshouse system was passed into New York State law in 1824.

In 1829, the Erie County Poorhouse received its first residents in the Black Rock section of Buffalo, New York. In less than 25 years, the poorhouse would experience extreme overcrowding and needed to move the facility to a larger expanse of land. In 1851, the poorhouse was moved to Buffalo Plains (see Chap. 11, Fig. 11.1). This is currently the site of the State University of New York at Buffalo's South Campus. The Erie County Poorhouse, similar to other New York State poorhouses, was not a singular building, but more accurately defined as a complex. Over its years of operation (1851–1926), the poor sought relief at Buffalo Plains in such spaces as a hospital, a tuberculosis ward, an insane asylum, and the poorhouse.

Records indicate that a major cause of entry for young women into the Erie County Poorhouse included pregnancy and recent birth (e.g., Keeper's Reports of the Erie County Board of Supervisors (1857–1862, 1863–1870, 1874, 1880, 1891, 1892, 1893, 1896, 1897, 1899, 1900). Katz (1986) noted that this poorhouse may have served as a maternity hospital for unmarried women throughout its existence. Higgins's (1998) analysis of Erie County Poorhouse records indicated an increase in the number of unwed, young women during the American Civil War.

This information underscores the vulnerability of women who lacked financial and social support systems. Many pregnant women would seek assistance from the poorhouse and its hospital, resulting in many children being born into the poorhouse. Older children would become poorhouse inmates with their parents or due to abandonment, death of parents, delinquency, and/or perceived disability. Other children would be removed from their pauper parents and placed under poorhouse care:

> On Tuesday night the husband died in the hospital, and Wednesday the Poormaster went to the boat to inform the family of the fact. He found the woman dead drunk on the cabin floor, and the children naked. The same night the woman gave birth to a still-born child. Wednesday afternoon the unfortunate woman was sent to the hospital, and her two children to the Poorhouse (The Buffalo Express, July 30, 1869: 4).

The poorhouse had developed out of necessity—a political and economic attempt to *deal with* the poor (Katz 1983). Improving the health of the poor was never truly the impetus for indoor relief. The poorhouse, instead, was designed to serve as a deterrent to poverty and its “causes” of idleness, laziness, and immorality (Katz 1986). It did not positively impact the lives of the poor, nor did it prevent morbidity and mortality associated with disease and malnutrition (Higgins 1998). While municipalities saw the poorhouse as a means of controlling the pauper population, the poor perceived the poorhouse and the city hospital as “a way station in route to potter’s fields” (Cable 1975: 34).

The aspirations of Yates and his fellow legislatures would never be realized. Shortly after this indoor social welfare system developed, charitable organizations began to question the appropriateness of children in the poorhouse. Just over 30 years after Yates’ report, a New York [State] Senate select committee (1856) condemned the presence of children in the poorhouse. The committee concluded that poorhouses were lacking in adequate preparation for the pauper child. There was a lack of secular education; there was no understanding of money; no development of skills; no social network.

Since its inception, the poorhouse was never static, but evolved in response to changing ideologies. The poorhouse did not cease to exist; it transformed from its origins as a catch-all facility for the poor, insane, sick, orphaned, and debilitated to one that specialized in the care of the aged and infirm (Katz 1986).

Child-Saving, Hereditary Pauperism, and the Children’s Law of 1875

Cultural views on the role of children in society experienced significant evolution in the nineteenth and early twentieth centuries. Katz (1986) argued that by the mid-1800s, American society valued middle-class children beyond their economic worth. In the latter half of the century, the sentimental value attributed to young children was extended to the working-class. During this time period, older children were increasingly depended upon for their contributions to household income and sustainability through their work outside the home. Younger children began to assist within the household instead of working in industries and factories. The value of younger children transitioned; as their economic contributions decreased, their sentimental value increased.

Beginning in the 1790s, a growing number of philanthropists directed their energies towards the care of destitute children (Mintz 2004). Collectively known as child-savers, they established charities, schools, orphanages, and houses of refuge for pauper children. Child-saver William P. Letchworth (1894) cited the deplorable conditions in which children lived in their confinement behind poorhouse walls and lobbied for an alternative solution to the care of government-dependent children. In the two decades that followed the New York State Senate's 1856 report, legislation was passed throughout the United States in an effort to reduce, or all together remove, children from poorhouses. The New York State Board of Charities was established in 1867, and following visits to New York City and county poorhouses, the board recommended removal of the children. The 1874 annual report of the New York State Commissioners of Public Charities directly contradicted the benefits of almshouse institutionalization as outlined in Yates' (1824) appeal:

> Degrading and vicious influences surround them in these institutions, corrupting to both body and soul. They quickly fall into ineradicable habits of idleness, which prepare them for a life of pauperism and crime. Their moral and religious training is in most cases, entirely neglected, and their secular education is of the scantiest and superficial kind. Self-respect is, in time, almost extinguished, and a prolonged residence in a poorhouse leaves upon them a stigma which clings to them in after years, and carries its unhappy influences through life (New York State Commissioners of Public Charities 1874).

By the time the report was released, the number of children in county poorhouses had already been substantially reduced, largely due to philanthropic efforts (Folks 1902).

The child-savers served to promote changes to legislation and policies in an effort to not only protect innocent children from the evils of society, but also to protect society from immoral and dangerous children (Mintz 2004). Much of the perceived danger focused on the intergenerational continuity of poverty, or "hereditary pauperism," and the institution itself as an "evil" in which "a large majority [of the adult inmates had] passed their earlier years" and "in it acquired their most deeply rooted ideas of life, society and social duties" (State Charities Aid Association 1888: 51). According to the child-savers, children between the ages of 15 and 18 were released from the poorhouse, having been morally and physically corrupted, with no skills or sense of purpose (New York State Board of Charities annual report 1874; State Charities Aid Association 1888). They "naturally (had) fallen back to the Poorhouse as a refuge, often bringing with them young children to repeat their degrading experiences and again reproduce their kind" (State Charities Aid Association 1888).

This fear of hereditary pauperism permeates the literature penned by child-savers. The poorhouse was seen as a "source of demoralization" that not only became ingrained in the individual, but corrupted multiple generations (Letchworth 1894). References to adult inmates who had lived out their earlier years in the poorhouse and the presence of multiple generations in the poorhouse at the same time provided the necessary impetus for the removal of children from poorhouse institutionalization. One example was provided by McPherson (1881: 61):

> A little girl was lately removed from the Poorhouse, the place of its birth; the mother of the child was also born there and never knew any any [sic] other home; the grandmother, too, claimed the county institution as her heritage. Three generations of paupers there at one time!

McPherson's telling of this story is eerily similar to those infamous words pronounced by Oliver Wendell Holmes in the Supreme Court's 1927 verdict in *Buck v. Bell*—"Three generations of imbeciles are enough."[1]

In response to mounting pressure from charitable and religious organizations, the New York State government passed "An Act To Provide For the Better Care of Pauper and Destitute Children" (1875) also known as "The Children's Law." Enacted in 1875, the law stipulated that children between the ages of three and sixteen years old should no longer be sent to New York State poorhouses for support and care. Instead, they should be committed to orphan asylums or other charitable or reformatory institutions. In 1878, this law was amended, requiring the removal of children between the ages of two and sixteen years old (Williams 1897). The Children's Law was not without its critics. Several bills were introduced into the court legislature in an effort to repeal it; none of which were successful (Letchworth 1894).

Removal of Children from the Poorhouse

With the passage of the Children's Law, New York State's official solution to hereditary pauperism and protection of its dependent children was removal from poorhouse institutionalization. However, protocols and mechanisms for the removal of pauper children were not established in the 1875 legislation. As a result, historical records document the presence of children in the Erie County Poorhouse throughout its existence. For example, McPherson (1881) stated that there were 57 children over the age limit in the Erie County Poorhouse in 1880. McPherson also reported that these children were not necessarily entered into the books of the Superintendent of the Poor.

Even though the transition was slow, New York State began to transfer responsibility of child guardianship to private institutions, corporations, and religious organizations (Williams 1897). Children were placed in orphan asylums or other institutions, e.g., St. Mary's Infant Asylum, and public authorities made provisions for their maintenance. The State would pay a per capita allowance to existing private institutions for each dependent child. While some supported private

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[1] Buck v. Bell, 274 U.S. 200 (1927) is a United States Supreme Court decision, written by Justice Oliver Wendell Holmes, Jr. The ruling permitted state compulsory sterilization of those individuals deemed unfit and declared that the decision was in the interest of public welfare.

institutionalization, others were particularly critical of New York's adopted solution for the reduction of child poorhouse inmates (Williams 1897). Criticisms included the lack of oversight and standardization regarding the treatment of dependents.

Another popular means of removing children from poorhouse institutionalization was adoption. In the early 1800s, many if not most adoptions were motivated by economic need (Katz 1986). This was not viewed with abhorrence, but reflected the dominant economic value attributed to children. Adoption had commenced long before the passage of the Children's Law. It was standard practice for healthy children to be separated from their pauper parents and preferably be adopted before their third birthday. "The younger a child is when adopted, the more likely it is to become firmly endeared to its new guardians" (State Charities Aid Association 1888: 55). By the early twentieth century, the impetus behind adoption changed to sentiment rather than the ability of children to produce or contribute financially to the household (Katz 1986). Along with this change in motivation came an increase in the adoption of babies and a reduction in the adoption of older children (Katz 1986). Katz further argued that technological advances and cheap immigrant labor reduced the need for child labor. In addition, fear of the increasing child immigrant population led to their removal from the workforce and placement in schools where they could become "Americanized."

Similar to that purported by Dougherty et al. (2005) in their examination of the Milwaukee County Home for Dependent Children, very few of the Erie County Poorhouse children who were adopted were actually orphans. McPherson (1881) advocated for the adoption of children, even in the event that parents were still living, citing both lowered expenses to the county and decreased likelihood of children becoming criminals. McPherson acknowledged that many argued for keeping children with parents believing that the reformation of adults could only be accomplished by the possession of their children. However, McPherson opposed this idea:

> But should the probable ruin of the boy be risked for the doubtful reform of the father? or [sic] are the taxpayers of Erie county obligated to support, year after year, the children of parents who refuse to neglect to provide for their offspring, without the privilege of placing them in good homes when such are offered? (McPherson 1881: 60–61).

While many children would be adopted within New York State or transferred to other institutions, many others would find homes in the Midwest via Orphan Trains. Charles Loring Brace, head of the New York State's Children's Aid Society decided to find slum children homes on western farms. Between 1855 and 1875, the Society sent an average of 3000 children annually (Mintz 2004). The fate of these children varied significantly, with some finding loving homes and others being indentured for over a decade. Still other children exercised their own responses to poverty and the Children's Law via noncompliance—running away, opting to seek spaces more familiar, or choosing to work and earn money independent of government suggestion (Mintz 2004). The United States government also developed a policy of sending nonnative dependent children, along with their destitute parents, back to their countries of origin (Keeper’s Reports of the Erie County Board of Supervisors 1891, 1892, 1893, 1896, 1897, 1899).

“Unfit” Children

As stipulated in the Children’s Law, not all children would be the recipients of care by private and religious charitable institutions. The removal of children from the poorhouse was predicated upon their being deemed healthy and mentally fit.

> On and after January first, 1876, it shall not be lawful for any justice of the peace, police justice or other magistrate to commit any child, over three and under sixteen years of age, as vagrant, truant or disorderly, to any county poor-house of this State, or for any county superintendent or overseer of the poor, or other officer, to send any such child as a pauper to any such poor-house for support and care, *unless such child be an unteachable idiot, an epileptic or paralytic, or be otherwise defective, diseased or deformed, so as to render it unfit for family care…*(An Act To Provide For the Better Care of Pauper and Destitute Children 1875, emphasis added).

In order to understand which children were, in practice, exempt from the Children’s Law, an understanding of the historical meaning attributed to the terms in the law is required.

Nineteenth- and early twentieth-century physicians and scholars problematized the understanding of mental illnesses. Dr. Martin W. Barr, Chief Physician at the Pennsylvania Training School for Feeble-minded Children (1904), suggested that it had become in fashion to use “feeble-minded” as a catch-all term for separate and distinct scientific categories of mental illness. Barr similarly noted the erroneous use of the term “insanity” to describe idiots, imbeciles, and backward child. He defined insanity as a “second childhood”—a dementia which caused one to revert to a child-like state (Barr 1904: 18). Idiots and imbeciles were mental defects, whereas dementia was a disease. According to Barr, there were types of defectives whose condition may be either mental, moral, or both. These defectives were usually associated with “certain physical stigmata or degeneration” (Barr 1904: 23). These types were not distinct in causation, but occupied different spaces on a scale. Therefore, there was a hierarchy applied to the term idiot, with simpletons being of the highest form, followed by fools or imbeciles, and then true idiots who “… are mere organisms, masses of flesh and bone in human shape” (Barr 1904: 21). Idiots were considered to be devoid of understanding from the time of birth. They were unable to communicate and therefore, remained socially isolated. “The idiot sees nothing, feels nothing, hears nothing, and knows nothing” (Barr 1904). According to Barr, imbeciles, on the other hand, possessed a certain degree of intelligence, but they were unstable and at times acted irresponsibly. Backward children were unable to advance rapidly, and may have been known as “simple” or “simpletons” to others.

Distinctions were created between those children who were labeled as teachable idiots and those labeled as unteachable idiots. According to Barr’s definitions, those labeled as fools, imbeciles, simpletons, and backward children would likely have been considered teachable. The Children's Law of 1875 specifically stated that "unteachable idiots" were exempt from removal from poorhouse institutionalization. *The Hand-book for Visitors to the Poorhouse* (State Charities Aid Association 1888) suggested that New York's teachable "idiot" children, who were not epileptic, should be moved to the New York Asylum for Idiots in Syracuse.

The term, "epileptic" is specifically noted in the Children's Law, and was the topic of much discussion in the late 1800s (Letchworth 1899). By this time, it was understood that epilepsy was related to the brain and "nerve centers" of the body. The notion that epilepsy may have been contagious led to the separation of epileptic individuals from the healthy (Levy 2003). It was believed that the insane were more likely to contract epilepsy than their sane counterparts. Barr suggested several possible causes and/or contributing factors associated with epilepsy, including heredity, intemperance in parents, traumatic injuries, injuries to the mother during the gestational period, parental syphilis, disease, malnutrition, and "difficult dentition" (Barr 1904: 213). According to Barr, convulsions and prostration of the nervous system were often followed by "gradual but certain diminution and degeneration of mental, moral and physical powers" (Barr 1904: 211). Following seizures, individuals may appear to be confused or display some unusual behaviors (Levy 2003). Post-seizure behaviors may also induce sleep, headache, and sore muscles. Such physical consequences and changes in the behavior of those with epilepsy, or other seizure disorders, were poorly understood by the nineteenth-century medical community. In many cases, this lack of understanding was met with desires to exclude those with epilepsy from mainstream society. "One would naturally suppose that an unwritten law would prevent intercourse of epileptics and therefore forbid or at least deter direct transmission of the malady, yet records of facts to the contrary are not lacking" (Barr 1904: 212).

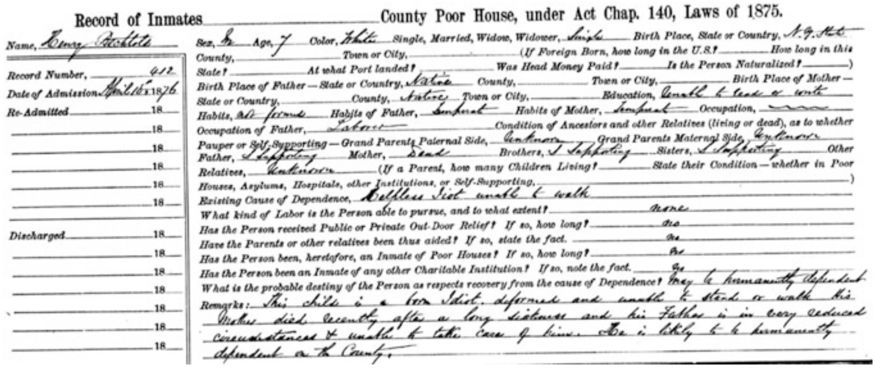
Unlike unteachable idiot and epileptic, the terms paralytic, defective, diseased, and deformed are quite vague and may be used to label a variety of diseases, conditions, and injuries (Fig. 7.1). Perhaps this was purposeful language that provided government officials with the freedom to make decisions about which children would remain in the poorhouse. Many philanthropic leaders of the time recognized that children who were deemed as unhealthy or unintelligent were treated poorly, or not at all, throughout the United States (Williams 1897). In mid-nineteenth-century New York State, the child, the poor child, and the poor disabled child were seen as occupying distinct categories. In 1878, the Children's Law was amended to abolish the exemption of "defective" children. However, the passage of this legislation did little to eradicate the confinement of these children to the poorhouse. Williams (1897) stated that 25% of the 100,000 children in the United States that were public charges were either juvenile delinquents or defectives, including the blind, the deaf and dumb, and the feeble-minded. New York State was no exception. According to the Census of Almshouse Inmates, many of the children left in the Erie County Poorhouse before and after the Children's Law

Fig. 7.1 “Child on chair,” associated with the archived photographs from the Buffalo chapter of the Children’s Aid Society. The child shows evidence of a lower limb impairment of unknown etiology. The child’s clothing appears to be raised above the waist in order to photograph the legs. In an additional photo, the child is accompanied by a woman in a nurse’s uniform. Institutional affiliation of the child is unknown. Courtesy of Buffalo History Museum

were those deemed defective or otherwise impaired (Fig. 7.2). The State Charities Aid Association of New York (1888) stated that “homes will not take them and no family cares to adopt them” (1888: 58).

Savior Children and “Defective” Children

In 1976, Michel Foucault published *La volonté de savoir*, the first volume in a series on the History of Sexuality. In it, Foucault introduced the idea that power is exercised at the level of life. This biopower serves those in power by intervening on the vital characteristics of human beings (Foucault 1978, English translation; Rabinow and Rose 2006). Rabinow and Rose (2006) proposed that Foucault’s concept of biopower includes three main elements. The first is a truth regarding the vital character of living human beings, and authorities that are competent to speak to that truth. The second element consists of strategies for intervening upon peoples for the overall health of the collective unit. The third required element of Foucault’s biopower includes modes of subjectification in which individuals work on themselves for the life and health of the population as a whole. Each of these elements



Record of Inmates ________ County Poor House, under Act Chap. 140, Laws of 1875.

Name, [illegible]

Record Number, 412

Date of Admission, April 16 1876

Re-Admitted ____ 18__

____ 18__

____ 18__

____ 18__

____ 18__

____ 18__

Discharged ____ 18__

____ 18__

____ 18__

____ 18__

____ 18__

____ 18__

____ 18__

Sex, [illegible] Age, 7 Color, White Single, Married, Widow, Widower, Single Birth Place, State or Country, N.Y. State

County, ____ Town or City, ____ (If Foreign Born, how long in the U.S.? ____ How long in this State? ____ At what Port landed? ____ Was Head Money Paid? ____ Is the Person Naturalized? ____)

Birth Place of Father—State or Country, Native County, ____ Town or City, ____ Birth Place of Mother—State or Country, ____ County, Native Town or City, ____ Education, Unable to read or write

Habits, [illegible] Habits of Father, Temperate Habits of Mother, Temperate Occupation, —

Occupation of Father, Laborer Condition of Ancestors and other Relatives (living or dead), as to whether Pauper or Self-Supporting—Grand Parents Paternal Side, Unknown Grand Parents Maternal Side, Unknown Father, Self-supporting Mother, Dead Brothers, 1 Self-supporting Sisters, 1 Self-supporting Other Relatives, Unknown (If a Parent, how many Children Living? ____ State their Condition—whether in Poor Houses, Asylums, Hospitals, other Institutions, or Self-Supporting, ____)

Existing Cause of Dependence, Helpless Idiot unable to walk

What kind of Labor is the Person able to pursue, and to what extent? none

Has the Person received Public or Private Out-Door Relief? If so, how long? no

Have the Parents or other relatives been thus aided? If so, state the fact. no

Has the Person been, heretofore, an Inmate of Poor Houses? If so, how long? no

Has the Person been an Inmate of any other Charitable Institution? If so, note the fact. no

What is the probable destiny of the Person as respects recovery from the cause of Dependence? may be permanently dependent

Remarks: This child is a born Idiot, deformed and unable to stand or walk. His Mother died recently after a long sickness and his Father is in very reduced circumstances & unable to take care of him. He is likely to be permanently dependent on the County.

Fig. 7.2 Intake Record from 1876 Census of Almshouse Inmates. The intake record for this 7-year-old child lists the existing cause of dependence as "Helpless Idiot unable to walk." The remarks state: "This child is a born Idiot, deformed and unable to stand or walk. His mother died recently after a long sickness and his father is in very reduced circumstances and unable to take care of him. He is likely to be permanently dependent on the county"

and their interplay is temporally and culturally specific and must be historically contextualized.

Foucault (1977) addressed the role of institutionalization, including that associated with asylums, poorhouses, and prisons, as seeking to alter the conduct of the body in order to fit and produce/reproduce the authorities' truth. Therefore, human variations which are deemed inappropriate to the success of the nation or society are separated from those bodyminds which are deemed to promote the progression of that society. In the mid-nineteenth to early twentieth centuries, it was deemed that children had the great potential to serve the future nation. Therefore, investment in children was considered paramount to the strength of the nation. Children needed to be indoctrinated in American values, Christian morality and strong work ethics. As Katz (1986: 117) purported:

> For many reformers, reeling from the failure of scientific charity, poorhouses and prisons, the temperance movement, or evangelical Protestantism to reshape adult character and the great moral and social problems of the age, the agent became the child herself, whose role flipped from victim to redeemer.

Reports and publications from physicians, philanthropists, and government officials began to specifically address the value in the plasticity of child minds, making them more suitable for reformation than adults (Mintz 2004). Williams (1897: 407) commented on the brain of the child—the child's "imbibing knowledge." It was clear that even in the absence of direct instruction, the child absorbed information by witnessing and imitating those around him or her. Child-savers and charitable organizations lobbied for removal of poorhouse children due to the lack of education and the surrounding environments which corrupted the child's mind and soul. Intelligent and healthy children could be taught American values and morals, but only if they were removed from their pauper parents and corrupting institutions.
]

Particular dangers for children in the poorhouse were "debased" women: "They were the companions of the children, moulding their plastic minds, and forming their characters by constant association with them" (Letchworth 1894). The intelligent and healthy children were future productive members of society, and increased the moral fiber of the country (Mintz 2004). It was believed that the unintelligent and unhealthy children—the unteachable idiots, epileptics, paralytics, defectives, diseased, and deformed—could not be taught the values of the nation, and therefore lacked the transformative powers of other children.

In this case, the "truth," the first required element of biopower, is the plasticity of the child mind and its potential to successfully increase the morality of the nation. The authorities to speak to this truth are the child-savers of the nineteenth century. Children perceived as unhealthy and/or unintelligent were disabled by this rhetoric. The child-savers of the nineteenth century along with their legislative cohorts, deemed themselves as authorities on the health and protection of United States' destitute children. At the same time, they intervened on the health of those deemed "unfit" in order to further promote a salubrious environment for the collective unit—the second element of biopower. The philanthropic child-savers praised the outcomes of their tireless work to ensure the removal of children from poorhouse institutionalization. Letchworth (1894) deemed the removal of children from county poorhouses as a great success "…it may be said that there are virtually no *healthy and intelligent* children over two years of age in the poorhouses and almshouses of the State of New York" (emphasis added). Likewise, McPherson (1881) concluded that "[w]ere Christian people fully aware of their duty to homeless waifs, orphan asylums would only be required as places of transfer or as homes for children mentally or physically diseased" (1881: 61). While child-savers and legislatures dedicated their lives to the removal of children from poorhouse institutionalization, their own words clearly demonstrate the absence of children deemed unhealthy and unintelligent from their efforts. Others more definitely explained their role as authorities. Barr (1904) recognized his role as preventing simple children from degenerating into the lower forms of idiocy and "safeguarding the absolutely irresponsible ammoral [sic] imbecile from crime and its penalty" (1904: 20). Barr (1904: 20) asserted that "[i]ndeed, the number of persons left by any society in a state of idiocy, is one test of the degree of advancement of that society in true and Christian civilization."

Foucault's concept did not suggest that biopower was unwaveringly wicked (Rabinow and Rose 2006). Letchworth (1899), for example, would go on to work for the improved treatment and care of epileptic children. In addition, many of his child-saver contemporaries did struggle with decisions to leave "defective" children in the poorhouse. Williams (1897: 411) was openly critical of it:

> One might naturally have assumed that the great institutions, putting themselves forward as charities, would have regarded it as a greater measure of benevolence to care for a crippled child, for example, than for a sound one. But strangely enough such did not prove to be the case. The great public-private institutions refuse admittance to unhealthy or crippled children. These must remain in almshouses or be otherwise provided for. …In some cases the defect that debars a child is merely a crippled hand or foot, or a like infirmity.

Informing Bioarchaeological Interpretations of Poorhouse Children

Between 2008 and 2012, infrastructure improvements to the University at Buffalo's South Campus warranted the disinterment of 376 individuals associated with Erie County Poorhouse complex (Hartner 2012). This included the skeletal remains of 66 children. This chapter specifically aims to provide depth of contextualization associated with the archival documents. Limited information on mortuary context, demographics, and pathology are provided here as the details of these analyses are beyond the scope of this particular chapter. The excavated portion of the cemetery indicated that children were buried among the adults, either in separate coffins, within, or on top of adult coffins. As illustrated in Chaps. 12 and 13, the mortuary context is vital to bioarchaeological analyses, providing clues to the social values afforded to particular individuals. The details of the burials of the Erie County Poorhouse are no exception.

Skeletal age at death was estimated using a number of methodologies based upon development and eruption of deciduous and permanent dentition, metric data from the skull and long bones, and epiphyseal-diaphyseal union (see Muller 2016 for further discussion). Fifty-eight of the 66 children were infants and eight individuals were between the ages of two and 16 years old. Infancy is defined here as being less than two years of age, in accordance with the amended Children's Law that recognized a transition to childhood beginning at two. Similar to other bioarchaeological sites, the Erie County Poorhouse cemetery manifests a high incidence of perinatal death, with the majority of infants (75%) aged between <40 gestational weeks and 3 months post-birth. According to poorhouse records, many children died due to nutritional deprivation and the synergistic effects of disease processes (Higgins 1998). The related underdevelopment may have altered bone lengths in some individuals. Therefore, age estimations may be younger than actual chronological ages.

A required step in any bioarchaeological investigation is determining the representativeness of the skeletons to the population from which they are drawn. Archival documents indicate that social attitudes regarding perceived defectiveness led to the institutionalization of poor children with particular impairments. Infants and children who lived and died in the Erie County Poorhouse were not necessarily representative of the children in Erie County, or even of those children who passed through the poorhouse doors. Healthy infants and children were present in the poorhouse, but for short durations. They were likely to have been "adopted" or removed from their pauper parents by some other means, e.g., religion-affiliated orphanages or schools. The historical record suggests that the remains of children in the cemetery are (1) likely to belong to those who died during birth or shortly after birth and/or (2) children who possessed tangible and/or visible manifestations of disease or impairment that were disabling—perceived as defective or unfit for care outside the poorhouse.

Given the number of perinatal deaths, it is likely that complications associated with the birthing process, e.g., breech presentation, asphyxiation due to prolonged labor and the umbilicus, are represented. Age-at-death analysis also indicates the presence of either premature or small-for-gestational-age infants who would have had significantly reduced chances of survival. It is also probable that the infant deaths were associated with genetic and fetal programming variables which cannot be detected in the osteological record (Perry 2006). However, there is evidence of malnutrition and/or disease in the skeletons, including evidence of severe anemia, rickets, scurvy, and congenital syphilis. Harris lines and enamel hypoplasias have also been documented among the infant remains. In the mid-nineteenth century, extremely high rates of infant mortality were a significant concern in United States urban centers (Mintz 2004). Infants are at great risk, especially during the perinatal period, and when small-for-gestational age. As such, high infant mortality in archaeological skeletal assemblages is not necessarily evidence of the cultural practice of infanticide (Gilmore and Halcrow 2014). However, there is evidence in the documentary record that some children’s deaths may have been hastened due to “benign neglect.” A letter from the Nursery and Child’s Hospital in West New Brighton, Staten Island states:

> It is much better to keep a *few* [sic] infants in good health, than a great many in only tolerable condition. The few will have stamina to become strong and useful members of society, while the many lead wretched lives, becoming paupers, and transmitting scrofula[2] from generation to generation (State Charities Aid Association 1888: 72).

Among the eight children between 2 and 16 years of age, Byrnes et al. (2015) described evidence of chronic malnutrition and disease associated with an 8 to 11-year-old child (Location #372). In addition to nonspecific indicators of stress, including linear enamel hypoplasias, there was evidence of scurvy and a systemic infection that likely labeled this child as “unfit.” Of additional interest was the evidence for dissection in a child aged 7 to 10 years (from Location #222) whose right tibia was sectioned at two points (details provided in Nystrom et al. 2017).

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[2] Scrofula was a term used to describe a chronic illness most often associated with children. It presented as severe infection of cervical lymph nodes that may have abscessed and led to ulcerations. Scrofula was also recognized as causing ulcerations of the eyes, ears, and joints (Lomax 1977). Historically, it is argued that this term was most often associated with extrapulmonary tuberculosis. However, diagnoses of scrofula in the past should not be assumed to be tuberculosis. Scrofula was also referenced as the “King’s evil” in medieval English texts and “struma” in other ancient texts (Lomax 1977: 1).

Conclusion

It is clear from an examination of the archival documents that children occupied a significant role in nineteenth and early twentieth century New York State. Philanthropic child-savers, charitable institutions and societies, religious organizations, and government welfare agencies all weighed in on the best means to end impoverishment, specifically the affliction of hereditary pauperism (State Charities Aid Association 1888; Reports of the State Charities Aid Association 1873, 1874, 1875). However, the clear exemption of children described as defectives, epileptics, paralytics, diseased, and deformed speaks volumes to the potential impacts of biopower on the young lives within the poorhouse. Furthermore, children described as mentally defective, specifically unteachable idiots, were disabled by those in power (State Charities Aid Association 1888). It may be argued that assignment in the latter category was more disabling. New York State desired to drive hereditary pauperism away through continued instruction on appropriate American values, work ethic, and morality. This society devalued the potential contributions of these children and excluded them from mainstream society.

Archival documents have revealed that children with particular impairments, both physical and mental, occupied distinct categories in New York State's historical welfare system. This chapter addresses the impacts of impoverishment, age, and perceived "defectiveness" on the children of the Erie County Poorhouse. Such ideas are foundational to understanding the role of impairment and disability on the biological outcome of poverty and political exclusion for particular individuals (Foucault 1978) within the archaeological record. The label of "unfit" was assigned to children through social, religious, and political rhetoric. This led to the pathologizing and disabling of specific children, and identified them as agents of disease and hereditary pauperism. This is compared with their "healthy and intelligent" counterparts who were perceived as social agents with potentially transformative powers, capable of bettering future generations. Being labeled as defective, unteachable, and products of "debased" women compounded a preexisting impoverished identity. Investigating the role of other social identities, e.g., race, gender, nationality, are important avenues for future research. Being institutionalized may have made impairments disabling, or more disabling, through the loss of social and physical contact with relatives and loss of solidarity with other children.

In the case of the Erie County Poorhouse cemetery, child skeletons that present osteological indicators of malnutrition and disease are less likely to represent resilient and healthful pauper children who lived in the poorhouse and succumbed to acute pathology. Rather, it may be hypothesized that many of the children in the cemetery are those deemed to possess physical and/or mental conditions and diseases that were disabling in their societal context and led to their institutionalization in the poorhouse. The children who were determined to be healthy were the ones who escaped from poorhouse institutionalization via adoption or private care. Although, there is also the possibility of child death from infectious agents while transitioning from the poorhouse to their adoptive families or other institutions (Higgins and Sirianni 1995).

Absent among the wealth of historical documentation associated with the poorhouse are the voices of the children themselves. The lack of this emic perspective clearly limits the ability to discuss the lived experiences of poorhouse children. However, the values, actions, and voices of those who recognized themselves as authorities on child dependency and protection add significantly to the necessary contextualization for bioarchaeological analysis of the Erie County Poorhouse cemetery. The results of skeletal analyses associated with children from the Erie County Poorhouse can only be understood with the inclusion of contextualized notions of impairment and disability (Southwell-Wright 2013).

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Author Biography

Jennifer L. Muller is an Associate Professor in the Department of Anthropology, Ithaca College, Ithaca, New York, USA. She received her Ph.D. from the Department of Anthropology, State University of New York at Buffalo in 2006. Muller’s research embraces the holism of anthropological study, integrating theoretical perspectives and methodologies from the cultural, biological, and archaeological subfields of the discipline. Her research has specifically focused on how discrimination-based inequities impact human biology in African diasporic populations and among the institutionalized poor. Foundational to this research is the understanding that the body is both biological and social, and that the insidious and pervasive attributes of structural violence may assault the body in a multitude of ways. Muller also examines postmortem structural violence; the idea that discriminatory practices continue to harm the poor and marginalized after death. Muller’s dissertation focused on the relationships between traumatic injuries and inequality in the W. Montague Cobb Human Skeletal Collection housed at Howard University in the District of Columbia, USA. Her research on the institutionalized poor has included bioarchaeological and/or historical analysis from New York State poorhouses, including: the Monroe County Poorhouse, Rochester; the Erie County Poorhouse, Buffalo; and the St. Lawrence County Poorhouse, Canton.

Part III
Quantitative Methods in Impairment and Disability: Bioarchaeological Approaches

Chapter 8
The Bioarchaeology of Back Pain

Kimberly A. Plomp

Introduction

Back pain is the leading cause of clinical disability worldwide (Hoy et al. 2010; Buchbinder et al. 2013). This is due to the fact that most people will experience back pain at some point in their lives, with reported prevalence rates reaching 84% in Western populations (Walker 2000; Binder 2007; Halderman et al. 2008). In particular, pain of the lower back can have a profound impact on an individual's activity and quality of life. Its impact is illustrated by the fact that lower back pain is reported as the second most common reason for missing work and one of the most common reasons for seeking medical assistance (Walker 2000; Lidgren 2003; Borenstein 2004).

Humans are afflicted with back problems more than any other primate species (Jurmain 1989; Lovell 1990), but the reasons why remain unclear. Many researchers have suggested that it may be due to the stress placed on our spines during bipedal locomotion (Merbs 1996; Jurmain 2000; Latimer 2005). In fact, some studies have even found anatomical evidence to support the hypothesis that bipedalism may play an important role in the development of some common back problems, including spondylolysis and vertical intervertebral disc herniations (Ward and Latimer 2005; Plomp et al. 2015a). Additionally, some aspects of modern lifestyles such as sitting, standing for extended periods of time, and smoking are suggested to be contributing factors to common back problems (Frymoyer et al. 1980; Dankaerts et al. 2006; Tissot et al. 2009; Shiri et al. 2010). However, these lesions are also commonly identified in archaeological skeletons, suggesting that even in the absence of modern technologies and lifestyles, back pain was likely a common ailment throughout human history. Consequently, back pain may have

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K.A. Plomp (✉)
Department of Archaeology, Classics, and Egyptology, University of Liverpool, 12-14
Abercromby Square, Liverpool L69 7WZ, UK
e-mail: kaplomp@liverpool.ac.uk

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been a leading cause of impairment and discomfort in the past, thereby directly affecting the quality of life of many individuals (Faccia and Williams 2008).

Considering the potential impact of back pain on the quality of life in past populations, comprehensive discussion of the clinical relevance of spinal pathologies commonly identified in bioarchaeology is required. This chapter does not include an exhaustive list of spinal pathologies, but provides a brief overview of a number of spinal lesions that are frequently identified in archaeological skeletons including osteoarthritis, spondylosis, vertical disc herniation, and spondylolysis. The clinical significance of the conditions is discussed, as well as any associations with pain and impairment in living populations. The level of detail and information provided varies between conditions depending upon the existing clinical and bioarchaeological literature. Lesions related to congenital deformities or infections are not discussed, as these conditions are comparatively rare in the archaeological record.

The medical definition of disability, as opposed to the social definition (Oliver 1990; Llewellyn and Hogan 2000; Shakespeare 2012), is used throughout this chapter to ensure consistency with clinical literature. As such, the term 'disability' refers to self- or clinically reported limitation of regular activities for an undefined amount of time, be it days, weeks, or months (WHO 2001). The term impairment is defined according to the World Health Organization's definition and indicates any problem in the function of the body (WHO 2001). There are two overriding aims of this discussion. The first aim is to integrate bioarchaeological and clinical research to clarify the clinical significance of spinal lesions commonly identified in archaeologically derived human remains. It is hoped that this chapter will provide a reference to assist bioarchaeologists in determining the likelihood that the individual(s) they are studying experienced back pain related impairment, and/or disability. The second aim of the chapter is to highlight the difficulty in associating back pain with particular lesions, even in a modern clinical setting.

