Mark A. Goldstein
Editor

The MassGeneral Hospital for Children Adolescent Medicine Handbook

Springer

The MassGeneral Hospital for Children Adolescent Medicine Handbook

Mark A. Goldstein
Editor

The MassGeneral Hospital for Children Adolescent Medicine Handbook

Springer

Editor
Mark A. Goldstein
Massachusetts General Hospital
Division of Adolescent and Young Adult Medicine
Boston, MA
USA
mgoldstein@partners.org

ISBN 978-1-4419-6844-9 e-ISBN 978-1-4419-6845-6
DOI 10.1007/978-1-4419-6845-6
Springer New York Dordrecht Heidelberg London

Library of Congress Control Number: 2010937420

First Edition

Chief, Division of Adolescent and Young Adult Medicine
MassGeneral Hospital for Children
Department of Pediatrics
Massachusetts General Hospital
Harvard Medical School
175 Cambridge Street
Boston, MA 02114

Disclaimer

The authors, editor, and publisher have made every effort to ascertain the accuracy of the information presented and to describe generally accepted practices at the time of publication. However, the authors, editor, and publisher are not responsible for any errors, or omissions or consequences from the application of information in this publication. We further do not make a warranty, expressed or implied, with respect to the currency, completeness, or accuracy of the contents of this publication. The practitioner retains the professional responsibility when information in this publication is applied in a particular situation.

The authors, editor, and publisher have made every effort to ensure that drug selection and dosage set forth in this publication are in accordance with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

Preface

Having been started in Boston by Dr. J. Roswell Gallagher in 1951, adolescent medicine is a relatively young specialty. Board certification was first offered in 1994. Many practitioners consider adolescent medicine to include ages 12–21 years, although exceptions are made at both ends of the age spectrum. Unique to this specialty is the emergence and completion of puberty, and all of the developmental tasks and events that may give rise to problems.

In adolescent medicine, there are strong links and interrelationships between developing physical bodies, emerging intellect, and social adaptations. As a result, the biopsychosocial aspects of each teen should be considered. For example, delayed puberty may affect academic achievement, and together these problems may lead to behavioral issues. During adolescence, the first manifestations of mental illness may occur, sexual awakening may lead to risk taking behaviors, and the growing need for independence arises affecting the adolescent's relationships with family, peers, schools, and other social institutions. Issues in any of these domains may result in interactions with the healthcare system. It is important to have resources to address these problems.

We have not intended that this handbook be a complete survey of adolescent medicine. Rather, we designed a text that we hope is

practical and user-friendly. In addition, this is not a work consisting only of facts, diagrams, tables, charts, and pathways. Instead, it was our hope to develop a resource that addresses best practices in adolescent medicine where practice not only means the most appropriate approaches, diagnostic evaluations, and best treatments, but also the best ways to connect, communicate, and continue care with teenagers. After all, if the physician cannot develop a good relationship with an adolescent, then treatment and follow through will surely be compromised.

This handbook has three sections: general adolescent medicine, sexuality, and mental health. There is also an appendix with additional materials. References and additional readings are listed at the end of each chapter. Knowing that mental health and substance abuse competencies are goals recommended by the American Academy of Pediatrics for primary care pediatricians, we have included an extensive section on these areas of learning. In addition, adolescents surface in the medical home asking for sexuality services, so we have included broad content for these important adolescent issues. We have made every effort to include practical materials useful for the primary care physician realizing that these core areas of learning may not be addressed extensively in pediatric or internal medicine training programs.

Except for neonatologists and geriatricians, adolescents may be seen by any other medical or surgical specialist. While this handbook is aimed at clinicians who see a number of adolescents in their practices, it should be relevant to most clinicians. Each of our outstanding physician authors represent expertise in pediatric or adult specialties and has taught or trained at Massachusetts General Hospital. Using their collective knowledge and wisdom, we have crafted a multispecialty approach to adolescent healthcare hoping to present a balance of the science and the art of adolescent medicine. Adolescence is time limited, and eventually adolescents will need to seek a new medical home. The last chapter addresses the issues inherent to care transition and offers a model for transfer of care to adult medicine.

September 2010 Mark A. Goldstein

Acknowledgments

I wish to thank Dr. Ronald E. Kleinman, Physician-in-Chief, MassGeneral Hospital for Children, Chair, Department of Pediatrics, Massachusetts General Hospital and Charles Wilder Professor of Pediatrics, Harvard Medical School for his enthusiastic support of this project. Without his commitment, this handbook would not have been possible.

Dr. Karen Sadler, faculty member of the Division of Adolescent and Young Adult Medicine, read the entire manuscript and offered many constructive criticisms. Dr. Eugene Beresin, Chief of the Child Psychiatry Residency Program, Massachusetts General Hospital and Professor of Psychiatry, Harvard Medical School reviewed the mental health chapter. I am grateful to both for their input.

Dr. Young Ho Yoon, a graduate of the MassGeneral Hospital for Children pediatric residency program, kindly offered his vast library of references to augment our reading list. I very much appreciate the scope and depth of his library, and am grateful that he allowed us to utilize these materials that add so much to the richness of the appendix.

Pamela Zhang drew the sketches in Chapter 3 and the section dividers. This young artist, a student at the Rhode Island School of Design, was able through her art to effectively portray the spirit and meaning of adolescence.

This handbook would not have been possible without the queries from many outstanding pediatric and medicine residents at the Massachusetts General Hospital as well questions from Harvard Medical students. Their inquisitiveness catalyzed the inspiration for this handbook.

Mark A. Goldstein, M.D.

Contents

Contributors

Fiona Baumer
Fourth Year Student, Harvard Medical School; Bullying

Ami B. Bhatt, M.D.
Division of Cardiology, Department of Medicine,
Massachusetts General Hospital; Cardiac Issues in Adolescents

Stephanie Corrado, M.D.
Division of Adolescent and Young Adult Medicine,
MassGeneral Hospital for Children, 55 Fruit Street,
Yawkey 6D, Boston, MA 02114, USA

Thomas J. Gill, M.D.
Division of Sports Medicine, Massachusetts General Hospital,
175 Cambridge Street, 4th Floor, Boston, MA 02114, USA

Mark A. Goldstein, M.D.
Division of Adolescent and Young Adult Medicine,
MassGeneral Hospital for Children, 175 Cambridge Street,
5th Floor, Boston, MA, 02114, USA

Nupur Gupta, M.D. M.P.H.
Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children; Basics of Hormonal Contraception

Esther Israel, M.D.
Division of Pediatric Gastroenterology, MassGeneral Hospital for Children; Adolescent Nutrition, IBD, IBS

Michelle Katz, M.D.
Fellow in Pediatric Endocrinology, MassGeneral Hospital for Children; Delayed Puberty, Short Stature and Tall Stature

Daniela Kroshinsky, M.D.
Department of Dermatology, Massachusetts General Hospital, 50 Stanford Street, Suite 290, Boston, MA 02114, USA

Brian Kurtz, M.D.
Second year resident, Child Psychiatry Service, Department of Psychiatry, Massachusetts General Hospital: Adolescent Mental Health Issues

Elizabeth Miller M.D. Ph.D.
University of California Davis Children's Hospital; Adolescent Relationship Violence in Clinical Settings: Challenges for Identification and Intervention

Madhusmita Misra, M.D.
Division of Endocrinology, MassGeneral Hospital for Children, Delayed Puberty, Short Stature and Tall Stature

Bradley Monash, M.D.
Chief Resident, MassGeneral Hospital for Children; Transition of Care

Mariette Murphy, M.D.
Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children; The Adolescent Patient Interview

Mark D. Price, M.D. Ph.D.
Division of Sports Medicine, University of Massachusetts, U Mass Memorial Medical Center, Worcegter, MA, 01605, USA

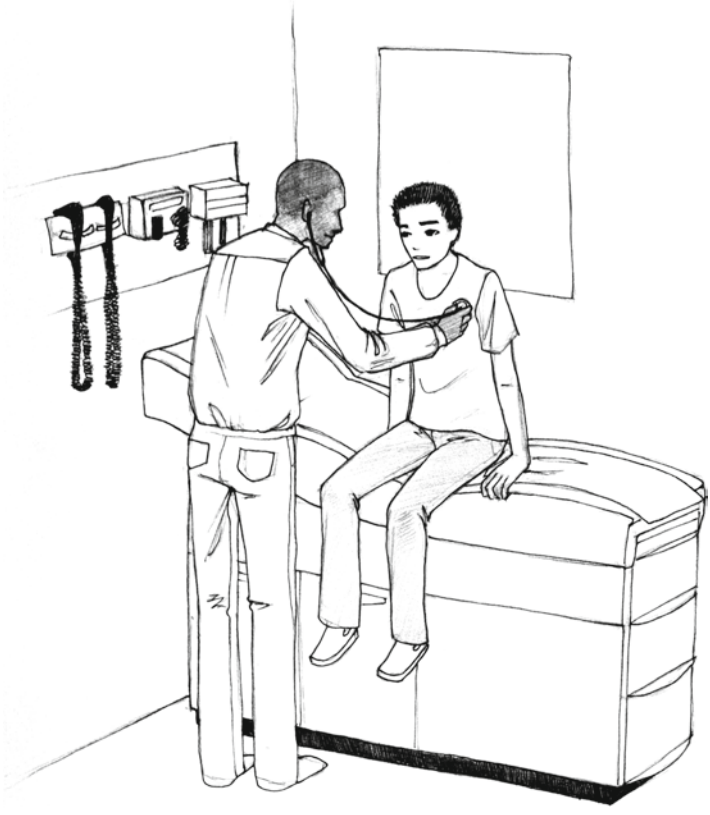
Jennifer Rosenblum, M.D.
617-643-1201 Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA

Sabina Sabharwal, M.D.
Division of Pediatric Gastroenterology, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA

Karen Sadler, M.D.
Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children; Tanner Staging, Normal Adolescent Development

Part I

General Adolescent Medicine



1

Adolescent Preventive Services

Jennifer Rosenblum

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
jrosenblum@partners.org

The annual visit offers the opportunity to promote healthy behaviors, identify at-risk behavior, provide immunizations, and screen for health problems. Guidelines for Adolescent Preventive Services (GAPS) is a comprehensive set of recommendations that is designed to be delivered as a preventive services package during annual health visits between the ages of 11 and 21. These recommendations were developed by the American Medical Association with contributions from a Scientific Advisory Panel in order to promote the developmental, psychosocial, and biomedical health of adolescents. The following is a summary of the recommendations. The full guidelines may be found at http://www.ama-assn.org/ama/upload/mm/39/gapsmono.pdf

RECOMMENDATIONS

1. Perform an annual preventive services visit from ages 11 to 21.
2. Deliver preventive services that are age and developmentally appropriate, and sensitive to individual and sociocultural differences.
3. Establish office policies regarding confidential care for adolescents conforming to state laws, which should be made clear to adolescents and their parents.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_1,

4. Provide health guidance for parents at least once during their child's early (age 11–14), middle (age 15–17), and preferably late (age 18–21) adolescence. Review these areas:
   - Normative adolescent development (physical, sexual, and emotional).
   - Signs and symptoms of disease and emotional distress.
   - Parenting behaviors that promote healthy adolescent adjustment.
   - Family activities and parents as role models for health-related behaviors.
   - Helping adolescents to avoid potentially harmful behaviors, including use of motor vehicles, weapons, and substances.
5. Promote a better understanding of adolescents' physical growth, psychosocial and psychosexual development, and the importance of becoming actively involved in decisions regarding their health.
6. Counsel all adolescents to promote the reduction of injuries in the following areas:
   - Avoiding the use of alcohol or other substances while using motor vehicles.
   - Using safety devices (seat belts, helmets, athletic protective devices).
   - Resolving interpersonal conflicts without violence.
   - Avoiding the use of weapons and/or promoting weapon safety.
   - Promoting appropriate physical conditioning before exercise.
7. Provide guidance about healthy dietary habits and safe weight management.
8. Provide guidance about the benefits of physical activity.
9. Provide guidance regarding responsible sexual behaviors.
10. Provide guidance to promote the avoidance of tobacco, alcohol, and other substances of abuse as well as anabolic steroids and performance-enhancing agents.
11. Screen annually for hypertension (defined as SBP or DBP > 95th percentile).
    - If SBP or DBP ≥ 90th percentile, repeat BP measurements three times in the next month.
    - If BP is at the 90th–95th percentile, assess for obesity and monitor BP every 6 months.
    - If BP > 95th percentile, obtain a biomedical evaluation to establish treatment options.

NOTE: The NIH Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents recommends the following:

- BP < 90th percentile is normal.
- BP at 90th–95th percentile or >120/80 is prehypertension. Should repeat at same visit and use average. Repeat in 6 months. Consider diagnostic work-up if overweight or if comorbidity is present.
- BP > 95th percentile may be hypertension.
- Stage 1 HTN = 95th–99th percentile plus 5 mmHg; repeat in 1–2 weeks. If still elevated on two or more occasions, evaluate and treat or refer to specialist within 1 month.
- Stage 2 HTN = >99th percentile plus 5 mmHg; refer within 1 week (immediately if symptoms are present) to specialist for evaluation and treatment.

[See Appendix for blood pressure tables]

12. Screen to determine their risk of developing hyperlipidemia and adult coronary artery disease (CAD), following the protocol developed by the Expert Panel on Blood Cholesterol Levels in Children and Adolescents.
    - Adolescents aged > 19 or whose parents have total cholesterol (TC) > 240 mg/dL should be screened with a non-fasting TC at least once.
    - Adolescents with an unknown family history or who have multiple risk factors for future cardiovascular disease (CVD) (e.g., smoking, hypertension, obesity, diabetes mellitus, excessive consumption of dietary saturated fats and cholesterol) may be screened for TC level (non-fasting) at the discretion of the physician.
    - If TC < 170 mg/dL, repeat within 5 years. If TC is 170–199 mg/dL, repeat test; if average of the two tests is < 170 mg/dL, repeat TC within 5 years. If average is ≥ 170 mg/dL or if initial test ≥ 200 mg/dL, check fasting lipid profile.
    - Adolescents who have a parent or grandparent with CAD, peripheral vascular disease, cerebrovascular disease, or sudden cardiac death at age 55 or younger should be screened with a fasting lipid profile.
    - Treatment options are based on the average of two assessments of low-density lipoprotein (LDL) cholesterol. Values < 110 mg/dL are acceptable; values between 110 and 129 mg/dL are borderline, and the lipoprotein status should

be reevaluated in 1 year. Adolescents with values of 130 mg/dL or greater should be referred for further medical evaluation and treatment.

NOTE: The American Academy of Pediatrics published an updated report in July 2008 with the following recommendations:

- Screen fasting lipid profile between age 2 and 10 for those with:
  (a) Positive family history of dyslipidemia or early CVD (<55 years for men, <65 years for women)
  (b) Unknown family history
  (c) Other CVD risk factors:
    - Overweight (BMI 85th–95th percentile)
    - Obesity (BMI ≥ 95th percentile)
    - Hypertension (BP ≥ 95th percentile)
    - Cigarette smoking
    - Diabetes mellitus
  - If values are within the reference range on initial screening, retest in 3–5 years.
    - Normal: TC < 170 mg/dL, LDL < 110 mg/dL
    - Borderline: TC 170–190 mg/dL, LDL 110–129 mg/dL
    - High: TC > 200 mg/dL, LDL > 130 mg/dL
  - Consider pharmacologic treatment in patients aged >8 if:
    - LDL ≥ 190 mg/dL and no risk factors
    - LDL ≥ 160 mg/dL with family history of early CAD or >2 other risks
    - LDL ≥ 130 mg/dL and diabetes

13. Screen for eating disorders and obesity by determining weight and stature and asking about body image and dieting patterns.

- Assess for organic disease, anorexia nervosa, or bulimia nervosa if:
  - Weight loss >10% of previous weight
  - Recurrent dieting when not overweight
  - Self-induced emesis, laxatives, starvation, or diuretics to lose weight
  - Distorted body image
  - BMI < 5th percentile
- Adolescents with BMI > 95th percentile have obesity and should have a comprehensive evaluation.
- Adolescents with BMI between 85th and 95th percentile are overweight and should have a comprehensive evaluation if:

- Their BMI has increased by two or more units during the last year
- There is a family history of premature CAD, obesity, HTN, or DM
- They express concerns about their weight
- They have elevated cholesterol or blood pressure

14. Ask about use of tobacco products.
15. Ask about use of alcohol and other substances of abuse, and over-the-counter or prescription drugs for nonmedical purposes, including performance-enhancing agents.
16. Ask about involvement in sexual behaviors that may result in unintended pregnancy and STDs, including HIV infection.
17. Screen sexually active adolescents for STDs, which includes:
    - Gonorrhea: cervical culture or immunologic test (females) or urine leukocyte esterase (males)
    - Chlamydia: immunologic test of cervical fluid (females) or urine leukocyte esterase (males)
    - Syphilis: RPR if they have lived in an endemic area, had other STDs, had more than one sexual partner in the last 6 months, have exchanged sex for drugs or money, or are males who have engaged in sex with other males
    - Human Papilloma virus (HPV): Pap test (females per recommendations in Chap. 6) and visual inspection (both)
18. Offer confidential HIV screening to sexually active adolescents.
19. Screen female adolescents at age 21 and every 2 years for cervical cancer by use of Pap test. (NOTE: Recommendations from the American College of Obstetricians and Gynecologists are to start annual Pap screen at age 21 regardless of vaginal sexual intercourse history).
20. Ask about behaviors or emotions that indicate recurrent or severe depression.
21. Ask about a history of emotional, physical, and sexual abuse.
22. Ask about learning or school problems.
23. Adolescents should receive a tuberculin skin test in the following settings: exposure to active TB, history of living in a homeless shelter, history of incarceration, history of living in an area with a high prevalence of TB, or working in a health care setting.
24. Adolescents should receive prophylactic immunizations according to the guidelines established by the federally convened Advisory Committee on Immunization Practices (ACIP). See

appendix for further information; the latest recommendations as of 2010 include:

- Three vaccines should be given ideally at the 11–12 year-old checkup (or as soon as possible in older adolescents who have not received the vaccines).
  - Tetanus-diphtheria-acellular pertussis (Tdap)
  - Give one-time dose 5 years after last DTaP dose or Td booster, then boost every 10 years with Td
  - Meningococcal conjugated polysaccharide vaccine (MCV4)
  - Give a 1-time dose to adolescents aged 11–18 years. All college freshmen living in dorms should be offered the vaccine
- Human papillomavirus (HPV) Gardasil or Cervarix
  - Advise a three-dose series of Gardasil to girls 9 through age 26 on a 0, 2, 6 months schedule. This protects against HPV serotypes 6, 11, 16, and 18. It may be given as early as age 9. Gardasil is also licensed, safe and effective for males ages 9–26 years, to prevent genital warts. However, the Centers for Disease Control has not added this as a vaccine recommendation for males. Cervarix may be given to girls ages 10–25 years on a 0, 1, and 6 month dosage schedule. It is protective against HPV serotypes 16 and 18.
- Influenza vaccine should be given annually to adolescents through age 18. Give to age 19 and older if:
  - Household contact of infants and children
  - Have a risk factor: pregnancy, heart or lung disease, renal, hepatic, hematologic, or metabolic disorder, immunosuppression, or live in a chronic-care facility
  - Live or work with at-risk people as listed above
  - CDC has other recommendations based on the specific influenza virus that is targeted.
- Catch-up immunization is recommended for the following vaccines in all adolescents who did not receive all recommended doses when younger:
  - Hepatitis B
  - Polio
  - Measles–mumps–rubella (MMR)
  - Varicella
- Certain high-risk groups should receive the following vaccines:
  - Pneumococcal polysaccharide vaccine (PPSV)

- Sickle cell disease
- Anatomic/functional asplenia
- Chronic cardiac, pulmonary, or renal disease
- Diabetes
- Cirrhosis
- Alcoholism
- Cerebrospinal fluid leaks
- HIV
- Immunosuppression
- Diseases associated with immunosuppressive (long-term steroids, cancer drugs) and/or radiation therapy
- Cochlear implant

- Hepatitis A
  - Travelers to or those living in areas with intermediate or high prevalence (anywhere except US, W. Europe, N. Zealand, Australia, Canada, or Japan)
  - Males who have sex with males
  - Injectable or non-injectable drug users
  - Those who receive clotting factors
  - Those with chronic liver disease
  - Those who work with HAV in a laboratory setting

REFERENCES AND ADDITIONAL READINGS

Advisory Committee on Immunization Practices: Summary of Recommendations for Childhood and Adolescent Immunization. Available at: http://www.immunize.org/catg.d/p2010.pdf

American Medical Association. Guidelines for Adolescent Preventive Services (GAPS). Available at: http://www.ama-assn.org/ama/upload/mm/39/gapsmono.pdf

Brigham KS and Goldstein MA. Adolescent immunizations. Pediatr Rev 2009;30:47–56.

Centers for Disease Control and Prevention. Vaccines needed for teens and college students. Available at: http://www.cdc.gov/vaccines/recs/schedules/teen-schedule.htm. Accessed February 2009

Daniels SR, Greer FR, and the Committee on Nutrition. Lipid screening and cardiovascular health in childhood. Pediatrics 2008;122:198–208.

Feld LG, Corey H. Hypertension in childhood. Pediatr Rev 2007;28:283–98.

U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, National High Blood Pressure Education Program. The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents. NIH Publication No. 05-5268. Bethesda, MD: National Heart, Lung, and Blood Institute. Revised May 2005, 8–15. Available at: http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.pdf

Weinstein SL, Dolan LA, Cheng JCY et al. Adolescent idiopathic scoliosis. Lancet 2008;371:1527–37.

2

The Adolescent Patient Interview

Mariette Murphy

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
mmurphy5@partners.org

Interviewing an adolescent provides a transition from the pediatric encounter where the history is primarily provided by the parents, and the teen may or may not be able to provide his or her perspective. The adolescent is available for observation and some interaction, but the primary line of communication is with another adult, the parent. Interviewing the parent is often a good prelude to the adolescent interview, as the parent generally provides a more thorough family history, which may also be an important educational experience for the adolescent patient. The parental perspective and the observation of the interaction between parent and teen provide clinical information that helps to understand the family dynamic. But the stance is really to speak to both generations together, discussing confidential care, setting boundaries, and describing the contract upon which clinical care may be based. At that point, moving the parent to the waiting room is important to transition to the interview of the adolescent, which establishes the basis of the clinical relationship. The developmental aspects of early, middle, and late adolescence set the adolescent interview apart from the child and adult interview.

Approaching the adolescent from a clinical stance of neutrality is key. Nonjudgmental inquiry is essential to establishing the rapport that may develop into a supportive clinical relationship. Most adolescents

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_2,

enjoy talking about themselves to a supportive and nonjudgmental listener. The clinician's role will also influence the investment and willingness of the adolescent to open up and speak honestly about what is going on in his or her life. If the clinician's role is to provide primary care that is ongoing, helpful, and available, an adolescent may be more likely to trust and invest in the relationship. If the clinician's role is evaluative or episodic, it may be more difficult to establish the trust that would enable honest disclosures. Assurances of confidentiality, particularly those established with the parent in the adolescent's presence, provide the basis for the development of a doctor–patient relationship that is open and honest. Being explicit about the limits of confidentiality, that is, harming oneself or others, is reassuring to the parents that their adolescent's safety is a priority.

In assisting an adolescent to tell his or her history, it is useful to open the interview with the context of the clinical relationship and the purpose of the visit. If the focus is on a particular medical complaint, a chronologic approach to the onset and development of symptoms allows the adolescent to tell the story as he or she has experienced it. Pulling back from the specifics and asking concrete questions, such as hospitalizations, operations, medications, and allergies may trigger the history of particularly salient aspects of the medical history.

In the context of the past medical history, asking chronologic questions about the teen's development in the various domains of functioning often provides another structure for unfolding a history. In the physical domain, any periods of time of weight loss, abrupt weight or height gain may open up the adolescent's feelings about his/her rapidly changing body. Dating the onset of the development of secondary sexual characteristics and how the developmental pattern unfolded transitions into more private clinical material and sets the context for more sensitive historical questioning about sexual contact. The repeated pattern of questioning with onset, subsequent pattern, and last episode may be applied to each sensitive area and establishes a flow to the interview that defuses some of the intensity. For example, inquiring about the first menses and assisting the adolescent's memory with memory joggers (e.g. what grade?) may help an adolescent return in her memory to that time and assists her in the forward progression of remembering the pattern of her menses such as monthly, skipping months, multiple menses within a month. The more recent history, such as the last menses, then becomes more reliable because there is an active use of memory. This same patterning can then

be applied to sexual contact: actively remembering the first contact; subsequent partners and sexual practices; with most recent contact, partner, and practice tending to be more reliable. If there is no sexual contact, the open ended and chronologically factual approach tends to make it easier to share that and explore how the Adolescent is thinking about sexuality, and when he/she may anticipate that sexuality may be part of his/her life. Answers may vary from not knowing, to waiting for marriage, to next month, but at least the chronologic flow has been established as part of the clinical relationship.