Conditions

Osteoarthritis

Osteoarthritis is one of the most common skeletal pathologies identified in archaeological populations (Lovell 1994; Jurmain and Kilgore 1995; Knüsel et al. 1997). It represents the breakdown of synovial joints, which are the moveable joints in the body (Barnett et al. 1961), and is diagnosed in archaeological skeletons by the presence of osteophytes, porosity, joint margin changes, and eburnation (Fig. 8.1) (Rogers and Waldron 1995). In the spine, the apophyseal and costovertebral joints are both synovial and susceptible to osteoarthritis. The apophyseal joints articulate the posterior elements of one vertebra to another, and the costovertebral joints articulate the thoracic vertebrae to the ribs. The etiology, or cause, of osteoarthritis is still unclear, but its development is generally accepted to be multifactorial (Spector and MacGregor 2004; Weiss and Jurmain 2007). A number

Fig. 8.1 Examples of osteoarthritis on the synovial joints of vertebrae, showing the presence of osteophytes, porosity, and eburnation (where visible). *Top left* Osteoarthritis of the right superior apophyseal joint of a first cervical vertebra; *top right* Osteoarthritis of both superior apophyseal joints of a fourth lumbar vertebra; *bottom left* costovertebral osteoarthritis on the right costocorporeal joint of an eleventh thoracic vertebra; *bottom right* osteoarthritis on the costocorporeal joint of a right rib

of factors have been suggested to influence the development of osteoarthritis, including the biomechanical breakdown of the joint due to physical stress, degeneration with increasing age, and/or a genetic predisposition (Spector et al. 1996; Herrero-Beaumont et al. 2009; Molnar et al. 2009).

Osteoarthritis of the apophyseal joints is common in both archaeological and modern populations. Bridges (1994) investigated prehistoric Native American skeletons from Alabama, and found that up to 56% of individuals that were estimated to be older than 30 years (age-at-death) had apophyseal osteoarthritis. Comparatively, Waldron (1992) found a prevalence rate of 35.7% in his study of skeletons from a Medieval London population. In a clinical study, Suri et al. (2011) reported prevalence rates of apophyseal osteoarthritis in the lumbar spine in 36% of adults younger than 45 years old, 67% of adults aged 45–64 years, and up to 89% of adults older than 65 years. In another clincal study, Mikkelsen et al. (1970) found that 19% of adults aged 45–64 years and 57% of adults older than 65 years had apophyseal osteoarthritis in the cervical spine.

The association of pain with apophyseal osteoarthritis is debated in clinical literature. Some researchers have found little to no association between osteoarthritis of the apophyseal joints and pain (e.g., Raastad et al. 2015). Other studies have found evidence to suggest that it may be a common cause of back and neck pain (e.g., Bradgley 1941; Borenstein 2004; Gellhorn et al. 2013), and a few even suggest that apophyseal osteoarthritis may cause disabling pain in severe cases (Pinals 1996; van Schoor et al. 2005). It has been estimated that the apophyseal joints are the source of pain in 15–45% of people with lower back pain, 48% of people with thoracic pain, and 54 to 60% of people with chronic neck pain (Schwarzer et al. 1994, 1995; Manchikanti et al. 2002). Weishaupt et al. (1998) looked at magnetic resonance images (MRI) of 60 asymptomatic adults, aged 20–50 years, to identify the frequency of spinal lesions occurring in the absence of back pain. They found that none exhibited severe apophyseal osteoarthritis. Since apophyseal osteoarthritis is a common lesion identified in people with back pain, the absence of severe cases in 60 asymptomatic individuals could indicate that apophyseal osteoarthritis is a common cause of back pain (Weishaupt et al. 1998; Borenstein 2004). Symptoms of apophyseal joint osteoarthritis are generally described as localized tenderness and pain when the back is extended (Eisenstein and Parry 1987; Dolan et al. 1996). Dolan et al. (1996) and Borenstein (2004) found that back pain associated with apophyseal osteoarthritis worsened with spinal extension, sitting, and/or standing. Since these activities are part of everyday life, it is likely that severe pain of the back caused by osteoarthritis could restrict a person's typical performance level of these activities.

There is far less information available for costovertebral osteoarthritis, as it is rarely recorded in clinical or bioarchaeological studies. However, a few studies have investigated osteoarthritis of the rib joints and their findings indicate that it may be a relatively common condition. Nathan et al. (1964) reported a frequency of 48% in the Hamann-Todd Collection, and Plomp and Boylston (2016) found a frequency of 27.5% in two Medieval English skeletal samples. In a clinical investigation, Malmivaara et al. (1987) found that approximately 57% of 24 cadavers aged 21–69 years at death had costovertebral osteoarthritis. Similarly, Grant and Keegan (1968) found that 32.5% of living individuals ranging from 15 to 84 years of age who sought medical attention for rib pain had costovertebral osteoarthritis. Although it has received little attention, clinical findings suggest that costovertebral osteoarthritis may cause thoracic pain during movement, respiration, and coughing (Grant and Keegan 1968; Weinberg et al. 1972; Benhamou et al. 1993; Sales et al. 2007).

Spondylosis (Vertebral Osteophytosis)

Spondylosis is arthritis of the spine that affects the fibro-cartilaginous joints, or synchondroses, between the vertebral bodies (Sarzi-Puttini et al. 2005). It is often used non-specifically to indicate any degenerative changes of the disc and vertebral

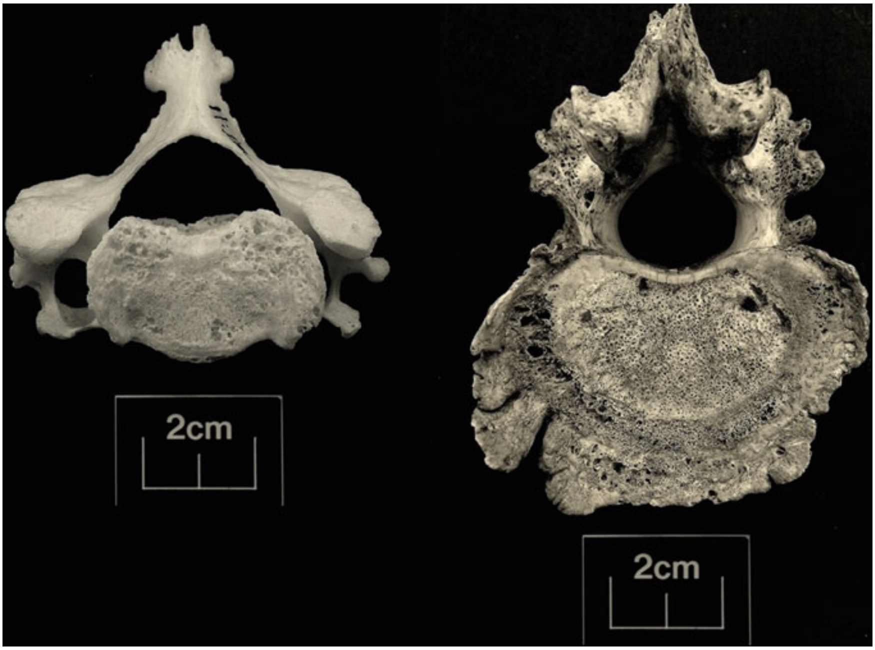

Fig. 8.2 Examples of spondylosis of a fifth cervical vertebra (*left*) (view: superior) and a first lumbar vertebra (*right*) (view: inferior) displaying marginal osteophyte formation and porosity on vertebral endplates

body (Middleton and Fish 2009). Spondylosis is considered to be a degenerative condition that occurs with increasing age and heavy physical activity, and may also be genetically influenced (Middleton and Fish 2009). In bioarchaeological studies, it can be diagnosed based on the presence of osteophytes along the margin of the vertebral bodies (e.g., Fig. 8.2). Clinically, spondylosis is diagnosed by observing disc space narrowing and osteophytes on the vertebra body using medical imaging technologies (Raastad et al. 2015).

Archaeological studies have reported frequencies of 34 to 70.9% in multiple populations and time periods (e.g., Rogers et al. 1985; Lovell 1994; Maat et al. 1995). In Bronze Age skeletons from Harappa, Lovell (1994) found no difference in the frequency of spondylosis among spinal regions (i.e., cervical, thoracic, lumbar). However, she did find that cervical vertebrae had severe osteophytes more frequently than the thoracic or lumbar vertebrae. Clinically, osteophytes have been reported in 48 to 84% of middle-aged men and 56 to 74% of middle-aged women (O'Neill et al. 1999; Cvijetić et al. 2000; Muraki et al. 2009), and can affect 95% of individuals by 79 years of age (Prescher 1998; Sarzi-Puttini et al. 2005). It commonly affects the cervical vertebrae, with nearly everyone being affected in this region by the age of 70 years (Irvine et al. 1965; Yu et al. 1987).

In clinical studies, spondylosis has been found to be asymptomatic (Torgerson and Dotter 1976; Teresi et al. 1987), as well as associated with both neck and lower back pain and disability (Yu et al. 1987; Videman et al. 1990; Raastad et al. 2015). In severe cases, spondylosis of the cervical spine can result in myelopathy (i.e., compression of the spinal cord) or radiculopathy (i.e., pinching of spinal nerves) due to the intrusion of osteophytes into the intervertebral foramina or along nerve passages (Yu et al. 1987; Salemi et al. 1996). This can manifest itself as pain in the neck and/or arms that can last for a few weeks (Yu et al. 1987). If osteophytes impinge on vertebral nerves or into the spinal canal, it can cause nerve root entrapment, spinal cord compression, and vertebral artery compression, all of which could result in pain, dizziness, headaches, stiffness, leg pain, and spasticity (Sarzi-Puttini et al. 2005; Binder 2007). In severe cases, osteophytes can fuse adjacent vertebrae, causing stiffness and limitation in axial movement (Sarzi-Puttini et al. 2005). Disc space narrowing is often associated with spondylosis and has been found to correlate with the presence of back pain and related symptoms in the lower limbs in modern populations (Frymoyer et al. 1984). This pain, especially if it radiates to the limbs, can limit an individual's ability to perform daily tasks, as well as significantly diminish their quality of life.

Disc Herniations

Herniations of the intervertebral disc are a common cause of back pain in modern populations (Wagner et al. 2000). The substance that herniates is the gel-like inner fluid inside the disc called the nucleus pulposus. The most symptomatic disc herniations are those that herniate horizontally into the spinal canal, placing pressure on the spinal cord (i.e., 'slipped disc'). However, this type of herniation rarely leaves evidence on skeletal remains. The herniations that do leave evidence on dry bone are less often symptomatic. This type herniates vertically, either superiorly or inferiorly, into the adjacent vertebral body and results in a depression on the vertebral endplate. This is called a Schmorl's node (or Schmorl's depression), and they are commonly identified in archaeological skeletons (e.g., Fig. 8.3) (Schmorl and Junghans 1971; Merbs 1983; Üstündağ 2009; Plomp et al. 2012, 2015b). The etiology of disc herniations, including those that result in Schmorl's nodes/depressions, is unknown. Many studies have found different factors that seem to contribute to individuals' susceptibility to disc herniations including acute trauma, physical movement, genetic predisposition, biochemical composition of the disc, developmental issues, increased body mass, and vertebral morphology (Cholewicki and McGill 1996; Williams et al. 2007; Dar et al. 2009, 2010; Zhang et al. 2010; Mok et al. 2010; Adams and Dolan 2012; Burke 2012; Plomp et al. 2012, 2015a, b).

The frequency of Schmorl's depressions reported in archaeological skeletal samples ranges from 4 to 62.9% (Rathbun 1987; Šlaus 2000; L'Abbe and Steyn 2007; Klaus et al. 2009; Üstündağ 2009; Novak and Šlaus 2011; Plomp et al. 2012).

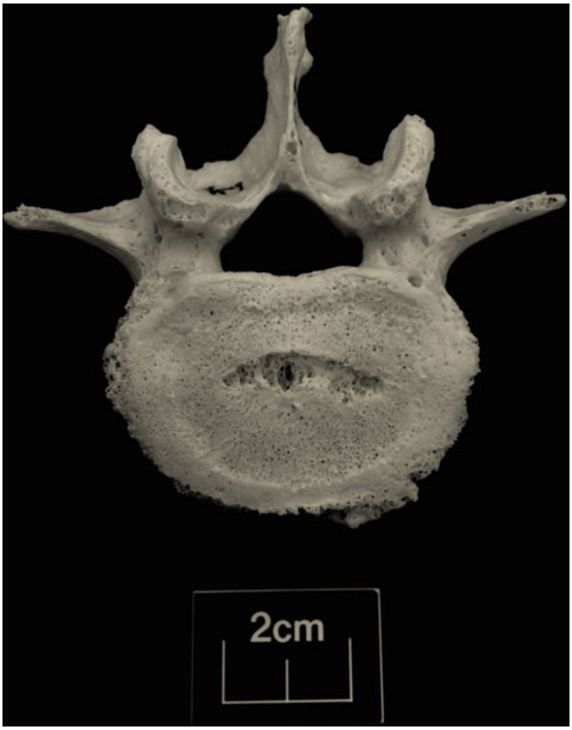

Fig. 8.3 Example of a centrally located Schmorl's node on a third lumbar vertebra; superior view

In modern populations, Schmorl's nodes are reported in 16 to 58% of individuals (Pfirrmann and Resnick 2001; Dar et al. 2009; Mok et al. 2010). The association between Schmorl's nodes and back pain is complicated, with Jensen et al. (1994) finding the lesions in 19% of asymptomatic individuals. However, others have found their presence to be related to acute and chronic episodes of back pain (e.g., Lipson et al. 1985; Walters et al. 1991; Takahashi and Takata 1994; Wagner et al. 2000). For example, Takahashi et al. (1995) found that out of 16 individuals with Schmorl's nodes, five people (31.2%) experienced back pain. This disparity between the frequency and reported symptoms of Schmorl's nodes is likely due to many factors, one such factor being the location of the lesion on the vertebral body. Faccia and Williams (2008) investigated the relationship between Schmorl's nodes and pain in modern patients and found that centrally located lesions are more often associated with pain, presumably due to the density of nerves in the central vertebral body. They also found that Schmorl's nodes can cause disabling pain, which consequently influences quality of life of individuals with symptomatic lesions. In their study, 92% of volunteers reported limited daily activities. Furthermore, they found that 75% of study volunteers reported missing work due to back pain (Faccia and Williams 2008). This suggests that Schmorl's nodes may have a substantial impact on an individual's ability to perform everyday activities.

Spondylolysis and Spondylolisthesis

Many back-related conditions affect adults, but children and adolescents can also experience back pain that results in disruption of an active lifestyle. Seventy-five percent of back pain in children is idiopathic (Feldman et al. 2000; Hu et al. 2008). When the cause can be identified, it is most commonly found to be spondylolysis (Hu et al. 2008). Spondylolysis (e.g., Fig. 8.4) is a cleft in the neural arch at the site of the pars interarticularis (Hu et al. 2008). Its etiology has been debated in the past, but is now generally accepted to be a result of a fatigue fracture. The fracture occurs when extension of the spine causes the inferior articular process of a vertebra to impact the pars interarticularis of the vertebra below it (Mays 2007; Hu et al. 2008). It is most commonly bilateral and in the lower lumbar spine. However, both archaeological and clinical studies have found cases in the cervical and thoracic vertebrae (Nordstrom et al. 1986; Waldron 1991).

Waldron (1991) investigated the presence of spondylolysis in 1659 individuals from early British populations and found prevalence rates of 3.74% in Romano-British populations, 4.55% in Anglo-Saxons, 5.08% in medieval populations, and 1.42% in the eighteenth–nineteenth century cemetery of Christ Church Spitalfields, London. Out of the 55 individuals who had spondylolysis in this study, 44 had the lesion in the fifth lumbar vertebra; one individual had it on his/her fourth cervical vertebra; four cases were unilateral; and four showed evidence of spondylolisthesis (i.e., ventral slippage of the vertebral body) (Waldron 1991). In another bioarchaeological study, Mays (2006) found a higher frequency of

Fig. 8.4 Example of bilateral spondylolysis on a fifth lumbar vertebrae; view inferio-posterior oblique. Note the absence of the laminae and posterior of the neural arch. New bone formation on the area where the fracture occurred indicates that this was an antemortem lesion

spondylolysis in the Medieval English Wharram-Percy collection. He identified spondylolysis in 11.9% of the 258 adult skeletons with preserved vertebrae.

Spondylolysis has been attributed to both lower back pain and disability (Rossi and Dragoni 2001), particularly when it occurs bilaterally and in the fourth lumbar vertebra (Libson et al. 1982; Saraste 1986). In modern populations, spondylolysis is common in athletes (Iwamoto et al. 2004), with up to 47% of adolescent athletes who suffer from low back pain having spondylolysis (Micheli and Wood 1995). In a study of 104 athletes ranging in age from 12 to 60 years old with defects in the pars interarticularis, 38.5% reported withdrawing from their athletic activities due to back pain (Iwamoto et al. 2004). This indicates that spondylolysis can cause disabling pain that decreases an individual's ability to perform his/her regular activities.

A complication of spondylolysis is the associated occurrence of spondylolisthesis, which is a ventral slippage of the vertebral body. It can occur as a consequence of spondylolysis because the posterior vertebral elements and ligaments are no longer anchoring the vertebral body in place (Frederickson et al. 1984). Spondylolisthesis can be difficult to identify in bioarchaeological studies, however, Mays (2006) suggests that it may be identifiable based on the location of the osteophytes on the affected vertebra and the vertebrae directly superior or inferior to it. If these osteophytes extend farther past the vertebral margin than would be expected in properly aligned vertebrae, it may suggest that the vertebral body has moved before or during osteophyte formation. Spondylolisthesis can contribute to lower back pain, with Rossi and Dragoni (2001) finding that 47.8% of 590 male and female athletes with symptomatic spondylolysis also had spondylolisthesis. In a randomly selected sample of 1147 middle-aged (45-64 years old) Finnish individuals without back pain, spondylolisthesis was found in 6%, indicating that the condition is more commonly associated with pain than without pain (Virta et al. 1992).

Inferring Pain, Impairment, and Disability in Bioarchaeology

One main point that can be taken from the brief descriptions of spinal conditions provided in this chapter is that there is no consistent relationship between spinal lesions and pain. Many lesions can be either symptomatic or asymptomatic, and idiopathic pain can often be attributed to one or more spinal lesions found with medical imaging. It remains unclear even with modern medical advances why some individuals may have painful Schmorl's nodes or apophyseal osteoarthritis, while others with the same lesions do not experience related pain. This variable association between back pain and the presence of vertebral lesions in clinical studies problematizes inferences of back pain-related impairment or disability in the past.

Another confounding factor for interpreting spinal lesions in human skeletons is that conditions or injuries that only affect soft tissue will not leave evidence on bone.

For example, Greenough and Fraser (1994) found that of 300 patients with acute periods of back pain, 11% had soft tissue strains that would leave no trace on the skeleton. As bioarchaeologists, we can only attempt to correlate skeletal lesions with the likelihood of related symptoms reported in clinical literature. This is further compounded by the fact that only chronic or traumatic conditions leave manifestations on bone (Wood et al. 1992). In the case of degenerative spinal lesions, the mere fact that it has left its mark on bone indicates that it was a chronic condition. Alternatively, conditions related to trauma may represent acute periods of pain, impairment, and disability, with any extended effects immeasurable on the skeleton.

The information that bioarchaeologists can gain about the associations between pain, disability, and spinal lesions originates from modern clinical studies. However, there is likely to be substantial differences in the age demographics between modern and archaeological populations. This is especially important to consider when discussing degenerative conditions that are highly correlated with increasing age, such as osteoarthritis and spondylosis (Middleton and Fish 2009; Herrero-Beaumont et al. 2009; Molnar et al. 2009). Due to modern advances in medicine and increased availability of food, people are living longer on average than historic/prehistoric human groups. This may affect the frequency and severity of degenerative spinal conditions identified in modern populations. For example, the possibility that cervical spondylosis will cause myelopathy (i.e., compression of the spinal cord) or radiculopathy (i.e., pinching of spinal nerves) increases as the osteophytes become larger and more diffuse along the vertebra (Yu et al. 1987; Salemi et al. 1996). Since spondylosis increases in severity with age, individuals who died prior to becoming an ‘old’ adult (65 + years) may not have developed large, diffused osteophytes and therefore, the associated pain and disability reported by older adults in modern clinical studies. Therefore, bioarchaeologists should consider the demography of the population(s) they are studying, especially age profiles, before interpreting and discussing the relationship between pain, disability, and spinal lesions.

Additionally, the types of work and level of activity can differ between modern and past populations. Activities, in particular those which are repetitive and extraneous, are thought to influence the development of degenerative and traumatic lesions in the spine. For example, disc herniations have been associated with lifting heavy loads during spinal rotation (Cholewicki and McGill 1996), while spondylosis is associated with athletic activities (Micheli and Wood 1995; Iwamoto et al. 2004). Although most clinical studies do not find a clear and direct link between spinal lesions and particular activities, it could be beneficial for bioarchaeologists to consider the types of activities that populations may have engaged in and relate this to activities associated with pain in clinical contexts. For example, the pain associated with osteoarthritis of the apophyseal joints has been found to worsen during standing, sitting, and increased extension of the spine (Borenstein 2004; Dolan et al. 1996). It would be important to consider this in a bioarchaeological study since sitting and standing for extended periods of time are commonplace in modern lifestyles (Frymoyer et al. 1980; Dankaerts et al. 2006; Tissot et al. 2009; Shiri et al. 2010), but may not necessarily have been so in past.

A medical definition of disability has so far been used throughout this chapter to keep the discussion consistent with the clinical literature. However, back pain can have a personal and social impact on its sufferers and this aspect of pain also needs to be considered. Pain is a personal experience that is influenced by many different variables, such as physical and social differences, personality, attitude, and personal beliefs (Kleinman 1988; Good et al. 1992; Kennedy et al. 2011; Bourke 2014). Interpreting pain in past populations is generally based on subjective speculation and it is well understood by paleopathologists that the presence of a skeletal lesion does not necessarily mean the condition had an impact on the life of the afflicted (Metzler 1999). Furthermore, inferring disability in the past (either by medical or social definitions) based on the presence of spinal lesions would be equally, if not more, ambiguous based on what we know of the clinical relevance of the conditions discussed in this chapter. People respond differently to impairment (i.e., a problem in function of the body) and what would make someone ‘disabled’, either in self-image, social categorization, or clinical diagnosis, would vary considerably between people based on factors such as personality, socially expected activities, social status, and cultural background (Oliver 1990; Llewellyn and Hogan 2000; Shakespeare 2012). In other words, an individual may experience an impairment differently depending on many different social and personal factors, and this experience may play a central role in whether that person considers themselves to be disabled or whether they are considered disabled by their community. For example, an individual confined to a wheelchair will experience a different level of ‘disability’ or limitation in regular activities, depending on whether their community has ample infrastructure to enable their free movement or not. This aspect of disability and impairment, which is critical in modern populations, is not something that bioarchaeologists can assess through the skeletal record.

Despite the obvious limitations of interpreting pain in the past, bioarchaeologists aim to create an informative and illustrative picture of what life in the past was like. If back pain impacted the quality of life of individuals in the past even a fraction as much as it does today, it is worth considering during bioarchaeological investigations and could be an interesting aspect of many osteobiographies. Back pain and related loss of spinal mobility can cause a significant amount of clinically defined disability in modern populations. Although it may not be a lifelong affliction for most people, episodes of back pain can affect an individual for a significant amount of time. For instance, 90% of acute back pain cases subside within 6 weeks of the initial pain episode, while 15-45% of people suffer from chronic pain that can last for over 3 months (Andersson et al. 1993; Andersson 1997; Middleton and Fish 2009). Therefore, it is an important aspect of daily life that bioarchaeologists and paleopathologists may wish to consider when piecing together osteobiographies. The discussion of lesions and their associated clinical significance can assist in understanding how back pain may have influenced the quality of life of past individuals. However, it must be done with consideration of the limitations of inferring pain based on skeletal pathological lesions.

The main conclusion to be drawn from the information provided in this chapter is that despite obvious problems with associating spinal pathologies directly with specific symptoms, it is clear that the pathological lesions commonly identified in bioarchaeology can and do cause back pain today. This pain can result in a decreased quality of life for modern individuals, as well as cause acute or chronic impairment and disability. Therefore, it is important for bioarchaeologists to not only record and report spinal pathologies, but also to consider the possible impact that these lesions had on the daily lives of the people we study.

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Chapter 9
Using Population Health Constructs to Explore Impairment and Disability in Knee Osteoarthritis

Janet L. Young and Edward D. Lemaire

Introduction

Research has shown that the human skeleton holds much information about diet, activity patterns, disease processes, violence, and trauma (Aufderheide and Rodriguez-Martin 1998; Goodman and Martin 2002; Steckel and Rose 2002; Ortner 2003; Roberts and Manchester 2007). This information is often interpreted using clinical data, to enable more informed interpretations (Faccia and Williams 2008). Roberts (1999: 92) emphasizes that "if disease or injury states are to be considered as potentially disabling, reference to the clinical record for these conditions (i.e., how they affected a person) is essential." However, individuals are biopsychosocial entities that are embedded in different environments (Engel 1977). Understanding these environmental factors and how they can impact disability is also essential.

The field of population health provides constructs that identify factors and models that can assist with examining the role of environmental factors in disability. Population health is an emerging field that "aims to improve the health of the entire population and to reduce health inequities among population groups … it looks at and acts upon the broad range of factors and conditions that have a strong influence on our health" (PHAC 2012: 1). Population health recognizes that, instead of a state of being, health is a capacity or resource allowing an individual to pursue his or her goals, acquire skills and education, and grow (PHAC 2012). This broader notion of health moves beyond the absence of disease by recognizing the range of

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J.L. Young (✉)
Canadian Museum of History, 100 Rue Laurier, Gatineau, QC K1A 0M8, Canada
e-mail: janet.young@historymuseum.ca

E.D. Lemaire
Centre for Rehabilitation Research and Development, Ottawa Hospital Research Institute, 505 Smyth Road, Ottawa, ON K1H 8M2, Canada
e-mail: elemaire@ohri.ca

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social, economic, and physical environmental factors that impact or buffer health outcomes.

The World Health Organization (WHO) follows this population health paradigm when discussing how diseases can lead to impairment and disability. Disease symptoms can impair typical function or create a “loss or abnormality in body structure or physiological function (including mental functions), where abnormality means significant variation from established statistical norms” (WHO 2011: 305). This impaired function interacts with attitudinal and environmental barriers to create disability producing activity limitations and participation restrictions (United Nations 2006). This definition of disability refers to the negative aspects of the interaction between an individual with a health condition and that individual’s contextual factors (environmental and personal). For the purposes of this paper, the terms impairment and disability follow these WHO definitions. Disability is thus an umbrella term covering impairments (problem in body function or structure), activity limitations (difficulty executing a task or action), and participation restrictions (problem related to involvement in life situations) and reflects interactions between body features and society features (WHO 2016).

Though studying pathological change in skeletal remains can help identify impairment, population health constructs and WHO definitions facilitate exploration of broader factors, both internal and external to the individual, which can identify barriers that lead to disability. In bioarchaeology, the capacity to make these interpretations can be complicated by skeletal analysis limitations, lack of information on skeletal samples, or biased sources of historical or ethnographic data.

The stages of assessing disability in archaeological populations include identification and interpretation of a skeletal condition, inferring impairment potential of that condition from clinical data, understanding the impact of the environment on the individual with the condition, and identifying disability. These stages are informed by multiple variables from different sources, with intrinsic bias present for each. These variables lead to four possible outcomes: no impairment or disability, impairment but no disability, impairment and disability, and no impairment but disability (Fig. 9.1). The capacity to inform the stages of the interpretive process becomes increasingly less rigorous due to cumulative bias. However, this is the nature of a science that focuses on past populations and does not prohibit the exploration of disability in archaeologically derived human skeletons. Using the example of knee osteoarthritis, this paper introduces a population health approach to identify barriers and buffers that can produce or impact disability in past populations.

Knee Osteoarthritis

Osteoarthritis (OA) is the main cause of disability in North America (Marra et al. 2007) and in developed countries (Spector et al. 1996). OA is caused by degeneration of both cartilage and subchondral bone (Fautrel et al. 2005) and occurs

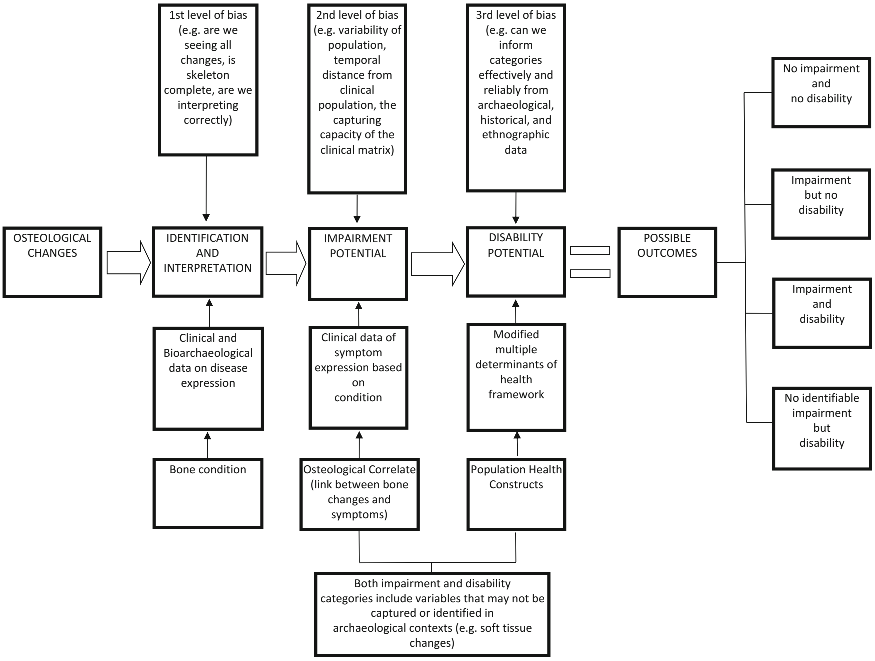

Fig. 9.1 Process from observation of osteological changes through to the identification of impairment and disability outcomes acknowledging multiple levels of bias

when the balance between the breakdown and repair of joint tissues is disrupted (Hunter et al. 2008). Knee OA not only involves this biological component but is also impacted by biomechanical elements. As a biological unit of hard and soft tissue structures, the knee is a mechanism for mobility and a pathway for load transfer. Knee OA can therefore be described as a final common pathway where mechanical factors lead to an imbalance between articular cartilage's degenerative and repair processes (Maly et al. 2008) thus creating knee joint failure (Biščević et al. 2008). This condition is almost always symptomatic, a major cause of pain and disability in older adults, and a main contributor to general chronic disability in North America (Cooper et al. 2000; Dieppe 2000; Breedveld 2004; Maly 2009).

Classical knee OA symptoms include reduced function, short-lived stiffness after inactivity, joint instability, buckling or giving way, and pain which may be activity related, mechanical, deep, aching, and/or not well localized (Hunter et al. 2008). Pain is often cited as a predominant symptom (Lethbridge-Cejku et al. 1995; Hopman-Rock et al. 1998; Bennell et al. 2003; Williams et al. 2004; Peters et al. 2005; van der Waal et al. 2005; Maly et al. 2006; Rosemann et al. 2006; Parmelee et al. 2007; Tuzun 2007; Hunter et al. 2008; Maly et al. 2008; Maly 2009). Though the pathophysiology of pain is complex (Hunter et al. 2008), both its chronicity and severity are main reasons cited for knee OA-related disability (Hopman-Rock et al. 1998; Bennell et al. 2003; Williams et al. 2004;

Peters et al. 2005; van der Waal et al. 2005; Maly et al. 2006, 2008; Rosemann et al. 2006; Parmelee et al. 2007; Luong et al. 2012). Knee OA symptoms are exacerbated by physical activity and relieved by rest, though advanced OA is capable of causing pain at rest, including during the night when it can lead to loss of sleep and further exacerbation (Hunter et al. 2008; Dieppe 2008). In some cases, symptoms initiate limb use modifications with the main limitations during sitting, standing, bending, and walking (Hall et al. 2008).

In clinical settings, the gold standard for assessing OA severity is through radiographs (Oka et al. 2008). Kellgren and Lawrence (1957) is one of the most cited clinical instruments to grade radiographic changes associated with knee OA. Three main physical features associated with knee OA (i.e., osteophytes formation, joint space narrowing, subchondral sclerosis: densification of bone below the articular surface) (Salaffi et al. 2005) are graded on a scale from 0 to 4 with definite knee OA categorized as grade 2 or higher (Lethbridge-Cejku et al. 1995; Cooper et al. 2014) (Table 9.1). In bioarchaeology, not all the features used in the Kellgren–Lawrence approach are available for observation. OA in archaeological bone is thus defined by characteristic changes visible on joint surfaces. Rogers et al. (1987: 185) defined these features as “(1) the formation of true, marginal osteophytes; (2) subchondral bone reaction (eburnation, sclerosis, cysts); (3) pitting of joint surfaces; and in severe cases (4) alterations in the joint contours.”

MRI images of bone accurately depict the macroscopic appearance of denuded bone (Cohen et al. 1999; Iwaki et al. 2000; Woodhead et al. 2001; Leitzes et al. 2005; Boileau et al. 2008; Louis et al. 2010; Ochiai et al. 2010). Based on this imaging approach, a grading system applicable to both clinical and archaeological skeletal populations was developed (Young and Lemaire 2014). This new system, the Clinical Archaeological Osteoarthritis Scale (CAOS), was used to grade knee OA expression in MRI from a clinical population. Based on knee OA of the distal femur, the scale focuses on features previously identified as significant in the Kellgren and Lawrence (1957) and Rogers et al. (1987) grading systems, including osteophyte formation and joint contour alterations. Pitting (micro/macroporosities) and cysts were also selected as relevant since they are easily seen on both denuded

Table 9.1 Kellgren–Lawrence grading of knee osteoarthritis with increased severity from 1 to 4 and the relevant qualitative variables of osteophyte formation, subchondral bone reaction, joint space narrowing, and articular surface densification

	Kellgren–Lawrence Grade			
	1	2	3	4
Osteophyte formation	Possible lipping	Definite	Moderate and multiple	Large and multiple
Subchondral bone reaction	None	None	Some sclerosis	Advanced sclerosis
Joint space narrowing	Doubtful	Possible	Definite	Marked
Articular surface densification	None	None	Possible	Definite

bone and MRI and are accepted as signs of the condition's progression in archaeological populations. The CAOS grading system consists of four grades: 0 represents no changes, 1 represents very mild changes such as minimal marginal bone exostosis possibly producing minor irregularities along the joint margin, 2 signifies distinct osteophytes along the margins of the articular surface indicated by evident contour irregularities, with possible surface microporosities, and 3 indicates articular surface deterioration with porosities/cysts and osteophyte formation recognized by completely irregular margins of the articular surface (Young and Lemaire 2014).

Impairment in Knee OA

The Osteoarthritis Initiative (OAI) is a multi-center, longitudinal, cohort, prospective observational study focusing primarily on knee OA and consisting of 4607 male and female participants of various ethnicities ranging in age from 45 to 79. Since participants self-identified, male and female can include both sex and gender associations. The OAI data includes knee OA status and outcome measurements, such as pain and physical function, overall physical assessment indices, and joint imaging assessments collected at baseline and subsequent 12-month intervals (Nevitt et al. 2006). OAI provides randomized subsets of MRI images for research purposes. A sample of 279 knees represented by: 139 right and 140 left knees, 141 males, 136 females, 46 to 80 years of age (mean 64 ± 9.7 years), BMI from 18.7 to 42.6 (mean 29.4 ± 4.7), weight from 43.5 to 121 kg (mean 83.6 ± 15.1 kg) was selected. Eighty-four percent of the knees belonged to Caucasians, 14% to African Americans, 1% to Asians, and 1% to other non-Caucasians. For males, the average age was 65.3 ± 9.4 years, BMI was 28.6 ± 4.1, and weight was 88 ± 14.5 kg. For females, the average age was 62.8 ± 9.9 years, BMI was 30.2 ± 5.2, and weight was 78.9 ± 14.4 kg. MRIs for each knee were reviewed using DICOMWORKS (v1.3.5 © 2000, 2001 Philippe Puech-Loïc Boussel). Both right and left knees were used as individual units of analysis since many OAI outcome variables are knee specific.

The OAI clinical variables assessed in this review focused on knee pain since this has been identified as the principle symptom leading to disability (Neogi 2013). Of approximately 1200 variables recorded by the OAI, 17 were identified: pain interferes with work, right and left knee pain with stairs, right and left knee pain in bed, right and left knee pain sitting or lying down, right and left knee pain standing, right and left knee pain bending knee fully, right and left knee pain twisting/pivoting, and right and left knee pain straightening knee fully. Frequency distributions for each OAI pain outcome variable were used to calculate the probability of having a functional deficit at each CAOS grade (Table 9.2). These probabilities were generated for males and females. Spearman's rank correlations were used to identify significant probability profiles relating CAOS grade to outcomes. For females, only 47% of the pain variables were significant ($r \geq 0.8$),

Table 9.2 Probability of having pain with each OAI outcome variable for both males and females for each CAOS grade based on the clinical sample results

Variable	% Probability of poor outcome									
	Female sample					Male sample				
	CAOS grade					CAOS grade				
	0	1	2	3	r	0	1	2	3	r
Pain interferes with work	63	61	70	93	0.8	35	59	74	73	0.8
Right pain walking	61	42	50	60	−0.2	9	39	52	73	1
Right pain with stairs	62	63	75	73	0.8	78	49	75	73	−0.4
Right pain in bed	18	16	35	60	0.8	0	18	37	0	0.1
Right pain sitting or lying down	20	18	35	47	0.8	0	25	39	9	0.4
Right pain standing	37	35	60	60	0.7	9	30	52	45	0.8
Left pain walking	41	32	30	53	0.2	13	29	50	64	1
Left pain with stairs	54	59	62	73	1	35	46	63	73	1
Left pain in bed	20	31	32	40	1	13	16	33	45	1
Left pain sitting or lying down	37	26	32	33	−0.2	17	25	37	55	1
Left pain standing	35	37	37	33	−0.3	17	44	46	64	1
Right pain twisting/pivoting	40	39	34	89	0.2	5	28	45	45	0.95
Right pain straightening knee fully	25	21	32	80	0.8	0	21	35	64	1
Right pain bending knee fully	37	39	52	80	1	0	36	43	64	1
Left pain twisting/pivoting	43	45	47	67	1	17	35	48	64	1
Left pain straightening knee fully	25	21	32	40	0.8	9	20	39	45	1
Left pain bending knee fully	43	39	40	40	−0.3	17	36	43	64	1

while 82% of the pain variables for males were significant. Females tended to have worse symptoms in the absence of bone changes when compared to their male counterparts. Type of activity affected symptom intensity, possibly due to joint biomechanics, load distribution across the joint surface, and recruitment of relevant soft tissue structures.

This impairment data generated from a clinical population of knee OA sufferers exposes the variable relationship between physical expression of knee OA and symptom experience, with the worst expression (CAOS grade 3) not always dictating severe symptoms. The activity being conducted and the individual's sex/gender both play roles but, even with this added level of detail and the capacity to demonstrate the probability of having impairment, predicting whether an individual was impaired by their knee OA cannot necessarily be established.

Linking OAI outcome variables to activities completed by past populations will depend on the population chosen. However, some movements have biomechanical features that can be generalized to other activities, allowing movements captured in OAI outcome variables to be related to skeletal populations. These include equivalent movements such as navigating a hilly terrain requiring incline ascent and subsequent descent (ascending/descending stairs), crouching while hunting or squatting during food preparation (bending knee fully), and knee mobility when chasing prey or tilling fields (twisting/pivoting). Impairment data must be combined with information from other aspects of the lived environment to identify if and when knee OA might become disabling. A theoretical approach is required to identify these potential barriers and any buffers that might mitigate any disabling circumstances.

Theoretical Framework for Disability

Engel's (1977) biopsychosocial theory of health, a conceptual model focusing on health as an interaction of individual, social, and environmental factors (Gignac et al. 2008), assists in identifying lifestyle variables related to knee OA in clinical populations and provides a framework to situate these variables for current and past populations. The biopsychosocial approach, often used in OA research, follows the population health paradigm in which positive health outcomes are based on a number of factors, including those extrinsic to the individual.

The biopsychosocial framework is also the principle structure for the *International Classification of Functioning, Disability and Health* (ICF). This WHO endorsed classification system was created to provide a standard terminology and structure for the classification of both health and health-related states (WHO 2001). ICF captures the interactions between a health condition and four main components: body functions, body structures, activities and participation, personal and environmental. Environmental factors, those extrinsic to the individual, include physical, social, and attitudinal environment (Wang et al. 2005). The ICF demonstrates the limitations of osteological analysis that can assist in informing only two functional aspects of the disability and health framework, "health condition" and "body functions and structures," and highlights the need to inform the remaining aspects of the disability equation. Therefore, to be explored, the ICF categories of personal and environmental factors must be deconstructed to derivative components. Known as the determinants of health, these components include, but are not limited to: social support networks, working conditions, social environments, physical environments, personal health practices and coping skills, biology, gender, and culture (PHAC 2001).

Applying the ICF's holistic approach to disability identification in paleopathology requires adaptation of current population health frameworks. For this

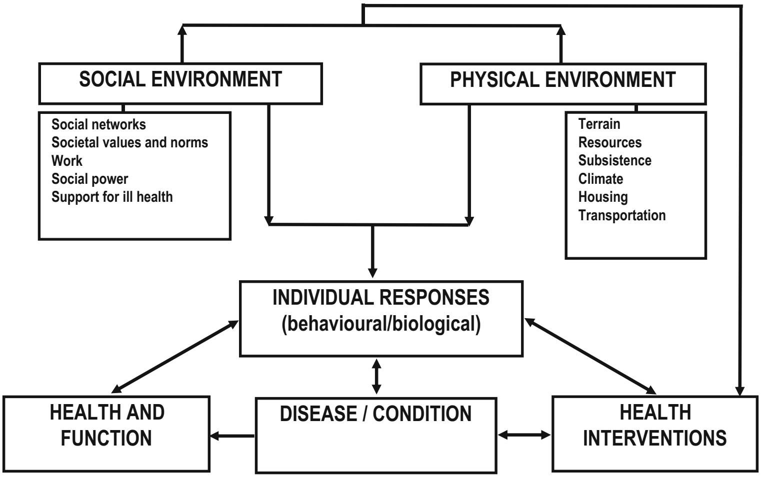

Fig. 9.2 Modified Multiple Determinants of Health Model (Evans et al. 1994a) for application to archaeological populations

study, the Multiple Determinants of Health Model (Evans and Stoddart 1994) was chosen because it is useful for identifying barriers and buffers that can create or mitigate disability in archaeological populations. Health determinants included in this revised model are social environment, physical environment, health interventions, disease profile, health and function, and individual responses (Fig. 9.2). Data to inform these determinants may be obtained from clinical, ethnographic, archaeological, and historical sources. For this study, knee OA was the disease variable and the health and function variables were the impairment potentials of knee OA (CAOS-related OAI data) , as previously discussed.

The social environment is a human-built, cultural construct in which people are nested, influencing and shaping them as individuals and as the collective whole (Corin 1994; Renaud 1994) in a manner that can be both “health-promoting or health-damaging” (Luong et al. 2012: 5). Cultural influences allow individuals to reference themselves in this world and provide a framework to understand what is meaningful. These influences, affecting all residents in a community despite their social position, include norms, beliefs, and values that encompass a way of life where individuals share behaviors and are guided by social institutions (Luong et al. 2012; Corin 1994). The framework created by the social environment also defines ill-health, the causes of ill-health, societal perception, and reaction to illness. Therefore, the social environment may, through the determinants of health, heighten knee OA’s effects to create a disability or act as a buffer and protector (Luong et al. 2012; Evans et al. 1994b).

Social organizations, including social networks, affect social support and isolation, emotional deprivation, stress, and stress’s relationship to the individual’s learned coping capacity (Hertzman et al. 1994). The availability of large social networks during illness can provide a buffer to poor outcomes (Evans et al. 1994a). Small family units could supply this buffer, but larger, family based communities provide a wider support system with built-in redundancies to compensate for failure. However, once communities grow too large, social positioning gradients can negatively affect health for individuals in the least affluent echelons due to fewer resources (Luong et al. 2012; Evans et al. 1994a). Therefore, moderate-sized family based communities could provide the necessary access to resources, varied types of work, and accommodation of individuals with mobility limitations due to knee OA.

Cultural norms and values impact the concepts of health and weakness, resource sharing practices, and the role of gender, including constraints on opportunities provided to men and women (e.g., culturally dictated work and duties) (Corin 1994). Cultural norms direct when and how those with a knee OA would be perceived and helped (negative or positive attitudes toward disability). Social power gives people freedom to make decisions, carry out their will, and help themselves. Bosma et al. (1997) showed that decision-making power is positively correlated with health outcomes. Social power could improve societal value for individuals with disabilities due to knee OA, making them less dispensable and more supportable. However, this support is also dependent on the latitude that resource availability and accessibility provide.

The physical environment includes both natural environmental factors such as air, water, food, soil, land management, flora, fauna, and climate and built environments such as housing, indoor air quality, design of communities, and transportation (PHAC 2003). The logistics of navigating various physical environments may be a barrier leading to disability for knee OA sufferers, despite social buffers (Luong et al. 2012; McDonough and Jette 2010). Subsistence patterns and available resources would also affect individuals whose mobility and work capacity are lessened, possibly impeding their access to varied work and resources.

Individual responses are comprised of behavioral and biological components. Behavioral responses are influenced by personal health practices, self-efficacy, and coping skills such as self-care, self-reliance, and freedom to make choices. These coping mechanisms can be conceptualized as an individual's inherent characteristics, acquired skills, or external buffers that are naturally available (e.g., supportive families) or purposefully introduced to provide support (e.g., self-help groups or similar social support networks) (McDonough and Jette 2010; Evans et al. 1994a). The social environment plays a key role in supportive communities and in forming a conceptual framework in which an individual learns how to cope, based on the acceptability of expressing symptoms. Generally, OA has been linked to more passive pain coping strategies, most likely due to irritation by increased motion (Perrot et al. 2008). Three coping mechanisms have been associated with knee OA: changing and modifying activities and roles, adapting to chronic pain and disability, and learning how to manage an unpredictable chronic condition (Keysor et al. 1998).

Biological responses are linked to general health status, gender (socially constructed identity of male or female), sex (biologically male or female), age, and social feedback. Biological and behavioral components are framed by psychological and social factors (Edwards et al. 2001; PHAC 2003). For example, ethnicity, defined as “the distinction between groups of people who share a certain social background, distinguishing behaviors, culture, history, beliefs, conventions and traditions as well as physical characteristics” (Campbell and Edwards 2012: 2), is known to influence how pain is appraised and responded to emotionally and behaviorally (Edwards et al. 2001). Gender has an effect on pain tolerance, depending on psychological factors that are socially constructed, but sex does not have an effect on pain threshold, with pain threshold defined as how the body processes pain perception (Bates et al. 1993; Schiefenhövel 1995; Nayak et al. 2000). The behavioral component may be related to societal norms on physical weakness, while the biological component may be determined through direct observations of a population’s general health.

Health interventions are a means of interfering in the course of a condition by influencing the biological, social, or physical environment of the individual to improve their situation. The success of interventions for impairment in earlier populations would depend on degree of symptom expression, the group’s capacity to intervene, and the effectiveness of the interventions. Determinants of health can act as barriers, buffers, or safety nets. Knee OA pain can produce barriers for determinants such as socially dictated work, physical environment, and societal values concerning weakness. Buffers that increase a person’s ability to work with their impairment, thereby avoiding disability, include social networks and alternate work availability. Last, safety nets provide a mechanism to assist those who become disabled; for example, social networks, social power, support for ill-health, and health care interventions.

In bioarchaeology, it is virtually impossible to accurately inform all variables that may contribute to knee OA disability. However, understanding that there are variables beyond our reach that may contribute to knee OA-related disability is important when considering the limitations in our interpretations.

Archaeological Application

Research has highlighted pain as a factor related to knee OA disability. The OAI data correlated with CAOS data provides some information on pain as it relates to bone changes at the distal femur, capturing the impairment potential for each activity. By identifying this impairment potential in archaeological populations and exploring possible social and physical barriers and buffers present in the environments of various populations, the potential for disability with knee OA can be inferred.

Individuals from contrasting skeletal samples, housed at the Canadian Museum of History, Gatineau, Quebec, were examined for disability potential. Skeletal sample selection was based on two criteria: (1) sufficient archaeological and ethnographic information to inform the determinant categories and (2) representation of contrasting populations of different subsistence patterns and/or geographic profiles.

The contextual information available for each of the chosen populations is based on primary and secondary sources. Because of this, the presence of innate source bias must be considered. The degree of bias-related influence on the historical accounts is uncertain, but its presence is unavoidable due to the limited amount of data available for these archaeological groups. However, this is a consideration for any interpretation of historical, ethnographic, or archaeological data that is used to define determinants of health variables for archaeological populations, but does not negate this data for use in the chosen examples.

The Ontario Iroquoian skeletal sample (*n* = 24) dates to the Ontario Iroquois Tradition (ca. 1000 AD to 1650 AD) (Wright 1973) was derived from three ossuaries (i.e., Middleport, Dwyer, Sherks). This sample included 15 male femora (three right and 12 left) and nine female femora (two right and seven left). A nineteenth–twentieth century Inuit sample (*n* = 23) was pooled from four different areas from the Igloolik region of Nunvaut (Inuksivik, Kamarvik, Mittimatalik, and Yellow Bluff) and included 15 male femora (seven right and 8 left) and eight female femora (four right and four left) (Fig. 9.3).

Fig. 9.3 Map of Canada depicting the regions from which human remains used in this study were collected; **a** Igloolik region of Nunavut, and **b** Iroquoian region of Ontario with ossuaries

Ontario Iroquoian Ossuary Builders

The usage of ossuaries is a tradition of the Ontario Iroquoians that spanned from prehistoric to historic times. The best ethnographic data on this burial custom comes from reports on the Huron feast of the dead. These historical accounts and subsequent historical summaries also discuss the social environments surrounding those who followed the custom (Sutton 1988; Johnston 1979). These accounts have been generalized to our ossuary populations to provide insight into aspects of life that would otherwise not be fully understood from the archaeological record.

The Iroquoian ossuary builders were a clan-based society, with a matrilineal organizational structure which guided political life, marital selections, support systems, and distribution of resources (Anderson 1985). Village society members were guaranteed access to the means of production and the products of social labor through this gender-based kinship (Anderson 1985). The Iroquoian economy was centered on horticulture, which women controlled through matrilocal production units (Dannin 1982). This made the matrilineal extended family not only the basic social group but also the main economic unit (Heidenreich 1978).

The central figures, decision makers, ritual position holders, and ceremonial leaders were mature men who, in youth, had proven themselves worthy. Mature women were the strongest voices in all family matters (Heidenreich 1978; Trigger 1987). Iroquoian cultural norms not only framed how individuals lived, but also created a strong sense of community responsibility (Trigger 1987: 50). Strength in the face of pain, torture, war, and childbirth was admired and respected (Champlain 1925; Trigger 1987). Public displays of emotion were viewed with scorn by the community (Trigger 1987). All members of the society were expected to share their wealth freely and without complaint with hospitality, gift giving, and exchange not only playing important roles but also providing strong social approval and accruing social status (Heidenreich 1978; Trigger 1987). No person was permitted to go hungry when food remained in the household (Heidenreich 1978; Trigger 1987).

Labor was divided by gender (Anderson 1985). The principle subsistence, horticulture, allowed for larger, economically self-sufficient, agricultural settlements (Heidenreich 1978). Men hunted, fished, cleared new land, built lodges, left on trading and war expeditions, were responsible for safety and order, and created links with the outside world (Herman 1956; Champlain 1929; Heidenreich 1978; Anderson 1985; Trigger 1987). Women provided almost all the horticultural labor including, planting, hoeing, harvesting, pulling weeds, and chasing away pests (Herman 1956; Heidenreich 1978; Anderson 1985). They also gathered all the firewood and performed domestic work; such as, child care, making household goods (clothing, pottery, thread, fishing-nets), and preparing food (Champlain 1929; Heidenreich 1978; Anderson 1985). Women could also assist in the hunts by driving, butchering, and transporting game (Heidenreich 1978; Trigger 1987). Women typically did not travel outside their territory (Trigger 1987), which was generally flat and consisted of arable soils surrounded by water and swamp (Heidenreich 1978). A system of extensive walking trails constituted the main transportation routes. Water transportation was not used within their territory but canoe travel was often used by men who ventured outside the region. Travel in winter was difficult and largely avoided, except for ice fishing and some socializing with nearby villages (Heidenreich 1978).

The Iroquoian ossuary builders were reputed to believe that an individual's health was not restricted to just the physical, but encompassed all things affecting happiness, personal fulfillment, or luck (good or bad) (Trigger 1987). Historical reports suggested that these people were unusually healthy, generally happy, and believed that they had an excellent life (Champlain 1929; Heidenreich 1978). Shaman were males, were considered important and prominent, and intervened when illness occurred (Heidenreich 1978; Trigger 1987).

Nineteenth–twentieth Century Inuit from Igloolik Region of Nunavut

In the nineteenth–twentieth century, Inuit from Nunavut's Igloolik region had little political or social unity. Composed principally of simple family units that allowed for rapid mobility, they followed rules established by custom, habit, and tradition, in particular taboos passed from generation to generation (Mathiasson 1928; Fitzhugh 1997). Though often dispersed, these smaller groups maintained distant kin relations and trading partners to engage in information sharing and hospitality (Fitzhugh 1997). These extended family groups not only lived together but formed the principal unit of cooperation, exchange, and distribution (Mary-Rousselière 1984). Any meat was distributed throughout the community because it was their practice to share (Rasmussen 1930). Males were dominant in the household, with older males making the decisions and coordinating group activities (Mathiasson 1928; Mary-Rousselière 1984).

"Few conditions in world history … imposed environmental stresses on the hunters and their communities as severe as those of the Eastern Arctic" (Maxwell 1985: 2). Small familial groups sometimes gathered for certain hunting pursuits. These usually occurred in winter, making the transient settlements more populated in winter than in summer when populations scatter for hunting and fishing, the primary subsistence (Mathiasson 1928). Traditionally, men hunted, sometimes requiring long trips to procure food and skins. They also fished, built houses, scraped skins, and made sledges and implements. Women mostly stayed indoors during the day, sewing clothes, and preparing skins. Women fished infrequently and rarely helped in the hunt, but periodically assisted by carrying meat (Mathiasson 1928; Rasmussen 1930).

Inuit cultural norms were a product of circumstances. Marine and terrestrial animals formed most of the Inuit diet. Resource failure was a constant threat in an Arctic ecosystem that had few species (Fitzhugh 1997). Despite their adaptability, sudden disappearances of game lead to periods of Inuit starvation (Maxwell 1985). A communism prevailed when resources were plentiful. When resources were meager and people struggled to subsist, which occurred frequently, the weak and dependent often became disposable to reduce the number of mouths to feed. This was so culturally accepted that the weak, old, or disabled would often choose to commit suicide rather than to be a burden on their family (Low 1906). The family had a duty to provide for all helpless persons, including fatherless children, widows, old men, and women who could no longer keep up on the constant hunting expeditions (Mathiasson 1928; Rasmussen 1930). Individuals who lacked immediate family became the responsibility of the extended group, who could choose to provide for the person or leave them to their fate. The latter was the frequent outcome for old women (Rasmussen 1930).

During winter, sledges pulled by dogs were the most frequent mode of transportation (Mary-Rousselière 1984). In summer, the coasts were rocky with many loose fragments lying at odd angles and little vegetation (Mathiasson 1928; Merbs 1983; Maxwell 1985). This ‘shingled’ terrain makes walking difficult and falling a possible hazard (Merbs 1983). Loads were carried or transported by their dogs. Kayaks were used in open water (Mathiasson 1928).

The Inuit, as with the Iroquoians, had a holistic view of health “where mind, body, and spirit are intrinsically linked and a weakness in one will surface as a weakness in another aspect” (Black et al. 2008: 157). As such, their healing techniques incorporated not only an extensive knowledge of the human body but of the person, with the body being viewed as a whole in relation with its social environment (Tipula et al. 2001).

By some reports, the Inuit appeared to have been proud, independent, have a sense of gratitude, slow to anger, and good natured, but capable of ungovernable bursts of rage when roused (Low 1906). Accounts of survival attest to their resiliency and determination (Rasmussen 1930). A complex system of taboos and propitiatory rites and sacrifices was considered necessary to maintain a balanced life (Rasmussen 1930). Overseeing this realm was the Angakut or Shaman (healer) who promoted physical, emotional, and spiritual wellness by a strict set of rules that governed each person’s behavior and established each individual’s relationship with the community (Rasmussen 1930). The more concrete forms of intervention for aches and pains were ointments, heated cloths containing clay, or broths (Gray 1996; Tipula et al. 2001; Black et al. 2008).

Population Comparison

The majority of the femora examined were within the first two CAOS grades (83%) with the Inuit totaling 96% and Iroquoian totaling 71% (Table 9.3). The entire female sample was categorized as CAOS grade 0 or 1, with none of their femora exhibiting advanced osteological changes associated with grades 2 and 3. The male samples from each population had distal femoral changes consistent with CAOS grade 2, but only the male Iroquoian sample had representatives in the grade 3 category. Interestingly, the Iroquoian males lacked any individuals with CAOS grade 0. The lack of representation in grades reflecting more advanced changes, especially for the female sample, or less advanced changes, especially for the

Table 9.3 Percentage of male and female femora by CAOS grades from 0 to 3 for each sample population and the entire sample

		CAOS grade			
		0	1	2	3
Iroquoian	Male %	0	53	34	13
	Female %	56	44	0	0
	Male and female %	21	50	21	8
Inuit	Male %	20	73	7	0
	Female %	62	38	0	0
	Male and female %	35	61	4	0
Entire sample	Male and female %	28	55	13	4

Table 9.4 Relevant pain outcome probabilities (%) for each of the sample populations for both males and females with ranges encompassing probabilities for both right and left legs (single % given when right and left leg probabilities were identical)

	CAOS grade			
Males	**0**	**1**	**2**	**3**
Interferes with work	35	59	74	73
Walking	9–13	29–39	50–52	64–73
Twisting/pivoting	5–17	28–35	45–48	45–64
Straightening knee fully	0–9	20–21	35–39	45–64
Bending knee fully	0–17	36	43	64
Females	**0**	**1**		
Interferes with work	63	61		
Walking	41–61	32–42		
Twisting/pivoting	40–43	39–45		
Straightening knee fully	25	21		
Bending knee fully	37–43	39		

Iroquoian male sample, may be an artifact of the limited number of complete femora available or it might reflect OA occurrence levels within the population.

Due to the sample size, right and left femora were pooled and outcome probabilities were provided in a single range encompassing both sides (Table 9.4). For example, females with CAOS grade 1 had a 42% probability of having right knee pain while walking, but only a 32% probability of having left knee pain for the same activity. Therefore, limb probabilities were combined into ranges (e.g., 32–42%). In instances where the right and left outcome variables produced the same probability score, only a single number is provided. Since females from both populations only exhibited CAOS grades 0 and 1, these were the only probabilities considered. As with all probability outcomes for each CAOS grade, having pain is not guaranteed since there could be no associated pain or impairment despite prominent osteological changes. Review of the determinants of health for each population allows for identification of barriers, buffers (options to circumvent barriers), and support mechanisms (if disability caused by the barriers cannot be mitigated) specific to each group (Table 9.5) and supports discussions on the how impairment of knee OA could become disabling.

Table 9.5 Summary of the determinants of health for each of the sample populations with the identification of barriers (−), buffers (+), and support mechanisms (*) for each group

Determinants of health	Populations			
	Iroquoian male	Iroquoian female	Inuit male	Inuit female
Social environment				
Social networks	Many multiple family and extended family groups (moderate to large society) with many social networks (+)(*)		Family and extended family (−)(*)	
Societal values and norms: weakness	Expressing weakness deterred and scorned (−)		Expressing weakness deterred and scorned (−)	
Societal values and norms: access to resources	All resources shared (+)(*)		Resources shared (+)(*) when available (−)	
Work	Physically demanding and moderate mobility (walking some distance) (−)		Very physically demanding and extensive mobility requirements including running (−)	Few physical demands, little mobility (+)
Social power	Have majority of power, make major decisions (+)(*)	Have considerable input (+)(*)	Have majority of power, make major decisions (+)(*)	Input in limited matters (−)
Social support for ill-health	Complete emotional and physical support (+)(*)		Intermittent support when resources allow (−)	
Physical environment				
Terrain	Flat (+)		Flat but rocky (+)(−)	
Resources	Plentiful (+)		Intermittent (−)	
Subsistence	horticultural, hunter and gatherer (+)		Hunter and gatherer (−)	
Climate	Seasonal with moderate summer and winter (+)		Seasonal with short cool summer and extreme winter (−)	
Housing	Permanent (+)		Temporary with seasonally permanent (−)	
Transportation	Mostly walking with some riding (−)		Mostly riding with some walking (−)	
Health care				
Interventions available	Shaman and natural healing methods (+)		Shaman and natural healing methods (+)	

(continued)

Table 9.5 (continued)

Determinants of health	Populations			
	Iroquoian male	Iroquoian female	Inuit male	Inuit female
Individual response				
General disposition	Happy and ill-tempered on occasion (+)		Happy and ill-tempered on occasion (+)	
Reported group biological health	Healthy (+)		Healthy (+)	

The background information on the chosen populations emphasizes strength and stoicism in the presence of physical pain and a general intolerance for exhibitions of weakness. This would suggest that pain experienced during more passive activities like sitting, lying down, sleeping (in bed), and standing would probably not be freely shared and would therefore have limited impact. Also, the terrain occupied by both populations was reported as being mostly flat so the variable of pain with stairs was also eliminated from consideration.

Five main pain variables remain for consideration. Pain interfering with work is a factor with over a 50% probability of occurrence for the majority of our sample. Arguably, this would have less of an impact on individuals who had access to different types of work that did not involve knee recruitment or accommodated the disability by changing or modifying the original work parameters. If no such modifications or alternate work opportunities existed, then support for those removed from the workforce would be required. For example, Iroquoian and Inuit females have the same probability of pain interfering with work at CAOS grade 1 (61%). However, the larger permanent Iroquoian community would have more opportunities for diversified work. These opportunities could provide work role options in which (for some) no disability would occur. If disability did occur in any work role, the larger permanent community could provide sufficient resources for her despite lacking the capacity to contribute. The Inuit embedded in their smaller family and extended family units may not have varied work opportunities and, with intermittent resource availability and limited community standing a disabled female may not have been supported.

Deficits in the remaining functional variables (i.e., walking, twisting/pivoting, straightening and bending knee fully) would have an impact on work capacity, role fulfillment, and mobility which would be especially applicable to the more challenging rocky environment of the Arctic in summer. A task like hunting, practiced by males in both of the populations examined, would incorporate the biomechanical requirements of these four movements. Both Iroquoian and Inuit males in our sample exhibited CAOS grade 2 femoral changes translating to a 50–52% probability of pain while walking, 45–48% probability of pain while twisting or pivoting the knee, 35% to 39% probability of pain while straightening the knee fully, and a

43% probability of pain when bending their knees fully. Though experiencing pain at CAOS grade 2 is not guaranteed, the possibility of pain interfering with fulfillment of the role as hunter is present (barrier). For Iroquoian society, the option of males to remain in the village and fulfill a security role was available (option around barrier). However, any impairment caused by femoral changes in Inuit males may become disabling if they cannot meet their role as hunter and are offered no other options for role fulfillment in the community.

Other Considerations

Clinical Sample

Bias must be considered when using a clinical sample to inform our understanding of skeletal populations, including possible dissimilarities in age, ancestry, BMI, efficacy of interventions available, and social and physical environments. On average, the chosen OAI sample had elevated BMI, likely in contrast to most archaeological populations; however, there was a lack of correlation between increasing BMI and the pain outcome variables in our sample.

The age range for the OAI sample population is older (45–79 years) than a typical archaeological population. Due to the progressive nature of knee OA, the large OAI sample was associated with individuals of mid to upper age ranges. Though increasing age has been correlated with OA symptom risk (Nguyen et al. 2011; Elbaz et al. 2011; Robbins et al. 2011), this was not found for our sample. Notwithstanding, increased activity is known to cause increased symptoms (Hall et al. 2008; Hunter et al. 2008). Therefore, an age-related increase in symptoms for an older clinical population may off-set the activity requirements of a younger archaeological population.

Medication may reduce symptom expression in knee OA in a clinical population, especially for those with the most severe bone changes. In theory, a larger number of functional deficits could be present for unmedicated populations, especially at CAOS grade 3. Though this effect cannot be estimated, it does not preclude the use of data generated from a clinical population to improve our dialogue on the impact of knee OA on past populations.

Source of Determinants of Health Data

The Modified Multiple Determinants of Health Model identifies several data categories that may not be obtainable for archaeological populations. Though physical environment features (terrain, resources, subsistence, climate, housing, and transportation) might be definable based on geographical, meteorological, and archaeological data; social environment features (social networks, societal values and norms, work, social power, and support for ill-health), health interventions, and individual responses (behavioral) are less accessible. Even for populations that have detailed ethnographic and historical data, innate bias of the source is difficult to quantify. Considerations when using these sources include worldview (geographical, temporal, and cultural), recorder gender, and informant bias (Hayter 1994; LeCompte 1987; Hurcombe 2014). For example, worldview can be impacted by personal history or professional training, including the time and place in which these were experienced and could be reflected in such things as cultural biases or racism. Gender bias can include access limitations to the opposite gender in the study population or observations tainted by the perception that a gender might have less status. Informant bias can result from an individual restricting or fabricating information that they share with the recorder.

Conclusions

Identifying disability in archaeological populations requires the assessment of impairment potential based on osteological changes and then situates the individual with any impairment in their surrounding environments, identifying both the barriers and the buffers that may create and/or mitigate disability. Population health constructs can provide the framework to define these environmental inputs. For our knee osteoarthritis example, a clinical population defined impairment potential, clinical literature supported the use of a modified determinants of health model to capture variables associated with living with knee OA (both barriers and buffers), and helped explore disability potential in the two archaeological samples.

The population examples chosen for this research were extremes, contrasting the impact knee OA could have had on individuals based on their documented life circumstances. The determinants of health profiles for these populations, based solely on second hand macro-level historical data, captured various nonbiological differences that could create barriers that affect disability potential of knee OA in both groups. The historical profiles reflect the contrasting environments surrounding the nineteenth–twentieth century Inuit and the Iroquoian ossuary builders. The environment in which the Inuit were embedded was extremely harsh, both socially and physically, indicating that knee OA may have been more disabling in this population where an increased number of barriers and less access to buffers existed.

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Chapter 10
Quantifying Impairment and Disability in Bioarchaeological Assemblages

Ann L.W. Stodder

Introduction

Skeletal characterizations of the health of past populations employ a variety of data: the prevalence of nonspecific stressors, traumatic injuries, infections, dental pathologies, degenerative conditions, and life expectancy and mortality patterns derived from life tables, which generate demographic summary statistics based on the age distribution of skeletal assemblages. The pitfalls of using life tables with archaeological assemblages are abundantly described in the literature (recently summarized by Larsen 2015), but among the most important (and unrecognized) of problems is that life table statistics are subject to equifinality; similar numbers, like life expectancy at birth, mask the variation, and underlying dynamics of population health. Paleoepidemiology reveals this variation, but these studies are based on the conditions that are observable in a large number of skeletal elements and teeth which generate data sets that can be manipulated statistically. The emphasis on generating and interpreting comparable quantitative data has been critical to the maturation process of paleopathology (Cook and Powell 2006) and bioarchaeology into a realm of inquiry that deals with "big data" (Stodder 2012). Larger scale population studies address major transitions in human adaptation and health such as those associated with agricultural intensification, migrations, and culture contact (Cohen and Crane-Kramer 2007; Jackes et al. 1997; Larsen and Milner 1994; Oxenham and Pechenkina 2013; Pinhasi and Stock 2011; Steckel and Rose 2002; Stodder 2006; Verano and Ubelaker 1992). However, these are incomplete; many skeletal pathologies do not fit neatly into quantitative groups, especially conditions

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A.L.W. Stodder (✉)
Office of Archaeological Studies, The Museum of New Mexico, Santa Fe, USA
e-mail: Ann.Stodder@state.nm.us

A.L.W. Stodder
Department of Anthropology, The University of New Mexico, Albuquerque, USA

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that are present in one or a few individuals and are not readily classified in the etiological framework that dominates paleopathology. When the focus is on quantitative data, individual skeletal pathologies that cannot be quantified may be trivialized and dismissed as irrelevant and anecdotal (e.g., Armelagos and Van Gerven 2003). This creates an analytical gap between population-level data and the considerable effort that is still expended by paleopathologists on the differential diagnosis and description of particular diseases and conditions observed in individual skeletal remains. Insofar as bioarchaeological studies focus on this quantitative, population-level data and ignore the individual pathologies that are increasingly the focus of both scientific articles (such as the case studies in *The International Journal of Paleopathology*) and humanistic studies and osteobiographies (e.g., Stodder and Palkovich 2012), there remains a real schism in how we use (and do not use) evidence of health in archaeological skeletal assemblages.

This chapter demonstrates the application of metrics from The Global Burden of Disease (GBD) project (Murray et al. 2012; Murray and Lopez 1996; World Health Organization 2013) in an effort to bridge this gap and incorporate a broader range of skeletal pathologies into the quantitative characterization of health in past populations. The GBD metrics used here address morbidity (i.e., health states representing departure from optimal functional health), rather than mortality. This approach is more immediately attuned to what we most often record in paleopathology; not causes of death, but the chronic conditions that are of sufficient duration that they impact the skeleton and the functioning of the individual, and in a composite picture, the functional health of a community. Instead of quantifying skeletal changes and lesion types (many of which do not clearly relate to symptoms or actual conditions), the GBD provides a tool to quantify the relative morbidity associated with a particular health state—a fractured femur, for example.

The consideration of morbidity, and the broader picture of health that this affords, is particularly relevant to current archaeological studies that employ resilience theory and social network analysis to explore community and regional-level resilience and vulnerability to environmental and political upheavals, such as droughts, volcanic eruptions, and conquest (Borck et al. 2015; Hegmon et al. 2008; Hoover and Hudson 2016; Redman 2005). In Southwestern archaeology, the scale and direction of migrations in response to climate fluctuations and episodes of violence are investigated in terms of the decision-making processes and trade-offs in donor communities (whence people migrated), in destination communities that accepted migrants, and in communities that were not abandoned but continued to be occupied after major disruptions. A limited number of studies employ paleopathology data. Hegmon et al. (2008) ranked scales of skeletally documented "health problems" and "violence" associated with social transformations including village fission and large-scale regional abandonments as a measure of "human suffering" (Hegmon et al. 2008: 317). Paleoepidemiological data such as the prevalence of stress indicators like dental enamel defects and nonspecific infections are brought to bear in explaining population decline among the Hohokam (Meegan 2009; Nelson et al. 2010; Sheridan 2003), although the scale of decline is in debate (McClelland 2015). These studies perfectly exemplify the potential role of quantitative, broadly inclusive, community-level morbidity data as a tool to identify thresholds of ill health that trigger migrations at small or large scales (Stodder 2016). By explicitly addressing functional impacts of ill health in individuals, this approach also articulates well with bioarchaeological studies framed in the life course and lived experience. Such studies are exemplified in the bioarchaeology of care approach (Tilley 2015; Tilley and Cameron 2014; Tilley and Oxenham 2011; Tilley and Schrenk, in press) wherein archaeological context and paleopathology are used to consider the impact of an altered health state on the life of the affected individual and his or her potential caregivers and others.

The Global Burden of Disease(GBD) was initiated by the World Bank in the 1990s and is now under the provenance of the Institute for Health Metrics and Evaluation (http://www.healthdata.org). This is a vast global epidemiology program that continues to grow and evolve, with significant implications for health policy at national, regional, and global scales. Only a small facet of the GBD is addressed here. The history and continuing evolution of the Global Burden of Disease project is summarized on the Institute for Health Metrics and Evaluation web site. The results of component studies by researchers in 180 countries addressing global results, regional, and country-specific health patterns, data for particular diseases and health risks for certain age groups are presented in numerous GBD reports (e.g., Cross et al. 2014; GBD 2013 Collaborators 2015; Gore et al. 2011; Murray and Lopez 1996, 1997; World Health Organization 2004). Many of these are published in *The Lancet* (an open-access medical journal) and in a wide range of other medical and public health journals.

The GBD generates summary measures of population health expressed as Disability Adjusted Life Years (abbreviated as DALYs), a time-based measure that combines projections of years of life lost (YLLs) due to premature mortality, and years lived with disability (YLDs) in states of less than full health. The incorporation of nonfatal health conditions in the data that drive healthcare policies and funding is a significant departure from "body count" approaches that focus on causes of death (Rehm and Frick 2010). Two components of DALYs, Disability Weights (DWs) and prevalence-based YLDs, can be used to better understand the functional implications of health states associated with skeletal pathologies, and to incorporate individual conditions into group-level characterization of departure from optimal functional health in the populations represented by archaeological skeletal assemblages. The ongoing discussions about the methods used to assign DWs is of particular interest here; the problem of cultural and community-specific DWs in contrast to universal (and thus globally comparable) DWs speaks clearly to the archaeological emphasis on context and cultural sensitivity in our interpretations of the social significance of differential health in the past, as well as to the importance of comparable data sets.