This same pattern of questioning may be applied to substances such as cigarettes, alcohol, and other drugs, and the neutral chronologically factually based questioning makes the pattern of use clearer, from experimentation, to use, to abuse. This approach to eliciting the history makes subsequent interventions and referrals easier as the adolescent may experience how the pattern of use leads to consequences that need intervention.

Applying this pattern of questioning to other domains such as school may also clarify areas of difficulty requiring intervention. Areas of strength and weakness may be explored as you progress through the chronologic facts of preschool, primary, middle, and high school from the adolescent's perspective and then checked with the parents when they rejoin at the end of the visit. Similarly, asking about how the family has changed over time and how the adolescent's relationship with family members is experienced now may yield valuable information about the family context as the adolescent is separating, individuating, and establishing more autonomy. The potential for the family to be supportive and to accommodate the assumption of more responsibility in tandem with the development of more autonomy may be explored as well as the resistances to this transition. The other members of the family are engaged in their own developmental change, and this may at times cause tensions or withdrawal of supportive supervision, which may lead to vulnerability in the adolescent and derail healthy development.

More episodic or cross-sectional screening may be done using Home/Education/Activities/Drugs/Sex/Substances (HEADSS) or other screening tools, but the sensitivity of the material may not yield accurate information if the adolescent is not engaged in the flow of the clinical interview.

Screening for mental health issues should be performed using standardized tools such as the Pediatric Symptom Checklist (http://psc.partners.org/psc_english.PDF) or through applying this pattern of chronologic questioning to the domains of basic functions particularly eating, sleeping, and peer relationships. Disordered eating and sleep may be explored through 24 h recalls or patterns of eating as well as patterns of sleep that may change dramatically during adolescence. Behavioral issues with peers such as bullying, isolation, violence, peer pressure, or inability to articulate one's own perspective have developmental as well as psychological impact and early identification and intervention may have a major impact during this critical period of growth and development.

In summary, the adolescent interview should be approached from a nonjudgmental, neutral clinical stance to engage the adolescent in telling his or her history with an attentive, supportive listener within a context of confidentiality. Screenings may use a chronologic approach, which brings the adolescent to the beginning of any particular developmental domain or behavior and may elucidate the pattern of development of behaviors, which may facilitate early identification and intervention easier. Standardized screenings may also be employed such as the HEADSS, SIGECAPS, Pediatric Symptom Checklist but may not elicit a full understanding of the development of problem behaviors.

CONFIDENTIALITY AND CONSENT

Each state has its own laws in respect to a minor's ability to consent for health services. These services may include pregnancy-related care, contraceptive or family planning services as well as prevention, diagnosis, and treatment of sexually transmitted infections. Other services that may be available by a minor's consent include HIV/AIDS testing and treatment, drug or alcohol counseling and treatment, outpatient mental health services and examination, diagnosis, and treatment after a sexual assault. The reader is encouraged to seek out state-specific information (Please see references and additional readings for suggested resources).

Fear of disclosure prevents some minors from seeking healthcare services. Confidentiality rests on the specific categories of minors who may consent to their own treatment. Those minors who are able to consent may also be responsible for payment of their treatment.

In general, the parent or legal guardian must consent to the non-emergency care of a child under 18 years of age. There are specific exceptions to that rule.

Emancipated Minors

The following are situations where a minor may be emancipated (depending on state law)

1. Minor is married, widowed, or divorced (can consent to abortion or sterilization)
2. Minor is in the armed forces
3. Minor is pregnant or believes herself to be pregnant
4. Minor is parent of a child (minor may also consent to medical or dental care of the child)
5. Minor is living separate and apart from his/her parent or legal guardian and is managing his/her own financial affairs
6. Minor believes him/herself to be suffering from or to have come into contact with any diseases defined by the Department of Public health as dangerous to the public health, except that in this instance, the minor may consent only to the diagnosis and treatment of the disease.

Usually, adolescents who fall into categories 1–6 cannot consent to abortion or sterilization.

Additional documentation is required whenever a minor makes health care decisions. The physician must document which category is being relied on and why the physician believes the category applies.

Mature Minor

The following are situations where, a minor can consent to medical treatment if the physician reasonably believes the following (under certain state laws).

1. The best interests of the minor will be served by not notifying his or her parents of the intended medical treatment
2. The minor is capable of giving informed consent to that treatment

Additional documentation is required:

(a) The reasons that the best interest of the minor is being served by not notifying the parents.
(b) The reasons used in determining that the minor is capable of understanding the information given, and giving consent.

Drug-dependent minors 12 years and older seeking treatment for drug dependence must be found to be drug-dependent by two or more physicians. The minor may consent only to medical care related to the diagnosis and treatment of drug dependency, specifically excluding methadone maintenance therapy.

Both physicians must document their findings in the medical record with regard to the minor's drug dependency and the reasons for determining that the minor is capable of understanding the information given and giving consent.

Emergency treatment may only be rendered without parental consent if there is risk to life and/or limb.

Bear in mind that there are formal forensic cognitive psychology evaluations that can be done, but physician documentation requires the reasoning underlying the decision to allow minors to consent. The clinician is encouraged to consult with an attorney who is familiar with the laws of the particular state. In some emergency situations, a judge's order may be needed.

REFERENCES AND ADDITIONAL READINGS

Cottrell LA, Nield LS, Perkins KC. Effective interviewing and counseling of the adolescent patient. Pediatric Annals 2006;33:164–72.

English A., Shaw FE., McCauley MM., Fishbein DB and for the Working Group on Legislation, Vaccination, and Adolescent Health. Legal basis of consent for health care and vaccination for adolescents. Pediatrics 2008; 121:S85–87.

English A., Kenney KE. State Minor Consent Laws: a Summary 2nd ed. Chapel Hill, NC: Center for Adolescent Health & the Law, 2003. (A 3rd edition has been released according to the website www.cahl.org)

Goldenring J., Cohen E. Getting into adolescent heads. Contemp Pediatr 1998; 5:75–90.

3

Tanner Staging

Karen Sadler

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
ksadler@partners.org

INTRODUCTION

GIRLS

Tanner Stage 1 (Prepubertal)

Height:	Increases at basal rate: 5–6 cm/year
Breast:	Papilla elevation only
Pubic hair:	Villus hair only; no coarse, pigmented hair

Tanner Stage 2

Height:	Increases at accelerated rate: 7–8 cm/year
Breast:	Breast buds palpable and areolae enlarge
	Age 10.9 years (8.9–12.9 years)
Pubic hair:	Minimal coarse, pigmented hair mainly on labia
	Age 11.2 years (9.0–13.4 years)
Modifications based on increasingly earlier puberty	
White:	Stage 2 changes may appear 1 year earlier
Black/Hispanic:	Stage 2 changes may appear 2 years earlier

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_3,

Tanner Stage 3

Height:	Increases at peak rate: 8 cm/year (age 12.5)
Breast:	Elevation of breast contour; areolae enlarge
	Age 11.9 years (9.9–13.9 years)
Pubic hair:	Dark, coarse, curly hair spreads over mons pubis
	Age 11.9 years (9.6–14.1 years)
Other changes:	Axillary hair develops (13.1 years)
	Acne vulgaris develops (13.2 years)

Tanner Stage 4

Height:	Increases at 7 cm/year
Breast:	Areolae forms secondary mound on the breast
	Age: 12.9 years (10.5–15.3 years)
Pubic hair:	Hair of adult quality
	No spread to junction of medial thigh with perineum
	Age: 12.6 years (10.4–14.8 years)

Tanner Stage 5

Height:	No further height increase after age 16
Breast:	Adult breast contour
	Areola recesses to general contour of breast
Pubic hair:	Adult distribution of hair
	Pubic hair spreads to medial thigh
	Pubic hair does not extend up linea alba

Other milestones

Adrenarche:	Age 6–8 years
Menarche:	Age 12.7 years (10.8–14.5 years)
	Delayed >1 year if low body fat (e.g., athlete, anorexia)

Growth in girls (Figs. 1 and 2)

Peak height velocity:	11.5 years (9.7–13.3 years)
Basal growth:	Occurs up until Tanner Stage 2
Basal growth rate:	5.0–6.0 cm/year
Pubertal growth	
Girls who mature average time:	8.3 (6.1–10.4) cm/year
Girls who mature early:	9.0 (7.0–11.0) cm/year
Girls who mature late:	7.5 (5.4–9.6) cm/year

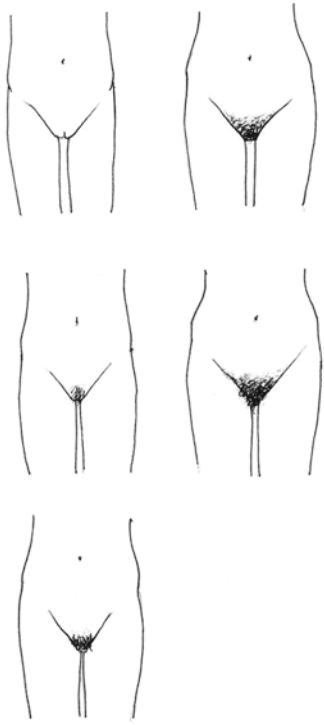


Figure 1. Female tanner stage pubic hair development.

PEARLS

- Adiposity and ethnicity are independently associated with earlier puberty
- Mexican-American and non-Hispanic black children experience puberty earlier than Caucasians
- Determine thelarche in overweight girls by palpation to distinguish fat tissue from breast tissue
- In normal-weight children: pubic hair in boys less than 10 years and in girls less than 8 years is abnormal

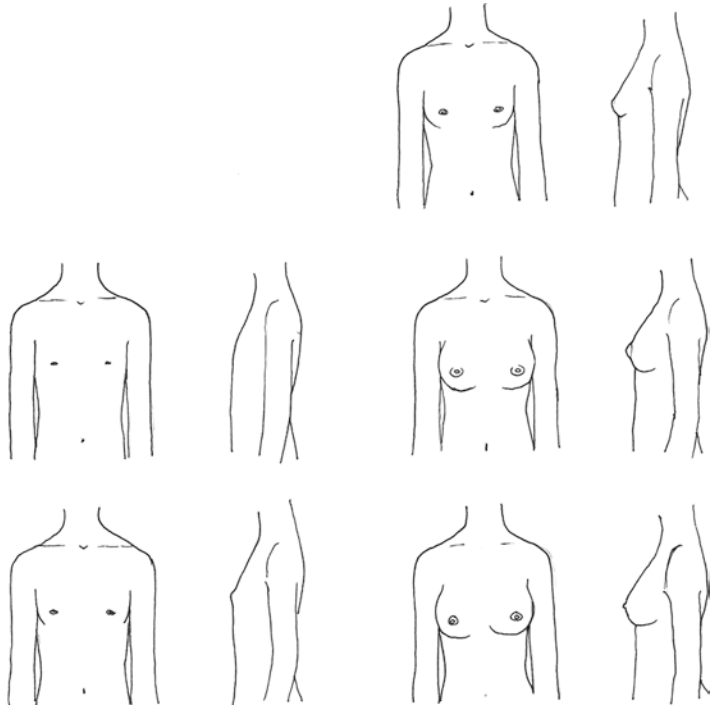


Figure 2. Tanner stage breast development.

BOYS

Tanner Stage 1 (Prepubertal)

Height:	Increases at basal rate: 5–6 cm/year
Testes:	Smaller than 4 ml or long axis <2.5 cm
Pubic hair:	No coarse, pigmented hair
Penis:	No growth

Tanner Stage 2

Height:	Increases at basal rate: 5–6 cm/year
Testes:	Size 4 mL or long axis 2.5–3.2 cm
	Age 11.5 years (age 9.5–13.5 years)
Pubic hair:	Minimal coarse, pigmented hair at base of penis
	Age 12.0 years (age 9.9–14.0 years)
Penis:	Earliest increased length and width
	Age 11.5 years (age 10.5–14.5 years)

Tanner Stage 3

Height:	Increases at accelerated rate: 7–8 cm/year
Testes:	Size 12 ml or long axis 3.6 cm
	Age 14.0 years (11.5–16.5 years)
Pubic hair:	Coarse, dark curly hair spread over the pubis
	Age 13.1 years (11.2–15.0 years)
Penis:	Increased length and width
	Age 12.4 years (10.1–14.6 years)
Other changes:	Gynecomastia may occur (age 13.2 years)
	Voice breaks (age 13.5 years)
	Muscle mass increases
	Spermatogenesis

Tanner Stage 4

Height:	Increases at peak rate: 10 cm/year (age 13.8)
Pubic hair:	Hair of adult quality
	Not spread to junction of medial thigh with perineum
	Age 13.9 years (12.0–15.8 years)
Penis:	Continued growth in length and width
	Age 13.2 years (11.2–15.3 years)
Testes:	Length 4.1–4.5 cm
Other changes:	Axillary hair (age 14.0 years)
	Voice changes (age 14.1 years)
	Acne vulgaris (age 14.3 years)

Tanner Stage 5

Height:	No further height increase after age 17
Pubic hair:	Adult pubic hair distribution (15.3 years)
	Pubic hair spreads to medial thigh
	Hair spread to linea alba
Penis:	Mature genital size by 16.5 years
Testes:	Length >4.5 cm
Secondary sexual characteristics:	Facial hair present on sides
	Mature male physique
	Gynecomastia disappears

Growth in boys (Fig. 3)

Peak height velocity:	Age 13.5 (11.7–15.3 years)
Basal growth occurs up until Tanner Stage 4	
Basal growth rate:	5.0–6.0 cm/year
Pubertal growth	
Boys who mature average time:	9.5 (7.1–11.9) cm/year
Boys who mature early:	10.3 (7.9–12.5) cm/year
Boys who mature late:	8.5 (6.3–10.7) cm/year
Male genital and pubic hair stages	

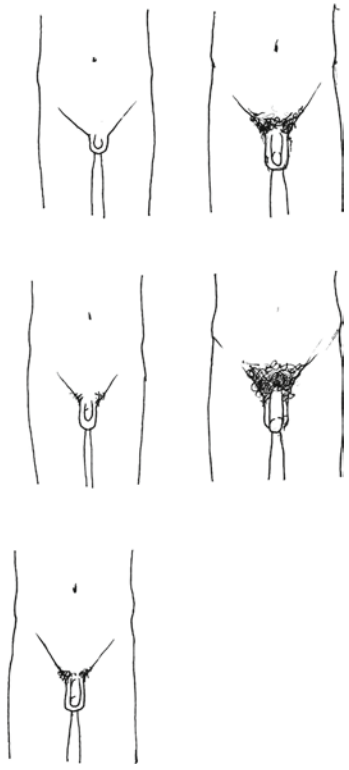


Figure 3. Male tanner genital and pubic hair stages.

REFERENCES AND ADDITIONAL READINGS

Family Practice Notebook. Adolescent Development. Available at: http://www.fpnotebook.com/Peds?Teen?AdlscntDvlpmnt.htm

Marshall WA, Tanner JM. Variations in pattern of pubertal changes in girls. Arch Dis Child 1969;44:291–303.

Marshall WA, Tanner JM. Variations in the pattern of pubertal changes in boys. Arch Dis Child 1970; 45:13–23.

Rosen DS. Physiologic growth and development during adolescence. Pediatr Rev 2004;25:194–200.

4

Normal Adolescent Development

Karen Sadler

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
ksadler@partners.org

Though adolescence may be a time of turbulence and conflict (the second "terrible twos"), 80% of children pass through the teen years without a significant deterioration in their family relationships. The hardest times for parents and caregivers tend to be when great developmental leaps are taking place.

PSYCHOSOCIAL DEVELOPMENT

Following the paradigm of Eric Erikson, the task of adolescence is to form an identity by:

(a) Striving for independence from parental control and a measure of economic independence.
(b) Developing a value system
(c) Becoming comfortable with their bodies
(d) Building meaningful relationships

Consequent Behaviors

Early Adolescence (11–14): Children begin to "break" from parents, preferring to spend less time with them, becoming "embarrassed"

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_4,

by them, demanding more privacy. They seek to integrate into a peer group, though that may take a few tries. They tend to be preoccupied with their bodies, especially those features they see as deviating from the norm.

Middle Adolescence (15–17): During this period, identification with peer group peaks. This fuels the continued drive for independence from parents, leading to battles over rules and limit testing. Vulnerability to group norms and values may lead to risk-taking behavior.

Late Adolescence (18–21): Identity should be almost established, thus there is less vulnerability to group norms, more comfort with physical attributes and a more stable self-image. Relationships are more reciprocal.

Cognitive Development

Early Adolescents: Expect concrete thinkers who are unable to appreciate the long-term consequences of their actions and who, when faced with a problem, have limited abilities to think through different hypothetical scenarios and to problem solve. Communication skills are not mature: when faced with an emotionally charged issue, they may not be able to broach it with their caregiver. They may demonstrate the concept of "imaginary audience" and convince themselves everyone will see their physical imperfections or know their emotional issues.

Middle Adolescents: Around 16 years, most children develop the capacity for abstract thinking, which enables them to problem solve more effectively. However, they apply this skill inconsistently, at times showing insight into difficult essay questions on exams and remarkable lack of insight into their own behaviors. Vacillation and inconsistency are seen. Feelings of invincibility engender risk taking, even with increased insight.

It is normal for teens to express opinions (strongly!), test limits, experiment with behaviors and identities, and to take risks.
Clinical tips:

1. Tailor your advice to the cognitive abilities of the teen: young teens need concrete, immediate analogies and rationales (smoking causes bad breath and black, infected lungs), while older teens can understand more long-term thinking (and reduces life expectancy).
2. Help young/mid-teens problem solve: think through different solutions together and discuss the pros/cons.

3. Be authoritative (you are a respected authority figure) but not judgmental.
4. Know the latest lingo, but use simple direct terms and descriptions.
5. Remember: they are listening, even if the sweatshirt hood is up and the earplugs are in. You remain a role model.
6. Always know the limits of confidentiality of each state in which you practice. You may be practicing within wide bounds of confidential care, but you remain a mandated reporter.
7. Know your resources: Planned Parenthood, Job Corps, social work, mental health providers, etc.
8. Important decisions are being made about sexuality, drug use/abuse, smoking, diet, exercise. We cannot make their choices for them, but we can help them think them through and encourage safe, responsible behavior.
9. Don't take it (whatever it is) personally!

Three axes control growth:

1. Adrenal: activates around 8–9 years. DHEA, DHEA-S, and androstenedione are produced, which control axillary sweating, body odor, and pubic hair.
2. HPA: GNRH → FSH, LH →gonadal stimulation → sex steroids →development of secondary sexual characteristics.
3. GHRH → Growth hormone → somatic growth (Table1).

Clinical tips:

1. The sequence and tempo of pubertal changes are just as, if not more, important than the time of onset.
2. After menarche, girls have on average, only 5 cm of growth left. Growth is complete 2–2½ years after menarche.
3. Girls increase percent body fat during puberty, boys decrease it. Girls end up with twice the percentage body fat as boys.

Table 1
Physical development

Developmental period	Percent growth
Prenatal	30
0–1 year	15
Until puberty	40
During puberty	15–18

4. Approximately 20% of girls experience pubarche (development of pubic hair) before thelarche (breast budding). This minority is at increased risk of hyperandrogenic conditions (PCOS).

Working with parents:

1. The extremes of parenting styles, authoritarian or permissive, are rarely effective, although the authoritative approach is better. This includes reasonable limits and rules, but flexibility, active listening, and positive interactions.
2. Effective parenting combines love, warmth, acceptance, availability, and developmentally appropriate guidance, rules, expectations, and supervision. (If it sounds hard, that's because it is!)
3. Parents remain role models for their teens during adolescence. Teens are particularly sensitive to hypocrisy so parents need to model with actions as well as words.
4. Humor and an ability to choose battles are helpful.
5. In the long term, teens must pull away to discover and create themselves, and then renegotiate new, more adult relationships with their parents.

IDENTITY DEVELOPMENT

Gender identity: the sense of being male or female is usually established by age 3

Sex roles: usually established between 3 and 7 years; these are the social and cultural expectations, beliefs and attitudes seen in male and female behavior

Sexual orientation is established in childhood, this is the gender to whom the individual is attracted to physically and emotionally:

Homosexual: same gender attraction
Heterosexual: opposite gender attraction
Bisexual: attraction to same and opposite gender

REFERENCES AND ADDITIONAL READINGS

Hazen E, Schlozman S, Beresin E. Adolescent psychological development: a review. Pediatr Rev 2008;29:161–68.
Ryan C, Futterman D. Lesbian and gay adolescents-identity development. Adolesc Med 1997; 211–23.

5

Male Genitourinary Exam

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, Mass General Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

During adolescence, examination of the male genitalia should be part of the annual examination. The purposes of this examination are to stage development, detect disease, and instruct boys on testicular self-examination. In addition, some boys are assured by "normal" findings in the exam. A chaperone is generally unnecessary but could be offered to younger adolescent males. Usually parents should be excused. Some boys prefer to be gowned. The genital exam is best performed when the boy is standing and the area well illuminated. A brief description of the exam should be given beforehand. It is best to have the patient roll back the foreskin (see Fig. 1).

For early adolescence (12–15 years), Tanner staging and a hernia check should be done. For middle adolescence (15–18 years), it is appropriate also to teach testicular self-exam. For late adolescence (18–21 years), also do a physical screen for sexually transmitted infections (STIs) and sooner if the patient is sexually active.

Pink pearly penile papules. Seen in about 15% of males, these are benign 1–2 mm papules often located on the perimeter on the glans penis, giving a cobblestone-like appearance. They develop after puberty and occur in a single or double row on the coronal of the glans. These papules are related to acral angiofibromas. They are not to be confused with genital warts or molluscum, and they do not require

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_5,

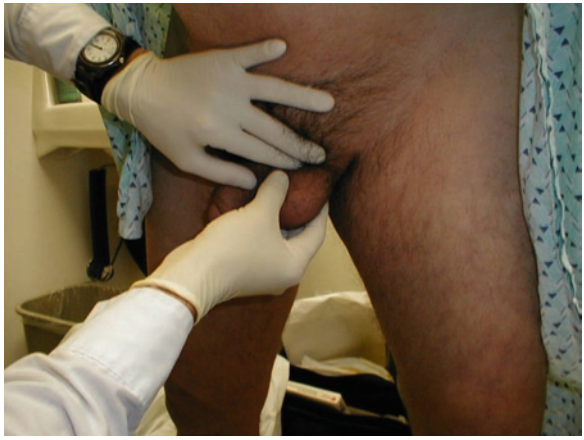


Figure 1. Male genitourinary examination.

any treatment. Reassure the adolescent that they are normal, and that they cannot be transmitted to a sexual partner.

Phimosis: (see Fig. 2). This condition may result from repeated inflammation or injury on the prepuce causing a fibrotic ring. As a result, there may be difficulty fully retracting the foreskin. This could interfere with hygiene, urination, and sexual relations. Although vitamin E or steroid cream may be helpful, the definitive treatment is a dorsal slit, removal of the fibrotic ring, or circumcision.

Paraphimosis: This condition occurs when the foreskin is tight but still somewhat retractile. When the foreskin is pulled back, but then cannot be repositioned, then paraphimosis occurs. Most commonly in adolescents, it occurs during intercourse – sometimes during the first occasion. It is an emergent condition. Treatment includes reducing the swelling by ice or fluid evacuation. Under local anesthesia, the foreskin is then replaced into its normal position. Prevention includes a dorsal slit procedure or circumcision. Swelling of the foreskin prevents normal retraction (Fig. 3) apperance of the foreskin after retraction is seen in figure 4.

Varicocele: This condition consists of enlarged and often tortuous veins that are usually seen on the left side of the scrotum since the left gonadal vein is longer than the right. The left spermatic vein inserts at a right angle into the left renal vein and has a higher likelihood of incompetent valves. This leads to a higher potential for blood to back

Figure 2. Phimosis.

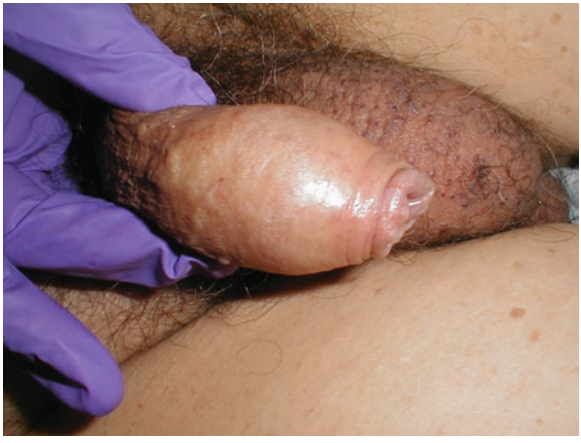


Figure 3. Paraphimosis. Credit: Charlie Goldberg M.D.