GBD Metrics and Terminology: Disability Weights and Years Lived with Disability

DALY calculations have three main components: (1) DWs—disability weights for particular conditions listed in The International Classification of Diseases (WHO 2016 www.who.int/classifications/icd/en/) and their sequelae; (2) YLDs—years lived with disability; and (3) YLLs—years of life lost due to premature mortality. Disability weights quantify loss of functioning on a scale from 0 to 1, with 0 representing full health and 1 representing a state equivalent to death (GBD Operations Manual 2009: 86, Salomon et al. 2015: 712). The concept of disability in GBD studies is related to departure from optimal health and increments of loss of functionality in the core domains of health (i.e., mobility, self-care, pain, cognition, interpersonal activities, vision, sleep, and affect), and explicitly *not* to the broader socially defined concept of well-being (GBD Operations Manual 2009: 46; Salomon et al. 2012; World Health Organization 2013: 11). Clarification of this concept and GDB use of the term disability has followed from works like Chamie's 1995 paper objecting to the characterization of disability as a part of the global burden of disease, measured through estimates of years of life 'lost' from disease and injury-specific disability. Years of life with disability are not necessarily 'lost' years, nor are they necessarily correctly described as a burden of disease (Chamie 1995: 323). The 2013 GBD manual specifies that disability in GBD studies "should reflect the general population judgements about the 'healthfulness' of defined (health) states, not any judgements of quality of life or the worth of persons or the social undesirability or stigma of health states" (World Health Organization 2013: 11). The term disability is used here in keeping with the GBD approach: as representing departure from optimal functional health.

Some of the disability weights from the 1990 GBD manual are relevant to paleopathology (Table 10.1). DWs range from 0.001 for periodontal disease to 0.473 for the neurological sequelae of venereal syphilis and 0.809 for terminal multiple myeloma. The high DWs for congenital syphilis (0.315) and for paralysis or impaired mobility (0.369) are also noteworthy. DWs differ between age groups for some sequelae including tuberculosis, malaria, diarrheal diseases, and dysentery associated with parasitic infection. Many of the conditions and risk factors that rank highest on global and regional GBD lists like schizophrenia, major depressive disorder, HIV, and motor vehicle accidents, are not recorded in the skeleton or are not relevant for prehistoric populations. However, DWs for comorbidity associated with conditions known to have impacted prehistoric communities are worthy of consideration (Table 10.1): cognitive impairment associated with both parasite-induced and iron deficiency anemia, and neurological sequelae of venereal syphilis, for example. As discussed by van Schaik et al. (2014), comorbidity is an important consideration for assessing disease in the past. The distinction between short-term and long-term impacts of conditions like skull and femur fractures is also of interest. The full DW table also lists differences for some conditions when treated as opposed to the DWs for untreated sequelae. Use of untreated DWs here is not

Table 10.1 Age group disability weights for selected sequelae, 1990 Global Burden of Disease Study

	Age group (years)				
Sequelae	0–4	5–14	15–44	45–59	60+
Dental caries	0.081	0.081	0.081	0.081	0.081
Periodontal disease	0.001	0.001	0.001	0.001	0.001
Edentulism	0.061	0.061	0.061	0.061	0.061
Tuberculosis (no HIV)	0.294	0.294	0.264	0.274	0.274
Syphilis: congenital	0.315	0.315	0.315	0.315	0.315
Tertiary, gummas	0.102	0.102	0.102	0.102	0.094
Tertiary, neurologic	0.283	0.283	0.283	0.283	0.283
Cancer, terminal multiple myeloma	0.809	0.809	0.809	0.809	0.809
Diarrheal diseases	0.119	0.094	0.086	0.086	0.088
Impaired mobility (hip, leg, foot)[a]	0.369	0.369	0.369	0.369	0.369
Malaria	0.211	0.195	0.172	0.172	0.172
Associated anemia	0.012	0.012	0.012	0.013	0.012
Neurological sequelae	0.473	0.473	0.473	0.473	0.473
Trichuriasis					
Massive dysentery syndrome	0.138	0.116	0.114	0.114	0.129
Cognitive impairment	0.024	0.024	0.024	0.024	0.024
Anemia	0.024	0.024	0.024	0.024	0.024
Otitis media: episodes	0.023	0.023	0.023	0.023	0.023
Otitis media: deafness	0.233	0.227	0.216	0.215	0.213
Cataracts or blindness	0.600	0.600	0.600	0.600	0.600
Iron-deficiency anemia					
Moderate	0.011	0.011	0.011	0.012	0.012
Severe	0.087	0.087	0.093	0.090	0.087
Very severe	0.241	0.244	0.255	0.252	0.252
Cognitive impairment	0.024	0.024	0.024	0.024	0.024
Rheumatoid arthritis	0.233	0.233	0.233	0.233	0.233
Osteoarthritis: hip	0.156	0.156	0.156	0.156	0.156
Osteoarthritis: knee	0.156	0.156	0.156	0.156	0.156
Dislocation: shoulder, elbow, hip	0.074	0.074	0.074	0.074	0.074
Fractures					
Skull—short term	0.431	0.431	0.431	0.431	0.431
Skull—long term	0.411	0.411	0.411	0.410	0.395
Face bones	0.223	0.223	0.223	0.223	0.223
Vertebral column	0.266	0.266	0.266	0.266	0.266
Rib or sternum	0.199	0.199	0.199	0.199	0.199
Pelvis	0.247	0.247	0.247	0.247	0.247
Clavicle, scapula, humerus	0.153	0.153	0.137	0.137	0.137

(continued)

Table 10.1 (continued)

	Age group (years)				
Sequelae	0–4	5–14	15–44	45–59	60+
Radius or ulna	0.180	0.180	0.180	0.180	0.180
Hand bones	0.100	0.100	0.100	0.100	0.100
Femur—short term	0.372	0.372	0.372	0.372	0.372
Femur—long term	0.272	0.272	0.272	0.272	0.272
Patella, tibia, fibula	0.271	0.271	0.271	0.271	0.271
Ankle	0.196	0.196	0.196	0.196	0.196
Foot bones	0.077	0.077	0.077	0.077	0.077

Source excerpted from Murray and Lopez 1996: Annexe 3

[a] GBD category originally for poliomyelitis-related impairment, expanded to include other causes of impaired lower limb mobility

intended to imply that prehistoric people did not treat illness and injuries, but rather the assumption that, as used in GBD studies, treatment includes a range of modalities not present in nonindustrial contexts. The 1990 DW values are used in the current study because the published version includes more detail about age groups than the later iterations.

Applying the DW and YLD Approach in Bioarchaeology

Disability weights and prevalence-based YLDs are presented for skeletal assemblages from two Ancestral Pueblo archaeological localities in the northern Southwest of the United States. Most of the discussion is about the people of San Cristobal Pueblo, a large town in the Galisteo Basin (near Santa Fe, NM). This town of sedentary farmers, hunters, and craftsmen was established in the late 1300s and occupied through the centuries of Spanish contact and exploration (starting in 1539), and the early colonial period in the 1600s. Like many neighboring towns, San Cristobal was abandoned at the time of the Pueblo Revolt in 1680 (Nelson 1914; Galisteo Basin Sites Protection Act 2014; Simmons 1979). The site was mapped and partly excavated by Nels Nelson in 1912. Later, excavation by Louis Sullivan resulted in a substantial collection of human remains that exhibit treponemal infection, tuberculosis, dental defects indicative of developmental arrest, skeletal lesions associated with vitamins B, C, and iron deficiencies, and relatively high rates of cranial trauma (Stodder 1990, 1996). Population estimates vary among archaeologists, but this was an aggregated community of 900–1200 people occupied in the Pueblo IV (Classic) and Protohistoric periods in New Mexico: times of population aggregation and decline, followed by drought, epidemics, political, and religious disturbance.

The second assemblage used in this study comes from a group of early Ancestral Pueblo villages in Ridges Basin (just outside Durango, Colorado) that were occupied for just a couple of generations, from about AD 710–825 in the Pueblo I period. These sites were excavated in the early 2000s as part of a very large cultural resources mitigation program (The Animas-La Plata Project) associated with the construction of a dam and reservoir (Potter 2010). Ridges Basin (now the site of Lake Nighthorse) was a well-watered, topographically rugged, and ecologically diverse location. Material culture and domestic architectural styles, mortuary treatment (Potter 2010; Potter and Chiupka 2007), and cranial (Douglas and Stodder 2010) and dental biodistance (McClelland 2010) studies indicate that two or three different groups of people settled here from a variety of locations to the south and west. One of these sites, Sacred Ridge, stood out as the largest aggregated settlement at the time, extending for about 13 acres with an estimated population of 50–60 people (perhaps one fifth of the Basin population). Highly visible ritual architecture on the ridgetop suggests restricted access to ritual power as an early manifestation of social hierarchy (Chiupka 2009). This is thought to be the impetus for execution of more than 30 individuals whose heavily processed remains were dumped in a small house on the edge of the Sacred Ridge community (Potter and Chiupka 2010; Stodder et al. 2010a), and the permanent abandonment of the Basin a decade later.

The two assemblages represent people who lived in one of the earliest and one of the latest Ancestral Pueblo settlements. Both groups were farmers and hunters with the essential Puebloan diet based on the maize, beans, squash, and other gathered resources, large and small game (antelope, deer, rabbits, turkeys), but they lived in different topographic settings, and experienced profound social disruptions at different scales. The YLD values for the San Cristobal and Ridges Basin adults are compared below, but first the data are used to examine the health burdens of males and females within each group.

The San Cristobal prevalence-based YLDs for 18 conditions recorded in 172 individuals ages 15 years and older are shown in Fig. 10.1 (data in Table 10.1)

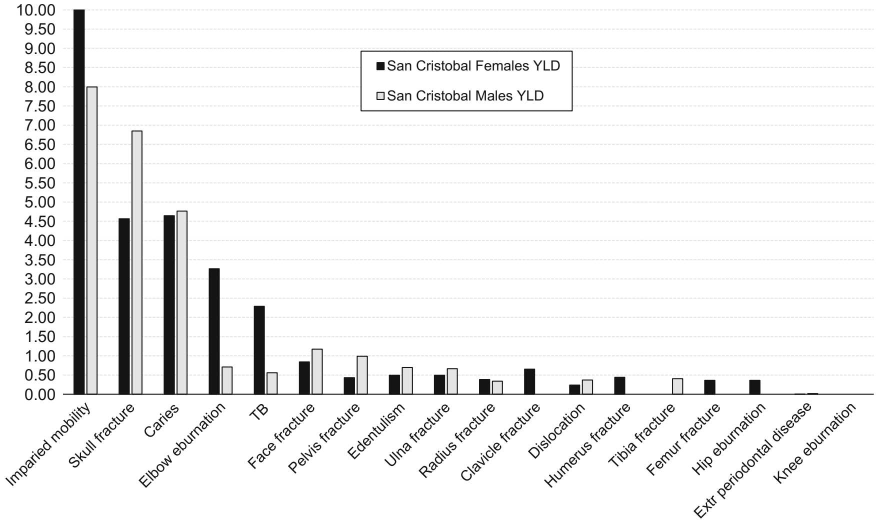

Fig. 10.1 Years lived with disability (YLD) for 18 conditions in San Cristobal males and females. (Adapted from Stodder 2016: 131 Fig. 8.2, with permission of The University of Colorado Press)

Table 10.2 Elbow eburnation (advanced osteoarthritis) in San Cristobal adults: prevalence, disability weight (DW) and prevalence based years lived with disability(YLD)

Age and sex group	N with/ N observable	Prevalence	DW	YLD
All adults				
3: 15–44 years	7/66	10.6061	0.156	1.65
4: 45 + years[a]	3/21	14.2857	0.156	2.23
3–4: 15 + years	10/87	11.4943	0.156	1.79
Males				
15–44	2/33	6.0606	0.156	0.95
45+	0/11	0.0000	0.156	0.00
15+	2/44	4.5455	0.156	0.71
Females				
15–44	6/33	18.1818	0.156	2.84
45+	3/10	30.0000	0.156	4.68
15+	9/43	20.9302	0.156	3.27

[a] GBD age group 4 ends at age 59, but is used here to include all. San Cristobal adults aged 45 and older

Distinct from the incidence-based YLL and YLD numbers used in modern epidemiology, the prevalence-based YLDs used here represent the number of years lived with disability per 100 individuals. They were generated by multiplying the prevalence (number of individuals affected/number observable) by the DW. The highest morbidity burdens for both men and women come from impaired mobility of the lower limb (the hip, knee, and foot), skull fractures, and dental caries. There are also some clear distinctions in morbidity patterns: women had a higher burden from advanced osteoarthritis in the elbow and hip, from tuberculosis, and clavicular and humeral fractures. Males had a relatively higher burden of disability from skull and facial fractures, and pelvic and tibial fractures.

Eburnation, the bone-on-bone polishing on the joint surface that develops after the articular cartilage is destroyed, is used to represent advanced osteoarthritis in this study (Table 10.2), as it is most reliably associated with pain and other symptoms in clinical studies (Waldron 2012). This represents a small percentage of people with osteoarthritis in the elbow and other joints, but other bony expressions of osteoarthritis that paleopathologists record in skeletal assemblages, like erosive lesions and joint lipping, are less consistently associated with self-reported pain and limited mobility in clinical settings. Advanced osteoarthritis was present in 18% of young and middle adult women (15–44-year olds) and in 30% of women who died at age 45 and older. This contrasts with the 6% prevalence in males before age 45 and no increase in prevalence in older adult males. The relationship of high humeral robusticity and activity-related joint degeneration in Ancestral Puebloan women is well documented (e.g., Ogilvie and Hilton 2011; Perry 2008), and related to the importance of corn grinding for domestic and ceremonial use, an activity ethnographically portrayed as sometimes occupying up to 8 hours a day for older girls and women (Crown 2000; Perry 2008; Spielmann 1995). Stress on the elbows from habitual activities (e.g., corn processing, ceramic manufacture, and other activities) generated an average of 3.27 years of disability for every 100 Puebloan women but only 0.71 disability years per 100 men.

The health state that resulted in the highest YLD numbers for the San Cristobal adults is impaired mobility in the hip, knee, or foot. This term is used here instead of the GBD descriptor "lower limb musculoskeletal-related disability" (World Health Organization 2013), which replaced an earlier, narrower category related to poliomyelitis induced paralysis. This is *not* a typical etiological category that is used in paleopathology studies; here it encompasses limitations of mobility and pain resulting from congenital malformations, extreme activity, trauma, and infection (Table 10.3). This demonstrates the value of this approach as it allows for a more inclusive accounting of functional impairment. In the 2010 GBD for the United States, the four highest ranked YLD values (of the 291 conditions) are for low back pain, major depressive disorders, 'other' musculoskeletal disorders, and neck pain, with osteoarthritis ranked 9th (Murray and Lopez 2013: 450). Globally, hip and knee osteoarthritis rank 11th in contributing to YLDs (Cross et al. 2014). This puts the prominence of impaired mobility and osteoarthritis in the skeletal assemblages into perspective; if we want to understand the morbidity experiences of people in the past, these seemingly mundane conditions are extremely important, as they are for people all over the world today.

As with all grouped data, closer consideration of the groups with impaired mobility shows the complications of this approach. The degree of impairment and/or pain was certainly different between these individuals. The functional impairment experienced by each individual would change over time as well, as a traumatic injury healed or tuberculosis or chronic infection advanced, but in this prevalence-based approach we are looking at a snapshot. There is a limit to

Table 10.3 Impaired mobility (hip, knee, foot) in San Cristobal adults: prevalence, disability weight (DW) , years lived with disability (YLD), and skeletal conditions in affected individuals

Age and sex group	N with/N observable	Prevalence	DW	YLD
All adults	29/119	24.3697	0.369	8.99
Females	16/59	27.1186	0.369	10.01
Conditions (some individuals have more than one): Tuberculosis hip, foot, spine: 3; infection/osteitis knee, ankle: 2; severe periostitis and treponemal infection: 4; significant leg length asymmetry: 1; bowing in tibia, femur, fibula possibly healed rickets: 2; advanced osteoporosis lower limb bones: 2; acromegaly associates joint disorientation and osteoporosis: 1; unilateral sacroiliac fusion or other hip injury and advanced osteoarthritis (OA) hip, ankle: 2.				
Males	13/60	21.6667	0.369	7.99
Conditions: Talocalcaneal coalition: 2; TB coxitis or infectious arthritis hip: 2; Osgood-schlatter's disease: 4; periostitis and secondary treponematosis: 1; pelvis fracture, unilateral sacroiliac fusion and secondary OA: 2; disk herniation and extreme OA in lower vertebrae: 1; pelvis deformity of uncertain etiology: 1; proximal tibia, fibula trauma uncertain etiology: 1; distal fibula fracture and extreme OA in both feet: 1.				

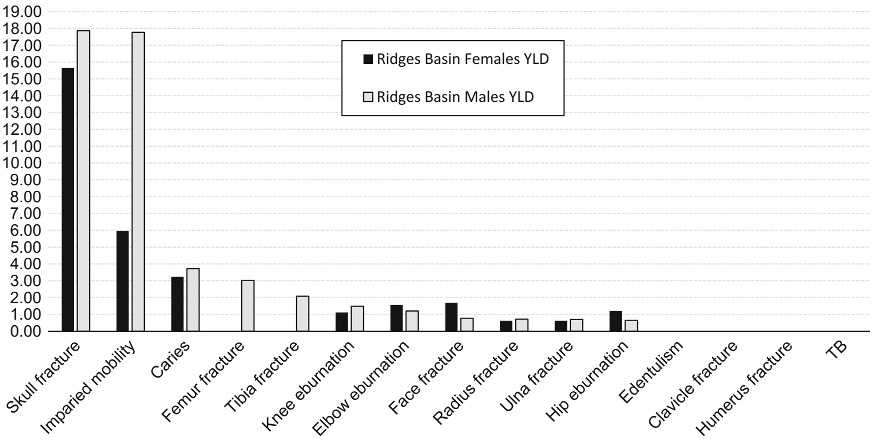

Fig. 10.2 Years lived with disability (YLD) for 15 conditions in Ridges Basin males and females

specificity here, but it is nevertheless illuminating to recognize that for these people living in multistory structures, without domesticated animals or other non-foot transportation, difficulty and discomfort in walking or standing was the heaviest burden: 8 and 10 years of disability for every 100 men and women, respectively.

The YLDs for men and women in the Ridges Basin communities (Fig. 10.2, data in Table 10.5) show a remarkably higher burden among males from leg fractures as well as impaired mobility in the hip, leg, or foot from other causes. This can at least in part be attributed to the significantly rugged terrain around the Basin, where hunting and other resource extraction activities were conducted. The males have a higher YLD from skull fractures, but women have a slightly higher YLD from facial fractures, injuries that are sometimes attributed to assault or domestic violence rather than intergroup violence (Walker 2001). The eburnation YLDs for women are slightly higher in the hip and elbow, but the marked difference in elbow eburnation at San Cristobal is not present in the earlier villages. The people in the Ridges Basin grew, processed, and consumed corn, but not as intensively as in the large, late prehistoric villages, and this was not a center of ceramic manufacturing, another activity that involves heavy use of the arms and hands.

Comparing the YLD charts for these two groups (Fig. 10.3), differences are evident in the very substantial impact of skull fractures in the Ridges Basin people who lived (and died) in highly unstable early aggregations of people from different parts of the region (Potter and Chuipka 2010; Stodder et al. 2010a). Skull fractures caused 13.5 disability years per 100 people in these early villages compared to 5.5 in the late prehistoric San Cristobal adults, some of whom lived during the extremely unsettled times of early Spanish occupation. There is also a high burden of impaired mobility in the hip, leg, or foot in the Ridges Basin people, and slightly more impact from leg fractures and knee osteoarthritis. Tuberculosis and edentulism are notably absent from the early population. The total YLD for the 18 conditions in the San Cristobal adults is 27.27, and 36.87 for the Ridges Basin villagers. This is a

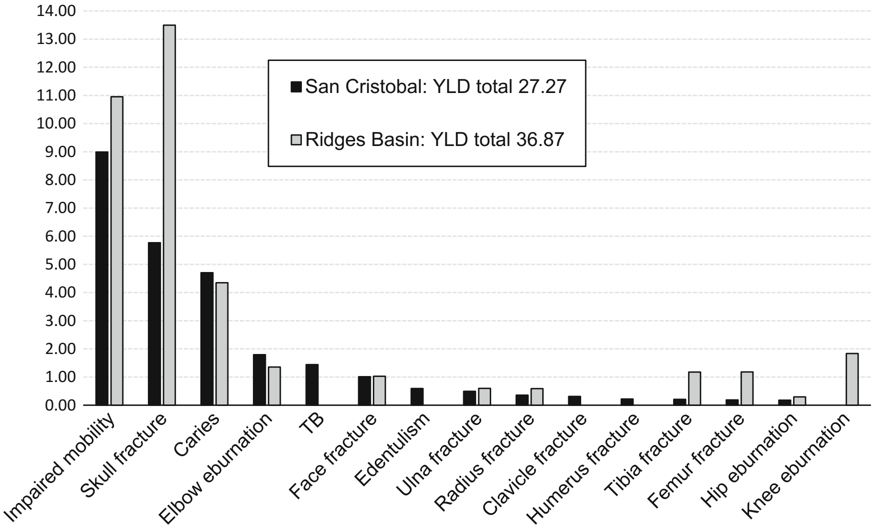

Fig. 10.3 YLDs for San Cristobal and Ridges basin adults. (Adapted from Stodder 2016: 133 Fig. 8.4, with permission of The University of Colorado Press)

striking difference, especially given that life tables for these two populations yield identical life expectancy at birth, 22 years (Stodder 2010: 70; Stodder 2016). The value of GBD metrics is exemplified here in the explication of distinct morbidity patterns between and within the two groups that are masked by life table statistics.

The study above uses summed DWs and YLDs to compare the extent and nature of morbidity (represented by 18 conditions) recorded in the skeletal remains of males and females in a late prehistoric community, and then compares them with an earlier community within the same cultural tradition. This a conservative, data-bound application of GBD metrics to bioarchaeology, designed with a focus on comparability of the two data sets. A more in-depth portrait of the ill health experienced by people in these communities includes DWs for the individual from the Ridges Basin with blindness resulting from neurofibromatosis (Stodder et al. 2010b). Going beyond the skeletal data, a significantly higher YLD for tuberculosis at San Cristobal (about 12 vs. 1.44 years) is based on the likely number of people *infected* with the disease only 5% of whom would exhibit skeletal involvement (Roberts and Buikstra 2003: 89). YLD values for dysentery, anemia, and cognitive impairment (see Table 10.1) can be generated for communities where there is paleoparasitological data indicating parasitic infection. In the U.S. Southwest this list includes Antelope House, Aztec Ruin, Salmon Ruin (Reinhard and Bryant 2008) and an increasing number of other sites.

Individual YLD scores can be generated based on the DWs for skeletal conditions in a single individual, and based on DWs for known comorbidities. The woman from San Cristobal with acromegaly, which causes remarkable changes in the skeleton but also impacts almost every other body system and has profound psychological consequences, would have a very high cumulative DW. A woman with marked pelvic deformity resulting from osteomalacia or trauma (or both) would be assigned DWs associated with impaired mobility and hip problems, but potentially also infertility and internal organ damage. A child with cribra orbitalia and advanced otitis media might be assigned DWs for deafness, some type of anemia and one of several other associated health states like malaria or thalassemia, and cognitive impairment. Quantification of individual disability burden can be a useful component of osteobiographies and of the bioarchaeology of care approach as a complement to the emphasis on differential diagnosis. Assigning a DW to every individual and summing those numbers for a group YLD is another way that this approach could be used to characterize and compare health.

Challenges to Global Disability Weights

Since the first GBD study, there has been considerable discussion about the methods used to generate the DW values that are the foundation of many of the GBD metrics. Disability weights were originally developed by panels of health professionals, but subsequent versions have been based on different, globally distributed, respondent communities. The most recent DW versions were developed on the basis of in-person, telephone, and internet-based surveys of the 30,000 people in the general population of urban and rural communities in five countries (the United States of America, Peru, Tanzania, Bangladesh, and Indonesia), with health states described in nontechnical terms (Haagsma et al. 2014; Salomon et al. 2012). This latest version of the disability weights has been portrayed as yielding “compelling evidence that contradicts the prevailing hypothesis that assessments of disability must vary widely across samples with diverse cultural, educational, environmental, or demographic circumstances” (Salomon et al. 2012: 2139). However, the discussion of methods and scope in DW surveys continues, and some researchers strongly advise that disability weights should be locally adjusted (e.g., Nord 2013, 2015).

While most DWs have not changed substantially through the evolution of the project, one exception has been a particular point of contention. The DW assigned to blindness changed from 0.600 (for 15–44-year olds) to 0.200 (averaged across all age groups) suggesting that the lower DW is based on accommodations in developed urban contexts that are not applicable in other world regions and contexts (Reidpath et al. 2003; Taylor et al. 2013). The DW for deafness was also reduced, from 0.216 (in 15–44 year olds) in the 1990 GBD study to 0.033 in the 2010 version (again, averaged across all age groups). It may be that some of the discrepancy in DWs for both blindness and deafness between the 1990 and 2010 versions is the use of averaged DWs in the later version (World Health Organization 2013), but it is also reasonable to assume that the different survey method and populations that underlie the DWs in the 2010 version reflect the respondents’ attitudes about the relative burden imposed by these conditions. This study employed the most detailed set of DWs that were available in 2011 (before the 2013 WHO publication of the most recent, 2010 versions of DWs); these later tables include 95% confidence intervals, but not the DWs for different age groups (World Health Organization 2013). Bioarchaeologists may choose to use any version of DWs, but we face the same fundamental issue as the epidemiologists in terms of the advantage of comparability between data sets and the likelihood that there are cultural distinctions as to which impairments represent the greatest loss of health (Haagsma et al. 2014).

Conclusion

Ogoing debate in the largest global epidemiology project ever implemented tells us that our questions about disability in cultural context are well worth asking. We have the opportunity to make closely contextualized interpretations about the impacts of disabilities in the past. Terrain, subsistence strategy, division of labor, and built environment all have implications for relative disability weights: lower limb or foot impairment may be assumed to have had a different degree of functional impact on an individual who lives in a cliff dwelling reached by a series of ladders and a horse riding nomadic pastoralist. Disability weights and YLDs can be used to quantify morbidity experienced by individuals and to compare the burdens of nonfatal health states between age and sex groups, as well as between populations. Characterizations of morbidity and impairment based on the functionally derived DWs can be more inclusive than etiological groups of paleopathologies, and these numbers have a different meaning from the prevalence data for nonspecific stressors. This approach is useful in revealing health dynamics in groups where the life table statistics mask the underlying (and very informative) differences in pattern and prevalence. The focus on nonfatal outcomes of diseases and conditions (i.e., morbidity) is appropriate for characterizing health in the past as it is today. The many issues attendant to the assignment of global disability weights cannot be ignored, and researchers may choose to employ country or region-specific DWs if these are developed as the GBD continues to evolve. As metrics that can be employed at several scales, DWs and YLDs should find a place in the paleoepidemiologist's and the osteobiographer's epistemological and quantitative tool kits.

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Appendix

Tables 10.4 and 10.5.

Table 10.4 Prevalence YLDs, San Cristobal adults

Condition	All adults	Females	Males
Impaired mobility (hip, leg, foot)	8.9924	10.0068	7.9950
Skull fracture	5.7684	4.5667	6.8500
Caries	4.7051	4.6456	4.7647
Elbow eburnation	1.7931	3.2651	0.7091
Tuberculosis	1.4421	2.2894	0.5604
Face fracture	1.0136	0.8415	1.1737
Pelvis fracture	0.6925	0.4333	0.9880
Edentulism	0.5931	0.4946	0.6971
Ulna fracture	0.4954	0.4954	0.6667
Radius fracture	0.3600	0.3830	0.3396
Clavicle fracture	0.3114	0.6524	0.0000
Dislocation	0.3033	0.2387	0.3700
Humerus fracture	0.2210	0.4419	0.0000
Tibia fracture	0.2085	0.0000	0.4045
Femur fracture	0.1889	0.3627	0.0000
Hip eburnation	0.1814	0.3628	0.0000
Extreme periodontal disease	0.0107	0.0056	0.0159
Knee eburnation	0.0000	0.0000	0.0000

Table 10.5 Prevalence YLDs, Ridges basin adults

Condition	All adults	Females	Males
Skull fracture	13.4955	15.6571	17.8696
Impaired mobility (hip, leg, foot)	10.9547	5.9516	17.7667
Caries	4.3500	3.2400	3.7125
Knee eburnation	1.8353	1.1143	1.4857
Elbow eburnation	1.3565	1.5600	1.2000
Femur fracture	1.1826	0.0000	3.0222
Tibia fracture	1.1783	0.0000	2.0846
Face fracture	1.0292	1.6938	0.7690
Ulna fracture	0.6000	0.6207	0.6923
Radius fracture	0.5902	0.6207	0.7200
Hip eburnation	0.2943	1.2000	0.6500
Edentulism	0.0000	0.0000	0.0000
Clavicle fracture	0.0000	0.0000	0.0000
Humerus fracture	0.0000	0.0000	0.0000
Tuberculosis	0.0000	0.0000	0.0000

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Chapter 11
Injuries, Impairment, and Intersecting Identities: The Poor in Buffalo, NY 1851–1913

Jennifer F. Byrnes

Introduction

Bioarchaeologists have recently contributed critical insights into the theoretical discourse on social identity theory (e.g., Agarwal and Glencross 2011; Knudson and Stojanowski 2008; Sofaer 2006; Gowland and Thompson 2013; Halcrow and Tayles 2008; Klaus 2008; Geller 2004). Many of these contributions have demonstrated that important facets of social identity, such as gender, age, and disability are often presumed to intimately interact with biology. However, none of these identity facets exist in isolation, and their dynamic intersection creates complexly embodied identities (Sofaer 2006; Gowland 2006; Collins 2003; Siebers 2008). Therefore, bioarchaeological data can be used to describe how the intersection of social identity became embodied, and how they contributed to the creation of individual biological life histories.

The skeletal remains analyzed in this study were excavated in Buffalo, New York from the site of the former Erie Country Poorhouse (ECP) cemetery, in 2008, 2009, and 2012. Excavation yielded remains representing at least 376 people. Out of this sample, 66 were sub-adults; eight were juveniles over the age of 2 years, and 58 were infants under the age of 2 years. A majority of the sample consisted of adults ($N = 310$) with a skeletal age of 16 years or older. Because of the importance of the appendicular skeleton for mobility and locomotion, physical impairment potentially resulting in disability would be most likely to manifest in the bones of the upper and lower limbs. Physically impairing injuries may also occur on the axial skeleton, including neurological damage, impingement, and limited range of motion. Traumatic injuries in the axial skeleton are more difficult to quantify compared to the appendicular skeleton. Therefore, only adult individuals that were

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J.F. Byrnes (✉)
Division of Social Sciences, University of Hawai‘i–West O‘ahu, 91-1001 Farrington Highway, Kapolei, HI 96707, USA
e-mail: jfbyrnes@hawaii.edu

J.F. Byrnes and J.L. Muller (eds.), *Bioarchaeology of Impairment and Disability*, Bioarchaeology and Social Theory, DOI 10.1007/978-3-319-56949-9_11

visually estimated to have had $\geq 75\%$ of their appendicular skeleton present, excluding the phalanges, metacarpals and metatarsals, were used to assess impairment ($N = 207$).

By using the theory of intersectionality as a lens, the identities of the people who were buried in the ECP cemetery from the late nineteenth and early twentieth centuries can be seen as an epistemological compass to orient explorations of past lived experiences. There is ample historical documentation that low socioeconomic status conferred a disproportionally greater risk of work-related traumatic injury, and resultant physical impairment. The intersection of impairment and low socioeconomic status in this context would have likely resulted in the social assignment of disability (Grech 2011; Groce et al. 2011). A new method for quantification of impairment associated with traumatic injuries is applied to the analysis of the ECP skeletal sample. Results of this analysis confirm that physical impairment was common. Ultimately, this chapter examines whether there are specific intersectional identities that created differential risk of physical impairment.

Brief Background of Impairment and Disability

In this chapter, impairment and disability are treated as related but distinct concepts. Impairment refers to a mental or physical loss of function, while disability is a sociocultural construct, which is associated with an impairment (Shakespeare 2013). Interestingly, depending on what school of thought you defer to, the definitions of impairment and disability may differ, as seen through the various definitions found in this edited volume alone. The World Health Organization's (WHO) *International Classification of Functioning, Disability and Health* report (ICF), which remains the standard for most health professionals, impairments are defined as "problems in body function and structure such as significant deviation or loss." However, disability is "an umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between a person's health condition(s) and that individual's contextual factors (environmental and personal factors)" (WHO 2001: 8). Moreover, many variables can affect the assignment of disability (Siebers 2008). For example, in late nineteenth-century America, a geriatric, uneducated, immigrant woman with a physical impairment might have been marked as disabled; however a young, educated, American-born man with the same impairment could have been normalized. Therefore, we can see that disability statuses can be dependent on other social identities, even when the impairment is comparable.

Although physical impairments are frequently observed in bioarchaeological skeletal analyses, the degree of impairment is seldom quantified and until recently interpretations of these findings are typically disconnected from disability theory discourse. In 1980s, bioarchaeological case studies of physically impaired individuals purported to document both disability and compassion in antiquity (e.g., Dickel and Doran 1989; Frayer et al. 1987; Trinkaus and Zimmerman 1982).

Subsequently, Dettwyler (1991) criticized these studies as culturally biased and suggested that it was not possible to infer disability and/or care in the past based on bioarchaeological evidence alone. In 1990s, on the heels of the disability rights movement, interdisciplinary interest in disability theory stimulated a brief flurry of bioarchaeological research (e.g., Hubert 2000; Finlay 1999). Finlay's special issue, in particular, generated considerable attention and stimulated thought-provoking commentary. For example, Tom Shakespeare provided a generally positive review of the special issue, but also identified areas of disability studies that could benefit from further bioarchaeological research (see Shakespeare 1999 for full commentary). Following an approximately decade-long lull in scholarly activity, research into disability in the past has recently reemerged as a priority (e.g., Byrnes 2015; Southwell-Wright 2013). Of particular interest is the development of Tilley's model, the Bioarchaeology of Care (Tilley 2015; Tilley and Oxenham 2011; Tilley and Schrenk 2017), which presents a theory and method that can be used to estimate whether or not care was given to disabled and/or impaired people in the past.

Intersectionality theory can help to interpret bioarchaeologically excavated skeletal remains. According to this theoretical perspective, identities are complexly embodied expressions of multiple identity facets such as race, gender, sexuality, class, and disability (Collins 2003; Crenshaw 1989, 1991; Siebers 2008). An emphasis on intersectionality is important if we are interested in understanding how identity assignments contribute to stigmas associated with marginalized groups. We cannot simply peel off a layer of identity to investigate stigma and oppression, we must consider all aspects of identity (MacKinnon 2013). Social identities should not be pigeonholed into binary categories or conceived as static—identities are fluid and permeable (Cho et al. 2013). Kimberlé Crenshaw originally articulated intersectionality theory from a critical legal, antiracist, and feminist perspective to explain how Black women were being discriminated against (1989). Crenshaw observed that while both Black people and women faced oppression, the unique intersection of Black and female identities compounded oppression of both social identities. Intersectionality refers to the tendency of identities to compound reciprocally, resulting in negative (oppressive) or positive (privileged) encounters.

The critiques of this theoretical approach stem from its application, specifically those that try to apply this by simply overlapping categories of identities (Gibson 2015). Every reader here knows and understands that all people are unique—no one person is identical on all levels of being. This is not revolutionary. However, many times as bioarchaeologists we attempt to categorize past peoples (e.g., old, Irish, female, mother, peddler, schizophrenic) in order to gain an understanding of their lives. The point here is not whether bioarchaeologists should or should not categorize past people. Instead, bioarchaeologists must realize that if sufficient attention is not given to social context, then the categories assigned are limited to *biological* bodies, rather than more anthropologically interesting *social* bodies. This balance of organizing data into easily tabulated parts (e.g., male vs. female) versus creating a complex picture of a person in time can prove challenging. Scholars such as Geller (2009) have engaged in this more complex and nuanced discourse in bioarchaeology and gender resulting in reconsidering how biological and social categories pertaining to sex and gender are recorded. Geller has also argued that bioarchaeological analyses have, unintentionally, projected "contemporary, Western cultural values" by placing ancient bodies into our society's "hegemonic bodyscape".[1] Geller's words resonate with the disability identity politics explored in the many of chapters in this volume. The significance and importance of this lies within the understanding of disability, which is a modern concept and term. Although ancient people may not have had a synonymous term for disability nor an equivalent social identity, contextualizing the recognition of human difference through the bodymind (Chap. 5) can provide the bioarchaeologist with contextualized insights into how various impairments were perceived in the past.

Most bioarchaeology studies focus on populations and when individual cases are discussed the emphasis is on paleopathology and not social theory discourse (some exceptions Boutin 2016; Stodder and Palkovich 2012; Marsteller et al. 2011). One recent ambitious example by Tremblay Critcher (2017) applied the Index of Care (Tilley and Cameron 2014) to both a skeletal sample and an individual case study from a historical cemetery. Although this produced varied results, Tremblay Critcher presented an innovative, multi-scalar approach. Some scholars have suggested that thick contextualization may permit bioarchaeologists to move beyond historical particularistic discussions of individual life histories. For example, historical narratives may better describe how social identities intersect and interact with biological realities (Gibson 2015). This approach, unfortunately, requires more information about both the society and the individual than is often available. Boutin (2016) recently discussed this phenomenon and application of intersectionality specifically focusing on disability for an individual from ancient Bahrain. Boutin's proposed model, "the Bioarchaeology of Personhood," draws on the concept of intersectionality theory to argue that the many facets of social identity are brought together and embodied within a specific place and time. Therefore, people should be viewed and understood through an intersectional prism—not solely through singular axes of identity. However, another salient point to make is that intersectionality's strength lies in "illuminating how intersecting axes of power and inequality operate" (Cho et al. 2013: 796). Shifting the focus from identity to identities can reveal more about the dynamics of the formation of oppression within a specific social community. Identifying the social, political, and economic forces at play provides a rich, informative, and holistic basis for a discussion of social identities. In this context, it is easier to draw out the competing and complimentary influences of agency and societal structure, in the enactment, maintenance, and embodiment of identity. Intersectionality theory allows us to discuss how various social identities interact differently with disability. This can help us understand the diversity of lived experiences, both in the past and the present.