Figure 4. Appearance after treatment. Credit: Charlie Goldberg M.D.

up and cause dilated spermatic veins. On the right side, the right spermatic vein enters the vena cava at an acute angle with backup less likely. Varicoceles present between ages 10 and 15 years and are seen in about 15% of adult males. Check to be certain a left sided varicocele obliterates when the patient assumes a supine position. If not, then imaging studies should be considered to rule out venous obstruction in the abdomen. Right sided varicoceles should be evaluated with imaging studies to rule out a mass lesion. Varicoceles should be followed annually, especially since larger varicoceles may be associated with decreased sperm counts (Fig. 5).

Balanitis: an infection of the glans, usually seen in uncircumcised males, and caused by *Candida*, although bacterial superinfection may occur. A sex partner may also have infection. A topical antifungal cream is the usual treatment. When the glans and the inner aspect of the foreskin are involved, it is termed balanoposthitis (Fig. 6).

Testicular Self Exam: TSE is an important examination that should be taught to adolescents. This is most easily done during the annual examination as the clinician is performing the exam. Teaching it every year is important as adolescents often do not start doing TSE immediately. There is no national consensus as to whether adolescents should perform TSE; however, some males have found important testiculation pathology on their TSE.

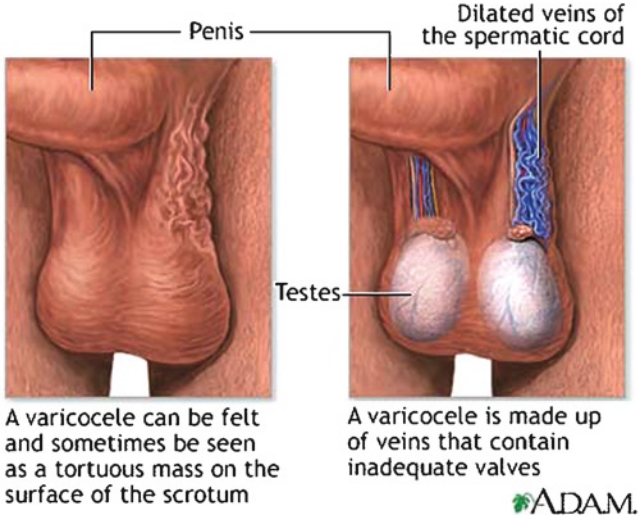


Figure 5. Left-sided varicocele. Credit: Medlineplus National Library of Medicine.

Figure 6. Balanitis of Glans. Credit: Charlie Goldberg M.D.

Hydrocele: This is a fluid collection between the parietal and visceral layers of the tunica vaginalis. In adolescents, hydroceles are usually painless, and they may change in size. Occasionally, hydroceles may develop in reaction to a testicular tumor, epididymitis or testicular torsion, so it is very important to carefully examine the

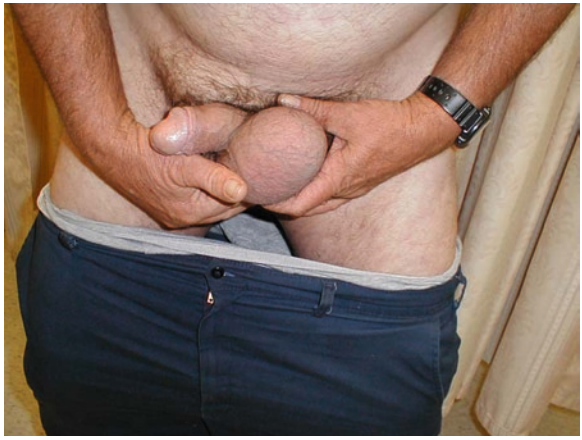


Figure 7. Hydrocele. Credit: Charlie Goldberg M.D.

testicle. Hydroceles may transilluminate. Elective surgery can be done for those hydroceles that are symptomatic or large (Fig. 7).

Hernia: A hernia usually presents as a bulge in the groin, although it may appear as a scrotal mass. Valsalva maneuvers including cough or straining can make a hernia more apparent. A hernia usually disappears with the adolescent in the supine position. Unless incarcerated, the pain may be a dull ache; with incarceration, the pain is more severe. A hernia feels soft and squishy and often takes the shape of a sausage. Inguinal hernias are generally electively repaired in adolescents; incarcerated hernias are a surgical emergency (Fig. 8).

Spermatocele: Spermatocele is a retention cyst of the rete testis, ductuli efferentes, or epididymis filled with fluid containing sperm. It rarely undergoes torsion. It is usually small, fluid filled, and should transilluminate located above and anterior to the testis. Ultrasound is generally performed to evaluate for the chance of occult testicular malignancy. No treatment is generally necessary.

Testicular Torsion: Torsion occurs from twisting of the spermatic cord that compromises blood supply to the testicle. There is usually a 4–8 h window before ischemic damage occurs; however, adolescents often present beyond that period. This condition is an urgent surgical emergency. Abnormal testicular fixation, “the bell-clapper” deformity, allows the testicle to twist especially as the testicle enlarges and

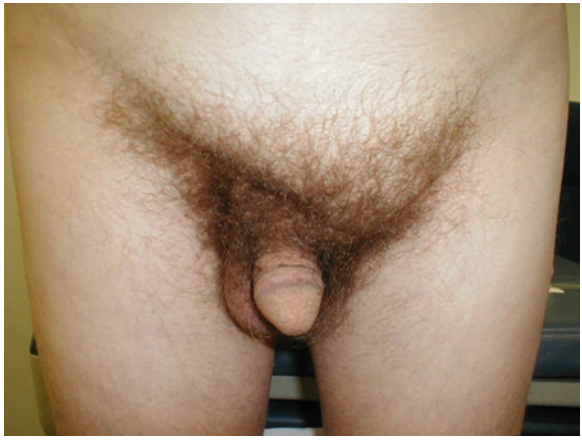


Figure 8. Indirect inguinal hernia. Credit: Charlie Goldberg M.D.

becomes more vascular during early puberty. Severe unilateral scrotal pain often accompanied by nausea and vomiting is the classic presentation. The affected testicle may be riding higher in the scrotum or have an abnormal transverse lie. The adolescent usually is in significant pain so a thorough testicular examination may not be possible. Immediate ultrasonography with color Doppler allows determination of blood flow, is readily available and less time consuming than radionuclide imaging of the scrotum. This test is highly reliable and does not expose the adolescent to radiation. A surgeon should be involved immediately (Fig. 9).

Epididymitis: This disorder is usually characterized by scrotal pain and swelling that occurs over a period of days rather than hours. Generally the epididymis is enlarged and tender as is the spermatic cord. There may be an associated hydrocele. Epididymitis may be caused by bacteria from urethritis or a urinary tract infection reaching the epididymis in a retrograde manner. A bacteriological diagnosis can be established by culturing urine or screening urine for Chlamydia or Gonorrhea. Men who have insertive anal sex may develop epididymitis caused by an enteric organism such as *E. coli*. Treatment is directed at the probable organism(s) and should be initiated before laboratory test results are available. (See section on STI for appropriate treatment regimens). The sex partners of patients with

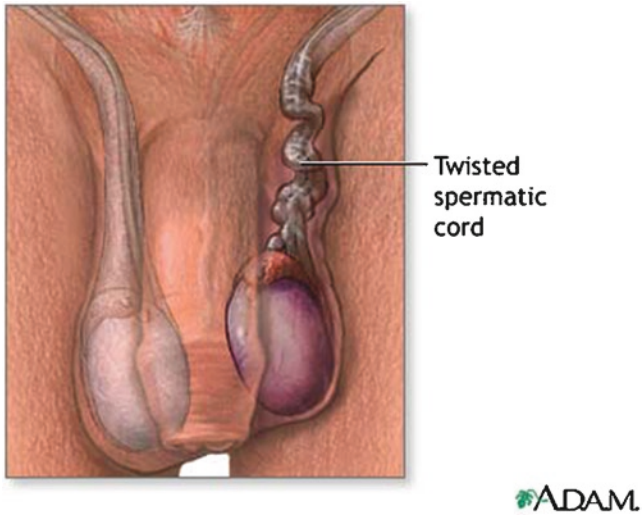


Figure 9. Testicular torsion. Credit: Medline Plus National Library of Medicine.

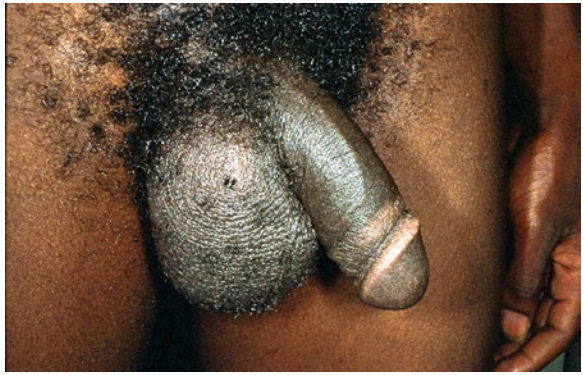


Figure 10. Epididymitis with swelling. Credit: Seattle STD/HIV Prevention Training Center.

confirmed infection with Chlamydia or Gonorrhea should be referred for treatment if his/her contact with the patient was within 60 days preceding the onset of his symptoms (Fig. 10).

Testicular Tumor: Tumors of the testicle are the most common cancer in adolescent and young adult males aged 15–34 years. The incidence may be as high as 1/10,000. It is highest in Caucasians, and

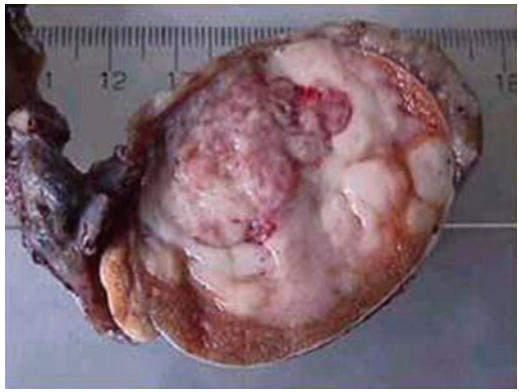


Figure 11. Testicular malignancy.

males with a history of cryptorchidism have an increased risk for testicular cancer. Because mid adolescents can develop testicular cancer, the teaching of the testicular self-examination should be initiated by that time. Symptoms include a definitive non-tender mass on the testicle. Adolescents complain of a dragging or heavy sensation to the testicle. Some teens develop gynecomastia when a tumor is secreting human chorionic gonadotropins. Others may have back or flank pain from metastatic disease. Examination reveals a firm/hard mass attached to the testicle that does not transilluminate. Testing should initially include a scrotal ultrasound (be sure to evaluate both testicles), which can discriminate between a malignant and a nonmalignant process. If a tumor is suspected on the basis of ultrasound, then oncology and urology need to be involved immediately for staging and treatment (Fig. 11).

I am grateful to Charlie Goldberg M.D. University of California, San Diego, School of Medicine, San Diego VA Medical Center for allowing me to use images in this chapter.

REFERENCES AND ADDITIONAL READINGS

Adelman WP, Joffe A. Testicular masses/cancer. Pediatr Rev 2005;26:341–43.
Gatti JM, Murphy JP. Acute testicular disorders. Pediatr Rev 2008;29:235–40.
Goldstein MA. Male puberty: physical psychological, and emotional issues. Adolesc. Med 2003;14:541–53.
Jenkins JT, O'Dwyer PJ. Inguinal hernias. BMJ 2008;336:269–72.
Korben A, Dissemond J. Pearly penile papules. CMAJ 2009; 181:397.

ERRATUM TO:

5

Male Genitourinary Exam

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, Mass General Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

Two figures were inadvertently transposed.

On page 29, the image for Figure 3 should have appeared on page 30 as Figure 4 – "Appearance after treatment."

The existing image for Figure 4 on page 30 should have appeared on page 29 – depicting "Paraphimosis." The Figure credits remain the same.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_5,

6

The Pelvic Exam and Pap Smear

Stephanie Corrado

Division of Adolescent and Young Adult Medicine, Mass General Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
scorrado@partners.org

Although the incidence of cervical cancer has declined in the United States, it remains one of the leading causes of cancer-related death in developing countries. Despite advances in cervical cancer screening, there were an estimated 11,150 cases of invasive cervical cancer in the USA in 2007 with 3,670 women expected to die of the disease. It is important to utilize the screening methods available to detect cervical changes early.

WHO NEEDS A PELVIC EXAM?

Consider adolescents with the following symptoms for a pelvic exam:

1. Pelvic/abdominal pain
2. Abnormal vaginal discharge
3. Vaginal lesions
4. Positive urine HCG with pelvic pain or bleeding
5. Dysfunctional uterine bleeding (DUB)
6. Amenorrhea
7. Papanicaolaou (Pap) smear at age 21 or older

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_6,

The pelvic exam includes examination of the external genitalia for anatomic abnormalities, hymenal opening, clitoral size, lesions or discharge, and a bimanual exam assessing for cervical motion tenderness, adnexal or uterine tenderness or masses. A speculum exam or Pap smear is not necessarily indicated for all pelvic exams. Contraceptive management can be done without a pelvic exam.

WHO NEEDS A PAP SMEAR?

The following are guidelines, for initial Pap smears in adolescents and young adults aged <30 years, from the American College of Obstetricians and Gynecologists (ACOG):

1. Cervical cancer screening should begin at age 21 years.
2. Cervical cancer screening is recommended every 2 years for women aged 21–29 years using either liquid-based cytology or the conventional method.
3. More frequent cervical screenings may be necessary in women who are HIV positive, are immunosuppressed, have a history of exposure to diethylstilbestrol in utero, or who have been treated previously for low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL) or carcinoma in situ. See additional readings and the article by Goldstein et al. for a case example.
4. It should be noted that some clinicians who are performing a pelvic examination in an adolescent under age 21, such as for abnormal vaginal bleeding, may perform a Pap test. For example, they feel that the patient may have an undiagnosed immunosuppressive disease that could be presenting with a serious cervical or endocervical lesion. As in many areas of medicine, the physician's judgment must be a consideration in deciding to do a Pap outside of the guidelines.

TESTING FOR HUMAN PAPILLOMAVIRUS ON THE PAP SMEAR

This is generally not recommended for adolescents who are 20 years and younger. Reflex HPV testing may be ordered for young adults ages 21–30.

Adolescents do not require a pelvic exam or Pap smear for contraceptive management. ACOG guidelines recommend Pap smear screening to begin at age 21, since this allows for spontaneous regression of HPV as there is a high clearance rate of HPV in adolescents. This results in fewer higher risk procedures (such as culposcopy) being unnecessarily performed. Screening of urine for Chlamydia and Gonorrhea may be done in lieu of cervical screening.

Male clinicians must be chaperoned by a female; this may not include the patient's mother, relatives, or friends. Female clinicians need not be chaperoned, but may wish to have one anyway.

Adolescents may have anxiety regarding the pelvic exam. Many will not know what the exam entails. It is important that the physician is sensitive to these issues and outlines the procedure clearly. A pelvic exam should be explained thoroughly and efficiently in three steps. The three main points are as follows and are written in script format:

1. External Genitalia Exam: "First, I will examine the outside of your vagina."
2. Speculum Exam and Pap: "Then I will insert a speculum into your vagina to visualize your cervix."
3. Bimanual Exam: "Finally, I will examine your uterus and ovaries by inserting a finger and feeling for your uterus and ovaries."

It is important to tell your patient that you will explain everything as you proceed. The external genital exam includes Tanner staging, evaluation of clitoral size, and inspection for external genital lesions, assessment of estrogenization status, vaginal discharge, and anatomy. Pink, moist vaginal mucosa reflects adequate estrogenization, while beefy, red, thin vaginal mucosa reflects low estrogen levels seen in disorders such as anorexia nervosa.

Prior to inserting the speculum, place the water-warmed speculum on the inner thigh to prepare her for the next step of the exam. The speculum should be positioned posterior at a 45° angle when inserted. The introitus should be gently pulled down with the opposite hand as the speculum is inserted. When inserted completely, the speculum should be opened slowly and pulled back and the cervix may be easily visualized.

Once visualized, the cervix should be inspected for lesions, friability, or ectropion. The Pap smear is obtained by initially using a cytobrush for ectocervical sampling and then a brush (sometimes called a broom) for endocervical sampling. Note that some hospitals and clinicians use only the brush (broom). The brush (broom) should

be inserted into the cervical os and turned ¼–½ turn to obtain the endocervical cells. Both brushes should be swirled vigorously into the liquid container if using the Thin Prep for cytology. The broom detaches and should be left in the Thin Prep liquid container. Testing for Gonorrhea and Chlamydia is done using the PCR testing kit. The white cleaning brush is used first to clean the cervical os, and then it is discarded. The test swab (blue swab) is then inserted into the cervical os and swirling it 10–20 times to obtain adequate cells. The blue swab is broken and placed into the tube to be sent for PCR.

Once the swabs are obtained, the speculum is removed slowly. Inspect the vaginal canal for any lesions not visualized on insertion.

The final part of the exam is the bimanual exam. Lubricating gel is used on one finger which is inserted into the vagina. The cervix and uterine size should be easily assessed. Cervical motion tenderness is present if there is pain upon moving the cervix during the exam. The adnexae are also assessed by moving to each side and palpating both internally and externally at the same time. Normal-sized ovaries are difficult to feel, as they are usually less than 3 cm in size. The presence of a mass, tenderness, or fullness in the adnexa prompts further investigation with a pelvic ultrasound.

CERVICAL TESTING METHODS

Two types of tests are used for cervical cytology: the conventional Pap smear and the thin-layer liquid preparations. Liquid-based cytology has become a standard collection method because there are fewer unsatisfactory specimens; reflex HPV testing can be performed and it may detect glandular lesions better than PAP smears.

The guidelines take into account the fact that adolescents exposed to HPV are likely to clear the infection spontaneously. By waiting until the age of 21, the chance of clearing is higher, thus avoiding unnecessary procedures for further evaluation such as colposcopy.

Cervical testing results are reported using the 2001 Bethesda classification system:

(a) Negative for squamous intraepithelial lesion (SIL) or malignancy
(b) Atypical squamous cells of undetermined significance (ASCUS)
(c) Low-grade squamous intraepithelial lesion (LSIL)
(d) High-grade squamous intraepithelial lesion (HSIL)

(e) Atypical squamous cells; cannot exclude HSIL (ASC-H)
(f) Carcinoma in situ
(g) Squamous cell carcinoma

Pap Diagnosis and Recommendations: As the new recommendations for initiation of the first Pap test at age 21 gradually become practice standards – and as some adolescents under age 21 may still have Pap tests – we have included information on the previous treatment recommendations of abnormal Pap tests.

ASCUS: ASCUS stands for "atypical squamous cells of undetermined significance." This is a common finding on routine screening. For adolescents aged 20 years and younger, HPV testing is not recommended, since there is a high prevalence of HPV infections in this age group that usually clear within 2 years of infection. In addition, minor-grade cytologic abnormalities, including ASCUS and LSIL, have very low risk for invasive cancer in this age group. The patient with ASCUS is to be observed and a repeat Pap test should be done in 12 months. If the repeat test is ASCUS at 12 months, then repeat the Pap in 1 year. If the repeat Pap at 12 months is LSIL, HSIL or higher, then the patient should be referred for colposcopy. Atypical cells identified on the cervical testing will resolve spontaneously returning to normal. Colposcopy is to be discouraged in adolescents as it may result in harm through unnecessary treatment.

LSIL: LSIL stands for low-grade squamous intraepithelial lesions. This means that there are squamous cell changes noted on the cervical testing. For adolescents 20 years and younger, follow the same referral guidelines as under ASCUS.

HSIL: HSIL stands for high-grade squamous intraepithelial lesions. This is less commonly seen in adolescents. High-grade changes reflect cervical dysplasia, and it is important for these patients to be referred for colposcopy and further testing and management per the gynecology service.

Atypical squamous cells cannot exclude HSIL, carcinoma in situ, and squamous cell carcinoma. These are potentially serious issues that require adolescents to be referred to a gynecologist.

The frequency of cervical screening may change if an adolescent has an abnormal Pap smear. The results of colposcopy determine the next steps in treatment. A colposcopy entails more direct visualization of the cervix using a special magnifying instrument called a colposcope. The cervix is stained with acetyl white solutions to look for abnormalities. If

indicated, a biopsy will be taken. Based on the biopsy results, the patient may need further testing with repeat colposcopy, repeat biopsy, or other surgical procedures. Usually, the patient will require cervical screening every 6 months until there are three normal cervical screenings.

REFERENCES AND ADDITIONAL READINGS

The American College of Obstetricians and Gynecologists. Cervical cytology screening. ACOG Pract Bullet 2009;109:1–12.

Goldstein M, Goodman A, del Carmen M, Wilbur D. A 23-year-old woman with an abnormal Papanicolaou smear. N Engl J Med 2009;360:1337–44.

Greydanus DE, Omar H, Patel DR. What's new: cervical cancer screening in adolescents. Pediatr Rev 2009;30:23–5.

Wright TC Jr, Massad LS, Dunton CJ et al. 2006 Consensus guidelines for the management of women with abnormal cervical cancer screening tests. Am J Obstet Gynecol 2007;197:346–55.

7

Adolescent Dermatology

Daniela Kroshinsky

Department of Dermatology, Massachusetts General Hospital,
50 Staniford Street, Suite 200, Boston, MA 02114, USA
dkroshinsky@partners.org

ACNE

Acne is one of the most common skin infections, affecting approximately 85% of people at some point during their lives. The lesions consist of open and closed comedones (blackheads and whiteheads), papules, pustules, cysts, and/or nodules over the face, chest, and/or back. Treatment is geared toward the type of lesions and presence of scarring.

Comedonal acne will only respond to topical retinoids such as tretinoin (Retin-A™), tazarotene (Tazorac™), or adapalene (Differin™). These medications increase skin turnover and make cells less "sticky" so they are less likely to clog pores. This is an important step, as the comedone is thought to be the precursor lesion to more inflammatory forms of acne. Efficacy and potential irritation are directly proportional, and these medications can be ranked in both as tazarotene > tretinoin > differin.

Topical retinoids should be used nightly, beginning with the lowest possible concentration and applied in small quantities. The easiest way to initiate use is with a pea-sized drop spread evenly over the entire face beginning every other night for 2 weeks, then increasing to nightly as tolerated. The major complaints are redness, dryness,

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_7,

and peeling. As the skin becomes used to the medication, these will subside. The use of non-comedogenic (non–pore clogging) moisturizer can minimize this, but some adolescents will never be able to tolerate nightly use and should be encouraged to use the medication every other night or biweekly. Patients and parents should be counseled that the medication needs to be utilized for 2–3 months before any results are seen. After 2–3 months of successful (i.e., non-irritated) use, concentration may be increased to the next highest strength available for maximal efficacy. In addition to clearing comedones, this family of medications may help resolve postinflammatory hyperpigmentation and may be useful in almost all types of acne.

Mildly inflammatory acne consists of few erythematous papules and/or pustules, usually accompanied by comedones. Topical erythromycin or clindamycin qam with a topical retinoid qhs is most effective. Concomitant benzoyl peroxide (BP) use with topical antibiotics may help limit development of resistance but also increases irritation and dryness. In addition, topical BP can bleach clothing and linens. Use of an over-the-counter BP wash ranging from 4% to 10%, with skin contact for 20–30 s may provide the same effect without the side effects.

For moderate-to-severe inflammatory acne, the above regimen should be continued and an oral antibiotic added. Minocycline or doxycycline 100 mg po bid is most effective. Use caution with doxycycline as significant resulting photosensitivity may result in severe sunburns and patients should be warned of this. Major complaints with minocycline include headache or dizziness – these may be dose dependent in affected individuals. Monitor also for blue-gray discoloration of old acne scars with long-term minocycline use. Both medications should be taken after eating, despite package insert instructions. These medications should be maintained until very few lesions are appearing each month. At this point, a taper can be initiated. Tapering may vary, but it is recommended to decrease the oral medication from 100 mg bid, to 50 mg qam and 100 mg qpm for 3–4 weeks, then 50 mg bid for 3–4 weeks, then discontinued.

Severe acne, which usually has nodules, cysts, and significant scarring, tends to be unresponsive to the above regimens; individuals with this type of acne should be referred for isotretinoin use. While it has received some bad press lately, isotretinoin remains the single most effective therapy for severe or scarring acne, and when monitored appropriately, remains a safe therapeutic agent. Patients with

Table 1
Acne therapy cheat sheet

Treatment	Options
Topical antibiotics	Clindamycin 1% pledget, solution, lotion, or gel Erythromycin 2% solution, pledget, or gel
Combination BP/antibiotics	Benzaclin™: 5% BP + 1% clindamycin Duac™: 5% BP + 1% clindamycin Benzamycin™: 5% BP + 2% erythromycin
Topical retinoids	Tretinoin 0.025%, 0.05%, 0.1% cream gel 0.04, 0.1% microsphere gel Tazarotene™ 0.05%, 0.1% cream, gel Adapalene™ 0.1% cream; 0.1, 0.3% gel
Oral antibiotic	Minocycline 50 mg, 100 mg tab, cap Doxycycline 50 mg, 100 mg tab, cap
Oral contraceptives	FDA approved for acne vulgaris: Estrostep™, Ortho Tri-Cyclen™, Yaz™ Clinical data to support use: Alesse™, Diane-35™ Yasmin™

severe acne, especially young men with back involvement, should be asked about bony pain, myalgias, arthralgias, or fevers, as this may be a sign of more severe acne, acne fulminans that will require both isotretinoin and prednisone use.

No matter what type of acne is present, affected adolescents should be follow-up in four to six weeks after the first visit to assess for proper use of medications and possible side effects, as well as to provide reassurance. From that point on, subsequent follow-up may be spread out: 6 weeks later, then 2–3 months later, then 6 months later, then annually. Female patients should be asked about irregular menses, increased hair growth that may suggest polycystic ovary syndrome that should prompt a hormonal evaluation (Table 1).

TINEA PEDIS

Tinea pedis, or "athlete's foot," is the most common superficial fungal infection affecting adolescents. It is infrequently seen in children. There are three forms of this foot infection: intertriginous, moccasin type, and inflammatory/vesicular. The intertriginous form typically presents as scaling, maceration, and inflammation in the toe web spaces. The moccasin-type tinea pedis presents with erythema,

scaling, and hyperkeratosis of the soles of the feet, extending up the sides of the feet. The inflammatory variant of tinea pedis presents with inflammation, vesicles, and sometimes bullae. It represents an inflammatory reaction to the fungal organisms present. Occasionally, the inflammatory reaction can become generalized, producing papules or vesicles over the hands and/or torso.

Diagnosis may be confirmed with a potassium hydroxide (KOH) wet mount preparation that will demonstrate septated hyphae and/or a fungal culture taken from gentle scraping of the scale from the affected surfaces. Treatment of routine infections is with a topical antifungal such as econazole, terbinafine, or ciclopirox twice daily for 2–3 weeks. Severe infections may require oral therapy. Preventing infection or recurrence is important. Humid or moist surfaces, such as the floors of the gym, pool decks or public showers are potential sources. It is important to keep feet dry and avoid occlusive or non-breathable shoes or socks. Antifungal powders or sprays and the use of footwear when walking on prone surfaces may be helpful to prevent reinfection. For those with sweaty feet, use of aluminum chloride 20%, a prescription-strength antiperspirant, can be helpful to prevent recurrences. Aluminum chloride should be initially applied q3days, increasing to qd as needed to control the hyperhidrosis.

TINEA CRURIS

Tinea cruris, or "jock itch," is a superficial fungal infection of the groin and/or upper thighs usually seen in adolescents and adults, typically male. It is most often seen in overweight individuals or persons involved in activities that produce sweating or chaffing or who wear tight fitting clothing.

Clinically, the lesions present as well-demarcated, erythematous to hyperpigmented plaques with a raised border of scaling and relative central clearing. Tinea cruris is usually pruritic, bilateral, and tends to spare the scrotum and labia majora. Involvement of these areas or the presence of satellite papules or pustules should suggest cutaneous candidiasis or inverse psoriasis. In chronic infections or if topical steroids have been applied, the margins, border, and scale may be more subtle, resulting in the loss of the characteristic "rings" and producing a "tinea incognito" picture. Chronic pruritus with scratching may produce lichenification. The diagnosis may be confirmed by

potassium hydroxide (KOH) wet mount preparation that will demonstrate septated hyphae and/or with a fungal culture. The differential diagnosis for a rash in this distribution includes cutaneous candidiasis, intertrigo, inverse psoriasis, irritant contact dermatitis, allergic contact dermatitis, and erythrasma.

Treatment involves topical antifungal agent applied twice daily for 3–4 weeks . Oral antifungal therapy may be necessary for extensive or inflammatory cases. Loose-fitting cotton undergarments and drying well after showers or perspiration may help to prevent recurrences. Prophylactic use of over-the-counter antifungal powders may also be helpful, though insufficient to treat an active infection and should not be used concomitantly with an antifungal cream as it will produce a paste, which is uncomfortable and cosmetically difficult. Concomitant tinea pedis should be treated to prevent reseeding of the infection.

TINEA VERSICOLOR

Tinea versicolor is a superficial fungal infection caused by the yeast forms of *Pityriasis ovale/Malassezia furfur* that creates multiple circular and oval scaling macules, patches, and plaques, most often becoming confluent over the chest/back, proximal extremities, and sometimes the neck and face. The lesions tend to be pink or salmon-colored in light skin types but can also present as hypo- or hyperpigmented areas. The organism produces azelaic acid, which can bleach affected areas. Patients should be reassured that color discrepancies may persist for months despite adequate treatment and that this is not a sign of a persistent state or reinfection. The color will return spontaneously with time, and additional treatment will not impact the course of repigmentation.

The causative organism is considered to be part of normal skin flora, but becomes clinically relevant during times of increased sweating and in adolescence with increased sebum production – both of which create a favorable environment for organism multiplication. The diagnosis may be confirmed by potassium hydroxide (KOH) wetmount preparation that will demonstrate “spaghetti and meatball” pattern of hyphae and spores. In darker skin types, confluent and reticulated papillomatosis (CARP) should be considered when lesions fail to respond. These lesions tend to present with velvety hyperpigmented patches or plaques over the central torso.

For the treatment of mild infections, selenium sulfide 2.5% or ketoconazole 2% shampoo may be applied daily for 10 min prior to rinsing for 1–2 weeks. Topical ketoconazole cream or lotion can be applied twice daily for 1–2 weeks as well. Severe cases, cases involving hair-bearing regions, or recalcitrant cases can require oral therapy. Ketoconazole 400 mg PO followed one hour later by sweat-inducing activities can be very effective, especially as this causes the medication to be secreted onto the skin where it is not rinsed for 10–12 h. This routine is repeated in 1 week to eliminate the hyphae resulting from the residual spores. Single dose fluconazole 400 mg PO × 1 is an alternate option. Use of the shampoo every other week or once a month may prevent recurrences in prone individuals.

PITYRIASIS ROSEA

Pityriasis rosea, or PR, is a common scaling eruption of unclear etiology. Though it has been thought to be virally mediated, no specific cause has been identified and antiviral therapies have been ineffective. It is reported in all age groups, with 75% of cases arising in individuals between 10 and 35 years old.

Clinically, the eruption initially presents with a "herald patch" – the largest lesion that is first to arise, usually on trunk, as a single papule that expands into a pink erythematous oval patch or plaque with raised border and scale that may be up to 10 cm in diameter. This lesion is followed 7–10 days later by the classic eruption of round to oval macules, patches, and plaques with fine central scale and a thicker ring of scale whose free edge faces inward (collarette). These lesions are arranged along the trunk in a "fir-tree" or "Christmas-tree" distribution (long axes of the oval lesions run parallel to the "branches" of the "tree" whose "trunk" is the spine). These lesions tend to arise on the trunk and proximal extremities, particularly the arms, though face, palms, soles, and mucosa may be involved and an "inverse" or skin-fold variety exists, with a predilection for the axilla and groin. Palm and sole involvement should prompt consideration for secondary syphilis, and an RPR can be checked if the clinical situation warrants. In a minority of cases, multiple herald patches may be found or can present concomitantly with the generalized eruption.

The eruption may be preceded by prodromal symptoms of fever, malaise, or arthralgias, and may be accompanied by pruritus. Patients

should be reassured that the color will fade with time and does not represent a "resistant" case. Papular PR is another variant, most often seen in individuals of African descent. The herald patch is followed by the eruption of up to hundreds of small maculopapules, some with a scaly border, over the same distribution as routine PR. Individuals affected by this variant are more likely to have scalp and facial lesions and more likely to report pruritus and post-inflammatory pigmentary alteration. The lesions are more likely to have abundant scale.

PR is a self-limited process and patients recover over 2–12 weeks, though rarely as long as several months later. The eruption usually heals without scarring, but may leave pigmentary alteration in severe cases or in skin with darker pigmentation. Treatment should be geared toward control of pruritus and minimizing the scale if the patient is concerned by the appearance. Nonsedating antihistamines, such as loratidine, cetirizine, and fexofenadine may be used during the day with diphenhydramine or hydroxyzine qhs. Resistant pruritus may be treated with topical steroids, though patients should be reminded that this will not alter the course. Hydrocortisone 2.5% lotion bid for 1–2 weeks in mild cases or triamcinolone 0.1% bid for 1–2 weeks may be helpful. Patients should be warned of the risk of cutaneous atrophy and striae formation if overused. Don't give refills! Scale may be improved with moisturizers, especially those containing lactic acid (6% OTC Am-Lactin™ or 12% Rx Lac-Hydrin lotions), used BID. Lac-Hydrin is often not covered by insurance. Recalcitrant or severe cases may be referred for possible narrowband ultraviolet B phototherapy tiw.

REFERENCES AND ADDITIONAL READINGS

James WD. Acne. N Engl J Med 2005;352:1463–72.
Yan, AC. Current concepts in acne management. Adolesc Med 2006;17:613–37.
Zaenglein AL, Thiboutot DM. Expert committee recommendations for acne management. Pediatrics 2006;118:1188–99.

8

Obesity

Jennifer Rosenblum

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA, 02114, USA
jrosenblum@partners.org

BACKGROUND

Since 1980, the prevalence of obesity in adolescents has more than tripled. The latest National Health and Nutrition Examination Survey (NHANES) data from 2003 to 2006 shows that 17.6% of adolescents ages 12–19 have obesity, compared to only 5% in the 1976–1980 survey. There are racial disparities, with Hispanics and African-Americans being affected more than Caucasians. This epidemic is now recognized as a national crisis, with significant health consequences and financial burdens.

DEFINITION

Obesity is determined by the body mass index (BMI), which is defined as weight (in kg) divided by height (in m^2). For children and adolescents, overweight is defined as BMI >85th percentile and obesity as ≥95th percentile for age based on the 2000 CDC growth charts.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_8,

ETIOLOGY

Obesity occurs due to an imbalance between energy intake and energy expenditure. The factors contributing to this imbalance include genetic, environmental, behavioral, and medical factors. The complex interaction between these factors as they contribute to obesity is unique for each individual.

MEDICAL EVALUATION

1. Identify medically treatable causes of obesity (Table 1).
2. Identify and treat obesity-related comorbidities (Table 2).
3. Assess medications that may be contributing and adjust as needed (Table 3).
4. Perform a laboratory evaluation for causes and effects of obesity: fasting glucose and insulin, liver panel, creatinine, fasting lipids, TSH, vitamin D, free testosterone.

Table 1
Medically-treatable causes of obesity

Drug induced (>97%)	(see Table 8.3)
Genetic syndromes (<1%)	Albright hereditary osteodystrophy Alstrom–Hallgren syndrome Bardet–Biedl syndrome Beckwith–Wiedemann syndrome Carpenter syndrome Cohen syndrome Prader–Willi syndrome
Single-gene disorders (<1%)	Leptin deficiency Leptin-receptor deficiency Propiomelanocortin (POMC) deficiency Prohormone convertase 1 impairment Melanocortin receptors 3 and 4 deficiency
Endocrine disorders (<1%)	Cushing's syndrome Hypothyroidism Growth hormone deficiency Acquired hypothalamic lesions • Infection • Vascular malformation • Neoplasm • Trauma

Table 2
Obesity-related comorbidities

Metabolic	Insulin resistance	PCOS
	Impaired glucose tolerance	Sleep apnea
	Diabetes	Migraines
	Fatty liver disease	Reproductive dysfunction
	Dyslipidemia	Gallstones
	Hypertension	Kidney stones
	Thromboembolism	Pancreatitis
	Proteinuria	Vitamin D deficiency
Structural	Obstructive sleep apnea	Slipped capital femoral epiphysis (SCFE)
	GERD	Tibia vara (Blount disease)
	Asthma	Fungal skin infections
	Back pain	Furunculosis/folliculitis
	Hip pain	Pseudotumor cerebri
	Knee pain	
Degenerative	Increased LV mass	Carotid intimal thickening
	Increased LA diameter	Coronary arterial fatty streaks/plaques
	Endothelial dysfunction	Decreased arterial distensibility
Psychosocial	Depression/mood disorders	Poor self esteem
	Anxiety disorders	Distorted body image
	Binge eating disorder	Discrimination by peers
	Alienation	Decreased achievement in education/ jobs
	Stigmatization	

Table 3
Medications contributing to weight gain

Class	Meds causing weight gain	Possible alternatives
Antiseizure	Carbamazepine, valproate, gabapentin	Topiramate, zonisamide, lamotrigine
Antidepressant	Tricyclics, SSRIs, MAO-inhibitors	Wellbutrin (fluoxetine and sertraline are preferred SSRIs)
Antipsychotic	Olanzapine, clozapine, quetiapine, risperidone	Ziprasidone (aripiprazole next best)
Antidiabetic	Insulin, sulfonylureas, thiazolidinediones	Metformin, exenatide, pramlintide
Steroid	Corticosteroids	NSAIDs
	Depo-Provera	Barrier methods

5. Determine the need for additional testing: sleep study, 24 h urine for free cortisol & creatinine, RUQ ultrasound, lower extremity x-rays, dilated ophthalmologic exam.

TREATMENT

The mainstay of treatment for adolescent obesity is behavioral modification. A smaller subset will benefit from adding weight-loss medications, and the most severe cases may warrant weight-loss surgery if behavioral modification and medications prove insufficient.

1. Behavioral: Goals include regulating meal patterns (avoid meal skipping), improving food choices, decreasing portion size, increasing physical activity, reducing emotional eating, and addressing family dynamics that may be contributing to weight gain. Patients should be counseled to achieve a daily deficit of 500–1,000 kilocalories (kcal), with the aim to lose 1–2 lb/week. Exercise should be increased gradually to achieve a goal of 1 h of physical activity, 5–7 days/week.
2. Pharmacologic: Traditional weight loss medications include the lipase inhibitor orlistat (Xenical™, Alli™, age 12 or older) and anorexiants sibutramine (Meridia™; studied in ≥ age 12 but FDA-approved ≥ age 18) and phentermine (Adipex-P™; age 17 or older). Off-label medications include metformin (use if insulin resistance), topiramate (use if migraines, seizures, and/or binge eating), and buproprion (use if depression).
    - Orlistat: Start 120 mg (Xenical ™) or 60 mg (Alli ™) with the highest fat-containing meal, and increase by 1 pill every 3–7 days until taking 3×/day with meals or up to 1 h after. It causes malabsorbtion of vitamins A, D, E, and K, so patients should take a daily multivitamin at least 2 h apart from orlistat. Gastrointestinal side effects are common and include diarrhea, oily stools, fecal urgency and leaking, flatulence, nausea, and abdominal cramps.
    - Sibutramine (Meridia ™): Start 10 mg daily. If weight loss of 4 lb in 4 weeks is not achieved, the dose may be increased to 15 mg daily if it is well-tolerated. Patients who are generally sensitive to medications may be started at a lower dose of 5 mg daily; similarly, patients who experience side effects at 10 mg daily may try decreasing the dose to 5 mg daily. Side effects include tachycardia, hypertension, headache, anxiety, LH/dizziness, insomnia, dry mouth, constipation, nausea, and palpitations. It should be avoided in combination with MAO

inhibitors, SSRIs, lithium, dextromethorphan, sumatriptan, and dihydroergotamine, given the risk of serotonin syndrome.

- Phentermine: Generally start 30 mg daily, 30–60 min before breakfast. If sensitive to medications or side effects, lower to 15 mg daily; maximum dose is 37.5 mg daily. It is approved for short-term treatment of obesity (3 months); however, many obesity experts prescribe it long term with continued monitoring as long as it is effective and well tolerated. Side effects include palpitations, tachycardia, hypertension, headache, jitteriness/nervousness, LH/dizziness, insomnia, dry mouth, constipation, and diarrhea.
- Metformin: Increases insulin sensitivity, which can decrease lipogenesis and increase lipolysis, thus promoting weight loss. Start 500 mg qpm with dinner for 2 weeks, then increase to 500 mg bid. Dose may be titrated as needed to maximum 1,000 mg bid based on weight loss and insulin response. Check baseline liver and kidney function and monitor with each dose change, and then every 4–6 months once stable. Side effects include nausea, vomiting, abdominal cramping or pain, diarrhea, flatulence, LH/dizziness, and a metallic taste.
- Topiramate: Antiepileptic medication found to have side effect of weight loss, approved for treatment of migraines. Start 25 mg qhs and increase by 25 mg every 2–4 weeks to maximum 200 mg qhs. Check baseline basic metabolic panel, LFTs, and CBC, and monitor with dose changes. Side effects include paresthesias, memory problems, fatigue, somnolence, dizziness, difficulty concentrating, depression, renal stones, acute-angle glaucoma, metabolic acidosis, leukopenia, and hepatoxicity.
- Buproprion: Useful adjunct for depression or smoking cessation. It may be dosed at 100 mg tid, SR 150 mg bid, or XL 300 mg daily. Side effects include dry mouth, insomnia, agitation, headache, nausea, dizziness, constipation, abdominal pain, and diarrhea. It is contraindicated in patients with seizure disorders, eating disorders, and alcoholism.

3. Surgical: Options include gastric bypass surgery (RYGB) and adjustable gastric banding ("Lap Band"). RYGB should be the surgery of choice in this population, as adjustable gastric banding is not FDA approved for < age 18 and thus remains investigational in this age range. Indications include BMI > 35 with serious comor-

bidities (diabetes, severe steatohepatitis, pseudotumor cerebri, moderate to severe sleep apnea) or BMI > 40 with less serious comorbidities (such as hypertension, dyslipidemia, insulin resistance, glucose intolerance, impaired quality of life, mild NASH, and mild sleep apnea). Teens undergoing this surgery should have complete skeletal, sexual, and emotional maturity, be autonomously motivated, have a supportive family, and have failed previous organized conventional attempts at weight loss.

REFERENCES AND ADDITIONAL READINGS

Center for Disease Control and Prevention. Childhood Overweight and Obesity. Available at: http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/index.htm

Commonwealth of Massachusetts. Betsy Lehman Center for Patient Safety and Medical Error Reduction: Expert Panel on Weight Loss Surgery. Executive Report, December 12, 2007. Available at: http://www.mass.gov/Eeohhs2/docs/dph/patient_safety/weight_loss_executive_report_dec07.pdf

Dietz WH, Robinson TN. Overweight children and adolescents. N Engl J Med 2005;352:2100–09

Rosenblum J and Stein HK. Medical Treatment of Obesity. In Farraye FA and Forse RA, Bariatric Surgery: A Primer for Your Medical Practice. Thorofare, NJ: SLACK Incorporated, 2006; 21–44.

9

Adolescent Nutrition, IBD, IBS

Sabina Sabharwal and Esther Israel

Division of Pediatric Gastroenterology, MassGeneral Hospital for Children,
175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
ssabharwal@partners.org, eisrael1@partners.org

NUTRITION

Elements important in the nutrition history during an adolescent encounter: Review body image including possible eating disorder thinking.

Explore dieting patterns: Poor eating habits formed in adolescence lead to obesity and other diet-related disease in later life. Use www.mypyramid.gov for a healthy diet guide.

Recommend reduced fat dairy/animal products, moderate portions, increased intake or fruits and vegetables, whole grains, with less frequent consumption of high-fat items.

Stress the importance of eating all meals, particularly breakfast:
- Irregular schedules trigger this behavior.
- This may affect school performance and overall diet (unhealthy snacking).

Educate adolescent females about consuming:
- Iron-rich and vitamin-C-rich foods
- Good sources of calcium (low-fat yogurt, cheese, calcium-enriched foods) for bone health

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_9,

Encourage making good choices when confronted with unhealthy options (fast foods, which are inexpensive) and provide ways for adolescents to socialize with friends.

Educate that dieting – manipulation of food intake driven by weight concerns – is NOT healthy and may be a setup for an eating disorder.

Dieting/disordered eating includes:

Exclusion of specific foods
Fad diets
Skipping meals, binge eating, fasting
Self-induced vomiting, laxatives, diet pills, diuretics
Excessive exercising

Emphasize that no one body type is ideal and that body diversity is important.

Snacking:

Avoid sugar-sweetened beverages/fruit juices.

Snacks should be nutrient dense (ratio of nutrients to calories similar to meals), which can fill in gaps that remain after meals.

Nutritious snacks: Fresh fruit/veggies w low-fat yogurt dip, iron-fortified cereal w low-fat milk, string cheese, cheese and crackers, low-fat frozen yogurt, vegetarian pizza, calcium-fortified cereal bars/juices.

Table 1 lists recommended amounts of vitamins and minerals for males and females in the adolescent age range.

Inflammatory bowel disease (IBD) – see Table 2 to help differentiate Crohn's disease from ulcerative colitis.

The history should be focused on abdominal pain, appetite, stool frequency and consistency, hematochezia, family history of IBD, previous growth data, school attendance, and effect on daily activity.

Physical Exam: Weight, height, abdominal tenderness/mass, rectal exam, rash, arthritis, oral lesions, vision changes, Tanner staging

Labs: CBC w/differential, ESR, C-reactive protein, serum total protein, albumin, stool guaiac; stool cultures, ova and parasite, *C. difficile* toxin assay, PPD testing; if poor nutrition suspected: serum iron, calcium, magnesium, zinc, folate, vitamin B12

Radiographic studies: Upper GI and small bowel follow-through series; depending upon presentation – bone age, abdominal plain

Table 1
Dietary reference intakes (Food and Nutrition Board, The Institute of Medicine, National Academy of Science)

Group	Calcium (mg/day)	Iron (mg/day)	Zinc (mg/day)	Vitamin A (mcg/day)	Vitamin C (mg/day)	Vitamin E (mg/day)	Vitamin D (mcg/day)
Males 9–13 years	1,300	8	8	600	45	11	5
Males 14–18 years	1,300	11	11	900	75	15	5
Females 9–13 years	1,300	8	8	600	45	11	5
Females 14–18 years	1,300	15	9	700	65	15	5
Group	Vitamin K (mcg/day)	Thiamin (mg/day)	Riboflavin (mg/day)	Niacin (mcg/day)	Vitamin B6 (mg/day)	Folate (mcg/day)	Vitamin B12 (mcg/day)
Males 9–13 years	60	0.9	0.9	12	1	300	1.8
Males 14–18 years	75	1.2	1.3	16	1.3	400	2.4
Females 9–13 years	60	0.9	0.9	12	1	300	1.8
Females 14–18 years	75	1.0	1.0	14	1.2	400	2.4

Although the Institute of Medicine recommendation for Vitamin D is 5 mcg (200 IU) daily, The American Academy of Pediatrics is recommending a vitamin D intake of 400 IU daily. The report may be accessed at: http://www.aap.org/new/VitaminDreport.pdf

Table 2
Differential characteristics of Crohn's disease and ulcerative colitis (Adapted Baumgert and Sandborn 2007)

Characteristics	Crohn's disease	Ulcerative colitis
Presentation before age 20	25–30% of patients	20% of patients
Hematochezia	Less common	Common
Passage of mucous/pus	Rare	Common
Abdominal mass	Sometimes (right lower quadrant)	Rare
Disease distribution	Entire GI tract	Colon
Extraintestinal manifestations	Common	Common
Small bowel/colonic obstruction	Common	Rare
Fistulas/perianal disease	Common	No
Histology	Transmural mucosal inflammation, granulomas, fissures, skip lesions	Superficial mucosal inflammation

films, US, CT scan with contrast medium, MRCP (if sclerosing cholangitis suspected)

Endoscopy: Upper endoscopic biopsies, colonoscopy with ileoscopy biopsies; ERCP (if sclerosing cholangitis suspected)

Medications: Aminosalicylates (Pentasa™, Asacol™) – starting therapy, maintenance; antibiotics (Flagyl™, Cipro™, Rifaxmin™) – maintenance; 6-MP/Immuran™ – maintenance, immunosuppression if failing aminosalicylates alone; Infliximab™/Humera™ – induction of remission, then maintenance, if failing 6-MP/Immuran; corticosteroids to induce remission (not long-term therapy)

IRRITABLE BOWEL SYNDROME

Symptoms

Chronic abdominal pain (crampy, intermittent, varying intensity)
Altered bowel habits

- Diarrhea: Frequent loose stools, small to moderate volume, often with mucus discharge, and with sense of incomplete evacuation after stooling (ALARM symptoms NOT IBS: large volume stools, greasy stools, bloody stools, nocturnal diarrhea)
- Constipation: May last days to months with intermittent diarrhea or normal stools between; stools often pellet-like; often

with sense of incomplete evacuation after stooling; can lead to inappropriate use of laxatives/enemas

Other GI symptoms: Gastroesophageal reflux, dyspepsia, nausea

Absence of organic cause (ALARM symptoms NOT IBS: hematochezia, weight loss, recurring fever, anemia, chronic diarrhea)

Young patients and women are more likely to be diagnosed

Diagnosis

Careful history (open-ended questions, dietary exacerbants) and physical examination, stool guaiac; screening laboratory tests and stool studies; breath hydrogen tests for lactose intolerance and small bowel bacterial overgrowth; upper and lower endoscopy if no improvement of symptoms with intervention or if alarm symptoms present

Treatment

Dietary modification: Exclusion of lactose, sorbitol, and flatulence producing foods (beans, onions, celery, carrots, bananas, prunes) from diet; increase in soluble fiber and decrease in insoluble fiber (constipation-predominant symptoms)

Psychosocial therapy: Hypnosis, biofeedback, psychotherapy to improve anxiety

Medications: Laxatives for constipation-predominant symptoms; anti-diarrheals (loperamide) for diarrhea-predominant symptoms; antispasmodic agents (dicyclomine, hyoscyamine): affect GI smooth muscle and decrease colonic movement; antidepressants: tricyclic antidepressants (amitryptyline, nortryptyline), use cautiously with constipation; SSRIs can be used in adolescents.