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[1] Geller (2009) uses the concept "hegemonic bodyscape" to describe the normal or heteronormative contemporary view of the male and female bodies.

The Erie County Poorhouse: Historical Context

Throughout most of the nineteenth century, Buffalo and Erie County grew at an unprecedented rate, attracting both a large number of investors as well as primarily newly arrived immigrants seeking employment (Goldman 1983). This phenomenon mirrored a nationwide trend, and created a need for publicly financed social safety nets, which was met by the establishment of poorhouses. The dominant ethnic groups flocking to Buffalo were the Germans and the Irish (Gerber 1989). These were by no means the only ethnic groups immigrating to the region, but for the better part of the nineteenth-century Irish and Germans made up the majority of the incoming labor force. There was a stark difference between what motivated these two groups to leave their home country. The Germans came to America in order to seek prosperity and wealth; they tended to be skilled laborers or were able to acquire skilled laborer positions based on their social connections. The Irish, however, came to America out of economic necessity. This was primarily due to British colonial oppression, combined with the potato famine (Gerber 1989). Due to these circumstances, Irish immigrants tended to be unskilled, uneducated, and were in general poor peasants. This limited Irish upward social mobility and earning potential. Most of the jobs available to them were unskilled, hazardous, low wage, and seasonal. Jobs typical for Irish men included lifting or carrying heavy objects and digging (e.g., grain-scooping on the docks as longshoremen) (Gerber 1989). Irish immigrant women were typically employed as domestics and personal service providers. With the influx of large numbers of Irish and their comparatively limited social mobility in Buffalo, they required the services of the poorhouse more so than other ethnic groups.

The middle and upper classes of Buffalo, hereafter referred to as the bourgeois, were mainly composed of native-born Protestants who progressively took political and social control of the city (Gerber 1989). White bourgeois identity became the societal ideal, which many immigrants and native-born, non-bourgeois Americans aspired to. American bourgeois identity differed significantly from the identities of the majority of immigrants that settled in Buffalo. Many German and Irish immigrants were Catholic, and their religion was met with hostility from the American Protestants in the area (Gerber 1989). The bourgeois attempted to mold the immigrants into an ideal preliterate (Marx et al. 1992). The poorhouse was a powerful tool of social control in the process of immigrant Americanization (Rothman 2002). Regardless of bourgeois' claims that the poorhouse was a solution to the problem of poverty, which they blamed on various cultural and biological inadequacies intrinsic to the incoming immigrant groups, the poverty itself was a creation of the capitalist economic system.

Occupation is an important factor in determining risk of morbidity and mortality. Thanks to the Erie Canal, which opened in 1825, Buffalo became a major trans-shipment port for raw materials, including lumber, wheat, and cattle (Stern 1987; Goldman 1983). From the mid-nineteenth century to the early twentieth century, milling, brewing, lumber, and leather were the major foci of industry (Stern

1987). Throughout the era of the Erie Canal, most working-class residents of Buffalo were employed in these industries, or as longshoremen. During the latter half of the nineteenth century, breakthroughs in steel, dye, and motive power technologies enabled the growth of new industries in the region, including animal slaughtering, soap production, and furniture manufacturing (Stern 1987). As a result of these trends in industry, there were corresponding changes in the labor force. By the late nineteenth century, foundries were the leading employers in Buffalo, with as many as 2200 workers in 1880 and 4254 in 1914 (Stern 1987). There were few opportunities for women to gain wage labor early on in Buffalo's industrial growth; men comprised about 94% of Buffalo's workforce in 1860. By the early twentieth century, the proportion of women employed in Buffalo, especially in the clothing manufacture the industry, had increased; in 1914 the only 86% of workers in Buffalo were male.

The types of skilled versus unskilled labor available in Buffalo changed over the course of the history of the city. During the nineteenth century, unskilled laborers are thought to have been at the greatest risk of suffering a workplace injury, but skilled jobs did not lack hazards. For example, beginning in the mid-nineteenth century a burgeoning iron industry in Buffalo provided high-risk jobs for both skilled and unskilled laborers (Goldman 1983). When the Lackawanna Steel Company relocated to Buffalo, many skilled and unskilled laborers found work in the foundry (Goldman 1983; Stern 1987). However, in general, skilled laborers in Buffalo, such as tanners, leather workers, cobblers, and brewers, generally faced fewer hazards that could result in traumatic injury than their unskilled counterparts. Table 11.1 summarizes the reported occupations of a portion of the 181,000 male workforce in 1910 as compiled from Goldman (1983). Table 11.2 displays the major occupations of the 30,000 women in the workforce in 1910 Buffalo, NY.

The original ECP opened its doors in Buffalo, NY in 1829 and remained in use until 1851 when it was relocated to the Buffalo Plains location on outskirts of the City of Buffalo—on the present Main Street campus of the State University of New

Table 11.1 Occupations of men in the workforce in Buffalo, NY 1910 (Goldman 1983)

Industry/Occupation	# of individuals
Iron or steel	~18,000
Unskilled industrial (semiskilled, e.g., breweries)	~10,000
Machinists and millwrights	6781
Carpenters	5369
Automobile	3600
Railroad cars	3400
Iron moulders	2141
Painters, glaziers, varnishers	1888
Copper	1800
Brick and stone masons	1225
Compositors and linotypers	942

Table 11.2 Occupations of women in the workforce in Buffalo, NY 1910 (Goldman 1983)

Industry/Occupation	# of individuals
Domestic servant	7127
Clerical	6000
Dressmaker or seamstress	3412
Retail	2583
Teacher	2285
Nurse	725

Fig. 11.1 Erie County Poorhouse from 1880 Illustrated Atlas of Erie County, New York. Reproduction by permission of the Buffalo & Erie County Public Library, Buffalo, New York

York (SUNY) at Buffalo (Walter 1958). The new ECP complex, which remained in use until 1926, eventually contained a variety of specialized-use buildings, including an insane asylum, a children's ward, a hospital with both maternity and consumptive wards, and a cemetery (Fig. 11.1). This deliberate removal of the institutional poor from the Buffalo urban center was part of a larger national trend to locate poorhouses in rural settings (Katz 1996; Rothman 2002). In the nineteenth-century the urban poor of America, including people with disabilities, especially those with obvious physical "deformities," indigent elderly, and other groups considered societally undesirable, were increasingly viewed as eyesores on the urban landscape (Schweik 2009). Municipalities established poorhouses in rural settings to provide "indoor relief" for the destitute, preferably out of public view (Katz 1996; Rothman 2002). Those seeking relief typically acquired societal stigma stemming from the perceived immorality of dependency and poverty (Katz 1996). While the origins of the poorhouse/almshouse as an institute has a complex history (Nielsen 2012; Howson 2008), American poorhouses established in the nineteenth century were always associated with large urban cities and can be viewed as a sociopolitical attempt to transform people into the compliant and productive citizens (Rothman 2002; Chap. 7).

The ECP cemetery, was established at the Buffalo Plains location in 1851, and remained in use until 1913. The cemetery received the bodies of those people who died when they were inmates of the poorhouse or who were seeking medical care from the associated hospital. Higgins et al. (2014) have compared inmate death certificates and the Erie County Poorhouse Hospital Mortality Registers in order to estimate how many of those who died on poorhouse grounds were actually buried in the associated cemetery. Out of the 7186 ECP deaths recorded in the hospital mortality registry for the years 1880–1913, the bodies of only 3198 people (about 44%) were recorded as being buried in the poorhouse cemetery (Nystrom et al. 2017). Bodies that were not buried in the poorhouse cemetery were either taken by families, friends, or churches to be buried elsewhere, or were used for medical dissection.

Although the ECP Hospital Mortality Registers recorded the claimed occupation for those who died, many specific details are either vague or lacking (Table 11.3). The two most commonly cited categories are "unskilled laborer" and "domestic worker," which, as discussed above, were the predominate occupations of the immigrant working class for males and females, respectively. Gender and ethnic identities restricted the occupational opportunities that were available to a person during this period in Buffalo. This situation resulted in differential susceptibilities

Table 11.3 Occupation of those recorded in the Mortality Registers listed from most to least common, 1880–1913 (Higgins 2014)

Occupation	# of individuals	%
Unskilled labor	2417	38.60
Domestic	1443	23.00
Other	478	7.63
Skilled laborer	433	6.91
None	408	6.52
Farmer	142	2.27
Carpenter	134	2.14
Pauper	106	1.69
Painter	98	1.56
Teamster	85	1.36
Prostitute	82	1.31
Sailor	67	1.07
Stonemason	50	0.80
Barkeeper	48	0.77
Shoemaker	45	0.72
Cook	44	0.70
Peddler	42	0.67
Blacksmith	38	0.61
Machinist	36	0.57
Butcher	35	0.56
Engineers	31	0.50
TOTAL	6262	100

for morbidity and mortality, resulting in differences in the rates at which various demographic groups sought relief from the ECP. Historical records suggest that the majority of people who sought relief in the ECP complex were physically and/or mentally impaired and incapable of providing for themselves (Higgins 1998). Thus, many of the adults who were buried in the poorhouse cemetery met their own society's criteria for disability—they lacked the ability to work. Therefore, the sample of adult human remains excavated from the former ECP cemetery presents an ideal sample for the bioarchaeological study of impairment and disability in early modern America.

Historical and Bioarchaeological Methods

Excavations at the former ECP cemetery were salvage in nature, and conducted by the staff of the Archaeological Survey—an applied archaeology contracting division of the Department of Anthropology at the SUNY at Buffalo. Standard sex and age methods were used to estimate demographics (Buikstra and Ubelaker 1994), supplemented by aging methods described by Buckberry and Chamberlain (2002). Age categories were divided into Adult (+20 years), Young Adult (16–35 years), Middle Adult (35–50 years), and Old Adult (+50 years). Due to generally poor preservation of the pelvis, a separate Middle/Old Adult category (+35 years) was created. Probable Females and Probable Males were combined with Females and Males. The complete demographics for those included in this sample are summarized in Table 11.4. Not surprisingly, the demographic profile of the ECP cemetery sample approximates the demographics recorded in the historical documentation.

For the purposes of this study, only the upper and lower extremities, excluding phalanges, metacarpals, and metatarsals were examined for evidence of trauma. This included hard tissue traumas, such as fractures, and some soft tissue traumas, such as dislocations, which were observable macroscopically. Associated complications arising from trauma were assessed using metric and nonmetric methods (Table 11.5). Rondinelli et al. (2008) "Diagnosis-Based" orthopedic assessment

Table 11.4 Skeletal demographics of sample

Sex	Adult	Young adult	Middle adult	Middle/old adult	Old adult	Total
Male	1 (0)	21 (7)	39 (15)	29 (11)	7 (5)	97 (38, 39%)
Ambiguous	1 (1)	4 (1)	6 (3)	27 (4)	2 (1)	40 (10, 25%)
Female	7 (2)	19 (1)	7 (3)	13 (2)	3 (1)	49 (9, 18%)
Indeterminate	3 (1)	5 (2)	1 (0)	11 (6)	1 (1)	21 (10, 48%)
Total	12 (4, 33%)	49 (11, 22%)	53 (21, 40%)	80 (23, 29%)	13 (8, 62%)	207 (67, 32%)

In () are number of individuals with trauma and their percentage in each skeletal demographic category

Table 11.5 Traumatic injury complications and methods for assessment

Complication	Methods for assessment
Osteoarthritis	None to severe (0–4)
Nonunion	Present or Absent
Joint fusion	Present or Absent
Alignment	Degrees off axis
Bone shortening	Metric comparison
Infection	Present or Absent, extent involved
Traumatic myositis ossificans	Present or Absent, extent involved
Osteochondritis dissecans	Present or Absent, extent involved

Table 11.6 Definition of impairment classes (adapted from Rondinelli et al. 2008)

Impairment rating	Upper extremity % impairment	Whole person % impairment	Lower extremity % impairment	Whole person % impairment
No objective findings	0	0	0	0
Mild	1–13	1–8	1–13	1–5
Moderate	14–25	8–15	14–25	6–10
Severe	26–49	16–30	26–49	11–19
Very severe	50–100	31–60	50–100	20–40

guide was used to quantify the percentage and corresponding “class” of impairment for the upper and lower extremities and the corresponding estimated percentage and “degree” of impairment of the whole person (see Table 11.6) (Rondinelli et al. 2008). For example, a hypothetical skeleton with evidence of a transfemoral (i.e., above-knee, mid-thigh) healed amputation, would be assigned a lower extremity impairment between 90 and 94% and described as “class 4,” the highest of five possible classes. “Grade modifiers,” which are based on assessments made from functional history, physical examination, and clinical studies, can be used to identify the specific percentages of impairment for any given body region within a class. The grade modifiers for each class are arranged from a low grade of A to a high grade of E. Because grade modifiers rely on additional information typically obtained through interview or examination of a living person, bioarchaeological analyses often must default to the grade C modifier. The grade C modifier for a mid-thigh amputation corresponds to a lower extremity impairment of 90%. If this hypothetical skeleton had no other evidence of impairment, the “Whole Person Impairment” (WPI) would be estimated at 36% derived from a table provided by Rondinelli and colleagues, which corresponds to a “Class 4” or “Very Severe” impairment (Table 11.6). If an individual had multiple traumatic injuries, these were recorded separately and then converted via a combined values chart provided by Rondinelli et al. (2008) to estimate the WPI percentage.

Rondinelli et al. (2008) presented many complications, however only a small proportion of them can be identified through skeletal analyses alone. For example, both pain and most soft tissue trauma complications remain elusive to the osteological analyst. The bioarchaeological application of this method is, therefore, restricted to impairments that are visible in the hard tissue remains (e.g., deformity, limb length discrepancy, osteomyelitis, and traumatic arthritis). If the antimere bone was available and displayed no apparent pathologies, it was used to establish a baseline for comparison of arthritis progression, metric measurements, and angulation. Other impairments that may have left traces on the bones of living people, however, may not be visible in the bioarchaeological record due to taphonomic processes. For example, articular surfaces, which are often poorly preserved, can be used to estimate traumatic arthritis. However, one method was modified specifically so that it could be applied to bioarchaeological skeletal material: traumatic arthritis, which is normally clinically observed with imaging, was observed macroscopically and with low magnification. The severity of the osteoarthritis observed was scored on a scale of 0–4, with a score of 0 representing none and 4 as severe (Table 11.7).

Fractures and other traumatic injuries were assessed in reference to anatomical distribution, following the work of Berger and Trinkaus (1995). Trauma was tabulated for each individual and element. Frequencies were calculated by skeletal element, region, and individual. Chi-square statistical analysis is the standard for intra-sample comparisons traumatic injury studies (Glencross and Sawchuk 2003; Judd and Roberts 1999; Grauer and Roberts 1996). SPSS software was used to calculate chi-square statistics of fracture frequencies. Statistical significance was defined as $p < 0.05$. The Mann–Whitney U statistical test analyzes nonparametric scores, with a null hypothesis that two populations are the same. This test was used to identity significant differences in impairment scores among demographic groups. SPSS software was used to calculate Mann–Whitney U statistics of impairment scores between males and females, as well as Middle/Old and Young Adults. Statistical significance was defined as $p < 0.05$. Intra- and interobserver error for using the modified Rondinelli and colleagues method was performed for 15% of the skeletal sample ($n = 10$). Intra-observer reassessment was performed one month after initial assessment. Interobserver error was conducted by a graduate student of

Table 11.7 Definitions of osteoarthritis (OA) severity by codes

Code	Porosity	Lipping
0 (no OA)	None or equal to antimere	None or equal to antimere
1 (mild OA)	Barely discernible (only if no lipping)	Barely discernible (only if no porosity)
2 (moderate OA)	Barely discernible	Barely discernible
3 (severe OA)	Clearly present (only if Lipping is Barely discernible)	Clearly present (only if Porosity is Barely discernible)
4 (very severe OA)	Clearly present	Clearly present

similar training and expertise, who was given instruction concerning the scoring procedures.

The nativity of those admitted to the ECP was gleaned from the Superintendent of the ECP annual reports for years 1851–1913, which overlaps with the estimated age of the cemetery sample (Liber Raines 2014; Perrelli and Hartner 2014). Mortality records for the ECP for the years 1880–1913 were transcribed by Higgins (1998, 2014) and compiled for this study to examine the total numbers and relative frequencies of historically claimed occupations.

Contextualized Results

Historical documents from the ECP show that foreigners outnumbered native-born people seeking relief (Fig. 11.2). Aggregated foreign-born data for the six most common countries of origin are displayed in Fig. 11.3. Ireland was the most commonly claimed nativity, followed by Germany. Of the 6262 transcribed mortality records from the ECP Hospital, the two most commonly claimed occupations were unskilled laborer (*n* = 2417, 38.6%) and domestic worker (*n* = 1443, 23%) (Higgins 2014). When sex was reported in ECP Hospital documents, males made up 90% of those treated for traumatic injuries. Skeletal sample demographics approximate the historical poorhouse demographics (Higgins 1998), with a majority identified as male and middle aged (Table 11.4). Using chi-squared analyses,

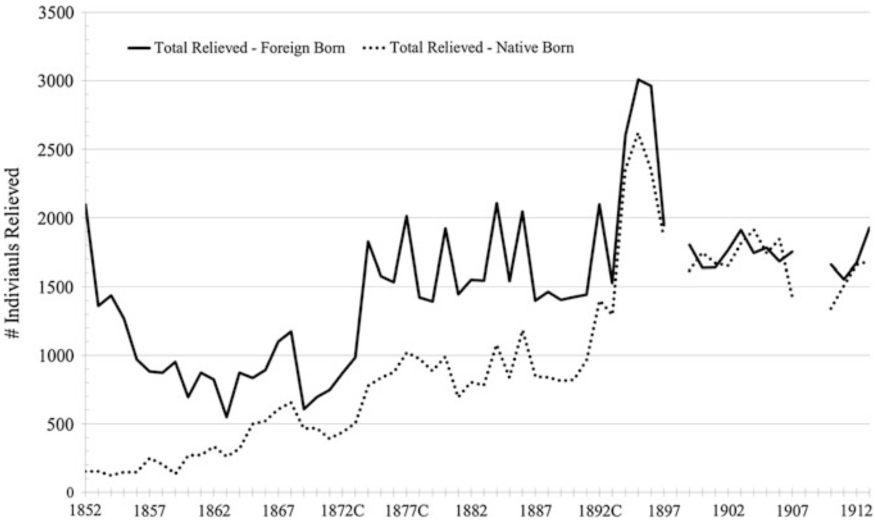


Fig. 11.2 Foreign and American-born relieved at Erie County Poorhouse annually, 1852–1897, 1899–1907, 1910–1913. Dates marked with "C" are adjusted for reporting periods (Liber Raines 2014; Board of Supervisors of Erie County 1852–1913)

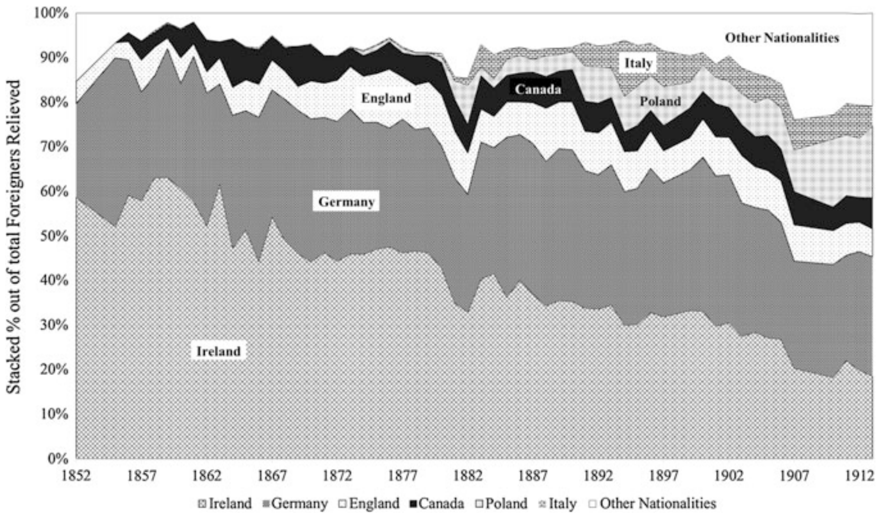
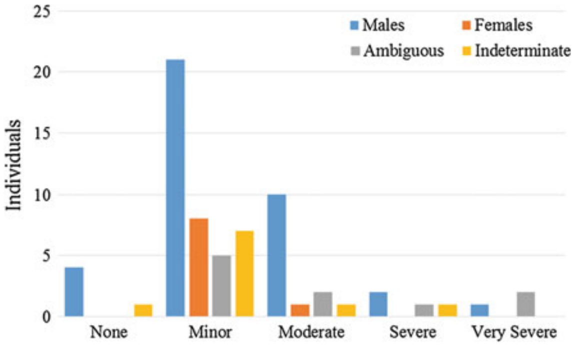


Fig. 11.3 Percentage of Foreign-born relieved at Erie County Poorhouse, specifically from Ireland, Germany, England, Canada, Poland, and Italy annually, 1852, 1855–1897, 1899–1907, 1910–1913 (Liber Raines 2014; Board of Supervisors of Erie County 1852–1913)

Fig. 11.4 Whole person physical impairment scores by sex



traumatic injury differences are statistically significant with males sustaining more fractures than females ($\chi^2 = 73.57$, df = 1, $p = 0.000$) and Middle/Old adults sustaining more than Young adults ($\chi^2 = 101.15$, df = 1, $p = 0.000$).

The skeletons of 67 people, out of the total 207 adults assessed, had observable traumatic injuries that fell within the parameters of this study's design. These individuals were assigned to whole person impairments classes, ranging from "none" to "very severe." Among the individuals with trauma, 69% ($n = 46$) were either not impaired or only mildly impaired, 21% ($n = 14$) were moderately impaired, and 10% ($n = 7$) were severely or very severely impaired (Figs. 11.4 and 11.5). Figure 11.4 shows impairment severity by sex. Males were not only more injury prone than females, but also suffered more severe WPIs as a result of their

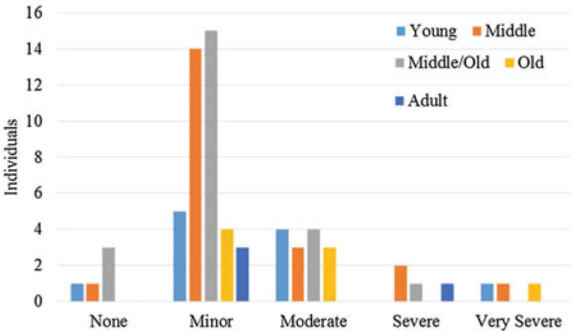


Fig. 11.5 Whole person physical impairment by age

injuries (i.e., higher morbidity). Only one female individual was assessed as having more than a minor impairment, while all 13 impaired males were assessed as having greater than minor WPIs. However, due to the relatively small female sample size ($n = 9$) compared to male sample ($n = 38$), any differences that may actually exist are masked when examining them statistically. Nevertheless, performing a one-tailed Mann–Whitney U Test to compare whole person impairment between males and females displays no significant difference in mean ranks ($U = 146$, $Z = -0.779$, $P = 0.257$).

Figure 11.5 shows impairment severity by age at death. These data suggest that people accumulated traumatic injuries throughout the course of their lives. Only one young adult was assessed as having more than a moderate impairment, while a total of 17 middle to old adults fell into those same parameters. However, the small size of the young adult sample ($n = 11$) compared to middle to old adult sample ($n = 56$) resulted in ambiguous statistical results. A one-tailed Mann–Whitney U Test, which was used to compare WPIs between young and middle to old adults, did not identify a significant difference in mean ranks ($U = 267$, $Z = -0.796$, $P = 0.213$). Intra-observer results scored one individual differently, from moderate to mild. Cohen's kappa (κ) statistical test suggests that this was not by chance ($\kappa = 0.853$, $P = 0.000$). These results are in the almost perfect category for scoring strength (Landis and Koch 1977). Interobserver results showed no differences in WPI.

Observed trauma frequencies and locations appear to correspond to historically documented and gender-specific occupational hazards. Historically, low-wage labor was strongly gendered. As a result, in both the specific Erie Country Hospital Mortality Registry as well as the more generalized historical census data collected for Buffalo during this time, males and females of all ethnicities were exposed to differential environmental risk of injury (refer to Tables 11.1, 11.2 and 11.3). Males of lower socioeconomic status tended to have a relatively high risk of traumatic injury due to the types of jobs available to them. Females typically worked as domestics, from home or in factories. Although no work place was risk free, lower class women typically faced fewer hazards likely to cause traumatic injury to the appendicular skeleton, compared to their male counterparts.

Finding the Intersection

Trauma due to occupational hazards is considered the most likely cause of the injuries documented in the ECP cemetery skeletal sample, given that most inmates were unskilled laborers. The turn of the century was a time of rapid industrialization for Buffalo. Workplace conditions, both unregulated and hazardous, led to high rates of injury and impairment, and gave rise to what one observer termed "the industrial cripple" (Heiser 1927). During the nineteenth and early twentieth centuries, many injured working class and poor people in Buffalo, who lacked the means to pay for private medical care, had little choice but to turn to the surgical staff at the ECP. But while their physical injuries were treated, the damage done to their economic lives was not. In a time when young, able-bodied workers were abundant, an injury meant a lost job, lost wages, and a lifetime of limited prospects (Chambers 2004; Diner 1998). Moreover, a visibly severe or "disfiguring" injury was a harbinger of certain unemployment (Schweik 2009). For the working class and poor of the *fin de siècle* generation, disability was one of the leading causes of pauperism (McLean 1907). For many, treatment at the ECP hospital was followed by residence in the poorhouse, and subsequent burial in the associated cemetery.

As unprecedented waves of immigrants settled in Buffalo, the "native" American residents began to develop ethnocentric and other forms of discrimination designed to marginalize immigrant groups. Irish and Germans, who comprised the two largest immigrant groups, faced various barriers to economic resources and opportunities and social mobility. As discussed earlier, the Irish were escaping British colonial oppression and the potato famine; however, most Germans were immigrating to seek economic opportunity. In general, their skillsets were different based on their backgrounds, and Germans tended to obtain more skilled labor jobs than Irish. Thus, embodied marginalization crossed the Atlantic with Irish immigrants, which both reduced their social mobility and increased their impairment burden in America. Many unskilled labor jobs at the time were also high-risk occupations, resulting in higher morbidity and mortality than most skilled labor jobs. The Irish, making up the majority of those in unskilled labor jobs, were predisposed to relatively higher risk of traumatic injuries on the job.

Although there are many instances of traumatic injuries in the ECP cemetery skeletal sample, many were determined to be minor physical impairments based on modern clinical assessment. It should be pointed out that most physically impaired individuals try to adapt their behavior around their physical impairments in order to perform daily tasks through coping mechanisms (Kowalski and Chung 2012; Bontje et al. 2004). Therefore, even though a paleopathology may be identified as a physical impairment, based on analogy with clinical literature, everyday functionality may or may not have actually been impaired, depending on the agency of the person and their role in their own society (Scheer and Groce 1988). In this vein, Lovell (2016) recently argued that a man with an antemortem hip fracture excavated from a Roman cemetery in Italy adapted his gait and was likely seen as mobility impaired, but not disabled, based on mortuary and historical contextualization. To

Fig. 11.6 *Top of Photo*: Right femur with healed amputation (above-knee), anterior view. Associated with individual from location 324. Example of very severe impairment. *Bottom of Photo*: Left femur is archaeological laboratory specimen for reference. Scale is in cm

further illustrate this point with an example in the ECP, a young, ambiguously sexed adult with a transfemoral, above-knee healed amputation (associated with location 324; Fig. 11.6) was one of the amputees included in this skeletal sample. Interestingly, there is one historical photograph from the poorhouse of an individual with a similar impairment, using a crutch to navigate his surroundings at the poorhouse (Fig. 11.7). Although he was impaired and may have been considered disabled outside the poorhouse, he was, nevertheless, still able to work as a barber at the poorhouse. A similar scenario may have existed for the individual buried within location 324.

An additional consideration for assessing physical impairment of skeletal remains concerns variations in the bony response to stress. Time since injury and individual physiological variation may dictate the amount of observable bony changes (e.g., osteoarthritis) that are possible to consider in the bioarchaeological assessment of physical impairment. For example, if two young adults sustained the same traumatic injury during late adolescence one could have died within 5 years of injury, while the other lived to be 65 years old. If bioarchaeologists were to examine the skeletal remains of these two hypothetical people, then their assessments of the physical impairments would likely be different, due to the amount of time passed since injury and physiological variations. One example of physiological variation in response to stress was described by Schmitt et al. (2007), who studied a skeletal series from Portugal, dating to the late nineteenth and early twentieth centuries. The goal of their study was to verify an inverse relationship between osteoporosis and osteoarthritis, which has been observed in clinical settings. In terms of physiological response to stress, Schmitt et al. (2007) reported that people tended to be either "bone formers" or "bone losers," depending on natural variation in the formation of osteophytes in osteoarthritis.

Fig. 11.7 Barber at Erie County Poorhouse with amputated thigh, 1905. “A Visit to the Almshouse,” Hospitals in and around Buffalo, scrapbook, Vol. 12, p. 320, ca. 1900–1907. Reproduction by permission of the Buffalo & Erie County Public Library, Buffalo, New York

The bioarchaeological quantification of traumatic injuries of the skeleton based on methods described in modern clinical literature produces precise, repeatable results. There are, however, also acknowledged drawbacks. Nevertheless, if bioarchaeologists are to continue to assess the severity of impairment in skeletal remains, there needs to be rigorous standardization as well as quality control. To date, there are only two other bioarchaeological studies that have attempted to quantify physical impairment. Young and Lemaire (2014; Chap. 9) created the Clinical Archaeological Osteoarthritis Scale (CAOS) to assess osteoarthritis of the knee by modifying a clinical method to bioarchaeological materials. Stodder (2016; Chap. 10) applied the concept of Disability Weights, as described by the Global Burden of Disease project, to archaeological skeletal material. Both methods use modern clinical definitions to objectively quantify physical impairment in skeletal remains. These models can easily be expanded to include other quantifiable measures of impairment in the past, such as many paleopathologically associated impairments. Additionally, Tilley and Cameron’s Index of Care (2014) uses the

WHO *ICF* to assist the researcher in qualitatively describing functional limitations resulting from skeletal pathologies through a series of prompts that contextualize the individual in their past society. However, this approach is subjective, in that it provides no method for objectively quantifying the severity of the pathologies being assessed. The validity and reliability of modern clinical methods for the assessment of bioarchaeological skeletal materials should be demonstrated and not assumed as a necessary, but not sufficient, first step toward interpreting impairment severity.

Age should be considered when attempting to determine whether or not observed injuries were actually impairments, or whether they were possibly disabling. For example, a broken ankle may have been more disabling for a young person compared to a middle aged or old adult, if their society placed different expectations for mobility on different age groups. This is not to say the timing of specific traumatic injuries needs to be known for every skeleton that is examined, but it is a factor that should be kept in mind when considering severity of impairment and disability. As Knudson and colleagues point out, bioarchaeological analysis can “elucidate the varied experiences of an individual life and in the moments surrounding their death and burial” (2012: 437). Thus, biological age is considered an aspect of social identity that intersects with other aspects of identity, such as gender and socioeconomic status (Gowland and Thompson 2013).

The complex intersection of various identity facets determined whether or not impairments were embodied as disabilities. As discussed above, if a poor Irish female immigrant to Buffalo were to become impaired and unable to support herself, she would have had fewer opportunities than an Irish male in a similar situation. As a result, impaired Irish women may have sought relief at the poorhouse at higher rates than males. However, Irish male immigrants were much more likely to acquire traumatic injuries from their unskilled labor jobs than females. Therefore, if we were able to infer ethnicity in the skeletal sample, we may find that Irish males made up the majority of those considered impaired by traumatic injuries.

Conclusions

Historical and bioarchaeological analysis of the ECP suggests that the intersection of specific facets of identity (e.g., gender, ethnicity, socioeconomic status, and age) contributed to societal oppression. For example, males were more prone to traumatic injuries requiring treatment than females. Likewise, male impairments tended to be more severe than female impairments. Given the demanding and often hazardous physical labor expected of nineteenth-century working-class males, this is not surprising. For most of the nineteenth century, Germans outnumbered Irish in the City of Buffalo by a ratio of 2:1 (Goldman 1983). Comparing this to poorhouse demographics, it becomes clear that Irish disproportionally sought relief at the ECP (Fig. 11.3). This is most likely because many Irish did not enjoy the same job mobility as did their German counterparts (Gerber 1989). Thus, Irish male immigrants in Erie County during this period were likely to be poor and possibly impaired due to occupational injury. Embodiment of physical impairments could lead to further "othering" and marginalization through the conferral of disability status.

Not all clinical methods can contribute to bioarchaeological analyses of assessing impairment; many variables complicate the diagnosis of impairment in bioarchaeological skeletal remains. Thus, the impairment assessments presented here, both for individual skeletons and the sample as a whole, should be considered conservative. Nevertheless, the modified method in this chapter has demonstrated potential. This chapter contributes to a growing body of scholarship that has developed methods to quantify impairment, and which are necessary interpretative steps in the models proposed in the Bioarchaeology of Personhood (Boutin 2016) and the Bioarchaeology of Care (Tilley 2015).

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Part IV
Case Studies of Impairment and Disability in the Past

Chapter 12
Impairment, Disability, and Identity in the Middle Woodland Period: Life at the Juncture of Achondroplasia, Pregnancy, and Infection

Aviva A. Cormier and Jane E. Buikstra

Introduction

In 1980, two sets of human remains were excavated from Mound 3 at the Elizabeth site (11PK512) in Pike County, Illinois, by the Center for American Archeology (CAA) Contract Archeology Program and the Northwestern University Archeological Field Schools (Charles et al. 1988; Douglas K. Charles personal communication 2015). The adult female (EZ 3-7-1), with associated fetal remains (EZ 3-7-2), was initially described as a "textbook case" of achondroplasia with persistent woven bone and osteoarthritis on lumbar vertebrae (Charles et al. 1988: 286). This rare recovery of a well-documented, pre-Columbian person with dwarfism provides an opportunity to discuss the intricate process of interpreting impairment, disability, and identity from bioarchaeological remains and archaeological contexts.

When discussing those who are "different," many people find politically correct discourse difficult in an ever-changing landscape. Currently, within the American little people community, the label of "dwarf" does not hold negative connotations, while "midget" is considered a derogatory and pejorative term (Ablon 1981, 1984; Little People of America FAQ 2013). The Little People of America (LPA) affirms the acceptability of "dwarf," "little person," "LP," and "person of short stature," but stresses that most people would just prefer to be identified by their name (Little People of America FAQ 2013). While achondroplasia is the most common form of

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A.A. Cormier (✉)
Department of Archaeology, Boston University, 675 Commonwealth Avenue,
Suite 347, Boston, MA 02215, USA
e-mail: acormier@bu.edu

J.E. Buikstra
School of Human Evolution and Social Change, Arizona State University,
PO Box 872402, Tempe, AZ 85287-2402, USA
e-mail: buikstra@asu.edu

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dwarfism or short stature (Vajo et al. 2000), within this chapter, when an individual's medical diagnosis is unknown or unclear, and in accordance with the suggestions of the LPA, he or she is referred to by their burial number, which is as close as possible to identifying them by their name.

Self-identity with the terms "impairment," "disability," and "handicap" also varies immensely between individuals and within communities, just as it fluctuates theoretically, legally, and temporally. The extensive legislative history of the disability rights movement, in the United States and globally, demonstrates the tremendous complexity of assigning the labels of disability, impairment, and handicap within the context of the twentieth and twenty-first century, let alone in prehistoric communities. Further, continuous reevaluation within the United States legal system (the Americans with Disabilities Act—ADA), the World Health Organization (WHO), and disability scholars, emphasizes how these definitions are context-specific and temporally, geographically, and socially contingent. The case study of this chapter reveals the complex challenge for bioarchaeologists, and scholars in general, to infer the social implications of disability or impairment from archaeological and osteological remains lacking in detailed contextual information.

EZ 3-7-1: A Case Study

Context

The Elizabeth site was located on the western bluff overlooking the Illinois River, with the mound group situated on the northern corner (Charles et al. 1988). Two bodies, an adult (EZ 3-7-1) and a fetus (EZ 3-7-2), had been placed in the western portion of Mound 3, in pits intrusive into the mound (Charles et al. 1988). Four primary burials in total had been placed in pits excavated into Mound 3 after its capping, but this was not unusual—most of the mounds from the Middle Woodland period at Elizabeth contained intrusive pit burials (Charles et al. 1988). Further, none of these intrusive burials nor any of the other burials in Mound 3 contained associated burial artifacts. The adult was in supine position with the head to the north and partially flexed knees and elbows, while the fetus appeared to be in breech position and "partially lodged in the birth canal of Skeleton 1 [EZ 3-7-1]… [with the] upper-body elements rested on [the] sacrum of Skeleton 1" (Charles et al. 1988: 256). The pathology description of the adult as "achondroplastic" and the positioning of fetal remains led Charles et al. (1988: 256) to suggest that this was an adult female who may have died in childbirth.

A radiocarbon analysis of bone from the adult individual (EZ 3-7-1) yielded a calibrated range of AD 132–388, with the median date of AD 268, indicating a Middle Woodland context (King et al. 2011). The environment of the Illinois River valley during Middle Woodland period (50 BC to AD 400) would have been a stable, lush, natural landscape of limestone escarpments, floodplain areas, and the Illinois River, which flowed close to the western bluffs (Buikstra and Charles 1999;

Charles et al. 1988). Beginning in the early Middle Woodland Period (ca. 50 BC), prominent bluff crest tumuli and habitation sites indicated the presence of new groups settling in the valley (King et al. 2011). Middle Woodland communities were clustered into residential groups defined by geographic proximity. A hierarchy has been proposed, which includes local, sustainable, and symbolic communities (King et al. 2011; Ruby et al. 2006). In general, we infer that Middle Woodland individuals of paramount rank may have controlled resource redistribution within Lower Illinois Valley communities (Buikstra 1977).

Middle Woodland rituals, as inferred from mound structure and site organization, recreated the cosmos, particularly representing water–air dichotomies in the iconography from artifacts from the Elizabeth site (Buikstra and Charles 1999). The monuments of the Middle Woodland period, structured by kinship, may have provided a forum for the negotiation of power relations of the living (Buikstra and Charles 1999). Sites, including Elizabeth, provide evidence for rituals that placed the disposal of the dead within the larger context of world renewal (Buikstra and Charles 1999).

Evaluation

To begin to understand her life in this Middle Woodland context, we performed a full paleopathological evaluation and differential diagnosis of the EZ 3-7-1 which involved identifying unusual modifications of bone (i.e., bone addition, bone destruction, bone density, bone size, or bone shape) that were the result of ante-mortem pathological processes. These were distinguished from postmortem, taphonomic changes. By examining the distribution, location, and quality of atypical bone development and addition, we engaged in a differential diagnosis for the conditions affecting EZ 3-7-1.

Macroscopic evaluation began with an inventory of the skeletal remains and the estimation of the age and sex. Her recovered skeleton was nearly complete, missing only large portions of the frontal bone, the smaller facial bones, the right parietal, patellae, much of the right os coxa, and various hand and feet bones. Because of questions surrounding the reliability of age estimation methods on individuals with pathological conditions, particularly achondroplasia (Bertrand et al. 2014), an age estimate for EZ 3-7-1 is tentative at this time. Until we have received the cementum annulation results (in process), the eruption of and wear upon the third molars and the evidence of pregnancy indicate that EZ 3-7-1 was an adult female. The estimation of biological sex from the presence of the fetal remains is supported further by the prominent ventral arc on the left os coxa.

Using Lovejoy's (1985) patterns of occlusal attrition, EZ 3-7-1 was assessed to fall in phases G or H, estimating her age to be 35–50 years at death, a middle adult. Due to the alveolar bone resorption following the loss of both the maxillary and mandibular first molars from the right side, the wear presents asymmetrically focused on the left molars. EZ 3-7-1 probably used the left side of her mouth for mastication more frequently, resulting in more advanced occlusal wear and the possible higher age estimation of 50. It is more likely that she was toward the earlier end of the middle adult range, closer to 35 or 40 years at death.

Our first observation was that EZ 3-7-1 had unusually short limb bones, with large, rugose muscle attachments and a disproportionally large skull (Fig. 12.1). Most notably, her upper limbs presented with atypical morphologies and articulations in both wrists and elbows. Her elbow extension would have been limited to a maximum of 150° and the articulated humeri, ulnae, and radii were angled laterally approximately 45°, a condition known as cubitus valgus or increased carrying angle

Fig. 12.1 Overview photograph of the skeletal remains of EZ 3-7-1 (photo by A. Cormier)

Fig. 12.2 Anterior view of the *upper left* limb of EZ 3-7-1, highlighting the cubitus valgus and restricted extension of the elbow, as well as limited pronation of the wrist (photo by A. Cormier)

(Fig. 12.2). The wrists restricted the pronation of the forearms due to the atypical shape of the distal ulnae and lack of typical articulation. Her vertebral column showed a caudal shift, as well as shortened pedicles and interpediclar distances, which caused significant narrowing of all vertebral canals.

Because the limbs appear to be atypically short, we employed a standard score analysis of her limb dimensions in comparison to a reference population drawn from contemporary female skeletons (Table 12.1). The z-scores indicated that there was more than a 97.5% chance that EZ 3-7-1 had atypical short stature and atypically robust long bones for her community. Further, the metric evaluation revealed that she probably experienced mesomelia (shortening of the middle segments) of the upper limbs and rhizomelia (shortening of the proximal segment) of the lower limbs.

In addition to these dimensional changes, we observed periosteal woven bone, in various states of formation and healing on the vault and face of the skull, ribs,

Table 12.1 A standard score analysis of the degree of skeletal difference between the EZ 3-7-1 and a reference sample of Lower Illinois Valley Woodland females (adapted from Cormier et al. n.d.)

	z score	EZ 3-7-1 (cm)	Mean (cm)	S.D.
L. Humerus Length	−9.66	16.88	30.08	1.37
L. Radius Length	−9.80	12.33	23.17	1.11
L. Ulna Max Length	−8.59	15.39	25.22	1.15
L. Ulna Physiological Length	−10.56	12.36	22.20	0.93
R. Humerus Length	−8.89	17.00	30.25	1.49
R. Radius Length	−10.98	12.45	23.18	0.98
R. Ulna Max Length	−9.75	14.90	25.15	1.05
R. Ulna Physiological Length	−11.08	12.58	22.19	0.87
L. Femur Length	−9.86	22.20	42.06	2.01
L. Tibia Length	−8.59	19.30	34.69	1.79
L. Fibula Length	−8.77	20.45	33.41	1.48
R. Femur Length	−10.30	22.20	41.54	1.88
R. Fibula Length	−8.49	20.13	33.32	1.55
L. Calcaneus Length	−3.41	5.45	7.03	0.46
L. Talus Length	−3.40	4.10	5.05	0.28
L. MT2 Length	−3.53	5.80	7.06	0.36
L. MT3 Length	−4.01	5.16	6.62	0.36
L. MC2 Length	−4.52	4.65	6.43	0.39
L. MC3 Length	−4.72	4.80	6.38	0.34
L. MC4 Length	−5.68	4.00	5.56	0.28
R. Radio-Humeral Index	−1.87	73.24	76.60	1.80
L. Radio-Humeral Index	−1.85	73.04	77.30	2.30
R. Humerus Robusticity	11.86	34.71	18.10	1.40
L. Humerus Robusticity	8.17	34.96	17.80	2.10
R. Femur Robusticity	15.61	20.21	11.50	0.56
L. Femur Robusticity	14.70	21.68	11.70	0.68

clavicles, scapulae, radii, ulnae, femora, tibiae, fibulae, and right second and third metatarsals. The right tibia and fibula showed the most addition, with prominent, interosseous, spicular crests on the lateral surface of the tibia possibly in contact with the medial surface of the fibula (Fig. 12.3). There are also osteophytes on many of the vertebral bodies (Fig. 12.4).

Differential Diagnosis

We approached the differential diagnosis of the EZ-3-7-1 (Cormier 2015; Cormier et al. n.d.) by initially considering any disorders that may have caused the generalized atypical morphology. Second, we focused on diseases that may have

Fig. 12.3 Anterior view of the *right lower* leg (tibia and fibula) of the EZ 3-7-1, illustrating the prominent, interosseous, spicular crests of periosteal bone addition (photo by A. Cormier)

contributed to the woven bone distribution. Our differential diagnosis thus begins with the conditions that may result in short stature and the development of atypical wrist and elbow articulations. We found that possibilities include growth hormone deficiency, various skeletal dysplasias, and certain conditions that involve Madelung's deformity and cubitus valgus.

Because her short stature is disproportionately expressed, we were able to eliminate the conditions of growth hormone deficiency (pituitary dwarfism), pseudoachondroplasia, and hypochondroplasia, and focus instead on other types of skeletal dysplasias. We were also able to exclude the cartilage dysplasias of achondrogenesis, camptomelic dysplasia, thanatomorphic dysplasia, which are fatal in infancy or early childhood (Aufderheide and Rodríguez-Martin 1998; Ortner 2003). Turner's syndrome can also be rejected due to the resulting sterility of

Fig. 12.4 Lateral view of the thoracic and lumbar vertebrae and sacrum of the EZ 3-7-1. Note the possible curvature of the vertebral column (photo by A. Cormier)

affected individuals (Aufderheide and Rodríguez-Martin 1998; Sybert and McCauley 2004), which is not the case here. Instead, EZ 3-7-1 has most, if not all, of the typical osteological indicators of achondroplasia (Cohen 1998; Hecht et al. 1989; Henderson et al. 2000; Hunter et al. 1998; Mackie et al. 2008; Wynne-Davies et al. 1981), including a small foramen magnum, reduced interpedicle distance, spinal stenosis, lumbar lordosis, postural kyphosis, incomplete elbow extension, and "trident" hands (short, widespread fingers).

While achondroplasia apparently affected EZ 3-7-1, the unusual elbow and wrist articulations suggest the possibility of an additional diagnosis (Ross et al. 2003). The morphology of both wrists supports the diagnosis of congenital Madelung's deformity, which is characterized by shortening of the forearm, increased angulation and subluxation of the wrist, and triangular arrangement of the carpal bones (Arora and Chung 2006; Rayan and Upton 2014; Schmidt-Rohlfing et al. 2001; Sibbel et al. 2015). The additional morphology of the elbows suggests that Madelung's deformity was one symptom of a larger syndrome with both the wrist and elbow morphologies, such as Leri-Weill Dyschondrosteosis (LWD), which is characterized by short stature, mesomelia, Madelung's deformity, increased carrying angle at the elbow, high arched palate, and scoliosis (Berdon et al. 1965; Cormier-Daire et al. 1999; Hamosh 2013; Leri and Weill 1929; Munns and Glass 2008). Coupled with the evidence of achondroplasia, we suggest a diagnosis of a combined skeletal dysplasia, specifically achondroplasia and Leri–Weill Dyschondrosteosis (Cormier 2015; Cormier et al. n.d.), which would account for the unusual skeletal morphology observed.

The atypical bone addition present throughout the skeletal remains of EZ 3-7-1 consists of periosteal lesions on many elements of the skeleton, along with vertebral osteophytes. Considering the relatively minimal changes to both the diarthrodial and amphiarthrodial joints and the porosity and concavity of the vertebral bodies, osteophyte development should be attributed to the unusual stresses of the achondroplastic posture, rather than early brucellosis, early-stage tuberculosis, early ankylosing spondylitis, or intervertebral disc disease. While there are many infections, diseases, and injuries that could result in periosteal, woven bone formation, the three most probable diagnoses for this individual are osteomyelitis, primary periostitis, and treponematosis. Because of the absence of sequestra and cloacae, it is difficult to make a more concrete diagnosis macroscopically. Future radiographic studies may allow for a more specific diagnosis and associated possible complications.

Identifying as "Dwarf" and/or "Disabled"

Prehistoric Dwarfism and Identity

In order to understand the status, role, and/or identity of EZ 3-7-1 during the Middle Woodland Period of the Lower Illinois Valley, we must use an integrated approach considering multiple lines of evidence, including osteological, artistic, archaeological, epigraphic, and ethnographic material. Unfortunately, while there are bioarchaeological examples of dwarfism from pre-Columbian North America (Curry 1999; Fowke 1902; Langdon et al. 1993; Ortner 2003; Snow 1943), there is a dearth of artistic, epigraphic, and ethnographic evidence available (limited to the Adena Pipe Figurine and Native American Folklore described below) and none for the Lower Illinois Valley during the Middle Woodland Period. While it is not wise to assume that the status and identity of the Middle Woodland dwarfs are directly comparable to those in other contexts, understanding of the complex and diverse roles of dwarfs globally informs our perspective of this Middle Woodland individual. Artistic, archaeological, epigraphic, ethnographic, and osteological from other regions throughout the world can suggest the variety of roles and identities persons of short stature have held across time and space, including from ancient populations of Egypt (Adelson 2005; Dasen 1993; Kozma 2006, 2008), Rome (Minozzi et al. 2013), Greece (Dasen 1993), West Africa (Chap. 5; Gusinde 1955; Hall 1927), the Near East (Fiorello 2014; Slon et al. 2013), Europe (Arcini and

Frölund 1996; Bianucci et al. 2012; Frayer et al. 1988; Sables 2010; Waters-Rist and Hoogland 2013), Asia (Woo et al. 2015), Latin America (Miller 1985; Rodríguez et al. 2012), and South America (Pachajoa et al. 2009; Rodríguez et al. 2012).

Due to the impressive natural and artificial preservation of ancient Egyptian human remains, many of the examples of possible dwarf skeletal remains have been excavated in Egypt, including from El-Mustagidda, Abydos, Saqqara, Thebes, Beni Hasan, and Asyut (Dasen 1993). Due to the paucity of the excavation documentation and misplacement of the physical remains (Dasen 1993), these osteological examples of Ancient Egyptian dwarfism, reveal little about the identities of the individuals, beyond the fact that many were found accompanying royal burials in tomb chambers. The prolific artistic and hieroglyphic record from Ancient Egypt can serve to inform osteological interpretations of dwarf identities.

According to the abundant artistic and archaeological record, the identities of Ancient Egyptian dwarfs ranged from gods to courtly elites to nonelite workers. Two Egyptian dwarf gods, Ptah and Bes, were associated with regeneration, rejuvenation, and fertility throughout the Old Kingdom, Middle Kingdoms, and the Greco-Roman Period (Adelson 2005; Dasen 1993; Kozma 2006, 2008). There were several elite dwarfs from the Old Kingdom that achieved high status and were associated with the king, given lavish burial rites in the royal cemetery near the pyramids (Dasen 1993; Kozma 2006). For example, Seneb (4th or 5th Dynasty) was overseer of the palace dwarfs, chief of the royal wardrobe, and priest of the funerary cult of the pharaoh Khufu (2589–2566 BC) (Adelson 2005; Dasen 1993; Kozma 2008).

Egyptian artistic representations documented nonelite dwarfs in almost every facet of life, as they were employed as personal attendants, animal tenders, jewelers, fishers, nurses, dancers, and entertainers (Dasen 1993; Kozma 2006, 2008). A sixth-century carving displayed a dwarf with an average-sized wife and children (Bourke 1971). A late period sarcophagus depicting a dwarf dancer and an alabaster ornament of a boat sailed by a dwarf were encountered in Tutankhamun's tomb (Sullivan 1995). These many artistic representations demonstrated that dwarfs were accepted and respected in society, with assimilation into daily life and without the stigma of an impairment or disability (Kozma 2006).

Thanks to the historical academic emphasis on classical archaeology and the Old World, there are various bioarchaeological and artistic representations of persons with short stature from ancient Italy and Greece. In Italy, examples include the earliest osteological case of dwarfism (Frayer et al. 1987, 1988) from the Upper Paleolithic (10,000 BP), a skeleton from the Roman Imperial Age (first-century AD) (Minozzi et al. 2013), and the many dwarfs recorded to have served the court of Isabella d'Este (AD 1474–1539) (Cartwright 1903; Marek 1976). The roles and status of dwarfs depicted in historical sources range from entertainers and attendants of Imperial Rome to those experiencing divine punishment during the spread of Christianity to being manifestations of social prestige owned during the Renaissance.

In Ancient Greece, the perfect, proportionate human form was idolized, leaving few sculptural or artistic representations of injured or atypical bodies (Dasen 1993; Edwards 1997). In fact, Plato and Aristotle viewed them as inferior beings and Athenian law gave the father permission to reject a “defective” newborn and leave them to die (Adelson 2005). One alternate interpretation of the lack of artistic representation is that individuals of atypical physique were instead integral to society and not identified as a distinct, minority group (Edwards 1997). However, a few specific figures are distinct in legends and mythology, such as Hephaistos and Geras, but most are depicted as hybrid man-animal creatures, such as centaurs and satyrs (Dasen 1990).

While few literary sources (such as ancient Greek plays or medical texts) include persons of short stature (Dasen 1993), artistic depictions of dwarfs on ceramic vessels are frequent, suggesting the partial acceptability of this particular body proportion of atypical short stature. The dwarf iconography on various types of vessels include portraiture of specific individuals, entertaining caricatures, illustrations of servants, attendants, and entertainers, and religious imagery, specifically pertaining to the cult of Dionysus (Dasen 1990, 1993). Through associating dwarfs with the Dionysiac cult and satyrs, they are frequently illustrated as being wild, inebriated, erotic figures, chasing women with exaggeratedly large and erect phalluses (Adelson 2005; Dasen 1993). While some of the iconography is realistic, most of the depictions of dwarfs from Ancient Greece suggest they were perceived as lewd creatures or servants.

Similarly, in pre-Columbian cultures of Central and South America, individuals with dwarfism were apparently portrayed in religious and political contexts. An anthropomorphic ceramic whistle from the Tumaco-La Tolita culture of the Colombia-Ecuador Pacific coast region (300 BC–AD 600) depicts a dwarf wearing a type of crown, which, in conjunction to the musical functionality of the artifact, has been suggested to convey a relationship between dwarf individuals and shamanistic activities (Bernal and Briceno 2006; Pachajoa et al. 2009, 2010). Some ceramic sculptures of the Moche culture depict dwarfs with headdresses indicating their high social status or ritual function (Alva et al. 1993). While bioarchaeological evidence is lacking, artistic and sculptural depictions of the ancient Maya demonstrate the frequency of dwarfism, suggesting that they filled many different social roles, from serving in the state administration to working as artists and musicians, and that they may have served as symbols of liminality, participating in rites associated with the divinities (Bacon 2007; Miller 1985; Rodríguez et al. 2012).

The few North American examples of archaeologically recovered skeletal remains with dwarfism range geographically from California to Florida. In the early twentieth century, dwarf remains were excavated from Mound 4 near Waverly, Ohio (Fowke 1902; Snow 1943). Snow (1943) presented two more cases of indigenous North American dwarfism from near Mound “G” at Moundville, Alabama, both of whom were buried in prone position with no associated artifacts. More recently, possible dwarf skeletons were excavated from a cache deposit at the Twin site in South Dakota (Langdon et al. 1993) and in Sacramento County, California (Ortner 2003). Ortner (2003) mentions further the tentative diagnoses of an individual with chondrodysplasia from the Late Prehistoric site of Belle Glade in Florida and a Late Woodland cranium with achondroplasia from the Ferguson Farm, Accokeek, Maryland in Ossuary IV, which was the only ossuary located outside of the palisade of the village (Curry 1999).

The only North American artistic or sculptural representation of a pre-Columbian individual with dwarfism is that of the Adena Pipe figurine from the Adena Mound at Chillicothe, Ohio (Webb and Baby 1957). Carved realistically in relief, this figurine from the Adena Culture (1000 BC–AD 200) depicts a dwarf with a "heavy-set muscular body and a trunk of normal proportions, the stubby arms and legs, and the enlarged head" (Webb and Baby 1957: 55). Webb and Baby (1957: 55) posit that an individual with this physical form of a swollen neck and limb joints may have existed and "may have been deified." Similar to imagery from elsewhere in the Western Hemisphere, it is not clear the exact mythology or beliefs that were associated with this Adena figurine.

For Central and North America specifically, when the Native American folklore began to be recorded in the 1500s by missionaries, general trends in beliefs and legends concerning "little people" slowly surfaced. From Mexico to New York, basic mythology patterns remain the same; little people are rainmakers, live underground or in the water, and/or have the ability to provide food (Bierhorst 1998). The Illinois Confederacy, whose territory extended south of the Great Lakes and east of the Mississippi including modern-day Central Illinois and the Elizabeth Site (Waldman 2014), had folklore that included stories of little people or the *Paisake* (plural of *Paissa*), similar to the *Pukwudgies* of the nearby (and allied) Algonquin. These little people were mischievous, sometimes dangerous, creatures of the forest, similar to European stories of elves, gnomes or fairies (Eberhart 2002). In some stories, these magical little people served the religious function of guiding spirits to the afterlife or represented the role of children, inferior, immature, and under the control of adults (Eberhart 2002).

While the connection remains tenuous between these mythological "little people" and real persons experiencing short stature, there are some elements to the folklore that might indicate the idea of "little people" did not develop independently from the occurrence of persons of short stature. For example, the Crow, whose ancestral home was along the Missouri River, feared the little people of the Pryor Mountains and referred to them as devils in human form with large heads (Lewis et al. 1902; Pitts 2002). Macrocephaly (increased head size) is a common symptom of many types of genetic skeletal dysplasia resulting in short stature, including achondroplasia (Oberklaid et al. 1979). This shared characteristic suggests the possibility of an inherent connection between the little people of legends and persons of short stature, such as EZ 3-7-1.

The paucity of artistic, archaeological, and ethnographic context of dwarfs specifically during Woodland times severely limits our abilities to discern the particular social, economic, and/or political identity of the EZ 3-7-1. Obviously it remains unwise to posit any conclusions regarding her role or identity from the evidence of distant cultures, such as Ancient Egypt or Greece, or from Native

American mythology and one loosely associated figurine. Further, we should not disregard the possible perceptions of the individuals who were not from elite contexts or subjects of portraiture. As demonstrated, archaeologically recovered dwarfs from nonelite contexts are rare and it is difficult to distinguish their lack of associated artifacts as being a result of a stigmatized identity or of simply a nonelite identity. The ethnographic and artistic evidence described above of persons of short stature also cannot suggest any connection between their identity and that of being disabled. Such artistic and iconographic depictions should encourage bioarchaeologists to step beyond any essentialized, modern perceptions of disability.

The Impairment and/or Disability of Dwarfism: The LPA, the WHO, and the ADA

The complexity of interpreting labels of dwarfism or disability from the past parallels the diversity of opinions within the modern organization of the Little People of America (LPA) and the greater Little Person community concerning whether having short stature should be considered a disability and/or impairment (Little People of America FAQ 2013; Van Etten 1999). In 1980, the World Health Organization (WHO) presented the *International Classification of Impairments, Disabilities, and Handicaps*, which deemed an impairment as "any loss or abnormality of psychological, physiological or anatomical structure or function" (1980: 47); a disability as "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being" (1980: 142); and handicap as "a disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social an d cultural factors) for that individual" (1980: 182). In 2001, the WHO published the *International Classification of Functioning, Disability and Health* (ICF), presenting an updated universal definition, measurement, and policy for disability and health (Chap. 3). Within the ICF, the WHO refers to disability as "an umbrella term for impairments, activity limitations, and participation restrictions" (2001: 2).

This shift from separate definitions to an encompassing framework is mirrored by the nuanced discussion of theories of disability by disability scholars and anthropologists around the world (Chaps. 1 and 2; Reid-Cunningham 2009). Historically, and especially in the UK, the field of disability studies has been dominated by the social model of disability (Barnes 2000; Finkelstein 1981; Oliver 1990, 1996, 2013; Shakespeare 2013; Shakespeare and Watson 1997) that dichotomizes impairment from disability. Under this model, impairment is considered an internal, bodily difference and personal limitation, while disability is external and public, a social creation of restriction especially within the economic sphere (Oliver 1996; Shakespeare 2013). While influential in advocating for activism and identity, the social model is limited in terms of cultural generality, personal experiences, and complexities of impairment (Ellis 2015; Shakespeare 2006; Chap. 2). The cultural model aims to overcome the disability-impairment binary and thus indicates that disability is not only about social, political, and economic structures, but it instead includes psychological, cultural, and individual points of view (Mitchell and Snyder 1997; Snyder and Mitchell 2006). Further, the cultural model defines impairment as “both human variation encountering environmental obstacles *and* socially mediated difference that lends group identity and phenomenological perspective” (Snyder and Mitchell 2006: 10).

We, as bioarchaeologists, are encouraged by the perspective of the cultural model, especially in its emphasis upon how disability and impairment are constructed socially, culturally, economically, personally, and psychologically depending on the particular temporal, geographic, and cultural context. At the same time, in order to approach the concept of disability from the perspective of the biological material available (i.e., the skeletal remains), we first have to rely on the social model’s, albeit limiting, dichotomy of physical and functional impairment versus the constructed view of disability. After considering this biological and mechanical perspective, bioarchaeologists must take into account the cultural model’s emphasis on the construction of impairment and disability within the particular environment of the individuals studied. Only by considering both perspectives, bioarchaeologists and disability scholars alike can begin to understand the multitudes of identities an individual might experience or deny, including being disabled and/or being a dwarf.

In order to understand these possible complexities and many nuances of the dwarf and/or disabled identity of the past, we consider contemporary perspectives and identities in relationship to current legislation and social theory. Today, many individuals with dwarfism do not view themselves as disabled, thus countering negative connotations that have been historically associated with the designation, including “sick, deformed, ugly, old, crazy, maimed, afflicted, abnormal, or debilitated” and in need of pity and charity to survive (Garland-Thomson 2002: 74). Some individuals resist being a member of the LPA and reject the resulting identity of “dwarf” because they choose to focus on their identity as an individual (Thompson et al. 2008). Such individuals may be even less apt to accept a label of “disabled” (Kruse 2003). This label is rejected due to their *ability* to overcome size limitations by adapting and accomplishing goals using various alternative methods, such as custom-made cars, kitchens, bathrooms, etc. Conversely, Van Etten (1999) argues instead that Little People, including herself, should acknowledge and embrace their disability in order to be protected by the Americans with Disabilities Act (ADA) from discrimination.

The Americans with Disabilities Act of 1990, amended in 2008, provided equal opportunity for “individuals with disabilities,” especially in the realms of private employment, public accommodations and services, and telecommunications. The ADA imparted a legal definition of a disability, meaning “(A) a physical or mental impairment that substantially limits one or more major activities of such individual; (B) a record of such an impairment; or (C) being regarded as having such an impairment” (The Americans with Disabilities Act of 1990 1990, sec. 12102). The ADA Amendments Act (ADAA) of 2008 aimed to ensure a comprehensive and inclusive definition of disability and to clarify the meanings of “substantially limits” and “major life activities.” In particular, “major life activities” are extended to

> but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working… the operation of a major bodily function, including but not limited to, functions of the immune system, normal cell growth, digestive, bowel, bladder, neurological, brain, respiratory, circulatory, endocrine, and reproductive functions (ADA Amendments Act of 2008 2008, sec. 12102).

This definitional broadening represent a shift in mentality from disability signifying the end of health to focusing on the level of health and how disability is a universal human experience (World Health Organization 2001).

Van Etten argues that the individual Little Person or the parent of a Little Person should embrace the universality of the label of disability as it is defined by the ADA in order to advocate for accommodation in relation to education and accessibility (1999). To be protected by the ADA, an individual or their advocate has to acknowledge their substantial limitation and thus accept the label “disabled.” In this contemporary American context, individuals with short stature have the right to self-identify as a dwarf and/or as disabled and thus receive the protection of the ADA. This freedom in self-identifying is a benefit of being American and the various freedoms that citizenship affords the individual. However, in this or in other geographical and temporal contexts, perceptions of disability are those of the beholder and included in the definition of disability by the ADA. The disability scholar and bioarchaeologists alike must contemplate both the self-identity of the individual and the identity ascribed by the legislative, political, economic, and social norms of the particular context.

The Impairment, Disability, and Identity of EZ 3-7-1

Her Identity from Contextual Evidence

Modern legislation and theory, artistic representations, sculptural relief, written accounts, folklore and ethnology, material culture, and mortuary contexts provide bioarchaeologists with complex depictions of individual and societal perceptions of what is considered disability, as well as dwarfism. In the consideration of EZ 3-7-1, the only artefactual or artistic depiction of an individual with dwarfism from a nearly contemporaneous context in North America is the aforementioned Adena Pipe figurine (Webb and Baby 1957). The Native American mythology concerning “little people” as mentioned above is difficult to connect to this community so removed in time. Even with the figurine and folklore, the social identity of a dwarf as represented in material culture from this geographical and temporal context remains unknown.

As reviewed above, there are other examples of skeletal remains of individuals with dwarfism archaeologically recovered from North America, but few have associated mortuary contexts that suggest a social interpretation of dwarfism or disability. Snow (1943) lamented that, aside from the Moundville dwarfs, previously excavated individuals with dwarfism from Eastern Woodland archaeological contexts have "all become misplaced or lost, and no description other than field notes is available" (1943: 8). This lack of contextual information severely hinders our interpretive ability for EZ 3-7-1.

The mortuary context of EZ 3-7-1 relays little to no information regarding the individual's identity (and the absence of evidence should not be considered evidence). In Mound 3 at the Elizabeth site, four burials, including the burial of EZ 3-7-1 and EZ 3-7-2, were interred in shallow, intrusive pits following the final capping activity of the mound (Charles et al. 1988). The skeletons from all four of the intrusive burials were oriented in a supine position, without a single associated artifact. Besides the pathological distinction of EZ 3-7-1, there are no differences from the mortuary contexts of the other intrusive burials. While it is indeed possible that other identities or circumstances of death assumed paramount significance in defining her final deposition in the community cemetery, we believe that dwarfism represented a pervasive identity for EZ 3-7-1.

Limitations of Major Life Activities

In order to consider possible daily activity limitations for EZ 3-7-1 (and thus possible disability under the ADA), we employed a life course perspective to evaluate the clinical characteristics and functional implications or consequences of the genetic conditions, periosteal bone addition, and full-term pregnancy, individually, and concurrently. A life course approach considers temporal and social elements to understand an individual's pattern of health and disease as it is influenced by its social, political, economic, and cultural contexts (Elder 1998; Hutchison 2014; Mortimer and Shanahan 2007; Yu 2006). EZ 3-7-1's perceived and real limitations would have varied chronologically, with the complications of achondroplasia evident in childhood and persistent through adolescence and adulthood. The periosteal pathology was likely acquired during adulthood, followed by pregnancy. Considering this temporal variation, her identity as disabled or impaired could have changed both in terms of self-identification and social perceptions.

Individuals with achondroplasia typically experience problems with obesity, leading to obstructive sleep apnea, cardiovascular disease, and joint problems (Hoover-Fong et al. 2008; Waller et al. 2008). Beyond body mass issues, individuals with achondroplasia may have neurological complications from spinal stenosis and the narrow foramen magnum, hypertrophic osteoarthritis of the posterior joints of the vertebral column, tibial bowing, respiratory problems, speech delays, otitis media, and hearing loss (Hunter et al. 1996, 1998; Shohat et al. 1993;

Waller et al. 2008; Wynne-Davies et al. 1981). Because of her significant spinal stenosis, EZ 3-7-1 probably experienced neurological issues, as well as the body mass problems exacerbated in adult life from pregnancy.

The atypical articulations at the elbows and wrists of EZ 3-7-1, along with the extreme periosteal bone addition of the right tibia and fibula (Fig. 12.3), would have restricted her range of limb movement with reduced elbow extension and extreme cubitus valgus, limited to a maximum of 150° (Fig. 12.2). Her articulated humeri, ulnae and radii were angled laterally approximately 45°, a condition known as cubitus valgus (increased carrying angle). Mobility of EZ 3-7-1's upper limbs may have been further limited due to the uncharacteristic wrist articulations, a result of the Leri–Weill Dyschondrosteosis. The atypical distal articulation of the ulnae and radii, the slippage of the triquetral in the right wrist, the restricted extension of the elbow, and cubitus valgus would have resulted in very limited arm and hand mobility. The limited function of the upper extremity at both the elbow and the wrist would have presented early in life but would have worsened with the increased body mass and girth from pregnancy.

Depending on the cause of the woven bone addition observed throughout her skeleton, she may have experienced further mobility and generalized activity limitations, with a later onset, during her adult life. The extensive bone addition of the right tibia and fibula may have affected the general mobility of the lower limbs. Depending on the possible infection or injury that led to the bone additions, there may have been visible complications of the soft tissue, such as rashes or lesions or even the neurological and spinal problems that may occur in cases of treponematosis (Farnsworth and Rosen 2006). Further, energy levels may have been depressed from the infection and/or pregnancy, compared to her younger adulthood.

There are many obstetric and gynecologic complications common in females with achondroplasia, including increased menstrual complications, problems with dosing hormonal contraception, possible reduced fertility, premature menopause, and increased incidence of leiomyomata or benign, uterine tumors (Allanson and Hall 1986). The most serious obstetric difficulty is a result of the severely narrowed pelvis, especially the diameter between the pubic symphysis and the sacral promontory (Allanson and Hall 1986; Ortner 2003). Pelves of achondroplastic females are too narrow for uterine growth of the fetus, which is pushed upward into the abdominal region, thus increasing the chances for maternal respiratory distress, early delivery, and incidence of neonatal death (Allanson and Hall 1986). Pelvic narrowing also makes descent of the fetal head unlikely, and the large head of a newborn with achondroplasia may increase cephalopelvic disproportion (Allanson and Hall 1986). Without cesarean section (Allanson and Hall 1986; Ortner 2003), this obstetric distress may have resulted in the deaths of both EZ 3-7-1 and EZ 3-7-2.

Thus, the combined genetic dysplasia, pregnancy, and infection suggest some serious activity limitations varying throughout the EZ 3-7-1's life. The skeletal manifestations of achondroplasia and Leri–Weill Dyschondrosteosis would have resulted in a slow, perhaps unsteady, gait especially considering the extensive kyphosis of the vertebral column (Fig. 12.4) and the disproportionately large head.

The combination of the bilateral lack of elbow extension, extreme cubitus valgus, and limited forearm rotation would have resulted in restricted functionality of the arms throughout childhood and adult life. Bone infection could have resulted in pain and limited movement. Activity would have been further restricted over recent months by the nearly full-term pregnancy, with the fetus abdominally located and in a breech position (feet-first).

Especially during the third trimester of her pregnancy, it may have been difficult for EZ 3-7-1 to complete typical tasks without assistance. Exacerbating general mobility restrictions, obtaining food and water may have been more difficult, as well as dressing and general hygiene. As EZ 3-7-1's range of activities would have become increasingly limited due to her pregnancy, her needs for assistance would have perceptibly increased beyond those of other females in the community, requiring increased accommodation for her survival throughout her pregnancy. If she had not self-identified or been perceived as disabled prior to this point, her inability to complete her typical range of activities would have become increasingly obvious to her and to those around her. As suggested earlier, it is probable that EZ 3-7-1 and EZ 3-7-2 died during childbirth, possibly from complications of a breech position and narrow pelvis and lack of modern medical intervention. In this case, the limitations and consequences resulting from her genetic dysplasias, pregnancy, and infection critically impacted her life course.

Disabled and/or Impaired?

Given EZ 3-7-1's typical, artifact-less burial and the lack of associated ethnographic and artistic evidence, our ability to interpret her disability and/or impairment is limited. We do, however, have evidence to understand her physical and functional mobility and limitations from the social model's perspective. Using the terminology of the ADA's, albeit modern, umbrella framework for the discussion of impairment and disability, we can suggest that, perhaps varying throughout her lifetime, her ability to complete major life activities was substantially limited. During her young adulthood, she may not have been as limited in activities such as walking or standing, feeding herself, basic hygiene, learning, thinking, and communicating. But later in life, this ability may have been severely complicated due to her skeletal dysplasias, pregnancy, and infection. Because of the lack of nuanced understanding from this particular temporal and cultural context, it is impossible to reveal the self-identity or social identity of EZ 3-7-1 as having an impairment or disability. It is possible that at that point she may have self-identified as having a disability, and her local Middle Woodland community may have considered her disabled. She was interred in a pattern like others without macroscopically observable impairments in the skeleton; we find no evidence of special treatment in death, but our ability to assume the same for life must be tentative. In this particular context, having a significant limitation in mobility and function may not indicate conclusively the self-identity of disabled or the social, economic, and/or political perception of disability. Further, while we acknowledge that the designation of disabled under the ADA is a modern perception and not necessarily applicable globally throughout history and prehistory, the broad umbrella terminology allows for further discourse.

Conclusions

As demonstrated by this case study and the accompanying discussion of disability theory and terminology, bioarchaeologists must be cautious in approaching social or cultural perceptions of disability and impairment. However, evaluating skeletal remains with attention to atypical morphology may relay information concerning functional limitations in daily activities. In a modern global context, considering the ADA and the ICF, EZ 3-7-1 would be regarded as a disabled individual. We may only speculate concerning the social perception of disability among her Middle Woodland peers.