REFERENCES AND ADDITIONAL READINGS

Baumgert DC, Sandborn WJ. Inflammatory bowel disease: clinical aspects and established evolving therapies. Lancet 2007;369:1641–57.

Bousvaros A, Antonioli DA, Colletti RB, et al. Differentiating ulcerative colitis from Crohn Disease in children and young adults: report of a working group of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the Crohn's and Colitis Foundation of America. J Pediatr Gastroenterol Nutr 2007;44:653–74.

Brandt LJ, Bjorkman D, Fennerty MB, et al. Systematic review on the management of irritable bowel syndrome in North America. Am J Gastroenterol 2002;97:S7–26.

Fass R, Longstreth GF, Pimentel M, et al. Evidence- and consensus-based practice guidelines for the diagnosis of irritable bowel syndrome. Arch Intern Med 2001;161:2081–8.

Gidding SS, Dennison BA, Birch LL, et al. Dietary recommendations for children and adolescents: a guide for practitioners. Pediatrics 2006;117:544–49.

Jenkins S, Horner SD. Barriers that influence eating behaviors in adolescents. J Pediatr Nurs 2005;20:258–67.

Siega-Riz AM, Carson T, Popkin B. Three squares or mostly snacks – what do teens really eat? A sociodemographic study of meal patterns. J Adolesc Health 1998;22:29–36.

Spear BA. Adolescent growth and development. J Am Diet Assoc 2002;102:S23–29.

10

Sports Injuries in the Adolescent

Mark D. Price and Thomas J. Gill

Division of Sports Medicine, University of Massachusetts, U Mass Memorial Medical Center, Worcester, MA 01605, USA
mark.price@umassmemorial.org

Division of Sports Medicine, Massachusetts General Hospital, 175 Cambridge Street, 4th Floor, Boston, MA 02114, USA
tgill@partners.org

As the number of children and adolescents participating in both organized and recreational athletic activities increases, pediatric sports injuries are becoming much more common. It has been estimated that over 30 million children participate in either recreational or organized sports, and the number is growing every year. Many of these injuries are chronic in nature and are the result of overuse and overtraining. However, traumatic injuries are not uncommon, requiring an estimated 2.5 million emergency room visits annually. While head and neck injuries comprise a significant proportion of pediatric sports injuries, upper and lower extremity injuries are much more common. Injury patterns in skeletally immature athletes are distinct from adults in that physes may also be involved whereas adults have primarily ligamentous and tendinous injuries.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_10,

SHOULDER

Dislocations and Instability

Instability may be either traumatic or atraumatic. Traumatic causes tend to be unidirectional and may require surgery, while atraumatic causes are more often seen in patients with generalized ligamentous laxity and are best treated with aggressive therapy. Anterior dislocations arise from a fall onto an outstretched, abducted, and externally rotated arm. Posterior dislocations are the result of a posteriorly directed force when the arm is in an adducted and flexed position. Posterior dislocations are also seen in the setting of electrical shock and seizures.

Anterior dislocations are far more common (>90% of all dislocations) than posterior (only 2–3% of dislocations). Posterior dislocations must be sought as they are frequently missed. Inferior dislocations (luxatio erecta) are uncommon.

Atraumatic causes are often more difficult to diagnose. Patients typically present with a chief complaint of pain, rather than actual complaints of instability. They are responsible for approximately 4% of dislocations, and are commonly seen in multiple family members. Possible causes include ligamentous laxity or voluntary dislocation.

Clinical Exam

Patients with an acute dislocation complain of pain and hold the ipsilateral forearm by their side. Anterior dislocations may have a palpable humeral head anteriorly, lack internal rotation, and may be held in an adducted position. Posterior dislocations may be locked in internal rotation, have a prominent coracoid process and limited forward flexion.

As with all joint dislocations, the first part of the assessment is a careful neurologic and vascular examination to rule out injuries to the neurovascular structures around the glenohumeral joint. These include the axillary and brachial arteries, and axillary and musculocutaneous nerves.

Injuries to the brachial plexus are not uncommon, with a neurapraxia present in >30%. The axillary nerve is the most commonly injured structure, and may be tested by light touch sensation to the lateral deltoid. Vascular injuries are uncommon in younger patients. Rotator cuff tears are uncommon sequelae of instability in adolescents. Patients with recurrent instability should be assessed for

generalized ligamentous laxity by looking for hyperextensibility of thumbs, elbows, or knees.

The apprehension-relocation test is pathognomonic for instability. It is performed with the patient lying supine. In this exam, the shoulder is brought into 90° of abduction and externally rotated. Patients with instability will report feeling "apprehensive," "tentative," or "scared" that their shoulder is about to dislocate as the arm is further externally rotated. This feeling can be relieved with a posteriorly directed force on the humeral head.

Radiography

A true AP of the glenohumeral joint, an axillary view, and a true scapular lateral view are recommended. Radiographs should be done prior to any attempt at reduction in order to rule out any associated fractures and to confirm the direction of dislocation.

Treatment

There are several acceptable techniques for reduction. One commonly used method employs a sheet placed around the thorax and pulled to the contralateral side while the affected elbow is flexed and the shoulder is slowly abducted and externally rotated under traction. The humeral head may need to be manipulated around the glenoid rim. Alternatively, one may ask the patient to try to reach out to the side and over his/her head while gentle traction is applied. Once the hand can touch the contralateral ear, the arm is brought down, and the humeral head should be relocated.

Patients are placed in a sling for comfort only, as there is no decreased redislocation rate with prolonged immobilization. They are instructed to continue to move their elbow and hands several times per day to prevent stiffness. Early follow-up with an orthopedic surgeon is recommended.

Recurrent instability is common in the younger population, with rates approaching 85–90% in some series. For this reason, some sports medicine specialists recommend early arthroscopic stabilization for patients in high-risk sporting activities, such as football and hockey.

In patients with recurrent multidirectional instability, surgery is only undertaken after an extensive course of physical therapy. This allows for strengthening of the rotator cuff, deltoid, and scapulothoracic musculature.

Little League Shoulder

Epiphysitis

Epiphysitis of the proximal humerus may be secondary to repetitive trauma from overhead activity such as throwing. Clinical exam shows diffuse shoulder pain that is made worse by throwing, tenderness and swelling over the lateral portion of the proximal humerus (>70%), and weakness in internal rotation and abduction. Symptoms are usually present for several months prior to presentation.

Radiography

This may show a widened proximal humeral physis. In more severe cases, mineralization and fragmentation of the metaphysis may also be present. Magnetic resonance imaging (MRI) may show edema at the proximal humeral epiphyseal growth plate.

Treatment

Treatment requires eliminating the throwing motion for a 2–3-month period. It is important to encourage the adolescent to remain physically active with other exercise programs, in order to prevent deconditioning, encourage compliance, and prevent the psychological distress that accompanies inability to play his/her sport. Once asymptomatic, gradual throwing is then resumed with progression of distance and velocity. Athletes are counseled to limit pitch counts and time spent playing as well as proper mechanics. Physical therapy has not been shown to have a role, and may even impede progress. This program has shown >90% of pitchers remaining asymptomatic.

Long-term complications are rare. These include premature epiphyseal and Salter-Harris fractures of the proximal humerus.

Rotator Cuff Tendonitis

Overhead athletes may sustain tendonitis and strains of the rotator cuff from overuse, while contact athletes may experience contusions to the rotator cuff from direct trauma. Patients will present with pain over the anterior or lateral shoulder that is worse with activity. There may also be weakness or lack of motion in the involved extremity.

Impingement of the rotator cuff between the humeral head and acromion may be assessed with Hawkins maneuver whereby the shoulder is flexed to 90°, adducted, and internally rotated. This "impingement" is often secondary to subtle underlying anterior instability. Rotator cuff muscle testing should be done, although weakness is often a result of pain inhibition rather than evidence of a tear.

Muscle Assessed	Finding
Supraspinatous (superior cuff)	Resisted scapular abduction
Infraspinatous/Teres Minor (posterior cuff)	Resisted external rotation
Subscapularis (anterior cuff)	Belly press or lift-off test

Radiography

X-rays often show no bony abnormalities. MRI is the study of choice and will show increased signal intensity in the injured rotator cuff muscles or tendons. First-line treatment is conservative with rest, ice, nonsteroidal anti-inflammatory drugs (NSAIDs), and physical therapy. Conservative treatment should be given at least 6–12 weeks for full effectiveness.

Treatment

The mainstay of therapy is rotator cuff and periscapular muscle strengthening using therabands. In rare instances, subacromial corticosteroid injections may be considered. The indications for surgery are very limited in this younger population.

ELBOW

Little League Elbow

The throwing motion causes an entity called "valgus extension overload" on the developing elbow. It puts high tensile stresses on the medial structures of the elbow (medial epicondyle and growth plate, flexor-pronator musculature and ulnar collateral ligament), and increased compressive forces on the lateral aspect of the elbow, particularly the radiocapitellar joint. This may result in medial epicondylar avulsion, apophysitis, or delayed closure of the growth plate, as well as osteochondrosis of the radiocapitellar joint with subsequent loose body formation.

Teens complain of elbow pain, decreased throwing distance and velocity and present with medial swelling, tenderness over the medial epicondyle, and flexor contractures. X-rays show irregularities of the medial epicondylar apophysis including enlargement, separation, and fragmentation.

Treatment

Treatment consists of the elimination of throwing activities, cross-training, and NSAIDs with a gradual resumption of throwing at 6 weeks if asymptomatic. If symptoms persist, splint or cast immobilization may be necessary for a short period of time. Pitch counts, proper mechanics, and adequate rest should be emphasized. See Tables 1–3 for the official little league pitching rules.

Osteochondrosis of the Radiocapitellar Joint

The throwing motion puts high compressive loads on the radiocapitellar joint. Patients present with diffuse elbow pain that is worse with activity. Swelling, stiffness, flexion contractures, and elbow locking or catching may also be present. X-rays may show irregular ossification of the radial head or capitellum, or radial head enlargement. MRI can delineate the size of OCD lesions as well as the presence of any fragmentation or separation.

Treatment

This depends on the size of the lesion and the presence of any displacement and ranges from conservative measures such as rest and NSAIDs to surgery for reattachment of any fragments.

Table 1
Total pitch counts by age

Age (years)	Pitch count (pitches/day)
17–18	105
13–16	95
11–12	85
9–10	75
7–8	50

Table 2
Rest requirements for pitchers younger than 16 years

Total pitches in one game	Rest required
>61 pitches	3 calendar days and one game
41–60 pitches	2 calendar days and one game
21–40 pitches	1 calendar days
1–20 pitches	0 calendar days

Table 3
Rest requirements for pitchers 17–18 years old

Total pitches in one game	Rest required
>76 pitches	3 calendar days and one game
51–75 pitches	2 calendar days and one game
26–50 pitches	1 calendar days of rest
1–25 pitches	0 calendar days of rest

Lateral Epicondylitis

This is seen in racket and throwing athletes, resulting from repetitive eccentric wrist extension. It leads to an apophysitis of the lateral epicondyle. Patients present with pain over the lateral epicondyle and pain with resisted long finger and wrist extension.

Radiography

These are often unrevealing.

Treatment

Treatment includes rest, activity modification, and NSAIDs. Physical therapy is aimed at stretching and strengthening of the wrist extensors.

KNEE

Patellofemoral Syndrome

This is one of the most common causes of knee pain in the young athlete. It may be caused by overuse, maltracking, or trauma. Patients will complain of diffuse pain around the patella or inferior to the patella.

Patellar tendonitis is the result of overuse activities, such as running or jumping and arises from increased pressure in the patellofemoral joint. Physical exam should check for symmetric patella tracking, swelling, lateral patellar subluxation, and patellofemoral crepitus. Pain with compression of the patella during quadriceps contraction (Clark's sign) may be present. The "tibial rotation test" may be used to evaluate maltracking. Increased pain with external rotation of the tibia (increases the angle between the patellar tendon and quadriceps tendon, or Q-angle) against resisted knee extension that is alleviated by internal rotation of the tibia indicates a positive test.

Treatment

This is nonoperative and consists of rest, ice, activity modification, and NSAIDs. Rehabilitation focuses on strengthening of the quadriceps muscles, especially the vastus medialis. Continued symptoms despite many months of nonoperative treatment warrant orthopedic consultation.

Osgood Schlatter Syndrome

Also known as apophysitis of the tibial tubercle, which arises from repeated tensile stress at the insertion of the patellar tendon during growth acceleration. Boys are affected more often than girls, with a peak age of incidence of 12–13 years. It presents as anterior knee pain with running and jumping, localized to the tibial tubercle. Examination demonstrates marked tenderness over the tibial tubercle, sometimes accompanied by swelling or prominence of the tubercle.

Treatment

This involves removal from any running or jumping activities/sports. Ice and NSAIDs may reduce symptoms. Crutches are used if the pain causes a limp. Patients may return to sport when they may perform pain free.

Anterior Cruciate Ligament Injuries

These injuries are commonly seen in contact sports, and it is much more common in female athletes. The mechanism is often either

direct collision or a sudden deceleration with rotation. Approximately one-third of patients describe hearing a "pop" at the time of injury.

Effusion is often present (>75%). The Lachman maneuver (attempted anterior translation of the tibia with the knee flexed 30°) is most sensitive at detecting an anterior cruciate ligament (ACL) injury. The patient should also be assessed for meniscal or collateral ligament injuries as these are frequently seen in association with ACL injuries.

Treatment

Immediate management consists of symptomatic relief. Crutches and protected weight bearing are helpful in the short term. Knee immobilizers can be helpful for the first 48 h but should be discontinued at that point as knee stiffness may develop.

Surgical reconstruction of the ACL is often indicated, and orthopedic consultation is recommended.

Patellar Dislocations

These issues are often from noncontact injuries. The initial history is similar to that of an ACL tear, and the two should always be suspected in acute knee injuries. Most dislocations are lateral. Patients present with tenderness along the medial aspect of the patella, and effusion is often present.

Radiography

Radiographs may be diagnostic.

Treatment

Acutely the patella must be reduced. This is accomplished with hip flexion, and application of a gentle medial force on the patella while extending the knee. Patients should be placed in a knee immobilizer with protected weight bearing for 3–5 days to allow healing of the injured structures.

Recurrent dislocation may occur in up to 50% of patients. Patients should also be evaluated for the presence of any osteochondral injuries with MRI. The presence of osteochondral injury or loose bodies warrants orthopedic consultation.

Shin Splints

The symptom of anterior leg pain is extremely common in young athletes and is frequently seen in young runners. It is important to differentiate between medial tibial stress syndrome (periostitis), chronic exertional compartment syndrome, and tibial stress fractures. Medial tibial stress syndrome is presumed to be an overuse injury to the soleus muscles resulting in an inflammatory response at the posteromedial tibial attachment. Tenderness occurs over a diffuse area along the medial tibial subcutaneous border.

Treatment

Treatment is nonoperative and consists of rest, activity modification (including running on softer surfaces), and the use of NSAIDs. It may be necessary to consider orthotics to prevent over-pronation of the foot.

Exertional compartment syndrome is an elevation of the compartment pressure in the lower limb after exercise. Symptoms usually present within the first 30 min of exercise. Direct palpation may reveal tense compartments. Confirmatory diagnosis is made with compartment pressure measurement before and after exercise. An elevation of >20 mmHg 5 min after exercise or an absolute value of >30 mmHg 1 min after exercise is considered diagnostic. Treatment may require surgical release of the compartments (fasciotomy).

Stress fractures are diagnosed by the presence of point tenderness over the involved bone. X-rays may be diagnostic, but take at least 2 weeks from the initial injury to show a stress fracture. Treatment consists of activity modification. If symptoms persist, it may be necessary to place the patient in a short leg cast or walking boot with protected weight bearing for 4–6 weeks. Stress fractures that still do not heal may require operative treatment.

Ankle Sprains

Lateral ankle ligament sprains are common in young athletes and involve the anterior talofibular ligament (ATFL) > the calcaneofibular ligament (CFL) >posterior talofibular ligament (PTFL). Patients will often describe a twisting injury to the ankle and present with swelling and diffuse tenderness over the lateral aspect of the ankle. Anterior drawer testing (attempting to anteriorly translate the talus over the tibia) may be present in more serious sprains.

Radiography

Radiographs are indicated when patients have (1) tenderness over the distal fibula/tibia, or tenderness at the base of the 5th metatarsal/navicular, and (2) an inability to bear weight. Ankle fractures warrant orthopedic evaluation.

Treatment

Acute treatment for ankle sprains includes ice and elevation to help control swelling and pain. Patients may require support with a brace, and more severe sprains may require immobilization with a pneumatic cast and crutches. Ankle range of motion exercises are important to prevent stiffness and should be initiated when symptoms permit (ideally within the first 48 h) (Table 4).

Concussions

More than 90% of concussions do not involve loss of consciousness (LOC), but will have some mild confusion or posttraumatic amnesia (PTA). Early symptoms include headache, dizziness, nausea or vomiting, incoherent speech, confusion, imbalance, disorientation, or lack of coordination.

Second impact syndrome occurs when athletes have not had enough time to heal after a concussion. The mortality approaches 50%. Most adolescents should be removed from competition following even a mild concussion, as the developing brain is at considerable risk for recurrent trauma. Evaluation by an expert in concussion management is often recommended. We recommend baseline neuropsychology testing for adolescent athletes in contact sports prior to the start of the season (Table 5).

Table 4
Grading and treatment of ankle sprains

Grade of Injury	Treatment
I (stretch but no ligament failure)	Rest, ice, compression, elevation (RICE); brace for comfort; return to sports in 1–3 weeks
II (partial failure of ligament)	RICE, brace while symptomatic; return to sports in 3–6 weeks
III (complete failure of ligament)	RICE, crutches, cast immobilization for 3 weeks Return to sports may take several months

Table 5
Grade of concussion and return to play guidelines

1. Mild (no LOC, PTA < 30 min)	May return if no symptoms for 1 week
2. Moderate (LOC < 5 min, PTA < 24 h)	Sidelined for 2 weeks, may return when no symptoms for 1 week
3. Severe (LOC > 5 min, PTA > 24 h)	Obtain head CT; sidelined for 4 weeks, may return when no symptoms for 1 week

REFERENCES AND ADDITIONAL READINGS

Bruns W, Maffulli N. Lower limb injuries in children in sports. Clin Sports Med 2000;19:637–62.

Cantu RC. Second-impact syndrome. Clin Sports Med 1998;17:37–44.

Carson WG, Gasser SI. Little leaguer's shoulder: a report of 23 cases. Am J Sports Med 1998; 26:575–80.

Frank JB, Jarit GJ, Bravman JT, Rosen JE. Lower extremity injuries in the skeletally immature athlete. J Am Acad Orthop Surg 2007; 115:356–6.

Good CR, MacGillivray JD. Traumatic shoulder dislocation in the adolescent athlete: advances in surgical treatment. Curr Opin Pediatr 2005;17:25–9.

Little league baseball Inc. Protecting young pitching arms. The little league pitch count regulation guide. Available at: http://www.littleleague.org/Assets/old_assets/media/Pitch_Count_Publication_2008.pdf

National Institutes of Health. Conference on sports injuries in youth: surveillance strategies, 1991. National Institutes of Health, Bethesda, MD. 1992. NIH publication no. 93-3444.

Rowe CR, Zarins B. Chronic unreduced dislocations of the shoulder. J Bone Joint Surg Am 1982; 64:494–505.

Simon TD, Bublitz C, Hambidge SJ. Emergency department visits among pediatric patients for sports related injury: basic epidemiology and impact of race/ethnicity and insurance status. Pediatr Emerg Care 2006;22:309–15.

11

Cardiac Issues in Adolescence

Ami B. Bhatt

Division of Cardiology, Department of Medicine, Massachusetts General Hospital, 8 Hawthorne Place, Suite 110, Boston, MA 02114, USA
abhatt@partners.org

ARRHYTHMIAS

The symptom of palpitations is pervasive during adolescence. The most common etiologies of palpitations are sinus arrhythmia (phasic variations with respiration), which are often accentuated in athletes and suppressed during illness, premature atrial contractions (more common at younger ages), premature ventricular contractions (more common in adolescence, generally benign when single, uniform, and lessen in frequency with exercise), and sinus tachycardia. Sinus arrhythmias and premature contractions do not necessitate further evaluation when isolated; however, sinus tachycardia warrants a history (anxiety, medication, drug use, alcohol use, pain, fever), physical exam and basic laboratories (TSH, CBC) if the history and physical examination is unrevealing.

Supraventricular tachycardia (SVT) is the most common sustained arrhythmia in the adolescent years. It may occur as an isolated event, or may signal the beginning of recurrent episodes. Sustained palpitations, abrupt onset/offset, associated chest discomfort, syncope, shortness of breath, or irregular rhythm suggests arrhythmias that should be referred to a cardiologist for further evaluation. Documentation of an episode on EKG is ideal, but not always

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_11,

possible as symptoms may resolve by the time the adolescent arrives for clinical evaluation. If the SVT is caught on EKG or telemetry, the mechanism of origination and termination, presence of pre-excitation, axis and width of the QRS complex, presence or absence of p waves (or flutter waves), and their appearance and axis, and rate of tachycardia can all help distinguish the mechanism of SVT.

The mechanism of SVT is often reentry, although enhanced automaticity comprises 10% of cases. Reentrant rhythms may occur at the sinus node, within the atrium, at the AV node, or via an accessory pathway (bundle of Kent). Initial treatment should include enhancing vagal tone via a Valsalva maneuver, cold stimulus to the face to elicit the diving reflex, or adenosine in a controlled environment such as the emergency department. Adenosine may result in slowing of the rate by creating AV block allowing diagnosis, or may terminate the rhythm. In cases of resistant or unstable SVT, direct current cardioversion is the treatment of choice.

Any cardiac rhythm, which is irregular, wide, associated with concerning symptoms, causes syncope, resistant to treatment, or hemodynamically unstable, should be referred to a cardiologist. Similarly, any cardiac arrhythmia in a patient with structural heart disease, or an adolescent with a family history of sudden cardiac death, should be referred to a cardiologist as well. Further cardiologist-based evaluation may include EKG interpretation, Holter monitor, echocardiogram to rule out structural heart disease such as hypertrophic cardiomyopathy, septal defects, Ebstein anomaly associated with WPW, complex congenital heart disease, or exercise testing. Advanced imaging (i.e., for RV dysplasia), or electrophysiological studies may be undertaken when specific diagnoses are suspected.

SYNCOPE

Syncope is a common symptom in adolescents. The vast majority of cases are the result of benign neurocardiogenic or vasodepressor syncope. Other noncardiac causes include other vagally mediated syncope, neuropsychiatric syncope, hypoglycemia or dehydration, or neurologic (seizure disorder). There are many potential cardiac etiologies, which include but are not limited to left heart obstructive lesions, arrhythmias, myocarditis, tumor or mass, pulmonary hypertension, or coronary artery anomalies.

Initial evaluation includes a detailed history consisting of the patient's recollection of the event and associated symptoms as well as a witness' description of the event. Associated aura, incontinence, or a postictal state may point to a neurologic cause, whereas palpitations, chest discomfort, sudden collapse rather than progressive loss of consciousness, and exercise-associated syncope may suggest a cardiac etiology. Past medical history is relevant, and adolescents with eating disorders, history of substance use, or history of congenital heart disease deserve special attention as their symptoms may be challenging to manage. The clinician should elicit a family history of cardiac disease, whether structural, arrhythmic, or sudden cardiac death.

The physical examination should include orthostatic heart rate and blood pressure, and auscultation should include the use of dynamic maneuvers to elicit outflow tract obstruction or exercise to induce changes in rhythm. Electrocardiography should be evaluated for underlying rhythm, duration of intervals (PR, QRS, and QT), heart block, pre-excitation, chamber enlargement, brugada pattern, or repolarization and ST/T wave abnormalities. The physical exam and EKG may also help identify hypertrophic cardiomyopathies and myocarditis. Additionally, any suggestion of electrolyte abnormalities may lead to a noncardiac diagnosis of eating disorders, diuretic/laxative abuse or other drug effects.