She was, however, almost certainly pregnant at the time of death and thus must have been sexually active at this point in her life. Further, following Tilley's methodology for understanding the bioarchaeology of care (Tilley 2012; Tilley and Cameron 2014; Tilley and Oxenham 2011), her survival into adulthood and throughout her pregnancy indicates that her limitations were met with support or accommodation within the community landscape. However, both the occurrence of sexual activity and that of community support do not negate the possible presence of social stigma. We cannot possibly infer the circumstances surrounding the conception of the fetus, as they range as far as from a loving, consensual relationship to an instance of abuse and rape. While it is possible that her relatively advanced age of pregnancy could be attributed to depressed fertility, we surmise that her onset of sexual activity was later than that for a typical female in this cultural context. Our only other Lower Illinois Valley example of death during childbirth occurred in a much younger female (16–19 years of age) interred at the Late Woodland Helton site, Mound 20 (Sgheiza et al. n.d.). This delay may indicate the presence of a social stigma associated with her skeletal morphology or impairment. This conclusion is, however, speculative, and we recognize that she may have become pregnant previously and survived after a spontaneous abortion.

The case study of EZ 3-7-1 demonstrates not only the power of bioarchaeology in the discourse of disability in past societies, but also that inferences must be approached with caution. Bioarchaeologists can examine the skeletal remains of individuals to estimate whether or not they experienced any functional limitations in daily activities and thus, in a modern framework of the ADAA and the ICF, would be considered disabled. This reconstructed physical impairment is not isomorphic with self- or social perceptions of disability without further contextual information, especially in lives far removed in time or space. However, by encouraging discourse that includes rigorous osteobiologies in discussions about impairment, the life course, and the need for social accommodation, we advance both our appreciation for past lives and the need for contextually sensitive study.

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Chapter 13
Attempting to Distinguish Impairment from Disability in the Bioarchaeological Record: An Example from DeArmond Mound (40RE12) in East Tennessee

Jonathan D. Bethard, Elizabeth A. DiGangi and Lynne P. Sullivan

Introduction

As described in this book's introduction, both archaeologists and bioarchaeologists have begun to pay special attention to questions related to numerous forms of social identity (Chap. 1). Among these, concepts of impairment and disability have been described as among the least established in this area of specialized (bio)archaeological scholarship (see Battles 2011; Buikstra 2010; Buikstra and Scott 2009; Insoll 2007; Knudson and Stojanowski 2008, 2009; Meskell 2007; Murphy 2000). Moreover, the notion of care provisioning has been refined and scholars can now use an index of care to further interpret bioarchaeological contexts (Tilley 2015; Tilley and Cameron 2014; Tilley and Oxenham 2011). These theoretical approaches have greatly enhanced bioarchaeology's ability to contribute to broad discussions about care and caregiving in the past and have significantly improved since Dettwyler's (1991) well-known critique.

While the bioarchaeology of care is now an area of inquiry in its own right, few bioarchaeological studies have explicitly engaged the disability studies literature to better understand and interpret human skeletal remains recovered from archaeo-

J.D. Bethard (✉)
Department of Anthropology, University of South Florida, 4202 East Fowler Avenue (SOC107), Tampa, FL 33620, USA
e-mail: jbethard@usf.edu

E.A. DiGangi
Department of Anthropology, Binghamton University, 4400 Vestal Parkway East, Binghamton, NY 13902, USA
e-mail: digangi@binghamton.edu

L.P. Sullivan
McClung Museum of Natural History and Culture, University of Tennessee, 1327 Circle Park Drive, Knoxville, TN 37996, USA
e-mail: lsulliv2@utk.edu

J.F. Byrnes and J.L. Muller (eds.), *Bioarchaeology of Impairment and Disability*,
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logical contexts (Battles 2011; Buikstra 2010; Metzler 2006; Southwell-Wright 2013). In addition, it is uncommon for bioarchaeological contributions to explicitly discuss and/or differentiate between the key concepts of impairment and disability, though some scholars have been unambiguous in their use of terminology (e.g., Cross 1999, 2007; Roberts 1999, 2000, 2011; Zakrzewski 2014). While this might come as a surprise to bioarchaeologists working on questions of identity, disability theorist Carol Thomas has suggested that even the field of Disability Studies (DS) has struggled with defining, understanding, and operationalizing the terms (Thomas 2004a, b). Indeed, competing theoretical perspectives adopted by DS scholars has added to the debate about the meaning of the terms impairment and disability. Before applying these terms to bioarchaeological contexts, scholars working with human skeletal remains would certainly benefit from engaging with this literature to better understand the nuances of various DS theoretical paradigms.

Briefly, as Thomas (2004a, b) describes, a primary question for DS scholars involves *how* disability comes into being. On one side of the argument, social model theorists "understand disability to reside principally in the socio-structural barriers that serve to disadvantage people with impairments" (Thomas 2004b: 22). This perspective contrasts with adherents of the post-modern or post-structural model (later referred to as the interactional model by Shakespeare 2006) which maintains "being or becoming a disabled person is about being socially constructed and positioned as such by those who can exercise power through forms of knowledge" (Thomas 2004b: 23). In other words, scholars who adopt this position maintain that individuals in positions of power (e.g., medical professionals and/or legislators) are those who levy a designation of "disabled" onto others; while social modellists assert that inherent, everyday social obstacles are disabling. These two perspectives are obviously quite distinct, and Thomas (2004a) concludes her essay by underscoring that the concept of impairment remains a debated topic in the DS literature.

Riddle (2013) contributes to the discussion of terminology by further comparing and contrasting perspectives on impairment and disability between the social and interactionalist models. According to Riddle (2013), social model adherents suggest "that impairment ought to be defined in individual and biological terms, whereas disability ought to be defined solely in terms of social creation—how impairment manifests itself socially" (25). Riddle (2013) underscores that from the perspective of social modellists, disability is purely and solely associated with the social and built environment. The model does not recognize impairment as a causal factor. Riddle (2013) contrasts this approach with the interactionalist viewpoint and suggests that these scholars propose doing away with the dichotomy altogether. Rather, Riddle (2013: 25) suggests that interactionalists regard disability "as a complex interaction between various traits inherent to a person (or one's impairment), and the manner in which those traits manifest themselves in the environment individuals find themselves (or the disabling facts of one's impairment)." In sum, perspectives on causality between impairment and disability remain a contested area of disagreement among DS scholars (Charmaz 1995; Hughes and Paterson 1997; Riddle 2013; Shakespeare 2006; Thomas 2004a, b).

Outside of academia, discussions about the use of terminology have been described as context-specific, and vary among individuals and across communities (Chap. 12). Semantic discourse has also reached the highest levels of bureaucracy with legislative bodies such as the World Health Organization (WHO), the United States Congress, the Parliament of Canada, and the Parliament of the United Kingdom ascribing specific meaning to the terms "impairment" and "disability" (Table 13.1) (Chap. 12; Cross 2007; Forber-Pratt and Aragon 2013; Gadacz 1994). For example, in 1980 the WHO defined the terms in a document titled *International Classification of Impairments, Disabilities, and Handicaps*, and later updated those definitions in a 2001 document titled *International Classification of Functioning, Disability, and Health* (*ICF*). The United States Congress defined the terms in the Americans with Disabilities Act (ADA) of 1990 (updated in 2010) as did the Parliament of the United Kingdom by enacting the Equality Act 2010[1] (Table 13.1).

Understanding nuances in terminology and appreciating the differences of various theoretical perspectives in DS on impairment and disability is a challenging task for bioarchaeological scholars. Indeed, if bioarchaeologists attempt to reconstruct this aspect of identity at all, some explicit assumptions are necessarily critical. Cross (1999, 2007) suggests that *impairment* can be identified from skeletonized remains alone while *disability* cannot. Cross (2007) notes that "in their concentration on 'fossilized disease' in the form of skeletal deformity, archaeologists dig up impairment, not disability" (191). Finlay (1999) mirrors this perspective, and cautions that scholars should be wary of interpretations which automatically link impairment with socially sanctioned discrimination. Taking the notions of impairment and disability a step further, we draw attention to the definitions presented by Kasnitz and Shuttleworth (2001: 2):

> Individuals are impaired if they experience (or are perceived by others to experience) physiological or behavioral statuses or processes which are *socially identified* [emphasis ours] as problems, illnesses, conditions, disorders, syndromes, or other similarly negatively valued differences, distinctions, or characteristics which might have an ethnomedical diagnostic category or label….Disability exists when people experience discrimination on the basis of *perceived* [emphasis ours] functional limitations.

This definition presents a marked departure from widespread bioarchaeological definitions of impairment which have relied on a strictly skeletal presentation of pathological "otherness." Kasnitz and Shuttleworth (2001) present a social component to impairment which oftentimes may be impossible for bioarchaeologists to interpret. In other words, paleopathologists and bioarchaeologists might erroneously assume that a pathological condition observable in human skeletal remains would have been met with some form of social stigma. At its most fundamental level, the definition proposed by Kasnitz and Shuttleworth (2001) reminds

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[1] Equality Act 2010 replaced Disability Discrimination Act 1995 (DDA) except in Northern Ireland where DDA still applies.

Table 13.1 Definitions of impairment and disability as presented by the WHO, ADA, and Equality Act 2010

	WHO—*ICF*	US Congress—ADA 1990	UK Parliament—Equality Act 2010
Impairment	Any loss or abnormality of psychological, physiological, or anatomical structure and function. Impairment is characterized by loses or abnormalities that may be temporary or permanent, and that include the existence or occurrence of any anomaly, defect, or loss in a limb, organ, tissue, or other structure of the body, including the systems of mental function. Impairment represents the exteriorization of a pathological state, and in principle it reflects disturbances at the level of the organ.	A *physical* impairment is a physiological disorder or condition, cosmetic disfigurement or anatomical loss impacting one or more body systems. Examples of body systems include neurological, musculoskeletal (the system of muscles and bones), respiratory, cardiovascular, digestive, lymphatic, and endocrine A *mental* impairment is a mental or psychological disorder. Examples include mental retardation, emotional or mental illness, and organic brain syndrome.	No definition given
Disability	Any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being. Disability is characterized by excesses of deficiencies of customarily expected activity performance and behavior, and these may be temporary or permanent, reversible or irreversible, and progressive or regressive. Disabilities may arise as a direct consequence of impairment or as a response by the individual, particularly psychologically, to a physical, sensory, or other impairment. Disability represents objectification of an impairment, and as it reflects disturbances at the level of the person.	A mental or physical impairment that substantially limits one or more major life activities	(1) A person (P) has a disability if— (a) P has a physical or mental impairment, and (b) The impairment has a substantial and long-term adverse effect on P's ability to carry out normal day-to-day activities

bioarchaeologists that even unmistakable skeletal pathologies may not meet the criteria to qualify as impairment in all contexts.

While bioarchaeological scholars routinely describe and document skeletal pathologies which may oftentimes qualify as impairments, particularly as they relate to previously defined definitions of the *ICF* and ADA, we caution that some DS scholars would argue that even "obvious" skeletal pathologies may not have been perceived in this way in the past. This distinction has been underappreciated in the literature and bioarchaeologists have typically imbued skeletons presenting biological "anomalies" with some form of social impairment during life (Kerr 1995; Knüsel et al. 1992; Trinkhaus and Zimmerman 1982; Wakely 1993; Wells 1982). However, Roberts (2000) argues that researchers must be wary of extracting social attitudes from the over-interpretation of physical remains, especially when archaeological data on mortuary context are lacking.

Additionally, the reality is that many forms of impairment (as defined by the *ICF* and ADA) leave no trace on skeletonized remains and are completely unobservable. Keeping in mind that bioarchaeologists rarely encounter remnants of soft tissue which could provide some additional clues to non-musculoskeletal impairments, we underscore that a majority of past contexts where impairment and/or disability were present remain undetectable. Finally, we highlight the importance of Buikstra's (2010) assertion about the necessity of the archaeological context for interpretation of impairment and disability. In ideal scenarios, bioarchaeologists generate information about archaeological context by directing or supervising excavations, but as Martin et al. (2013: 122) note, bioarchaeologists often encounter human remains which have little to no contextual information available. These poorly documented instances pose problems for bioarchaeologists who might describe what they define as a skeletal impairment but have no corresponding contextual information which would allow for a more nuanced interpretation of disability.

Buikstra (2010) maintains that contextualized archaeological data, particularly related to grave and burial location, are compulsory elements if bioarchaeologists are to conjecture about any disabling effects of skeletal impairments. The remainder of this chapter focuses on a particular case study and describes a unique mortuary context which highlights the complexities of decoupling impairment and disability in the bioarchaeological record.

An Archaeological Case Study from East Tennessee

The DeArmond Site and Burial 50

The 500 years prior to the arrival of European colonists marked a time of tremendous social complexity through the Eastern Woodlands of what is now the United States. Known as the Mississippian period, this time period spanned from A.D. 900–1600 and was characterized by agricultural crop production, nucleated settlements, and earthen platform mounds surrounded by plazas, shared iconography, and shell-tempered ceramic technology (King and Meyers 2002; Koerner 2005; Pauketat and Alt 2015; Schroedl et al. 1990; Smith 1986). Mississippian people lived in a large area which spanned across the interior Southeast, into the Midwest, the southern mid-Atlantic region, and reached as far west as the eastern Great Plains (Cobb 2003; Payne and Scarry 1998; Steponaitis 1986). Populations frequently chose to settle in river valleys due to the availability of natural resources (Smith 1978). Furthermore, many Mississippian communities, such as the one we discuss in this chapter, developed mortuary programs which included burial in platform mounds. These mounds have been the subject of large-scale archaeological excavations (Steponaitis 1978, 1986).

The skeleton we describe here was recovered as the result of a large federally funded archaeological project under the auspices of the Tennessee Valley Authority (TVA) and Works Progress Administration (WPA). These projects were initiated in 1933 as part of President Franklin D. Roosevelt's New Deal program, and were funded until 1941 when the United States government ceased subsidizing WPA projects and shifted federal resources to the war effort (Milner and Jacobi 2006; Sullivan 2006b). The main impetus behind the TVA/WPA projects was to control flooding and soil erosion through a system of reservoirs on the Tennessee River, and to bring electricity to the Tennessee Valley by building hydroelectric power plants in conjunction with the dams. William Webb, a physicist and avocational archaeologist at the University of Kentucky, led the successful effort to get the federal government to use WPA labor to do salvage archaeology on the sites that would be lost forever due to the inundation necessary for the power facilities (Milner and Jacobi 2006). These excavations resulted in the recovery of thousands of skeletons and artefacts at sites scheduled to be inundated from several southeastern states including Alabama, Kentucky, and Tennessee. A history of the TVA/WPA excavations in Tennessee can be found in Dye (2016), as well as an account of the excavations conducted for the Watts Bar Reservoir project, which included the DeArmond site (Koerner and Dalton-Carriger 2016). The DeArmond site, named after the twentieth-century family who farmed the land, is the location of the case study presented in the remainder of this chapter.

The DeArmond site was located in Roane County, Tennessee (Fig. 13.1). It consisted of an earthen pyramidal mound with an adjacent village, both dating to the Mississippian Period, and was located on the bank of the Tennessee River (Koerner 2005). Excavations were undertaken prior to the site's inundation by the Watts Bar Reservoir in 1942 (Fig. 13.2) (Koerner 2005). Of the six occupational levels of the mound, the individual of interest here (Burial 50[2]) was one of 77 burials[3] in the uppermost level and dates to A.D. 1300–1500 (Koerner 2005). Burial

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[2] "Burial 50" was the designation applied to this individual during the excavation in 1940.

We recognize that an individual is *associated with* the burial rather than the burial number being the *identifier of* the individual. However, the individual is referred to throughout the text as "Burial 50" in the interest of being succinct.

[3] Two Stage B burials contained two individuals; therefore, the total number of individuals recovered from Stage B was 79 (Koerner 2005).

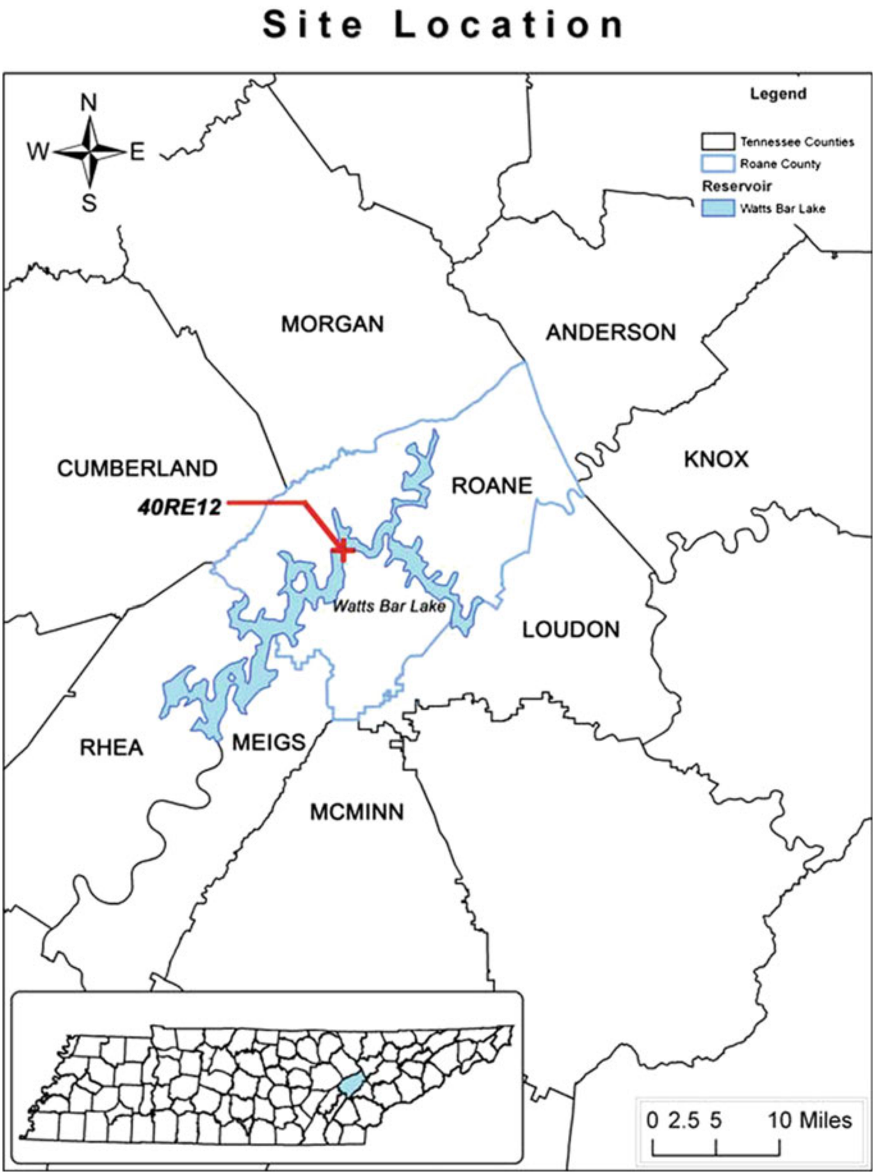

Fig. 13.1 Location of the DeArmond Site in East Tennessee (from Koerner 2005, p. 2) (Presented courtesy of Shannon D. Koerner)

50 was excavated on August 2, 1940 and represents the remains of an edentulous middle-aged or elderly adult female individual (DiGangi et al. 2010). She was buried in a partly flexed position, with her head oriented to the northwest and her

Fig. 13.2 DeArmond Mound prior to excavation in 1940, facing north. Image from the WPA/TVA Archives, presented courtesy of McClung Museum of Natural History and Culture, The University of Tennessee

Fig. 13.3 In situ photograph of the individual interred in DeArmond Burial 50. Note the shortened left femur and right humerus. In addition, one effigy vessel is visible underneath the left ankle. Image from the WPA/TVA Archives, presented courtesy of McClung Museum of Natural History and Culture, The University of Tennessee

body supine, with her knees to the right and her hands placed over the right side of her chest (Fig. 13.3).

As described by DiGangi et al. (2010) and summarized here, Burial 50 presented a rare pathological condition which resulted in marked asymmetry between her right and left femora and humeri. Her right humerus was 82 mm shorter than the left humerus and the left femur was 58 mm shorter than its complement (for images see DiGangi et al. 2010). According to DiGangi et al. (2010), the condition most likely responsible for these limb-length discrepancies is a rare cartilaginous dysplasia called enchondromatosis (for differential diagnoses refer to DiGangi et al. 2010).

Enchondromatosis is characterized by the presence of multiple benign cartilaginous tumors (enchondromas) located in the growth plates of the long bones, especially the femur, tibia, and fibula, but several other bones, including those of the pelvis, metacarpals, metatarsals, phalanges, and skull base can also be affected (D'Angelo et al. 2009; Sunny et al. 2016). Due to the location of these tumors at the metaphysis, they can impede normal growth and result in limb shortening and deformity (Pannier and Legeai-Mallet 2008; Silve and Jüppner 2006). Pathological fractures and limb angulation are also common signs (Tiet and Alman 2003; Pannier and Legeai-Mallet 2008). The disease is commonly asymmetrical but bilateral (Aufderheide and Rodríguez-Martín 1998; Kaibara et al. 1982; Silve and Jüppner 2006). The disorder is not hereditary and is caused by a somatic error in endochondral ossification during development (D'Angelo et al. 2009). It appears during the first decade of life, and can resolve as the growth plates fuse, due to cartilage in the metaphysis being replaced by mature bone (Silve and Jüppner 2006; Tiet and Alman 2003). Further, there are several types of enchondromatosis (Kumar et al. 2015). The type most relevant to this case is known as Ollier disease, which in addition to asymmetric location of the enchondromas, is characterized by limb-length discrepancy and gait issues among other signs (D'Angelo et al. 2009; Kumar et al. 2015; Wejjakul et al. 2013).

DiGangi et al. (2010) determined that enchondromatosis was the most likely candidate in the differential diagnosis for the asymmetric limb shortening pathology, even though other common signs, such as affected hand and foot bones and pathological fracture of affected bones were not observed. However, this may be related to the skeletal preservation in this case. While most of the metacarpals (9 of 10) and all ten of the metatarsals were recovered, less than half of all hand and foot phalanges (20 of 56) were recovered and present with the rest of the skeletal remains.

In addition to the pathology affecting the humerus and femur, the tibiae of the individual associated with Burial 50 demonstrate depressed surfaces in the region of the tibial tuberosity consistent with Osgood–Schlatter's disease (DiGangi et al. 2010). The quadriceps muscle, the major extensor of the thigh, converges into a single tendon inserting on the patella, and in a continuous line from the patellar ligament inserts into the tibial tuberosity. Osgood–Schlatter's disease occurs when part or all of the unattached epiphysis for the tibial tuberosity is avulsed by a recurring strain or microtrauma from the patellar ligament originating from the quadriceps muscle (Dunn 1990; Gholve et al. 2007; Ortner 2003). Common to both sexes, it occurs during the pre-adolescent years (8–13 in girls, 10–15 in boys) and is bilateral about a quarter of the time (Scotti et al. 1979). Following avulsion, the anterior metaphyseal area of the tibia will develop a characteristic concave or depressed surface (Aufderheide and Rodríguez-Martín 1998; Ortner 2003).

The disease is typically seen in children active in sports-related behaviors (DiGangi et al. 2010; Dunn 1990), and most cases will resolve once skeletal growth of the knee is complete (Çakmak et al. 2014; El-Husseini and Abdelgawad 2010).

Mortuary Context of Burial 50

As argued in this chapter, in order for bioarchaeologists to begin interpreting both impairment and disability, a nuanced understanding of the archaeological context is compulsory. In the case of Burial 50, an analysis of Stage B burial demographics and associated material culture help provide some insight into the question of whether or not this individual experienced disability during her lifetime. For example, the composition of the Stage B burial assemblage suggests that burial in the mound was not limited to particular cohorts of community members or that Burial 50 was segregated from others at the time of her death. Of the 51 individuals who could be identified as to sex, 36 are male and 15 are female (Koerner 2005; Smith 1990). Of the individuals for whom skeletal age data are available, 58 individuals are adults, 13 are adolescents, two are children and one is an infant (Koerner 2005; Smith 1990). The burial population in this level thus is skewed toward males and adults, as is the case with many Mississippian mounds (e.g., Anderson 1996; Hatch 1976; Peebles 1974; Sullivan 2001, 2006a).

Twenty-nine burials were oriented to the southwest and an additional 21 were oriented towards the northwest. About 55% (n = 44) of all Stage B individuals were interred with grave offerings (Koerner 2005). Nine individuals contained graves with ceramic vessels, and of these, five were adults, three were young children, and one was an infant (Koerner 2005). Four of the nine individuals interred with pots could be sexed as female, and two as male (Koerner 2005). This pattern of females more often interred with pottery than males is typical for the time period of the region (Hatch 1976; Lewis et al. 1995; Sullivan 1986). Interestingly, the only shell-tempered ceramic vessels with effigy were recovered with Burial 50. One of these was a human effigy bowl placed directly under her left lower limb at the ankle; and the other was a frog effigy bowl placed to the southwest of her flexed right knee (Koerner 2005). While Burial 50 was the only individual interred in the DeArmond mound with effigy-modeled vessels, these types of ceramics are not uncommon in Mississippian mortuary contexts and have been recovered from numerous sites in East Tennessee and around the Southeast in general (Hatch 1976; Lewis et al. 1995; Power 2004).

Discussion of Burial 50s Impairment and Disability

The skeletal data observed in the case study of Burial 50 presents a unique opportunity for bioarchaeologists to grapple with the concepts of impairment and disability. As discussed previously in this chapter, scholars from DS have not reached consensus on the meanings of these terms. While debates about terminology continue among academics, legislative bodies, and disability advocacy groups, the terminology used here is consistent with that defined by the *ICF* and ADA and other scholars who have worked on this question (e.g., Cross 1999, 2007). It is suggested here that bioarchaeologists do have some ability to infer impairment through careful paleopathological observations. Indeed, if *ICF* and ADA frameworks are followed, paleopathological diagnosis of the cartilaginous dysplasia described in Burial 50 meets the definition of *impairment*.

Symptoms involved with enchondromatosis (the likely condition responsible for the asymmetric femora and humerii lengths) include localized pain and swellings and difficulty walking, or limping (if the legs are affected) (D'Angelo et al. 2009; Kumar et al. 2015; Silve and Jüppner 2006; Sunny et al. 2016). Further, the only modern treatment available is surgical intervention to remove the benign tumors and/or to induce remodeling and growth in any shortened limbs using one of a variety of modern orthopedic surgical techniques (D'Angelo et al. 2009; Sunny et al. 2016; Wejjakul et al. 2013).

Osgood–Schlatter's disease presents in pre-adolescence with pain, swelling, and tenderness in the region of the tibial tuberosity (Bloom and Mackler 2004; Çakmak et al. 2014). Modern treatment involves activity modification, quadriceps strengthening, ice, anti-inflammatory medications, and surgery in extreme cases (Bloom and Mackler 2004; Dunn 1990; El-Husseini and Abdelgawad 2010). It may take years to resolve completely, and while the long-term outcome of the disease is favorable, some individuals will maintain chronic knee joint mobility limitation (Bloom and Mackler 2004; Çakmak et al. 2014; Krause et al. 1990). For example, a modern study demonstrated that college-age athletes having a history of Osgood–Schlatter's disease in their early teens performed worse on knee mobility and sports activity surveys than athletes with no history of the disease, and this difference was statistically significant (Ross and Villard 2003). Considering the clinical literature and the individual of interest's femoral length discrepancies, as well as the bilateral presentation of Osgood–Schlatter's disease on her tibiae, Burial 50 would have experienced decreased mobility as compared to her peers without such leg length discrepancies or tibial tuberosity avulsion (i.e., gait restrictions due to the asymmetric femora, and possible chronic unilateral or bilateral knee flexion limitations). At the very least, there would have been times during her life when her knees and possibly shortened femur and humerus caused pain.

Moreover, by understanding the functional limitations which accompany asymmetric limb lengths, as well as recognizing the developmental component of her musculoskeletal impairment (i.e., this is an impairment which manifested itself during her childhood), this individual negotiated and managed her impairment throughout her life. She would have almost certainly experienced reduced or at least restricted locomotion of both her affected upper and lower limbs, especially due to the pain that often accompanies enchondromatosis and Osgood–Schlatter's disease (e.g., Bloom and Mackler, 2004; D'Angelo et al. 2009).

However, this interpretation is a modern perception of impairment on Burial 50 herself and the whole of the DeArmond community. Following Kasnitz and Shuttleworth (2001), it is worth noting that Burial 50 (and her contemporaries) may not have perceived her limb length differences in the same way that we are, even in spite of her unequivocal physical differences. While this is the case, we caution that if this perspective is adopted in every instance of observable skeletal paleopathology, bioarchaeologists will severely limit their ability to interpret this aspect of identity and would be unable to consider how community members interacted with people with physical impairments.

Turning to a discussion of Burial 50 and disability, we call attention to terminology defined by the *ICF* and ADA. A common theme between these statutes concerns the way in which impairments hinder day-to-day activities. In this case study from the DeArmond community, we can imagine a scenario in which the individual associated with Burial 50 did experience a restriction in performing major life activities involved with the use of the lower limbs (i.e., walking, running). Despite these skeletal impairments (to use the *ICF* and ADA definitions) which clearly indicate that Burial 50 would have presented visible physical differences to other DeArmond community members, her mortuary treatment does not suggest marked differentiation from others (DiGangi et al. 2010). Her manifestations of reduced upper and lower limb lengths, and subsequent mobility and gait restrictions do not appear to have ostracized her from individuals with typical limb morphology, given that her burial treatment was not atypical. It is necessary to emphasize this point, underscoring that Burial 50 had atypical physical dimensions throughout most of her life, beginning in childhood. Other DeArmond community members would have certainly observed her movement restrictions; however, we will obviously never know how Burial 50 perceived her own mobility and how community members would have interpreted her unique and different gait. Whether or not the ceramic effigy vessel placed under the left ankle of Burial 50 offers some insight into community members' perceptions of her differences or is sheer coincidence, remains unanswerable.

As described by DiGangi et al. (2010), the inclusion of Burial 50 with other Stage B interments suggests that she was not spatially segregated from the community and that her burial in the platform mound afforded her mortuary treatment less commonly observed among females. Previous work which has developed a model for Mississippian mortuary contexts in Southern Appalachia proposes that the burial of females in mound contexts is less common than for males and may suggest importance at the community or town organizational level of an individual, as opposed to kinship group or clan leadership (Sullivan 2001, 2006a, b; Sullivan and Rodning 2001). For example, an analogous distinction is made in early Cherokee society between male chiefs who broker trade and other intercommunity political relationships, as contrasted with the (matrilineal) clan and kinship group leadership positions held by senior women (Rodning 1999; Sullivan and Rodning 2011). These gendered distinctions are reflected in spatial distinctions in grave placements; male community leaders were buried in or near the community structures associated with male leadership roles, including mounds and council houses, while senior females who served as kin group leaders were interred in the houses of their respective kin groups (Rodning 1999; Sullivan and Rodning 2011). Following this ethnohistoric analogy and derived model for Late Mississippian groups in Southern Appalachia, Burial 50s mortuary context was a place more suggestive of a role of community as opposed to kinship leadership (Sullivan 2006a; Sullivan and Rodning 2011). However, it is difficult to speculate as to what this role might have been. This is despite Burial 50's age and skeletal manifestations of reduced upper and lower limb lengths and subsequent mobility restrictions.

A recent contribution by Kamnikar et al. (2015) described a contemporaneous Mississippian context at the Upper East Tennessee site of Holliston Mills. In this case study, Kamnikar et al. (2015) described the burial of an adult female impaired by chronic treponemal disease. Contextualized mortuary data found no differences in her burial treatment with regard to spatial segregation or variance in the distribution of artefacts recovered in a large sample of 660 burials.

While Burial 50 as well as the woman from Holliston Mills were interred in contexts with other adults lacking congenital musculoskeletal impairments, we must remain tentative about inferring too much about their experience with disability across their entire life course based on mortuary context alone. We do not want to suggest or assume that Burial 50 would have never experienced disability or felt disabled at times throughout her life. In this regard, we echo Cormier and Buikstra (Chap. 12) who highlight this point and suggest that bioarchaeologists remain cautious even when mortuary data do not indicate marked differences between persons presenting musculoskeletal impairments and those whose skeletal morphology appears unaffected.

A related point that needs to be addressed is instances where mortuary treatment of individuals with musculoskeletal impairments differs from that of the majority of community members. For these contexts, we pose a question to the readership of this chapter: What, if anything, do these contexts tell us about the experience of disability in the past? As was discussed by DiGangi et al. (2010), the mortuary treatment of Burial 50 was quite different from two individuals with congenital achondroplastic dwarfism at the Moundville site, a large Mississippian mound center in Alabama. One individual was male and one was female, and both were found buried face down (Fig. 13.4) (Jacobi 2002; Snow 1943). Jacobi (2003) relates the prone burial of the achondroplastic individuals to a worldwide custom in which prone burial signifies individuals whom the living did not want to return. Therefore, it is suggested that this example of prone burial fits the criterion of a deviant burial, as defined by Tsaliki (2008). While we do not wish to overreach by implying that all individuals who faced disability would have been buried in a deviant manner (see Tsaliki 2008: 3), we suggest that comparative analysis of burial positioning provides a framework for continued discourse on utilizing contextualized mortuary data to better understand impairment and disability in the bioarchaeological record. Finally, we suggest that bioarchaeologists might find useful the detailed ethnographic literature which may enrich contextualized archaeological mortuary data. For example, Murphy (2000: 75) suggests that the differential burial of individuals of “unusual” appearance is known from a variety of ethnographic

Fig. 13.4 In situ photograph of male individual from Moundville presenting achondroplasia. Note prone burial position. Image from Snow (Snow 1943, p. 9). Photograph by Walter B. Jones. Courtesy of the University of Alabama Museums, Tuscaloosa, Alabama

contexts; and Raji and Hollins (2000) have described contexts where people with intellectual disabilities are oftentimes excluded from participating in funerary rituals.

Conclusions

This chapter outlines the complexities of defining and applying the terms *impairment* and *disability*. Bioarchaeologists who are interested in working on this aspect of identity should explicitly define these terms before drawing conclusions from visible skeletal pathologies indicative of musculoskeletal impairment. Modern frameworks such as the *ICF* and ADA are helpful for understanding the ways in which a host of skeletal impairments restrict major life activities, however, modern concepts related to these restrictions may have little to no application in past bioarchaeological contexts. While there is evidence that Burial 50 from the DeArmond site in East Tennessee had several musculoskeletal impairments, no mortuary evidence suggests that her body was stigmatized after death. Rather, she was provided mortuary treatment not out of line with other members of her community, though fewer females typically are interred in platform mounds in Southern

Appalachian Mississippian mortuary contexts. We conclude with a cautionary note to bioarchaeologists to carefully consider context before equating visible skeletal pathologies with impairment and extending that interpretation to include disability. In addition, we note that even well-contextualized mortuary data nevertheless may be insufficient to truly understand the scope of disability experienced by people in the past.

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Chapter 14

Anglo-Saxon Concepts of Dis/Ability: Placing Disease at Great Chesterford in Its Wider Context

Sonia Zakrzewski, Stephanie Evelyn-Wright and Sarah Inskip

Within bioarchaeology, the terms disability and impairment commonly have been used without critical evaluation and the link to the material body has rarely been clearly delineated. This paper focuses on a specific case study of a burial cluster identified at the cemetery site at Great Chesterford, Essex, in order to develop an understanding of disability within the early Anglo-Saxon period. Our aim was to synthesize the paleopathological evidence from this context with ideas and perspectives yielded from wider archaeological and historical sources in order to understand how (and indeed whether) disability was constructed in these early Anglo-Saxons.

Impairment, Disease, or Disability?

According to the World Health Organization (WHO), disability is an umbrella term, covering: impairment, limitation on activity, and restriction on participation (WHO 2011). An "impairment" is a problem in bodily function or structure. An "activity limitation" is a difficulty encountered by an individual in executing or undertaking a task or action. A "restriction on participation" is a problem experienced by a person in their involvement in everyday life situations. Following this definition, disability is a complex palimpsest, reflecting the interaction between a person's body and the society in which they live.

S. Zakrzewski (✉) · S. Evelyn-Wright
Archaeology, University of Southampton, Southampton SO17 1BF, UK
e-mail: S.R.Zakrzewski@soton.ac.uk

S. Evelyn-Wright
e-mail: sw20v07@soton.ac.uk

S. Inskip
Faculteit Archaeologie, Universiteit Leiden, Leiden, The Netherlands

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Disability itself, however, is understood in different ways across academic disciplines (see discussion in Masala and Petretto 2008). Within medicine, disability has been constructed in terms of medical reductionism. In contrast, social scientists have usually followed a social model of disability (Thomas 2007). The medical model views disability as a personal medical "tragedy" which needs to be cured or controlled (Cross 1999). Alternatively, the social model of disability states that disability is not caused by impairment, but rather from the social restrictions placed upon individuals with bodily impairment (Oliver 1983). As a result, medical sociologists theorize both chronic illness and disability in terms of social deviance (Thomas 2007). This focus comprises both aspects of the impaired body and the lived experience. In this sense, a disability is simply a form of limited activity, and hence a disabled person is someone who has a medically certifiable condition preventing them from carrying out the full "normal" range of age-related activities (Thomas 2007). In this chapter, the definitions introduced by the social model of disability are used, whereby physical impairment equates to the medical or anatomical phenomenon, and the term "disability" describes a social construct. In this sense disability is culturally specific, and thus variable both temporally and spatially. Following Thomas (2007), in this chapter, disability is considered to be an age-related and universal phenomenon, following the interactional model of Shakespeare (2006). Shakespeare's model argues that disability cannot be disjoined from impairment: this contrasts with the social model in which disability is not linked to impairment, but rather results from social barriers. This means that importance must be placed upon living with "illness" with specific focus placed on *both* the individual *and* their close relations, their context and any associated change in circumstances (Zakrzewski 2014).