A thorough initial diagnostic screening will identify the majority of adolescents with significant disease. Although the majority of syncopal episodes will not be associated with life-threatening arrhythmia or aborted sudden cardiac death, referral to a cardiologist is always appropriate. Advanced EKG interpretation, echocardiogram, exercise testing, tilt testing, Holter monitoring, genetic testing, or advanced imaging may aid in determining the patient populations at highest risk for cardiac symptoms and cardiac disease with syncope as a heralding event.

When discussing arrhythmias or syncope with an adolescent, the initial reassurance that most episodes of palpitations or syncope are not associated with sudden cardiac death is often essential in reassuring both the patient and family so that they may participate in further conversation. Prefacing the discussion with the fact that further testing or a referral to a cardiologist is common, further allays fears. History should certainly always be performed both with the adolescent and guardian present as well as with the adolescent alone, to elicit relevant history. A basic drawing and explanation of the roles of the sinus node

(natural pacemaker), AV node (relay station), and the ability of the heart to generate additional beats (a failsafe mechanism) provides a groundwork upon which both arrhythmias and syncope may be discussed. The competing effect of vagal tone (high in athletes creating low heart rates) and the adrenergic nervous inputs (adrenalin, caffeine, red bull, many drugs) on the activity of the electrical system of the heart then becomes easier for the adolescent to comprehend.

CHEST PAIN

Chest pain in the adolescent is most likely noncardiac in origin. A thorough history and examination should provide reassurance and attention to the gastrointestinal (GERD, ulcer, esophagitis, esophageal foreign body/food, spasm, rupture, cholecystitis, perihepatitis, pancreatitis), pulmonary (spontaneous pneumothorax, pneumonia, pleurisy, asthma, rare: pulmonary embolism, pulmonary hypertension, infarction (sickle cell) and musculoskeletal (costochondritis, trauma, overuse, herpes zoster, or breast related) systems may provide a noncardiac diagnosis.

Angina may represent coronary vasospasm, myocardial bridging, peri/myocarditis, hypertrophic cardiomyopathy, anomalous coronary, familial hypercholesterolemia, cocaine, Kawasaki disease, or aortic stenosis, all of which are potential, but rare, cardiac etiologies.

In adolescents with known Marfan syndrome or connective tissue disease, aortic dissection is an important cause of chest pain. Evaluation should include physical exam for four extremity blood pressures, diastolic murmur of aortic regurgitation, a chest X-ray for widened mediastinum or imaging for aortic dissection if suspicion is high. It is important to recognize undiagnosed connective tissue diseases where the physical exam reveals pectus excavatum or carinatum, arachnodactyly, flat feet, high arched palate, lens dislocation, striae or recurrent hernias, or if there is a relevant family history, as adolescents in the growth phase may dilate their aorta rapidly. Lastly bicuspid aortic valve should prompt exam for aortic stenosis but also consideration of aortic dissection.

The association of chest pain with syncope, exertional dyspnea, or irregular rhythm should prompt a more thorough evaluation for cardiac causes including a referral to cardiology for potential Holter monitoring and echocardiogram. Chest pain may always be a mechanism to ask for help, when no physical cause can be elicited.

STRUCTURAL HEART DISEASE

Adolescents with congenital heart disease, hypertrophic cardiomyopathy, Marfan syndrome and related connective tissue disorders, and bicuspid aortic valve should be referred to a cardiologist for evaluation and aid in management. Cardiac symptomatology in the athlete is approached in a myriad of ways and is beyond the scope of this handbook. Specialty care with cardiologists trained in adolescent and adult congenital heart disease will enable patients to receive appropriate care and transition to becoming an independent adult with knowledge of their heart disease, understanding of the importance of routine follow up, and the ability to traverse the complicated path of chronic disease in our health care system.

REFERENCES AND ADDITIONAL READINGS

DiVasta AD, Alexander ME. Fainting freshmen and sinking sophomores: cardiovascular issues of the adolescent. Curr Opin Pediatr. 2004;16:350–6.

Grubb BP. Neurocardiogenic Syncope. N Engl J Med. 2005;352:1004–10.

Lewis DA, Dhala A. Syncope in the pediatric patient. The cardiologist's perspective. Pediatr Clin North Am. 1999;46:205–19.

Maron BJ. Sudden death in young athletes. N Engl J Med. 2003;349:1064–75.

Nishimura RA, Holmes DR Jr. Hypertrophic obstructive cardiomyopathy. N Engl J Med. 2004;350:1320–7.

Tainer NS, Carboni MP. Chest pain in the adolescent and young adult. Cardiol Rev. 2000;8:49–56.

Warnes CA, Williams RG, Bashore TM et al. ACC/AHA 2008 guidelines for the management of adults with congenital heart disease. J Am Coll Cardiol. 2008;52: e143–e263.

Washington R. Sports cardiology in the adolescent athlete: concerns for the pediatrician. Pediatr Ann. 2007;36:698–702.

Part II

Sexuality, Gynecology and Abnormal Growth and Development

12

Menstrual Irregularities: Amenorrhea

Stephanie Corrado

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
scorrado@partners.org

In order to understand menstrual irregularities, one must be comfortable in understanding the menstrual cycle. The first half of the menstrual cycle from day 0–14 is termed the follicular phase. It begins with menses, which is the uterine withdrawal bleed that occurs from day 0 until day 5–7. Ovulation occurs midway through the cycle usually between days 10–14. If fertilization does not occur, the egg involutes into a corpus luteum, which produces progesterone. This occurs in the second half of the menstrual cycle and is termed the luteal phase. Normal menses occur every 21–35 days. Below is outlined the variations in follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels, and the corresponding changes in estrogen and progestin throughout the cycle (Fig. 1).

Amenorrhea – too little bleeding: Amenorrhea in the adolescent is either primary or secondary. The definition of primary amenorrhea is absence of a menstrual period by age 16 or 1 year after reaching Tanner stage 5. The definition of secondary amenorrhea is absence of menses for duration of 6 months after previous uterine bleeding. It is important to differentiate primary versus secondary amenorrhea as it will guide your workup.

The majority of adolescents will have menarche by age 16, Tanner stage 4 or 2 years after onset of thelarche (onset of breast development). Ninety five to 97% of adolescents will have their menarche

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_12,

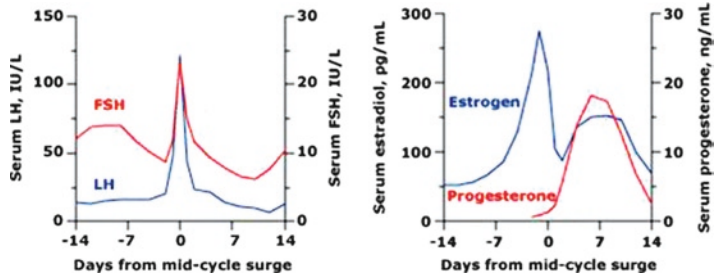


Figure 1. Hormonal changes during the menstrual cycle.

by age 16 and two-thirds of adolescents by Tanner stage 4. The absence of menarche by this time prompts investigation into primary amenorrhea. Growth and development must be assessed with attention to Tanner stage. The differential can be thought of from the head down including both anatomical and physiologic causes (Table 1).

Structural abnormalities should be considered in the adolescent with primary amenorrhea and a physical should include assessment of the genitalia and ascertaining the presence of a vagina, uterus, and ovaries. Mayer-Rokitansky-Kuster-Hauser (MRKH) syndrome is diagnosed in the female who has normal ovaries, normal hormonal pattern, normal development of breast and pubic hair, but with absent cervix, uterus, and upper two-thirds of the vagina. The patient will have a shortened vaginal canal and primary amenorrhea. Chromosomes are normal, 46XX. Renal ultrasound should be obtained because of the increased incidence of renal anomalies in these patients.

Hypothalamic causes for amenorrhea are the most common etiologies especially for secondary amenorrhea in the adolescent or young adult. Eating disorders, stress, psychological illness, and strenuous exercise must be recognized as important causes of delayed or irregular menses in the young adult. There are numerous studies supporting the physiologic response of stress on the hypothalamus and menstrual cycle. Stress has been shown to cause functional hypothalamic amenorrhea by increasing cortisol levels which affects GnRH release from the hypothalamus thus affecting the menstrual cycle. Studies have shown that management of stress through cognitive behavioral therapy may help resume ovarian function, ovulation, and menstruation.

Exercise and disordered eating have been recognized as important causes of menstrual irregularities in adolescent females and young women. The female athlete triad is defined as low energy availability

Table 1
Causes of primary amenorrhea (Adapted from Emans et al)

Gland/organ/tissue	Etiology
Hypothalamus	Chronic disease Familial delay Stress Psychiatric Eating disorders Overweight Kallman syndrome Drugs Tumor, irradiation
Pituitary	Idiopathic hypopituitarism Tumor Hemachromatosis Infarction Irradiation, surgery
Thyroid	Hypothyroidism, hyperthyroidism
Adrenal	Congenital adrenal hyperplasia Cushing's disease Addison's disease Tumor
Ovaries	Gonadal dysgenesis Ovarian failure Autoimmune PCOS
Uterus	Pregnancy Agenesis Synechiae
Cervix	Agenesis
Vagina	Agenesis Transverse septum
Hymen	Imperforate

with or without disordered eating, amenorrhea, and osteoporosis, and has earned much attention over recent years. Studies have shown a higher percentage of menstrual dysfunction in athletes. The most serious effect of amenorrhea in the athlete is bone loss secondary to a low estrogen state during peak bone development. For exercise-induced amenorrhea, the best treatment is to decrease exercise and increase caloric intake for an overall net decrease in energy expenditure.

Eating disorders including anorexia nervosa and bulimia are common causes of menstrual irregularities and should be screened for in every adolescent and young woman with menstrual disorders.

Inadequate estrogen levels occur in women with low body weight, and menstruation will not likely occur at weights less than 90% ideal body mass index (BMI). Bulimia also affects the hypothalamus, which may lead to menstrual irregularities despite having adequate weight or estrogen status.

Premature ovarian failure may occur before or after menarche and occurs in 1% of females under 40 years old and 0.1% of females less than 30 years old. Often premature ovarian failure occurs slowly over the years and 50% may have intermittent ovarian function with 20% ovulating spontaneously. FSH levels should be followed closely along with evaluation for other autoimmune disorders. There are increased health risks associated with the low levels of sex steroids for a longer duration of time.

Pituitary tumors should be considered if there are elevated prolactin levels, headaches, visual changes or neurologic changes. In patients in which other causes of amenorrhea have been excluded and amenorrhea persists, prolactin levels should be repeated every 6–12 months. High protein meals, strenuous exercise, breast stimulation, nipple piercing, orgasm, hypothyroidism, and medications may also elevate prolactin level; so a non-exercised fasting level should be obtained in the case of hyperprolactemia. In some cases, if no other etiology can be determined, an MRI of the brain should be performed to assess for a tumor.

Polycystic ovary syndrome (PCOS) is a poorly named syndrome, since as once previously thought, patients do not have to have cysts on their ovaries. Recent research has shown an association between insulin resistance and the androgen excess that occurs in PCOS. Patients with PCOS usually have irregular menses or dysfunctional uterine bleeding but also may present with amenorrhea. The constellation of acne, hirsuitism, acanthosis nigricans, clitoromegaly, overweight, and irregular menses should prompt the investigation for PCOS. The diagnosis is supported by elevation of LH/FSH ration, dehydroepiandrosterone sulfate (DHEAS) or free testosterone. If DHEAS or free testosterone is markedly elevated, a first morning 17OHP level is helpful in ruling out congenital adrenal hyperplasia (CAH). If there is evidence of insulin resistance, a glucose tolerance test is useful in determining if metformin should be added for treatment as well. Exercise for 45 min three times a week has shown to decrease insulin resistance and help regulate menses in patients with PCOS even if there is no weight loss. Management of weight may lead to regulation of menses in many patients with PCOS.

DIAGNOSTIC STUDIES

Generally, urine (human chorionic gonadotropin) HCG, complete blood count (CBC), chemistries, FSH, thyroid-stimulating hormone (TSH), and prolactin are obtained for the initial evaluation of amenorrhea. CBC and chemistries are obtained to rule out underlying chronic disease, TSH for hyper or hypothyroidism, and prolactin for a prolactin-secreting tumor or hyperprolactinemia from other etiologies such as medications or pregnancy. FSH is useful in differentiating between ovarian failure and hypothalamic hypogonadism, or the most common cause of amenorrhea (Fig. 2). If there is evidence of androgen excess, then labs that differentiate between CAH, adrenal tumor, or PCOS should be obtained and include testosterone, sex hormone-binding globulin (SHBG) and DHEAS. If DHEAS or free testosterone is markedly elevated, then a first morning 17OHP may be obtained to evaluate CAH. Chromosomal analysis should be included in those with ambiguous genitalia, stigmata of Turner syndrome, blind vaginal pouch, or absence of axillary or pubic hair (Table 2).

In a normal female with normal or low FSH, a progesterone challenge may be both therapeutic and diagnostic. Progesterone is given in the form of Provera ™ 10 mg orally daily for 10 days. If adequate levels of estrogen > 40 pg/mL, a withdrawal bleed will occur after the challenge. If estradiol levels are low in states of chronic illness, malnutrition, anorexia, or hyper-athleticism, then a withdrawal bleed will not occur because the endometrial lining is not under the influence of adequate estrogen levels. Progesterone therapy can be useful in

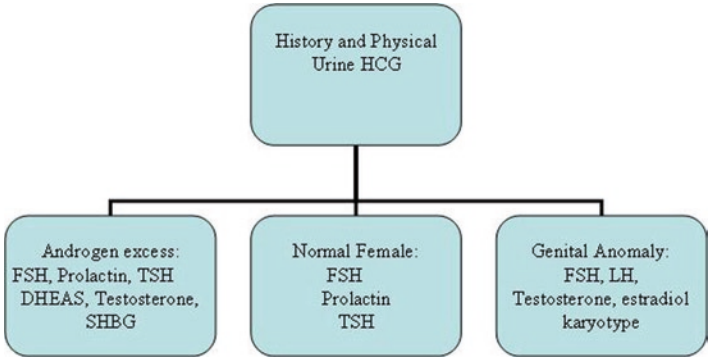


Figure 2. Approach to amenorrhea (Adapted from Emans 2005).

Table 2
Patient evaluation

History	General history as taken with all patients Menstrual history: Age of menarche, thelarche, pubic and axillary hair Age of mother's, sister's menarche Days between menses, duration of menses, amount of flow: (4–5 pads or tampons/day is usual) Cyclic cramping, dysmenorrheal Medications SH: eating and nutrition, sports, sexual activity, drug or ETOH
System review	Headache, vision, weight changes, acne, hirsuitism
Physical	General physical Height, weight, and BMI Thyroid Tanner staging of breast and pubic hair Hirsuitism, acne, acanthosis nigricans Gynecologic exam: External genitalia: pubic hair, clitoromegaly (>10 mm), hymen Vaginal mucosa: estrogenization Low estrogen state: beefy red, thin mucosa Adequate estrogen: pink, moist mucosa Imperforate hymen: bulging, blue tinged, blood filled vagina Vaginal length: insert cotton swab. Vaginal agenesis: if only inserted 0.5–2 cm Bimanual exam if tolerated Pelvic ultrasound if indicated
Studies	Growth curve Urine HCG Basic chemistries, CBC, erythrocyte sedimentation rate (ESR) FSH, TSH, Prolactin Androgen excess: DHEAS, SHBG, testosterone (total and free) Overweight: insulin and glucose, glucose tolerance test (GTT) Structural abnormalities, ambiguous genitalia, growth or pubertal delay: karyotype Consider bone age in patients with short stature or growth delay Consider bone density scan Renal ultrasound in patients with MRKH Pelvic ultrasound
Pearls	Urine HCG regardless of reported history Growth and development history, menarche Tanner staging and pelvic examination if tolerated FSH is useful in differentiating gonadal failure If FSH is low, hypogonadotropic hypogonadism is most likely DHEAS, SHBG, testosterone if androgen excess is evident Provera™ challenge is both diagnostic and therapeutic Hypothalamic hypogonadism and PCOS are common causes of both primary and secondary amenorrhea.

establishing the diagnosis of low estradiol levels and can also be useful in treating adolescents with PCOS who may not have spontaneous withdrawal bleeds. A withdrawal bleed should be stimulated every 3 months to avoid endometrial hyperplasia.

In females with no breast development but with a normal uterus, an FSH level is helpful in differentiating between chromosomal abnormalities or hypergonadotropic hypogonadism. If FSH is high, then ovarian failure is present and a karyotype is obtained. If the karyotype is normal, then the diagnosis is pure gonadal dysgenesis (46XX). Abnormal karyotype would reflect Turner syndrome or mosaicism (45XO).

In females with normal breast development but absent uterus or vaginal pouch, a testosterone level and Karyotype must be obtained. If testosterone is elevated to a male level, and karyotype is 46XY then there is evidence of testicular feminization or androgen insensitivity. In this case, the androgen receptors are insensitive to testosterone, and there will be lack of pubic and axillary hair as well. There will be normal breast development, but the uterus and ovaries will be absent. Undescended testicles are usually surgically removed given the increased risk of testicular cancer. If testosterone level is normal and karyotype is 46XX, then there is congenital absence of the uterus. One should obtain a renal ultrasound as there may be associated renal anomalies.

In the patient with absent breast development and absent uterus, a karyotype must be obtained. If the karyotype is 46XY then the diagnosis is either gonadal enzyme deficiency or agonadism.

REFERENCES AND ADDITIONAL READINGS

Edozien L. Mind over matter: psychological factors and the menstrual cycle. Curr Opin Obstet Gynecol 2006;18:452–56.

Emans S. J. Amenorrhea in the Adolescent. In: Emans SJ, Laufer MR, Goldstein DP, Eds. Pediatric and Adolescent Gynecology. 5th edn. Philadelphia, PA: Lippincort Williams & Wilkins, 2005, pp. 214–70.

Gamboa S. Clinical inquiries: What's the best way to manage athletes with amenorrhea? J Fam Prac 2008;57:749–50.

Goodman L. The female athlete and menstrual function. Curr Opin Obstet Gynecol 2005;17:466–70.

Gordon C. Amenorrhea. In: Neinstein LS, Ed. Adolescent Health Care. Philadelphia, PA: Lippincott Williams & Wilkins, 2002, pp. 973–95.

Meskhi. Premature ovarian failure. Curr Opin Obstet Gynecol 2006;18:418–26.

Nelson LM. Primary ovarian insufficiency. N Engl J Med 2009; 360:606–1

13

Menstrual Irregularities: Abnormal Vaginal Bleeding

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

It is common for girls to have irregular menstrual cycles in the first 2 years after menarche. This is usually due to a lack of maturity of the hypothalamic–pituitary–ovarian axis controlling the menstrual cycle. Most girls are anovulatory during this time. The clinician may see young postmenarchal girls with the complaint of irregular or heavy vaginal bleeding. Although dysfunctional uterine bleeding, which is due to immaturity of the hypothalamic-pituitary-ovarian axis, may be the explanation for many of these issues, it is important to consider other systemic as well as gynecologic causes of the bleeding before assuming dysfunctional uterine bleeding (DUB) is the etiology for the bleeding.

The physiology of the normal menstrual cycle has been reviewed in a previous chapter. In an anovulatory cycle, FSH induces ovarian estrogen secretion, which stimulates the endometrial lining to proliferate. Normally, a mid cycle LH surge induces ovulation. When the axis is not mature, ovulation will not occur. As a result, there is no corpus luteum to produce progesterone that will stabilize the endometrial lining. In addition, there is lack of a positive feedback response by the hypothalamic pituitary system to estrogen, As a result, an unopposed endometrial proliferation will occur, and irregular endometrial sloughing occurs resulting in irregular bleeding.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_13,

In addition, DUB can be caused by the lack of a dominant ovarian follicle. The end result of this situation is fluctuating levels of circulating estrogen leading to irregular menstrual bleeding. The diagnosis of DUB is made by excluding causes of vaginal bleeding.

In the evaluation of an adolescent with vaginal bleeding, consider general causes of bleeding as noted in Table 1, then consider lesions related to the genital tract noted in Table 2.

A thorough history including a detailed system review and complete physical examination is needed. The history should detail the menstrual cycle including menarche, the pattern of bleeding, frequency and length

Table 1
Systemic causes of vaginal bleeding

System/cause	Disease/agent
Hematologic	Platelet disorders, e.g., thrombocytopenia Coagulopathy, e.g., von Willebrand's disease or hemophilia
Endocrine	Polycystic ovary disease, hyperprolactinemia Hypothyroidism, ovarian/adrenal tumors Excess adrenal androgen production disease
General	Lupus Diabetes mellitus Renal disease Henoch–Schonlein purpura Hereditary disease, e.g., Osler-Weber-Rendu
Medication	Anticoagulants Oral contraceptives Antipsychotics NSAIDs SSRIs

Table 2
Gynecological causes of abnormal vaginal bleeding

Anatomical region	Disorder
External Genitalia (patient may believe that blood is coming from her vagina)	Trauma
Hymen	Trauma
Vagina	Trauma, foreign body, malignancy, ulceration, hemangioma
Cervix	Trauma, cervicitis, polyp, malignancy, IUD
Uterus	Pregnancy related issues, endometritis, endometriosis
Ovaries	Ectopic pregnancy, tumor

of the menstrual periods, cramping, mid-cycle pain, number of pads utilized on a daily basis, as well as a sexual history. Despite the sexual history given by young adolescents, a pregnancy test is required to rule out pregnancy. The physical examination should include a complete set of vital signs, examination for evidence of bleeding, and a general physical including assay for a hyperandrogenic state. The decision to do a pelvic examination is done on a case-by-case basis, but should be encouraged in those patients who have severe bleeding. Most young adolescents may not tolerate a speculum examination, so one could start with an external genital examination to evaluate for Tanner development, enlarged clitoris (PCOS) and trauma. If possible, a speculum and bimanual examination should be done. If necessary, a transabdominal pelvic ultrasound could supply information that otherwise would be obtained by a pelvic examination. Most young girls do not mind a pelvic ultrasound as long as it is not done with a vaginal probe.

DIAGNOSTIC TESTING

The history and physical examination will help to guide the laboratory evaluation. That said, pregnancy needs to be ruled out; in addition, a complete blood count, platelet count, and differential is usually warranted. In more severe bleeding, prothrombin time, partial thromboplastin time (PTT) and a von Willebrand's panel is appropriate. Appropriate testing for PCOS, thyroid function, diabetes, and other endocrine tests may be done on a case-by-case basis. Be aware that anovulatory menses may occur with eating disorders and the female athlete triad.

MANAGEMENT

If trauma, neoplasm, pregnancy, or an infectious etiology is noted as the cause of the abnormal vaginal bleeding, then that issue should be treated. If the patient appears to have DUB, then management will depend on the severity of the bleeding, the patient's clinical status, and laboratory testing.

Mild DUB

For mild DUB presentations without anemia, the patient may be observed and given iron supplementation. Studies have shown that

NSAIDs will reduce menstrual blood flow if they are started at the beginning of the menstrual flow and continued through the entire period. The teen should keep a menstrual calendar. However, she may also be placed on a monophasic oral contraceptive pill that has a moderate amount of estrogen: 30 mcg and a progestin such as Norgestrel 0.3 mg or Levonorgestrel 0.15 mg. Examples: (Lo-Ovral ™ Nordette ™, Levlen ™ Levora ™).

Moderate DUB

If the adolescent has moderate bleeding compounded with anemia, then the oral contraceptive should be given two times a day until bleeding ceases, then once a day for 21 days; after that, there should be 7 days of placebo. Iron should be administered orally, and the patient should be maintained on the once-a-day-oral-contraceptive regimen for 3–6 months with monitoring of the hematocrit and hemoglobin.

Severe DUB

This would be characterized by a hemoglobin level of 8–10 g/dL signaling moderate anemia and symptoms of severe bleeding. Generally, it is recommended that the oral contraceptive be given four times a day for 2–4 days until the bleeding is controlled, then three times a day for 3 days, then two times a day for 14 days. Patient needs cycling for 6 months using 21 once-per-day pills and placebos for 7 days. Hematocrit and hemoglobin should be monitored. If the patient has severe bleeding, and severe anemia (hemoglobin < 7 g/dL) (or hemodynamic instability), then consider inpatient admission, transfusion, and hormonal treatment; a gynecological consultation is recommended. Some patients do not tolerate estrogen or have contraindications for estrogen treatment. In these cases, cyclic progesterone may be useful. A gynecological consultation is recommended. The prognosis for DUB is excellent as most adolescents will develop appropriate cycles within 3 years after menarche.

REFERENCES AND ADDITIONAL READINGS

Gray SH, Emans SJ. Abnormal vaginal bleeding in adolescents. Pediatr Rev 2007; 28:175–82.

Rimsza ME. Dysfunctional uterine bleeding. Pediatr Rev 2002; 23:227–33.

14

Basics of Hormonal Contraception

Nupur Gupta

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street Yawkey 6D, Boston, MA 02114, USA
ngupta3@partners.org

The USA has the highest rate of teen pregnancy and births in the western industrialized world with 34% of young women becoming pregnant at least once before the age of 20. Eighty percent of these are unintended and to unmarried teens. Despite advances in contraception, there remain three million unintended pregnancies each year in the USA with about half of them ending in planned terminations. Adolescents usually approach providers about 1 year after initiation of sexual activity to seek contraception. Barriers to care include lack of knowledge, confidentiality concerns, and fear of a pelvic examination. Preventive visits prior to initiation should address these issues and open up the conversation about sexual activity and contraception.

In the USA, oral contraceptive pills (OCP) remain the most common form of contraception for adolescents and reproductive-age women. However, there are newer hormonal methods that are easy to use, have fewer side effects, and are less dependent on user compliance for their efficacy.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_14,

COUNSELING ABOUT THE HORMONAL CONTRACEPTION

- Adolescents do not need a pelvic exam to initiate birth control.
- Screening for STIs and a Pap smear should be considered in the sexually active adolescent (routine Pap smear begins at age 21 years).
- A careful history and blood pressure is sufficient to decide if hormonal contraception may be safely initiated.
- The clinician should reinforce condom use.

Initial follow up should be 6 weeks after initiation of the OCP to check for side effects and proper use. Subsequent follow-ups should be every 6 months.

MEDICAL HISTORY

Prior to starting adolescents on birth control, a good medical history should be obtained. This should include:

- A detailed menstrual history including
- Age at menarche
- Date of last menstrual period (LMP)
- Regularity of menses
- Length of menses
- Cycle length
- Presence of cramps/back pain/mood changes/premenstrual symptoms
- Personal history of thrombosis, myocardial infarction, migraine with aura or focal neurological defects.
- Family history of clots. If positive, the adolescent should have basic workup to rule out prothrombotic disorders.

WHO has recently updated contraindications to hormonal contraception. Use this link for further information: http://www.who.int/reproductive-health/publications/mec/3_cocs.pdf

THE ORAL CONTRACEPTIVE PILL

The OCP is one of the most common forms of birth control used by adolescents. There are two types of OCPS. The combined oral contraceptive pill (COCP), consisting of a synthetic estrogen and

progestin, and the progestin only pill (POP). The latter is not often used as it requires teens to take the pill at almost the same time every day to ensure efficacy.

In almost all COCPs the estrogen used is ethinyl estradiol (EE). In some, mestranol is used but this is converted rapidly in the body to EE. OCPs contain different amounts of EE ranging from 20 to 50 mcg. The type of progestin also varies in the COCPs and should be taken into account when prescribing the pill. There are three generations of progestins. The first generation progestins or estranes are ethynodiol diacetate, norethindrone acetate and norethindrone. Second-generation progestins, or gonanes are norgestrel and levonorgestrel. Third generation progestins or high potency gonanes include desogestrel and norgestimate. As one progresses from first to third generation, there is an increase in half-life and androgenic effects may vary.

Combined OCPs come in both monophasic and multiphasic packs. Monophasic pills have a constant amount of estrogen and progestin while the amount of hormones varies through the cycle in multiphasic pills. For adolescents, one may start with either type, but preferably one that contains a low to moderate dose of estrogen (20, 30, or 35 mcg).

Mechanism of COCP Action

- Prevents ovulation by inhibiting the gonadotropin-releasing hormone axis
- Thickens cervical mucus to prevent sperm penetration
- Inhibits capacitation of the sperm
- Creates endometrial atrophy and changes the tubal transport mechanism

The pill may be easily changed according to individual side effects, but a trial of 3 months is recommended as it may take that long for an individual to become used to the pill and for the initial side effects to subside.

Method of Use

Both COCPs and POPs are taken orally. However, the POPs have to be taken at almost exactly the same time every day to ensure efficacy.

Efficacy

COCPs: perfect use: 0.3% failure rate, typical adult use: 8% failure rate, adolescent use: 5–15% failure rate. Reasons for reduced efficacy in adolescents include ineffective education and counseling about how to use the OCP and its side effects. They also may be ambivalent about contraception or forget to take the pill on a regular basis.

POPs: Much higher failure rate (as high as 50%), as the progestin has a much shorter half life and is dependent on the user taking it at exactly the same time every day.

Counseling about the OCP

- Initiation: The pill may be started on either day one of the menstrual cycle or on the Sunday after menstruation begins. The quick-start method may improve compliance. In this, adolescents may start on the day they have their visit if they have a negative pregnancy test. This method appears to improve compliance without increasing side effects except for occasional irregular bleeding. Teratogenic effects have not been reported in case of early pregnancy.
- Patients must be reminded to take their pills every day at about the same time. Jog the memory tips include: keeping OCP with toothbrush, or in an underwear drawer. Occasionally, patients may set an alarm on the cell phone or computer as reminders.
- Taking the pill at night often reduces nausea.
- If the adolescent misses a pill or two they may double up for up to 2 days. If they have missed three pills it is better to stop, get a withdrawal bleed, and then start a new pack.

Side Effects

Side effects may be related to the estrogen and/or the progestin components.

- Estrogen-related side effects include, but are not limited to, irregular menstrual bleeding, breast tenderness, fluid retention, nausea, increased appetite, headache, and hypertension.
- Progestin-related side effects include, but are not limited to, menstrual changes, bloating, mood changes, and increased

appetite with weight gain, acne, hirsuitism, and, rarely, male pattern hair loss.

Return to fertility: May vary but may be as long as 5 months after discontinuation of the COCP.

WHO SHOULD NOT TAKE OCPS

Absolute Contraindications

- Patients with previous history of venous thromboembolism
- Patients with known Factor V Leiden mutation (risk of clot increased 30-fold) or other thrombophilia condition (e.g., prothrombin mutation, Protein C or S deficiency)
- Smokers 35 years of age or older
- History of breast cancer
- Uncontrolled hypertension
- History of stroke
- History of migraine with neurologic symptoms
- Undiagnosed uterine bleeding
- Liver disease

Non-contraceptive benefits of the combined OCP: These benefits include treatment for dysfunctional uterine bleeding, dysmenorrhea, acne, hirsuitism, polycystic ovary syndrome, and irregular menses. The same education about the use of birth control pills should be provided despite the reason for treatment.

Newer Oral Contraceptives

Extended cycle regiments are available for those adolescents who desire less frequent menses or would benefit from extended cycles due to medical conditions including premenstrual dysphoric disorder (PMDD) or endometriosis. These may include OCPs that have 84 days of active hormone tablets followed by 7 inactive ones providing an extended cycle of 91 days. These give the user only 4 “menstrual” periods a year. They also reduce other side effects that occur because of hormone withdrawal, e.g., premenstrual symptoms, headaches and migraines, mood changes, and heavy or painful monthly bleeding. Another new combination OCP supplies hormones throughout the year with a withdrawal bleed occurring only once a

year. Other formulations containing 24-day active and 4-day placebo regimen have also recently been approved by the FDA, which offer the advantage of extended cycle with a low dose of estrogen.

COCPs containing drospirenone as a progestin are also relatively new to the market. This is a 17-α-spironolactone derivative that possesses diuretic and anti-androgenic activity. This makes it a good OCP when treating adolescents with PCOS. However, as the progestin has anti-mineral corticoid activity, it should not be used in adolescents who are at risk for hyperkalemia such as those with renal, hepatic, or adrenal insufficiency, or those on certain medications like angiotensin-converting enzyme inhibitors, angiotensin II receptor antagonists, and nonsteroidal anti-inflammatory drugs.

The first chewable COCP in the market is spearmint flavored and is as effective as other contraceptive pills and suggested to be more acceptable to young women who find it hard to swallow pills.

TRANSDERMAL CONTRACEPTION

Transdermal contraception that is currently available is the contraceptive patch. This is a 20 cm^2 plastic patch that contains a combination of the progestin, norelgestromin (NGMN), and ethinyl estradiol. It consists of a thin, matrix-type system with three layers, the backing layer, which is composed of a translucent, flexible polyester film, a middle drug adhesive layer that contains the active components, and a clear, polyester film that protects the adhesive layer during storage and is removed just before application.

Mechanism of Action

The principle is similar to the OCP. The hormones are released from the adhesive layer, absorbed across the skin, and allow for a fairly constant level to be maintained.

Method of Use

A new patch is placed on the skin once a week for 3 weeks. The fourth week is patch free, which allows for a withdrawal bleed to

occur. A single patch is said to release enough hormone to last 7 days and in effect actually prevents ovulation for up to 9 days.

Efficacy

Perfect use: 0.3% Failure rate; Typical use: 8% Failure rate.

Detachment rate: 3–5% but in adolescents may be as high as 35%. There has been evidence that the patch is less efficacious in women heavier than 90 kg.

Counseling about the Patch

- The patch may be applied to the buttocks, upper outer arm, lower abdomen, or upper torso (excluding the breasts). All sites have been shown to be equally effective.
- When a new patch is applied, the site should be changed.
- The site should also be free of creams, oils, and cosmetics.
- Regular activities including exercise, bathing, swimming, and use of a whirlpool or sauna do not usually result in detachment of the patch.
- If the patch becomes detached, it may be reapplied or a new patch must be applied immediately to maintain hormone levels and efficacy. The patch is then changed on the regular patch-change day. However, if the adolescent is unaware of the amount of time that has lapsed since the last patch became detached, she must use a new one and start the cycle again, and efficacy then cannot be guaranteed.

Side Effects

- Skin irritation or rash at the site of application.
- The patch is said to expose women to 60% more total estrogen in their blood as compared to someone taking a 35 μg OCP and that may increase the risk of adverse events.
- Higher incidence of breast symptoms, including breast discomfort, engorgement or pain; and dysmenorrhea than COCP users.
- Breakthrough bleeding but not significantly different than in OC users.

Return to Fertility: Similar to COCP

VAGINAL RING

The vaginal ring consists of a hormone containing silicone ring approximately 2 in. in diameter. It contains a combination of etonogestrel (a progestin), and EE. The hormones are implanted in the core of the ring.

Mechanism of Action

The principle is similar to COCP. The hormones are released slowly and constantly into the vagina, and subsequently absorbed through the vaginal mucosa into the general circulation.

Method of Use

The ring is flexible and is inserted intravaginally by pressing the two sides together. A tampon applicator may also be used for this purpose. The user inserts the ring into the vagina, placing it anywhere that feels comfortable, usually on the last day of her menstrual period. The ring then remains in place all day and night and requires no further attention. It is removed 3 weeks later and a withdrawal bleed then ensues. A new ring is then inserted 1 week later.

Efficacy

Perfect use: 0.3% failure rate. Typical use: 8% failure rate.

Counseling about the Ring

- According to the manufacturer, the ring may be removed for up to 3 h during coitus if the user so desires, without the use of a back-up method, but must then be reinserted by the user after intercourse.
- The unused ring should be refrigerated at 4–8°C.

Because the ring is self-inserted, it requires relative comfort with touching one's genitalia.

Side Effects

- Nonspecific vaginitis (14%)
- Breakthrough bleeding comparable to COCP
- Headache (12%)

- Leukorrhea (6%)
- Nausea (5%)
- Vaginal discomfort (4%)

The most common causes for discontinuation were device-related events like expulsion, foreign body sensation, and coital-related events.

Return to Fertility: Similar to COCP

INJECTABLE CONTRACEPTIVES

Progestin-Only Injectable Contraception

Depot medroxyprogesterone acetate (DMPA) (Depo-Provera) is a progestin-only injectable contraceptive that provides 3 months of contraception. As it does not contain estrogen, women in whom estrogen is contraindicated may use it.

Mechanism of Action

It acts by inhibiting ovulation, thickening the cervical mucus, and thinning the endometrium so that implantation is prevented.

Method of Use

It is injected deep intramuscular in the gluteal or deltoid muscle, every 3 months, in a dose of 150 mg.

Efficacy

Perfect use: 0.3% failure rate. Typical use: 3% failure rate.

Side Effects

- Menstrual irregularities (irregular bleeding or amenorrhea)
- Weight gain (54%)
- Reduction in bone mineral density: There have also been concerns regarding DMPA usage and its effects on bone mineral density (BMD). Several prospective studies have shown that adolescents who use DMPA experience a relative loss of BMD as compared to those not using hormonal contraception.

In November 2004, the FDA introduced a black box warning that prolonged use of the drug may result in significant loss of bone density, that the loss was greater the longer the drug was administered and that it may not be completely reversible. The FDA suggested that it should be used for long-term birth control only if other methods were inadequate.

- Delay in return to fertility (usually about 10 months)

Counseling about DMPA

- Patients should be counseled about the fact that they may have irregular menstrual bleeding on DMPA and occasionally amenorrhea. They should also know that most adolescents who use DMPA do become amenorrheic by their third shot (i.e., in 9 months)
- Counsel about weight gain and explain that it is seen in about half of users.

Discontinuation rates for Depo-Provera are exceedingly high with 33% of adolescents not choosing to get a second injection at 3 months and 75% discontinuing use by 12 months. Weight gain and menstrual irregularities are cited as the most common causes for discontinuation of DMPA.

Subcutaneous DMPA Formulation

Subcutaneous depot-medroxyprogesterone acetate (DMPA-SC) was approved by the US FDA in December 2004 under the name depo-subQ provera 104™. This contains 104 mg of MPA compared to the intramuscular injection currently available. The subcutaneous route, also administered every 3 months, provides slower and more sustained absorption of the DMPA and is just as efficacious in preventing ovulation.

Combined Injectable Contraception

Description and Method of Use: Combined injectable contraceptives are those that contain both a progestin and an estrogen. These are injected once a month in contrast to the progestin-only contraceptives that are administered once every 2–3 months. Combined injectables

have become more popular among both patients and providers than the progestin-only injectables because of their reduced propensity to cause side effects like irregular bleeding and weight gain and as they allow a quicker return to fertility. At present, there are no such contraceptives available in the USA although they continue to be available in other parts of the world.

Return to Fertility: may be delayed and vary from 10 to 18 months from the last injection.

SUBDERMAL CONTRACEPTIVE IMPLANT

Contraceptive implants are devised for women who are seeking a reliable and reversible method of contraception, not requiring daily compliance, and who need protection from pregnancy for 1–5 years. Implanon™ (Organon) is the only subdermal implant currently available in the USA. It consists of a single ethylene vinyl acetate rod, 4 cm in length and 2 mm in diameter, with a matrix that carries the active progestin hormone, etonorgestrel. The matrix is covered by a thin membrane that allows the release of the hormone into the surrounding tissue and then into the circulation. It provides contraception for 3 years.

Mechanism of Action

The subdermal implant was designed to suppress ovulation for 3 years. Although ovulation is inhibited, the levels of hormone do not suppress follicular activity so that estrogen levels remain almost normal. Thus there is less concern for effects on lipoproteins and BMD. At lower concentrations, the progestin exerts its contraceptive action by increasing the thickness of the cervical mucus preventing the penetration of sperm, and making the endometrium thin, and thus hostile to implantation.

Method of Use

Insertion of these single rod systems is easy, with the devices being preloaded and disposable. Removal often only requires a 2 mm skin incision and some finger pressure. Providers need some basic training for insertion.

Efficacy

Perfect use: 0.05% failure rate. Typical use: 0.05% failure rate. Implanon users have few, if any, ovulatory cycles.

Side Effects

Irregular bleeding (68%), which usually diminishes with continued use. Many women regain regular bleeding patterns after 6–9 months of use.

- Weight gain (20.7% with an increase of >10% above baseline)
- Acne (15.3%)
- Breast pain (9.1%)
- Headache (8.5%)
- Mood changes may also occur and are more commonly reported in teens (33%) than in adults (17%)

Return to Fertility: Almost immediate. Most women ovulate within 4 weeks.

LEVONORGESTREL-RELEASING INTRAUTERINE CONTRACEPTIVE SYSTEM

The levonorgestrel-releasing intrauterine system (LNG IUS™) consists of a 32 mm T-shaped polyethylene frame with a cylinder wrapped around its stem. This cylinder contains 52 mg of LNG mixed with polydimethyl siloxane that allows the slow release of the progestin hormone through the surface membrane. The device is impregnated with barium sulfate to make it readily visible on x-ray and ultrasonography. It provides contraception for up to 5 years of use.

Mechanism of Action

Levonorgestrel is released locally and exerts its contraceptive effect by thickening cervical mucus to reduce sperm penetration, inhibiting sperm motility and function, and causing endometrial atrophy. It suppresses ovulation in only 25–50% of users and like other intrauterine devices (IUDs), it also induces a foreign body reaction that causes localized inflammation and may be spermatotoxic.

Method of Use

The recommendations for the intra-uterine system are similar to those for copper bearing IUDs, i.e., it is recommended for parous women, with no history of PID in stable, monogamous relationships. It is also recommended that the size of the uterus be assessed before insertion of the IUD. The cavity should be 6–9 cm in length and unobstructed. Although being nulliparous is not a contraindication, it is recommended that women with uncertain fertility need to be counseled that although there is a rapid return to fertility with the removal of the LNG IUS™, there is no guarantee that they will be able to conceive.

The World Health Organization recommends that the LNG IUS™ be inserted within 7 days of commencement of menses, 4 or more weeks postpartum (if it can be determined a woman is not pregnant) and immediately post abortion. They do not recommend prophylactic antibiotics. WHO also states that women who are at high risk for pelvic inflammatory disease (PID) are not good candidates, but those women have had PID and have demonstrated their fertility, may use the LNG IUS if they are now at a low risk for sexually transmitted infections (STIs). Contraindications are similar to those for other IUDs including a specific contraindication for women who have a past history of and/or are at continuing risk for ectopic pregnancy.

Insertion of the intrauterine device requires training, but is fairly straightforward. It is inserted with the help of an applicator. This involves a one-hand technique that allows continuous control of the uterine position of the device throughout the procedure.

Efficacy

Perfect use: 0.1% failure rate. Typical use: 0.1% failure rate.

Side Effects

- Bleeding disturbances are common in the first 1–4 months after insertion often followed by amenorrhea
- Acne
- Dizziness
- Headaches

- Breast tenderness
- Nausea, vomiting
- Weight gain
- Ovarian cysts
- The chances of ectopic pregnancy are fewer than 1 per 1,000 women years of use, slightly less than a copper containing device.

Return to Fertility: This is usually immediate after the removal of the device.

EMERGENCY CONTRACEPTION

There are two types of EC, the progestin-only method (levonorgestrel 0.75 mg) or ulipristar acetate and the combination pill, containing ethinyl estradiol and a progestin. The copper-releasing IUD may also be used for the purpose of EC. Although not an ideal form of contraception, it should be available to all adolescents who are exposed to the risk of pregnancy by virtue of having unprotected intercourse.

PROGESTIN-ONLY METHOD

Mechanism of Action

Levonorgestrel acts primarily by inhibiting ovulation with some effects on sperm motility and by thickening cervical mucus. This progestin-only method acts only before fertilization and has no post-fertilization action. Ulipristar acetate works by delaying or preventing ovulation.

Method of Use

There are three types of progestin-only pills that are available in the USA.

The first (Plan B™) consists of two tablets of 0.75 mg of LNG given 12 h apart. The first tablet should be used as soon after unprotected intercourse as possible, up to 120 h and the second tablet 12 h later. Both tablets may also be taken at the same time if tolerated by the adolescent. Plan B™ One-Step containing 1.5 mg of levonorgestrel is now available. One pill is taken as soon as possible within 72 hours

of unprotected sexual intercourse. Ovrette™, a progestin-only pill containing norgestimate may also be administered as EC. However, to achieve an equivalent dose of LNG in Plan B, 20 tablets of the OCP have to be administered twice at an interval of 12 h (total dose of 40 tablets). Ella One™ is a prescription only selective progesterone receptor modulator recently approved by the FDA for emergency contraception. Ella One™ should be taken as early as possible but within 120 hours of unprotected intercourse. The side effect profile is similar to levonogestrel.

Combination-Pill Method

The "Yuzpe regime" involves the use of combined oral contraceptives (COCs) for the purpose of emergency contraception. Several of these can be used with the drawback being that a large number of pills need to be taken with each dose with resultant nausea and vomiting attributable to the estrogen content of the pills. Often, an antiemetic preparation is also prescribed and should be taken about 30–60 min before the first COC dose.

Efficacy

1.1% with LNG (Plan B) and 3.2% in the Yuzpe group. The efficacy of Plan B declines from 98% if taken within the first 12 h to 50% if taken within 120 h of unprotected intercourse.

Side Effects

- POPs: headache, fatigue, spotting, nausea, and dizziness reported in the first week after taking the EC.
- Yuzpe Regime: estrogen-related more common symptoms including nausea, vomiting, spotting, breast tenderness, and headache.

Contraindications to use of POPs

These include medication allergy, pregnancy, and undiagnosed genital bleeding, while those to COCs also include the contraindications to estrogen. These include allergy, pregnancy and acute, current migraine

with neurological deficit. Although personal history of deep vein thrombosis and pulmonary embolism is an absolute contraindication to ongoing contraception with the combined OC it is not to emergency contraception, although it would be prudent to use a POP in such circumstances.

REFERENCES AND ADDITIONAL READINGS

American Academy of Pediatrics, Committee on Adolescence. Contraception and adolescents. Pediatrics 2007;120:1135–48.

Gupta N. Advances in hormonal contraception. Adolesc Med 2006;17:653–71.

Gupta N, Corrado S, Goldstein M. Hormonal contraception for the adolescent. Pediatr Rev 2008;29:386–397.

Katz, VL. Comprehensive Gynecology 5th Ed. Philadelphia, PA: Mosby Elsevier, 2007

Lara-Torre E. Update in adolescent contraception. Obstet Gynecol Clin N Am 2009; 36:119–128.

Prine L. Emergency contraception, myths and facts. Obstet Gynecol Clin N Am 2007; 34:127–136.

15

Adolescent Pregnancy

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

Sexual activity prevalence: About 25% of teens report intercourse by age 15. In Boston, 49% of high school females report sexual intercourse. Predictors of early sexual intercourse include early pubertal development, history of sexual abuse, poverty, lack of attentive/nurturing parents, lack of school or career goals, substance abuse, and poor school performance. Virginity pledges may not affect sexual behavior and may also decrease the likelihood of using contraception.

Teen birth rate: The birth rate is increasing reversing a downward trend over the past 1½ decades. Half of teen pregnancies occur within the first 6 months after initiation of intercourse. About 900,000 teens become pregnant each year; more than 4 out of 10 adolescent girls have been pregnant at least one time before age 20 years. Slightly more than half of these pregnancies result in live births. Adolescents less than 18 years old are more likely to deliver a preterm infant less than 32 weeks gestation as well as an infant weighting less than 2,500 g.

Contraception: Many adolescents know the mechanics of contraception, but use it inconsistency. Motivation to use contraception varies according to the relationship. African-American adolescents have concerns about the perceived side effects such as weight gain from hormonal contraception. In addition, girls worry about

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_16,

confidentiality in obtaining hormonal contraceptives. Other girls voice disinterest or an inability in being compliant with a daily, weekly, or every q 12 week hormonal regimen such as injectable Depo-Provera™.

Symptoms: Symptoms of early pregnancy may include nausea, vomiting, breast tenderness, fatigue, urinary frequency, as well as amenorrhea. Some girls have irregular periods, so they will not be alarmed by a late one. Questions to ask: "When was your last period?" "When were you last sexually active?" "Do you use contraception? If so, what?" "Could you be pregnant?"

Pregnancy testing: Have a very low threshold to order a pregnancy test as pregnancy is not evident early on in adolescents. In fact it may not be evident for months in obese adolescents. Do not rely on the adolescent's menstrual or sexual history to rule out pregnancy. Pregnancy tests will be positive before any clinical evidence of pregnancy. A serum beta-subunit HCG is likely to be positive by 7 days after conception. A monoclonal urine HCG test is convenient and can be done in 5 min. It may be positive 7–10 days after conception and before the first menstrual period is missed.

Confidentiality: A pregnant teen has the right to confidentiality. You cannot inform her parents without her consent. If there is concern about the teen's risk for self-harm, suicide, homicide, or potential abuse, you can break confidentiality as needed. Consult an attorney if there are questions.

Care: If an adolescent is pregnant, decide whether a pelvic exam is needed to date the pregnancy. If the dates are early (and reliable), an exam may not be necessary. Pregnancy options should then be discussed.

A pregnant teen should be prescribed a prenatal vitamin with folic acid and seen weekly until referral to a prenatal clinician or other options are accepted. Counsel her not to use substances including alcohol, tobacco, substances, or possible teratogens. Make all attempts to obtain consent to inform her parents. Social service should be involved. If the teen wishes to terminate the pregnancy, she should be referred to an organization such as Planned Parenthood. In Massachusetts, a "judicial bypass" allows teens under age 18 years to terminate a pregnancy without parental involvement. Follow-up should be arranged to assess her gynecological status, evaluate for emotional issues and prescribe contraception. Depression is more common in pregnant adolescents than those not pregnant. Pregnant

teens should be screened for depression with appropriate referral and treatment if the screening is positive.