Dis/Ability: Deviance, Liminality, and Mediation Through the Body

A human body is a social interface. Each person knows and interacts with the world and its occupants through their own unique body. Simultaneously one is interacted with, recognized and defined through that body by others. Therefore one's experience of life, and other people's experience of oneself, is shaped by one's own body. Given that experience of life is mediated through the body, Metzler has argued for a study of the "lived experience" (2013: 1). Indeed social theorists consider that the body is the unit of social interaction (Goffman 1990 [1963]; Shilling 2012), and "[o]ur lived embodiment provides a basis for theorizing social commonality, social inequalities, and the construction of difference" (Shilling 2012: 24).

Despite rejecting the social deviance model, Murphy (1990) views disability as a state of liminality, whereby the person is excluded from ordinary life and is denied the full expression of "being human." As such, the disabled person is outside the formal social system. This construction of disability is built upon "being" as an embodied phenomenon, with meaning residing *in* the body and the body itself residing *in* the world (Merleau-Ponty 1962), and thus meaning being mediated through that body and its lived experience. The boundary between disabled and able-bodied is not binary, but, as demonstrated from clinical research by Davis et al. (2012), is rather fluid.

The acting out of roles is vital to the construction of a person's own self-identity (Goffman 1990 [1963]). Following this argument, social stigma can arise depending upon how the body mediates the self-identity/social identity relationship. Embarrassment reveals a gap between a person's *virtual* identity, how they see themselves, and their *actual* social identity, or how others see them (Goffman 1990 [1963]; Shilling 2012). Goffman's argument is that this leads to social stigma. One might argue that, in the modern world, this viewpoint is demonstrated by the amount of work that an individual with disability might have to do in order to be accepted as a full member of society. Following this perspective, individuals who deviate from modern normative identities can be made to feel alienated as a result of their appearance and/or actions. Indeed negative views of disability, or disabilism, develop this viewpoint and stress that the relative degrees of need, care or dependency, may lead to individuals being ascribed a childlike status. The varying configurations of needs are thus given primacy at the expense of the social individual, thereby revolving back to the social model of disability (Thomas 2007). Such an approach, however, implies a clear and close link between a person's *virtual* social identity and their *actual* social identity (Shilling 2012), and implies an able-bodied norm (Shakespeare 2006).

The perceived impaired body also may be socially constructed and mediated. If the embodied "difference" comprises the "impairment," then the external reaction to such impairment is the "disability" (Tremain 2002). Indeed Tremain (2002) develops this argument further to consider impairment and disability to be viewed in the same way as sex is to gender. This socially constructed view of disability permits being "disabled" to be viewed as simply a point upon a continuum of ability rather than as a binary opposition to able-bodied. One can be born and die and remain at a point on the spectrum of dis/ability. Alternatively, one's place can vary along the spectrum over the course of a life time. This notion places the focus upon the body itself and its experiences, including being in pain and experiencing chronic illness (Thomas 2007). In this way, disability and being disabled are not an inevitable consequence of impairment but are necessarily linked to the body only because the physical body is the means by which life is experienced. "Writers on disability demonstrate how individuals can struggle simultaneously with the limitations and problems of their own bodies, while being visible to others on the basis of these disabilities and invisible to them as full human beings occupying a range of social roles" (Shilling 2012: 219).

The duration of disability may be of importance when understanding its social construction. Chronic conditions, including long term, recurring or permanent diseases, can be both impairing and disabling. During the high medieval period, it appears that the distinction between transitory and chronic disorders was blurred (Demaitre 2013). The question therefore arises as to whether the relative permanence of an impairment was of importance in defining disability in past human groups. Conversely, how long must the duration of a transitory impairment be for it to be considered as disabling? In the UK today, the Equality Act of 2010 clearly, if arbitrarily, demarks a disability as being over one year in duration. But what was the situation in the past? During certain periods of life, a person may experience temporary restrictions on their ability to undertake certain activities (Zakrzewski 2015). Following a long bone fracture, the limb requires stabilization and hence mobility is reduced, which could potentially affect the individual, their family and (through social or economic interactions, or lack thereof) the entire local community during the recovery period. Another example might be pregnancy, a time when the mother typically has to alter her behavior in order to ensure the well-being of the infant. Pregnancy can impinge on mobility, through symphysis pubis dysfunction. One could argue that the historic process of “lying in” entailed the social exclusion of the mother and therefore constitutes a clear example of a disability under the social model. Following childbirth, the woman is likely to return to full mobility and full social integration and thus no longer experiences this “disability,” but may still retain some restrictions on participation or activity resulting from caring for a young child or nursing that infant. This is a thought-provoking example because, of course, pregnancy is a completely expected and normal process for a woman to experience and yet we would argue could still be, by our definition, disabling. During these periods, the (temporarily) disabled individual might occupy a specific liminal position within the society, being neither a fully active and participating member of the community, nor separate and excluded, but yet remaining an integral part of that social grouping. Zakrzewski (2015) has previously argued that it is the way in which the society treats such changes that are important in understanding the fluid relationship between society and disability and that we should think in terms of a continuum of ability, with individuals moving backwards and forwards along it at differing life stages. Similarly, it is worth considering the lack of current understanding that surrounds invisible disability, and especially chronic pain (cf. Bourke 2014). In the modern world, chronic pain may be treated and kept in some sort of check, but such mechanisms to modify hidden or invisible disabilities did not necessarily exist in the early medieval period.

The paleopathological record is clearly an imperfect record of impairment, as not only are many such conditions invisible in the skeletal record, but excavated samples are obviously incomplete records of past populations (Waldron 1994a, 2007). Roberts (1999) has previously considered the difficulties in identifying disability within a paleopathological framework. Issues raised include modern concepts of disability being different from past understandings, complications in assessing what abnormalities in skeletal record may have been disabling to the individual concerned, difficulties in assessing the impact upon the society in which that individual lived, problems with interpreting textual or other sources to obtain population disease prevalences, and contentions with the archaeological record for caring and compassion. The social implications of care provision have been considered (Tilley and Oxenham 2011), but difficulties remain. Tilley and Cameron (2014) attempted to redress this through the development of an “Index of Care” system of analysis, whereby their application provides worksheets and guidance on how data should be collected and analyzed if there is some evidence of potential impairment and/or disability. It is still imperative, however, to remember that the "survival" of individuals with disabilities or impairments cannot be directly assumed to result from compassion (Dettwyler 1991). Bodily deformity, such as resulting from tuberculosis or leprosy, need not necessarily be disabling (Roberts 1999), and the pain experienced will vary significantly (see discussion in Roberts 2000 and Bourke 2014). Furthermore, it is the skeletal or bodily impairments, such as joint disease or arthritis, rather than disability, that are excavated and studied (Cross 1999), and subsequently a concept of disability must be developed, such as by using the Index of Care system (Tilley and Cameron 2014). Finally, it is crucial to consider that conditions that are not disabling in modern Western life, such as myopia (short sightedness), would likely have had a much greater impact upon *both* the individual *and* the society in which they lived during the Anglo-Saxon period.

Great Chesterford

Great Chesterford is a fifth–seventh-century Anglo-Saxon cemetery in Essex, which was excavated in 1950s. The site was originally discovered as a result of commercial gravel digging. As a result of the Anglo-Saxon items recovered, excavation was undertaken on behalf of the Inspectorate of Ancient Monuments by Annable and then Evison (Draper 1986; Evison 1994). The site itself is located near a Roman town (Fig. 14.1), and despite the destruction of about 100 Anglo-Saxon graves by the gravel digging, the cemetery, as excavated, includes inhumations, cremations, disturbed burials, and animal burials (Inskip et al. 2015; Waldron 1994b). The site was used during the period over which the transition to Christianity occurred. As a result, some burials included grave goods such as spears, buckles and ceramic vessels.

Grave goods found at the site include swords, spears, shield bosses and a wide variety of jewelry. The jewelry included numerous types of brooches including: square headed, radiate, cruciform, saucer, disc, annular, and penannular. Beads, both monochrome and polychrome, were found in the majority of graves associated with females. A range of containers including both decorated and undecorated ceramics, glass vessels, bronze bowls, and buckets were also found. Knives were found in many graves, usually located near the left leg for females and near the waist for males. No indisputable wood traces of coffins were found, although a number of graves contained nails in the fill (Evison 1994).

Anglo-Saxon Burial Rites

The early Anglo-Saxon period burial rite is characterized by strong patterns pointing toward fairly rigid burial standards. For example, provision of grave goods has been found to correlate strongly with the gender identity of the interred

Fig. 14.1 Map of England locating Great Chesterford and other sites mentioned in the text

(Stoodley 1999), so much so that in some past excavation publications, sex has been assigned to the skeletal remains solely on the grounds of their gendered grave goods. The efficacy of this practice is obviously problematic. Within this backdrop of rigid burial norms, a so-called "deviant burial" could send a strong message as to the interred individual's identity and this has been a very strong theme within Anglo-Saxon academic discourse.

Reynolds (2009) has argued that one might use burial rite as the prime indicator in order to identify deviant status within the Anglo-Saxon period, while remembering that deviancy comprises a wide range of differences in social category. Reynolds (2009) focuses upon prone burial as an indicator of special treatment of the corpse, and this has commonly been understood to mean deviancy. Later, during Christian periods, burial away from consecrated ground would clearly demarcate some form of deviant burial practice. In a eleventh–twelfth-century Norfolk cathedral cemetery (North Elmham), an individual with a "chronically distorted left knee" was buried with their head to the east, breaking the normative Christian practice of the head to the west (Reynolds 2009: 228). This man was also buried just beyond the boundary wall of the churchyard (Hadley and Buckberry

2005). At the same cemetery, an adult male, with blade injuries to his body suggesting execution, was buried under the cemetery boundary wall (Hadley and Buckberry 2005: 145–146). Similarly, a man with "malformed legs" is said to have been buried on a hilltop in Hampshire (Fitzpatrick et al. 2001: 219), and has been argued to be an example of deviant burial practice (Reynolds 2009). The deliberate removal of body parts, by amputation, is accepted as an early Anglo-Saxon indicator of deviant burial (Reynolds 2009), although few have been identified skeletally from the period (Buckberry 2014). The rite has normally been interpreted as either the result of surgery or as punishment (Roberts and Cox 2003; Reynolds 2009). It is notable, however, that at least from later periods where there is wider evidence of the practice occurring, some individuals show clear evidence of healing after their amputation. Covering a corpse with stones, either small or large in size, is relatively rare in early Anglo-Saxon cemeteries, but Reynolds (2009) has demonstrated that it is the second most popular form of deviant burial rite. Indeed, Reynolds has identified examples in which individuals are buried prone and covered with stones or pebbles, and also individuals who had experienced amputation and had their burial covered with stones. Although not clearly associated with either "deviant" or burials of apparently "different" individuals, this funerary practice continues in the later Anglo-Saxon period, with stones, and indeed other items, deliberately placed on or around the body (Hadley and Buckberry 2005).

Aspöck (2015) has argued that deviant burial analysis leads to unhelpful binary dichotomies being created between "deviant burial" and "the norm." She states instead that there is evidence for a series of practices that were utilized and deemed acceptable depending on the individual concerned (Aspöck 2015: 105). Aspöck (2015) and Reynolds (2009) both claim that crouched burials, a widespread rite during the early Anglo-Saxon period, should not be considered deviant but rather should be considered within the range of "normal" but that this burial position might be symbolically or socially meaningful. Aspöck (2015) goes on to suggest that crouched graves could have been created as a result of an active choice to facilitate a body within a child-sized grave pit. This has been suggested to symbolize a non-adult social status on the interred, potentially as a result of impairment. It is important to note that this is not necessarily a negative viewpoint regarding the person interred.

As mentioned earlier, the position of the body geographically has importance in terms of inclusion and exclusion of an individual in a cemetery ground or a particular type of cemetery such as an execution cemetery. However, the position *within* a cemetery could also be important. Burial clustering is also a well-attested theme within Anglo-Saxon burial practice. Hadley and Buckerry note that "*where* a person was buried as much as *how* [they were buried] appears to have been important… [and that this] may also have been used to convey messages about … social status" (2005: 125). In this sense, the dead and their environment have a reciprocal relationship. The presence of a specific person within a particular part of a cemetery could serve to define the space as well as enhance their own status (Devlin 2015). Age at death was certainly a factor in the location of a burial plot, as shown in the middle Anglo-Saxon cemetery of Winnall II, Hampshire (Aspöck

2015), later Anglo-Saxon cemeteries in Lincolnshire and Yorkshire (Buckberry 2007; Hadley and Buckberry 2005), and indeed also at Great Chesterford (Evison 1994). What is particularly interesting is the pattern picked by Lee (2008) of the association of children with some adults exhibiting paleopathology such as leprosy at Beckford, Hereford, and Worcester. This evidence has been used to infer a childlike status on those adults and it is this theme that will be discussed further later on in the discussion of Great Chesterford.

This analysis is focused on the central portion of the cemetery where there appears to be a group or potential cluster of burials of atypical individuals (see Figs. 14.2 and 14.3). The cluster of importance to the argument here comprises an individual with leprosy (GR96), two with tuberculosis (GR4 and GR128), three with other vertebral pathologies (GR92, GR97, and GR157), two with cranial trauma (GR 93 and GR 101), and a female potentially buried in association with an infant (GR 127). Furthermore, there is a concentration of graves nearby of juveniles, some of them also exhibiting clear paleopathology. This is not to say that this is the only area of the cemetery in which juveniles or adults with skeletal pathologies are found, but rather is simply an area in which there is a greater than expected concentration of such individuals. For this cluster, the notion of deviant burials would seem unsuitable. Deviancy has often been associated with a marginal position in a cemetery, but at Great Chesterford the cluster has a central location. It would seem therefore this does not reflect a desire to exclude or marginalize these individuals, but perhaps to represent them as a group identity. The meaning of such a cluster will now be discussed with reference to four key themes: liminality, visibility, etiology, and relationship of disability with gender and age.

Liminality

Liminality may be a useful concept when discussing past medical notions of physical impairment. The disabled person may be considered to be in a liminal state, neither ill, nor healthy. Liminality should not be directly equated with either marginality or exclusion, or indeed inclusion, but instead describes the in-between phase in which impaired people may find themselves. Such individuals are *between* normatively fixed positions, such as healthy or ill, rather than *outside* of traditional structures, such as social systems (Metzler 2013). This approach recognizes the distinctions between impairment, disability and illness, and considers that not all impaired people would have been treated as either disabled or ill over this time period. At least during the later high medieval period, contemporary concepts of health and disease show that the impaired body was considered to be neither sick nor healthy. According to the medical thinking of the time, the course of an illness would be to either improve, in which case the patient became healthy, or get worse, in which case the patient died (Metzler 2013). Following this model, the disabled person does not fit either of the healthy/ill categories, but instead is in a liminal position between the two states.

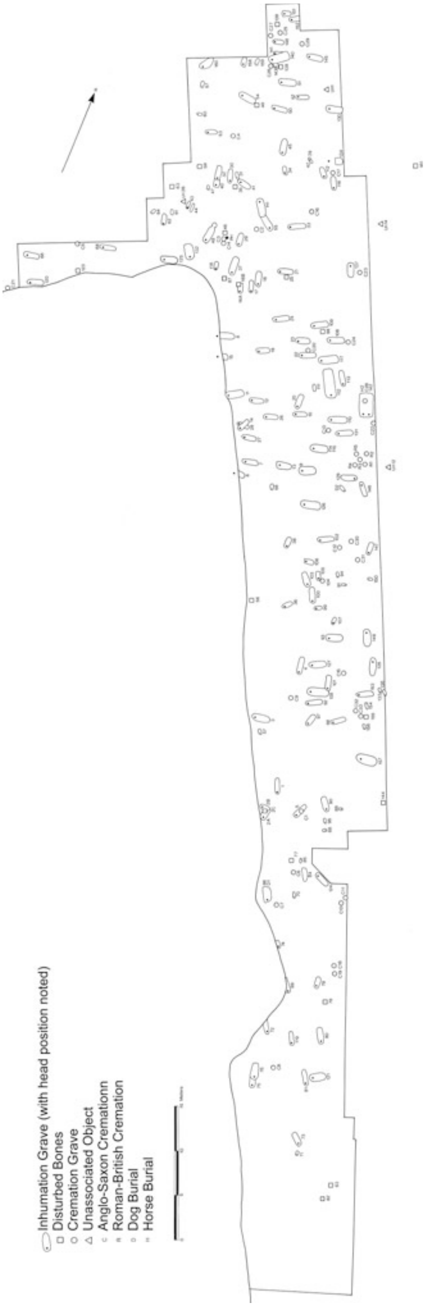

Fig. 14.2 Plan of excavated cemetery. Modified after Evison (1994)

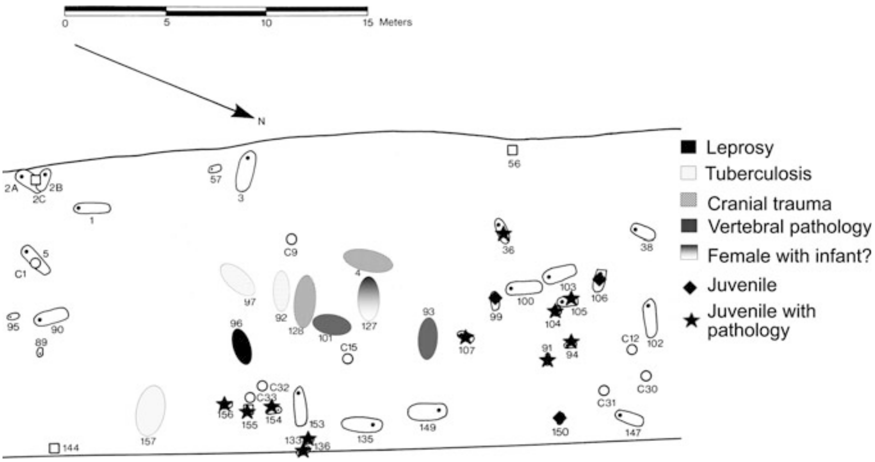

Fig. 14.3 Cluster of burials in central portion of cemetery, indicating major skeletal pathologies identified

Many of the individuals represented in the cluster discussed could be perceived in this way. Diseases such as tuberculosis and leprosy were untreatable and long term, meaning that the individual lived with their impairment and this became their norm for life. In this way, one could perhaps argue that they were perceived as neither healthy nor ill, and therefore in some in-between position. Furthermore, at Great Chesterford, a contrasting example of this liminality could be in the form of grave GR127, containing the buried remains of a female and infant. The infant has been aged as having died during or very soon after birth. It is therefore not a big leap of speculation to consider that this burial represents a pair who died in childbirth. As discussed briefly earlier (and see Chap. 12), pregnancy is a time of specific social expectations and behavior in all society. It is a time, both historically and today, that associated with both risk and much fear. This (pregnant?) individual (mother?) could be argued to have been residing in a liminal position at time of death, neither ill nor normative. This individual's association with other impaired individuals could be the result of the ultimately unsuccessful pregnancy having altered other people's perceptions of her, thereby transforming her into a "disabled" individual who was unable to fulfill her social duty of childbearing.

Visibility

Visibility of a disability can be described in two ways. The first comprises a direct aesthetic (apparent) "deformity," whereas the second way relates to how someone is perceived to perform as a person and whether that person is (considered) able to undertake their required (or certain specific) activities. Anglo-Saxon law codes, written in the seventh and ninth centuries, list compensation for injury (Gates and Marafioti 2014).

> The scale of compensation in the laws of Æthelbert relate directly to a man's ability to undertake his responsibilities as an adult within his society, as set out in the laws. To be unable to carry out these duties through physical or mental impairment would have inevitably had a depressing effect on a man's status, as the scale of compensation indicated (Crawford 2010: 95).

Thus it is clear that the ability to act and follow some normative pattern of behavior was of particular importance to Anglo-Saxon males.

The visibility and deforming aspects of an impairment can have a profound impact on an individual's experiences of disability, with themes such as stigma being an ever-present feature. What is unclear, however, is how visibility impacted upon the understanding of disease in the earlier periods. The number of recipes for skin diseases is large within later Anglo-Saxon medical remedies (Bonser 1963). Undoubtedly, the unknown quality of the internal organs and the fact that one could literally see if such remedies were working on the skin must have had its part to play, but this abundance of recipes could relate to a requirement for aesthetic quality of the skin. It is clear that the visibility of the disorder is important, as, during the later medieval period, a series of potentially grossly disfiguring diseases are well known. These diseases include the "king's evil" (scrofula) and Saint Anthony's fire, which could either be ergotism or erysipelas (Bonser 1963; Haggard 1932). These diseases, however, leave little evidence in skeletal remains. The superficial visibility of disease is thus of great importance in understanding medieval concepts of health and disease, and one would assume that it is likely to be of importance during the preceding Anglo-Saxon period. Evidence has been found for facial deformity in the later Anglo-Saxon period in Spofforth, Yorkshire (Craig and Craig 2013). The individual from Spofforth was aged to be 6–7 years old and was provisioned with a normative burial rite. It would appear, in this instance, that perhaps the deformity was not perceived as restricting the individual's ability to participate in their socially expected tasks. It is certainly clear that, at least until the reign of King Alfred (ninth century), physical deformities and injuries posed a much greater threat to social status than either illness or infirmity which left no visible mark upon the body (Crawford 2010).

If one assumes that juveniles and adults with apparently visible disease were indeed buried in clusters at Great Chesterford, it is important to consider how noticeable such disorders were. In this respect, we are focusing on visibility related to performance rather than on the physical visibility of deformity, although the latter aspect, as discussed above, also would have been of importance. Indeed, were diseases only recognized as such if they impinged upon a person's ability to be a productive part of the community? Taking such a view, was disease only of importance to the Anglo-Saxon community at Great Chesterford when it impacted as a *visible* dis/ability? In this sense, is it disease that is of importance or a person's in/ability to actually undertake the required activities that is paramount? The evidence for normative burial associated with facial deformity at Spofforth (Craig and Craig 2013), or later at fifteenth century Towton (Fiorato et al. 2007), adds strength to the argument that disability was more acute when it affected a person's ability to perform in their perceived social role rather than their visible appearance or looks.

Individuals with reduced mobility or social usefulness in terms of their abilities to undertake "normal" activities would have had relatively great visibility within Anglo-Saxon society. If we then view each individual as simply being located differently on, or moving along, a continuum of ability, we can, following the approach of Tremain (2002), attempt to evaluate whether the individual might have been in pain (see also Bourke 2014; Chap. 8). This approach to disability mirrors that taken by social scientists in viewing dis/ability as simply being one aspect of the life course and one aspect of an individual's identity. Crawford (2010) argues that during the later Anglo-Saxon period (i.e., Christian period), physical or mental impairments, and specifically visible differences, such as blemishes, blindness, or physical deformity, might have been treated as socially disabling. What is unclear, however, from her argument is whether it is the visibility of the difference or Christianity that is of primary importance in the construction of social disablement.

The visibility of a funerary rite enables a burial to have an active role in mediating contemporary social order, thereby forming the means by which a lasting memory of the deceased is established (Devlin 2015). Thus a burial and the deceased occupant retain some agency postmortem. Williams (2006) and Devlin (2015) thus have argued that the visibility of death and burial provided an important context through which social memories and identities were performed, created and maintained. This is a particularly interesting point when one considers the reconstruction of graves in museum contexts. These reconstructions are used to instill the burial with "an identity and personality in the present" (Williams 2009: 194), and that the process of composing a museum display itself is similar to the staged display of the body during the burial process.

Is visibility predicated upon position within the funerary landscape? As noted earlier (cf. Hadley and Buckberry 2005), these could be argued to form a reciprocal relationship. In this sense, the cluster of inhumations is of particular importance. As burials of the dead have relationships with their environment, the presence of burials of specific personae within a certain portion of a cemetery affects social status (Devlin 2015). It is certainly clear that deviant burials are frequently placed in specific and highly visible parts of the landscape (Buckberry and Hadley 2007; Reynolds 2009), including in border areas (Marafioti and Gates 2014). The most clearly deviant burials, of people who were executed, were placed separately in execution cemeteries from the seventh century onwards (Buckberry 2014). Although such cemeteries appear to have been in use for prolonged periods, actual executions occurred only rarely. Apparent execution cemeteries were usually located close to hundred boundaries, which are divisions of a shire for military, judicial and administrative purposes, although these units themselves were not documented until the tenth century (Buckberry and Hadley 2007). During the period under consideration here, however, deviant burials were usually located within the broader community cemetery (Buckberry 2014). The question therefore arises as to whether visibly different individuals were placed in an area of their own mortuary geography within that cemetery. Certainly during the later Anglo-Saxon period, burials located on the outskirts of Christian churchyards sometimes displayed unusual characteristics, and the implication has been that these individuals were segregated from the rest of society in death (Hadley and Buckberry 2005: 145). Such an idea has been hinted at in previous studies of early Anglo-Saxon cemeteries (Hadley 2010; Reynolds 2009; Williams 2006), including studies commenting upon the lack of juveniles within most of these cemeteries (Lucy 2000), but its extension into visible disease has not been undertaken. At Great Chesterford, future research will include Geographical Information System (GIS)-based analysis of our putative diseased or "different" clustering.

Etiology

As impairment can be congenital, a result of disease, or as a result of trauma, the question arises as to whether the etiology of impairment was of importance during the early Anglo-Saxon period. Given that there was no understanding of contagion at the time, the concept of transmission of disease or infection with some pathogen would be unclear. Later, in the high medieval period, differentiation was made between congenital impairments, disease-related impairments and traumatic impairments, but these cannot simply be equated with modern understandings of diseases or pathogens (Metzler 2006). Trauma-related impairments, such as those deriving from violence, are likely to have been well understood. Indeed, there are plentiful archaeological examples of individuals surviving severe skeletal trauma, including several with evidence of healing despite sharp force trauma (e.g., Roberts and Cox 2003), such as individual 5607 from St Helen on the Walls with healed trauma to the occipital bone (Dawes 1980).

As noted earlier, the etiology of impairment might also affect the understanding of the contemporary community. It is likely, therefore, that acquired impairments would have had some cause ascribed to them in the minds of the individuals at the time, whereas congenital impairments would have had no discernible cause (Metzler 2006). The birth of "monstrosities must have been especially terrifying… [From study of the Anglo-Saxon texts, it appears that] It was believed that these could be procreated only through the agency of demons" (Bonser 1963: 269). Despite earlier references to congenital impairment, such as Galen's discussions of how physical deformations can arise in utero and, in the early seventh century, Isidore of Seville's discussions of inheritance in terms of seeds for procreation (Metzler 2006), these ideas would not have been known to most of the Anglo-Saxon population. During the period predating Christianity, there is no evidence of any belief among the contemporary population that congenital disorders in children were the result of transgressive, sinful behavior of their parents (i.e., of the “visiting the sins of the parents upon the child”). There were, however, beliefs in the impact of food and environmental influences on congenital impairment. Foods consumed by pregnant woman were believed to have had some influence on the shape of the child. Indeed, Metzler (2006) noted that women were supposed to refrain from consumption of certain meats, especially meat derived from male animals such as rams or bulls. Furthermore, quoting from later Anglo-Saxon medical, astrological and magical texts, she demonstrates that a child may be born “stupid” if a woman frequently eats nuts, acorns, or any fresh fruit when she is 4 or 5 months pregnant (Metzler 2006: 92). Additionally, certain perinatal activities were also considered to be causative for specific congenital impairments such as bad posture resulting from incidents during swaddling (Metzler 2006). During the high medieval period, the Bible formed the basis for all Christian thought, and thus impacted upon religious notions and their understanding of disability at the time (Metzler 2006). The early Anglo-Saxon period, however, as exemplified by Great Chesterford, predates this and so does not have such a text to provide a framework for thought and understanding. There were, however, texts with legal, magical, and astrological bases defining how individuals should live their lives, and, from the later Anglo-Saxon period, monastic chronicles and biographies and, most importantly, a series of medical recipe manuscripts (Bonser 1963). Three vernacular medical texts known as *Leechbooks* were written in Winchester shortly after King Alfred’s reign—the earliest of these was that of the physician Bald (Bonser 1963; Talbot 1967). By the later Anglo-Saxon period, there are also both a series of medical terms, and Anglo-Saxon words signifying disease (*morbus*) and pain (*ece* and *wærc*) (Bonser 1963). Within the *First Leechbook*, there is a treatise detailing surgical correction of harelip during the Anglo-Saxon period (Bonser 1963; Vrebos 1986); such a complex medical intervention implies a tremendous degree of attention upon congenital and deforming abnormality (Roberts and Manchester 1995). Therefore, one might question whether congenital disorders occupy the same liminal ground as visibly acquired “difference,” as they would have been visible to other members of the community throughout the individual’s life.

Gender and Age: The Links to Liminality

Changes through the gendered life course must be considered. During the Anglo-Saxon, and indeed later medieval periods, one of the main causes of acquired disability, as opposed to congenital disability, was likely due to accident or injury (Metzler 2013). This might be associated with the loss of ability to undertake expected activities and a change in ability to work. Similarly, aging, more generally, shares many issues with disability; advancing age often comes in tandem with changes in dis/ability. Aging is both a physical phenomenon, like impairment, and comprises a social and medical construct, like disability. Indeed, when someone was incapable of living an active life, their use to the local community became questionable and they could be forced to relinquish positions of power and social responsibility (Metzler 2013; Rothauser 2007). The ability to function defines usefulness and thus the ability to be recognized as a normal person. Certainly during the post Anglo-Saxon period, those with power were usually required to be fit and physically able, with the visibility of their abilities being key (Metzler 2013).

> So old-age of itself is not a disabling condition during the Middle Ages; instead the individual physical or mental condition that characterized a person was the defining factor. Some old people, including some very old in years, would never have been disabled, since they were fortunate enough to live into their ripe old years in a fit, healthy and active state, while others of less years will already have suffered the aches and pains that eventually led to physical and mental deterioration, incapacity, consequently retirement from work or public life and dependency (Metzler 2013: 153).

It is clear that disability changes during a gendered life course, with individuals moving forward and backward along a continuum of ability. Similarly, the visibility of their impairment or activity impingement also changes through their individual life course. Children might thus become more "*able*" when they become adults. Indeed it is possible that after becoming more able to undertake certain activities, such juveniles are then considered to be full *people* rather than children in particular cultural contexts. The age at which this might happen is unclear as the period of "youth," or when the person had not yet attained full social adulthood, might have extended past physical adolescence (Shapland et al. 2015).

In later Anglo-Saxon (i.e., Christian) cemeteries, burials of males appear to be more numerous in prominent locations within the churchyard (Hadley 2010). Furthermore, despite many adult males apparently being physically "impaired," adult men are often treated differently from others in their mortuary practice (Hadley 2010). "All of the published osteological examples of impaired individuals who have received non-normative burial are adult males" (Craig and Craig 2013: 636) and adult males also occupy the majority of deviant burial types from the Anglo-Saxon period (Hadley and Buckberry 2007). Indeed, at Raunds cemetery in Northamptonshire, it appears that the three most physically distinctive individuals, all male, were interred at the limits of the consecrated ground. Throughout the Anglo-Saxon period,

> in order for a free man to participate in adult life, he needed to be able to ride a horse or walk, to carry weaponry, and to see, hear and speak. … To be unable to carry out these duties through physical or mental impairment would have … had a depressing effect on a man's status (Crawford 2010: 95).

We would argue therefore that masculinity is of importance at Great Chesterford as six of nine adults in the burial cluster are male. The question, therefore, is just how visible were the skeletally recognizable conditions of tuberculosis, leprosy, etc.? Individuals with skeletal disorders, such as severe osteoarthritis, might have restricted abilities to undertake farming or other work. Impairment or reduced ability to undertake required activity is thus paramount. Did impairment affect their behavior in some performative way? Many of the disorders studied include acquired impairment over time, and could have restricted their ability to perform within the community's idealized norms. These norms vary over a person's life course and stages of life, so perhaps their perceived dis/ability did too. Viewing as a continuum of ability allows for flux over the life course. For example, pregnant females are (in many ways) disabled and have restricted ability during that stage, but are performing a role in society as a prospective mother. In addition, this liminal state has bodily visibility. Dis/ability is fluid and, in Anglo-Saxon males, may be linked with masculinity. Furthermore, the ideals associated with masculinity were pivotal as they affected the potential of an Anglo-Saxon male to actually *be* a person.

The association of these people with visible disease alongside children is also noteworthy. Later Anglo-Saxon society was ordered around kinship and declarations of allegiance (Crawford 2010; Sayer 2009), and hence a person who could neither hear charges laid against them nor respond to them, such as due to physical impairment, was obliged, under Anglo-Saxon law, to remain in a position of dependency upon their father, thereby essentially retaining the legal status of child (Crawford 2010). Were the impaired individuals thus considered to be similar in social standing to children (cf. Lee 2008)? Crawford (1991, 2010) also notes that certain types of physical impairment would have meant that the individual was given a dependent status, as identified in the differential mortuary treatment of children and in multiple burials (Stoodley 2002). Furthermore, in later Anglo-Saxon cemeteries, burials of children are more commonly found and are often located in conspicuous positions, such as adjacent to or within churches or near to prominent male burials (Hadley 2010). As they are always undergoing growth and biological change, by definition, children are in some form of liminal state. The link between children, liminality and visibility (including dis/ability) might thus warrant further investigation.

Bioarchaeology and the Future?

Although it has been said that "like biological age or sex, bodily 'difference' or impairment may be mapped and quantified by osteoarchaeologists" (Crawford 2010: 93), the processes in so doing are clearly difficult and subject to interpretation. It is clear that within paleopathology, we are able to identify disease, and may be able to make some estimate of the impact that it would have had both upon the individual affected and their contemporary social group. But this is, by necessity, dependent upon our understanding of embodiment. As is well known, only a very limited number of diseases and impairments leave skeletal lesions, and hence there can be no such thing as a healthy mortuary population (DeWitte and Stojanowski 2015; Waldron 2007; Wood et al. 1992; Wright and Yoder 2003).

It has also been noted that, during the later Anglo-Saxon period (i.e., the Christian period), individuals with apparent physical impairment were *not* treated differently in death (Hadley 2010), and so those situations in which individuals are treated differently may imply some form of further difference. Given that contemporary written records suggests that physical disability impinged upon the construction of Anglo-Saxon masculinity (Crawford 2010; Hadley 2010), greater understanding of Anglo-Saxon concepts of dis/ability is required. But concepts of dis/ability, or disablement and enablement (Masala and Petretto 2008) are likely to be primarily local in nature, as, like patterning of burial provision (cf. Hadley and Buckberry 2005), it might vary between contemporary or neighboring settlements.

To develop such a greater understanding of dis/ability in Anglo-Saxon England, one would need to synthesize a series of distinct osteobiographies with population- or sample-based studies. This involves taking best practice from studies of the individual (e.g., see papers in Stodder and Palkovich 2012) to develop and compare differences between individuals. As Zakrzewski (2015) has previously noted, Robb (2002) provides an excellent demonstration of the potential for osteobiography to aid in understanding the individual, and Boutin (2016) demonstrates its use in understanding both personhood and disability. Given the large number of Anglo-Saxon cemeteries, one would hope that, within the archives, there might be sufficient numbers of high quality photographs and drawings to use an "anthropologie de terrain" approach to gain insight into the funerary ritual associated with each burial, following Duday (2009; Duday et al. 1990). Williams (2009) notes that the depiction of the grave context has become one of the primary archaeological foci for study, such that in the publication of the West Heslerton cemetery, the plans, sections, and photographs of the graves were integrated with records of the artifacts and radiographs within the grave catalog. This type of approach, using different scales to explore and record detail, has great potential for archeothanatology, and hence in the understanding or recognition of past dis/ability. It is therefore imperative that bioarcheologists assess the potential of each inhumation to actually undertake the work expected for an individual both to *be* and *be recognized as* a person in their own particular time period. Following this approach, bioarchaeology must go beyond simply identifying and cataloging the paleopathology found on each skeleton, but use the recorded lesions to develop osteobiographies in order to identify whether each burial was able to act and live as a *social person* in their own society. This must then be synthesized with analysis of *grave variation* in conjunction with *grave types* (cf. Buckberry 2007). In this sense, the same approaches used to assess whether a juvenile had transitioned to be a social adult (cf. Shapland et al. 2015) may be employed to develop an osteobiography that permits enablement or dis/ability to be delineated. Although Dettwyler (1991) has argued that conclusions cannot be drawn about the quality of life for the disabled from skeletal evidence of impairment, if we bioarcheologists move beyond implicit (and often tacitly negative) assumptions about disability, study, and focus can be placed upon both the individuals as people and upon "ability."

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