Ectopic pregnancy: The incidence of ectopic pregnancy has increased with a risk of maternal mortality. Because of the high incidence of sexually transmitted infections, teens are at higher risk for ectopic pregnancy. Any adolescent presenting with pain, vaginal bleeding, and a missed menstrual period should be considered as having an ectopic pregnancy. A pelvic examination should be performed to evaluate for adnexal tenderness, abdominal tenderness, and adnexal mass or signs of pregnancy that include softening of the cervix and uterine enlargement. With a positive HCG test, obstetrical consultation should be obtained immediately and a transvaginal pelvic ultrasound should be performed on an emergent basis.

REFERENCES AND ADDITIONAL READINGS

Committee on Adolescence, American Academy of Pediatrics. Counseling the adolescent about pregnancy options. Pediatrics 1998;101:938–40.

Committee on Adolescence, American Academy of Pediatrics. Adolescent pregnancy: current trends and issues. Pediatrics 2005;116:281–86.

McClanahan KK. Depression in pregnant adolescents: considerations for treatment. J Pediatr Adolesc Gynecol 2009;22:59–64.

16

Polycystic Ovary Syndrome

Jennifer Rosenblum

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
jrosenblum@partners.org

BACKGROUND

Polycystic ovary syndrome (PCOS) is a spectrum of disease that is characterized by menstrual irregularity due to ovulatory dysfunction and hyperandrogenism. Presenting signs and symptoms are heterogeneous and may vary over time. It is associated with an increased risk of obesity and the metabolic syndrome as well as infertility. The diagnosis of PCOS should be considered in any adolescent girl with hirsuitism, severe acne, menstrual irregularity, or obesity.

DEFINITION

The syndrome was originally described in 1935 by Stein and Leventhal in women with amenorrhea, hirsuitism, obesity, and a characteristic polycystic appearance to their ovaries. There are no formal criteria established for adolescents with PCOS, who face unique challenges in diagnosis due to the normal occurrence of anovulation in the first 2 years after menarche, the difficulty of distinguishing between polycystic ovaries and the normal appearance of multifollicular ovaries in adolescence, and the lower detection of polycystic

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_16,

ovaries by transabdominal ultrasound compared to transvaginal ultrasound which is inappropriate to use in virginal adolescents. In adults, two sets of diagnostic criteria exist:

1. NIH (1990) – must have all three of the following:
   - Menstrual irregularity due to anovulation or oligo-ovulation
   - Hyperandrogenism, either clinical (hirsuitism, severe acne, male pattern balding) or biochemical evidence (elevated serum androgens)
   - Exclusion of other causes of the above: congenital adrenal hyperplasia, androgen-secreting tumors, hyperprolactinemia, Cushing's syndrome, acromegaly, hypothyroidism, and drugs.
2. Rotterdam (2003) – must have two out of three of the following:
   - Oligomenorrhea or amenorrhea
   - Unexplained hyperandrogenism, either clinical or biochemical evidence
   - Polycystic ovaries on ultrasonography

In adolescents, PCOS may be defined as chronic, unexplained ovarian or adrenal hyperandrogenemia confirmed by biochemical testing.

ETIOLOGY

PCOS is a result of excess ovarian androgens, although there is debate as to whether this is due to a primary steroidogenesis disorder in the ovaries (functional ovarian hyperandrogenism) or adrenals (functional adrenal hyperandrogenism), or secondary to excessive LH secretion from the pituitary gland which causes the ovary to secrete androgens. In addition, there is evidence that insulin-resistant hyperinsulinism may play a role in the steroidogenic dysregulation of PCOS. The development of PCOS likely involves a complex interaction between genetic traits and environmental factors.

EVALUATION

1. Serum androgens: total testosterone, free testosterone, and DHEAS
2. Rule out other causes of hyperandrogenemia: 17-OHP, prolactin, cortisol, IGF-1, TSH, and ultrasound to rule out ovarian or adrenal tumor

3. Assessment for associated conditions and risks: fasting lipid profile, fasting insulin, and 2-h glucose tolerance test (suggest repeating this every 2–3 years)

TREATMENT

1. Combined hormonal contraception is the first-line treatment to regulate menses and thus prevent endometrial hyperplasia, as well as to improve hirsuitism and acne. Should use an OCP that contains a progesterone with antiandrogenic activity (drospirenone – in Yasmin™) or minimal androgenic activity (norgestimate – in Ortho-tri-Cyclen™ or Orthocyclen™, ethynodiol diacetate – in Demulen™, and desogestrel – in Orthocept™). OCPs should be used until the patient is 5 years postmenarchal or has lost a substantial amount of excess weight.
2. Progestins alone may be used cyclically to regulate menses, but this will not improve clinical symptoms of hyperandrogenism. Micronized progesterone (Prometrium™ 100–200 mg qhs) or medroxyprogesterone acetate (Provera™ 10 mg qhs) may be given for 7–10 days every 4–6 weeks.
3. Glucocorticoid therapy may be used to regulate menses when adrenal androgens are markedly elevated, but this does not result in consistent ovulation. There is controversy about the efficacy and safety of this treatment for PCOS. It does not appear to improve hirsuitism or acne.
4. GnRH agonists (depot leuprolide – Lupron™) may be used to regulate menses in patients who do not tolerate OCPs and in whom progestins do not suffice. It should not be used in girls < age 16 due to concerns about bone mineral accrual.
5. Cosmetic treatments may be used for hirsuitism. Inexpensive options include shaving, chemical depilitating agents, bleaching, and waxing. More expensive options include eflornitine hydrochloride cream (Vaniqa™), laser therapy, and electrolysis.
6. Antiandrogen therapy may be added to OCP therapy for the treatment of hirsuitism. When given alone, it may cause menstrual irregularities as well as teratogenic feminization of the male fetus. Spironolactone (50–100 mg bid) is the recommended choice as it is the safest and most potent antiandrogen in the USA.

7. Insulin-lowering agents may help to improve ovulation as well as reduce androgen levels, although are not as effective as OCPs in controlling menstrual irregularity and hirsutism. Metformin may be used as an adjunct to weight-loss efforts, and should be considered in adolescents with PCOS who have obesity, hyperinsulinemia, or glucose intolerance. It increases the frequency of menses and ovulation by ~50% and lowers testosterone by ~20%. Should start 500 mg qpm with dinner and increase by 500 mg/week as tolerated to maximum dose of 2,000 mg daily or divided bid. Thiazolidinediones should not be used in adolescents with PCOS, given concerns of weight gain and rare hepatic toxicity.

REFERENCES AND ADDITIONAL READINGS

Ehrmann DA. Polycystic ovary syndrome. New Engl J Med 2005;352:1223–36.
Nestler JE. Metformin for the treatment of polycystic ovary syndrome. New Engl J Med 2008;358:47–54.
Rosenfield RL. Clinical features and diagnosis of polycystic ovary syndrome in adolescents. Available at: www.uptodate.com
Rosenfield RL. Treatment of polycystic ovary syndrome in adolescents. Available at: www.uptodate.com

17

Sexually Transmitted Infections in Adolescents

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

GENERAL INFORMATION

There are five major principles for prevention of sexually transmitted infections (STI):

1. Education and counseling of patients at risk for STI
2. Identification of asymptomatic patients with STI who are unlikely to seek treatment
3. Effective diagnosis and treatment of STI
4. Effective diagnosis and treatment of partners of patients with STI
5. Identification and immunization of patients at risk for vaccine preventable STI

In all states, adolescents can consent to the confidential diagnosis and treatment of STI. In the majority of states, adolescents can consent to HIV counseling and testing.

The rates of STI are highest among adolescents compared to other age populations. Younger adolescents (<15 years) who are in detention facilities, injecting drug users, those attending STI clinics, or males having sex with males are at an even higher risk for STI.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_17,

Survey data from NHANES (National Health and Nutrition Examination Survey) indicate that 26% of females between ages 14 and 19 years have laboratory evidence of an STI including HPV, Herpes type 2, chlamydia, or trichomoniasis.

ADOLESCENTS' UNIQUE SUSCEPTIBILITY TO STI

Biological Factors

- Increased cervical ectopy
- Decreased cervical mucous
- Possible lower levels of secretory IgA
- Larger cervical transformation zone
- Increased trauma during intercourse
- Presence of other STI
- Douching
- Coitus during menses

Behavioral Factors

- Use of substances during sex
- Multiple sexual partners
- Unprotected intercourse
- Early coitarche
- Coercive sex
- Having sex with partners who have had multiple partners
- Inconsistent use of condoms

Cognitive Factors

Lack of information about STI and symptoms, a sense of invulnerability

Other Factors

- Lack of access to health care
- Shame
- Poverty
- Homelessness
- Sexual abuse

Special Adolescent Populations

Females: Higher reported rates of STI, may suffer more complications including ectopic pregnancy, pelvic inflammatory disease (PID), infertility, and pelvic pain.

Disadvantaged youth: are generally at increased risk for STI.

Race and ethnicity: African Americans and Hispanics have higher STI prevalence rates in comparison to non-Hispanic whites.

Males who have sex with males: Some are at higher risk for HIV and other STI. Routine testing for HIV and syphilis as well as immunization against Hepatitis A and B is recommended, if documentation of immunity is not available. In addition, if the adolescent has had insertive intercourse within the past year, screen urethra for chlamydia and gonorrhea (urine or swab sample); if patient has had receptive anal intercourse within the past year, screen for rectal gonorrhea and chlamydia; if patient has had receptive oral intercourse, screen for oral gonorrhea.

Women who have sex with women (WSW): Few data are available on the risks associated with sex between women. Most WSW report one or more lifetime male sexual partners. Digital vaginal or digital anal contacts especially with shared penetrative sex items may present a means for transmission of microorganisms. HPV transmission can occur with skin to skin or skin to mucosa contact. Pap tests should be performed consistent with national guidelines: Begin at age 21 years even if no sexual intercourse has occurred (Table 1).

Table 1
Screening recommendations for STI in lesbian, gay, and bisexual adolescents (Source: Centers for Disease Control-CDC)

STI	Males	Females
Gonorrhea: urethra/cervix	Yes	Yes
Pharynx	If indicated by history*	If indicated by history*
Anus	If indicated by history**	If indicated by history**
Chlamydia: urethra/cervix	Yes***	Yes***
Pharynx	No	No
Anus	If indicated by history**	If indicated by history**
Syphilis and HIV	Yes, Yes	Yes, Yes
Hepatitis A, B	Yes, Yes	No, Yes
BV	No	Yes
Trichomoniasis	No	Yes
HPV	No	Yes

* history in the past year of receptive oral intercourse
** history in the past year of receptive anal intercourse
*** history in the past year of insertive or receptive intercourse

History taking (use gender neutral language such as partner rather than boyfriend or girlfriend): Avoid homosexual or heterosexual unless used first by the adolescent. Explain why a sexual history is important for the adolescent's health and tell the patient that these discussions are confidential and will not be revealed to a parent (unless the life of the adolescent is threatened by an STI).

- Do you have sex with men, women, or both?
- In the past 2 months, with how many partners have you had sex?
- How many lifetime partners have you had?
- Do you use condoms during sex; if so, do you use condoms every time, sometimes, usually not?
- Have you ever had an STI?
- Have any of your partners told you that he or she has had an STI?

VACCINE PREVENTABLE STI (SOURCE: CDC)

Hepatitis A

Indications: Men who have sex with men; illegal injection and non-injection drug users; persons with chronic Hepatitis B or C, or those with chronic liver disease. Pre-vaccination serologic testing for susceptibility is not necessary and should not interfere with the initial vaccination; post-vaccination serologic testing is not indicated (Table 2).

Hepatitis B

Indications: Vaccine is recommended for all unvaccinated adolescents. Pre-vaccination serologic testing may be done if immunization

Table 2
Hepatitis A dosage schedule (Source: CDC)

Vaccine	Age (Years)	Dose	Volume (mL)	Two Dose Schedule (mos)
HAVRIX	1-18	720 (EL.U.)	0.5	0, 6-12
HAVRIX	>18	1,440 (EL.U)	1.0	0, 6-12
VAQTA	1-18	25 (U)	0.5	0, 6-18
VAQTA	>18	50 (U)	1.0	0, 6-18

history is unclear. Antibody to Hepatitis B core antigen (anti-HBc) is the test of choice. If positive, then test for Hepatitis B surface Antigen (HBsAg). If HBsAg negative, then no follow-up or immunization is necessary. If HBsAg positive, then refer for medical follow-up (Table 3).

Human Papillomavirus Vaccine

Indications: Vaccine is recommended for all females 9–26 years. Pre-vaccination serologic testing is not done (Table 4).

Testing

HIV

- CDC recommends routine testing of all adolescents at least one time in the health care setting; high-risk adolescents (see below) should be tested annually
- USPSTF recommends screening all high-risk adolescents; no recommendations for routinely screening adolescents
- Massachusetts Health Quality Partners recommends routine testing of patients at increased risk for HIV infection

Table 3
Hepatitis B dosage schedule (Source CDC)

Vaccine	Adolescents 11-19 years: three dose schedule (0,1,6 months)	Adolescents 11-15 years: two dose schedule (0, 4-6 months)	Adults 20 years or older: three dose schedule (0, 1, 6 months)
Recombivax HB	5 (ug) 0.5 ml	10 (ug) 1.0 ml	10 (ug) 1.0 ml
Energix B	10 (ug) 0.5 ml	Not Available	20 (ug) 1.0 ml

Check CDC Website or AAP Redbook for dialysis patient vaccine recommendations

Table 4
Human papillomavirus vaccine dosage schedule (Source CDC)

Vaccine	Dosage Schedule
Gardasil ™ (serotypes 6, 11, 16, 18)	0, 2, 6 months (males and females 9-26 years)
Cervarix™ (serotypes 16, 18)	0, 1, 6 months (females 10-25 years)

- Adolescents are able to and must provide written informed consent in Massachusetts; extensive pretest counseling is not necessary; negative results may be telephoned or sent to the patient; positive results may be telephoned or preferably given in person. Check other states regulations for information on adolescent HIV testing consent.
- High-risk groups include unprotected intercourse with more than one partner, MSM, persons seeking treatment for STIs, or with a prior history of STIs, past or present injection drug use, sex for money or drug situations, history of Hepatitis B or C, inmates, residents of homeless shelters, active TB
- A negative HIV test does not reflect exposures during the past 3 months
- Screening EIA cost is ~ $1–2; positive EIA is repeated, and confirmatory Western blot is checked if second EIA is positive
- Combined EIA and Western blot have sensitivity of >99.7% and specificity of >99.9%
- Rapid HIV antibody test is available especially for source patients from needle-stick injury; 20 min for results, cost $14
- Home-based testing is not recommended

Syphilis

Routine screening of all individuals is not recommended

- Screening of high-risk individuals is recommended including MSM, sex workers, sex for drugs, syphilis contacts, persons with other STIs
- USPSTF recommends screening pregnant women and high-risk patients
- MHQP recommends screening high-risk patients and pregnant women
- RPR (a non-treponemal test) is the preferred screening test
- Optimal testing frequency is not determined

Chlamydia

- Sexually active female adolescents should be screened for chlamydia
- Asymptomatic sexually active adolescent males do not need to be screened
- The optimal screening frequency is not known but may be decided on the adolescent's risk factors

- Females may be tested with an endocervical swab or urine (not a clean catch)
- Males may be tested with a urine or urethral swab
- USPSTF recommends routine screening of sexually active adolescent females
- CDC recommends annual screening of sexually active adolescent females and screening of adolescent males in high-risk settings (correctional facilities, adolescent clinics, and STI clinics)
- MHQP recommends annual screening of sexually active adolescent male and females

Gonorrhea

- USPSTF recommends sexually active female adolescents be screened for gonorrhea
- MSM (see MSM guidelines)

SEXUALLY TRANSMITTED INFECTIONS

Office Testing

1. Wet mount: Take a drop or two of fresh vaginal fluid preferably from the cul-de-sac and place it immediately on a slide; add one or two drops of normal saline and cover with a cover slip (Fig. 2). Evaluate under low- and medium-power microscopy. Epithelial cells, white and red blood cells, and bacteria are commonly seen.
2. KOH mount: Take a drop or two of fresh vaginal fluid preferably from the cul-de-sac and place it immediately on a slide; add one or two drops of 10% KOH and cover with a coverslip. Warm the underside of the slide gently with a match. Evaluate for fungal forms under low and medium power microscopy (Fig. 3).
3. pH paper is useful in testing vaginal pH for diagnosis of bacterial vaginosis

Vaginitis

Bacterial Vaginosis

Symptoms: Malodorous (fishy smell) vaginal discharge; >50% of women are asymptomatic

Signs: Thin gray or white homogenous discharge coating the vaginal walls

Diagnosis: Amsel criteria – 3 out of 4: pH of vaginal fluid >4.5, a fishy odor to vaginal discharge before or after addition of 10% KOH, and the gray or white vaginal discharge (Fig. 4).

There is also the presence of clue cells on microscopic examination (Fig. 1). Clue cells, which are vaginal epithelial cells studded with coccobacilli should be seen in 20% of the epithelial cells on a wet mount.

Treatment: Metronidazole 500 mg orally two times a day for 7 days; or Metronidazole gel 0.75%, one full applicator (5 g) intravaginally once a day for 5 days; or Clindamycin cream 2%, one full applicator (5 g) intravaginally at bedtime for 7 days

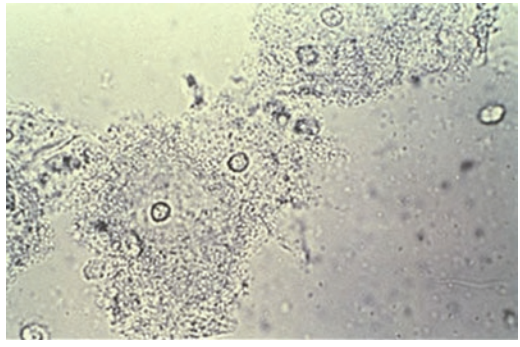


Figure 1. Clue Cells. Credit: Seattle STD/HIV Prevention Training Center.

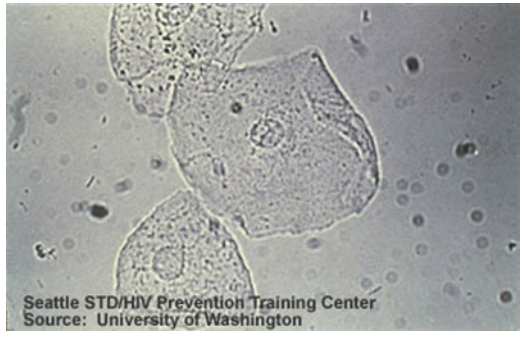


Figure 2. Saline preparation of vaginal fluids.

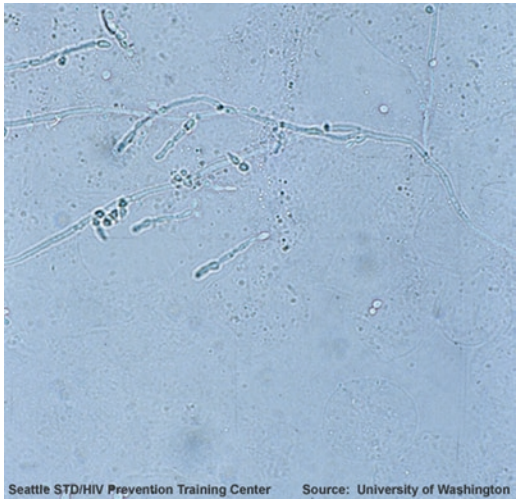


Figure 3. Yeast.

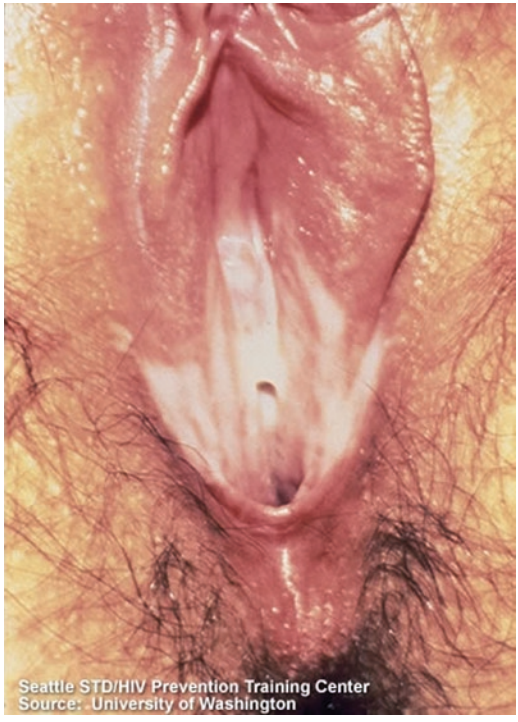


Figure 4. Vaginal discharge in bacterial vaginosis.

For alternative treatments and treatment of pregnant women check website: http://www.cdc.gov/std/treatment/2006/vaginal-discharge.htm#vagdis2

Management of sex partners: none recommended

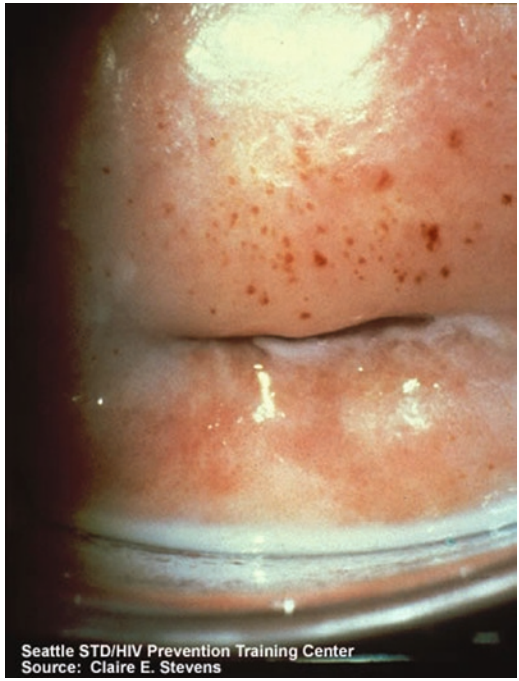
Follow-up: not necessary if symptoms resolve

Trichomoniasis

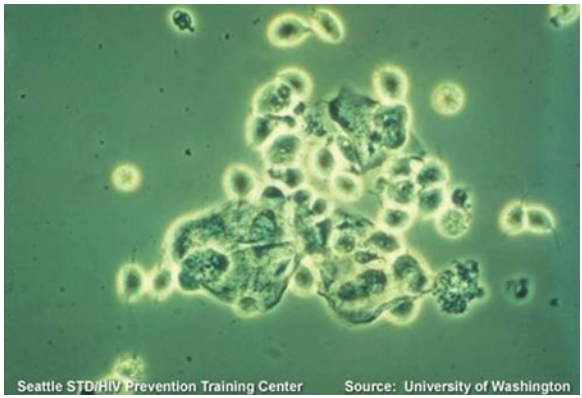
Symptoms: Diffuse, malodorous, yellow-green vaginal discharge with vulvar irritation; some women are asymptomatic.

Signs: Characteristic vaginal discharge with frothy appearance; strawberry cervix (Fig. 5)

Diagnosis: Wet prep of vaginal secretions for presence of trichomonads (60–70% sensitive); OSOM Trichomonas Rapid Test also useful (>83% sensitivity and >97% specificity); males require culture of



Figur 5. Strawberry cervix.



Figur 6. Trichomonas vaginalis in wet mount preparation.

urethral swab, urine, or semen. Trich appear to be swimming in a wet mount with whipping motions of the flagellae (Fig. 6).

Treatment: Metronidazole 2 g orally in a single dose or Tinidazole 2 g orally in a single dose

For alternative treatment and further information check website: http://www.cdc.gov/std/treatment/2006/vaginal-discharge.htm#vagdis3

Management of sex partners: sex partners should be treated

Follow up: Unnecessary if patient becomes asymptomatic. Check website if patient continues to be symptomatic

Vulvovaginal Candidiasis

Symptoms: Vulvar pruritus, vaginal discharge, vaginal soreness, dysuria, dyspareunia

Signs: Vulvar erythema, edema, excoriations, or a thick cottage cheese–like vaginal discharge (Fig. 7).

Diagnosis: Wet prep 10% KOH examination of vaginal fluid is best looking for hyphae. Candida culture may also be performed. A positive wet prep may give the appearance of "meatballs and spaghetti."

Treatment: Numerous regimens are available including Butoconazole 2% cream 5 g intravaginally for 3 days or terconazole 80 mg vaginal suppository, one intravaginally for 3 days.

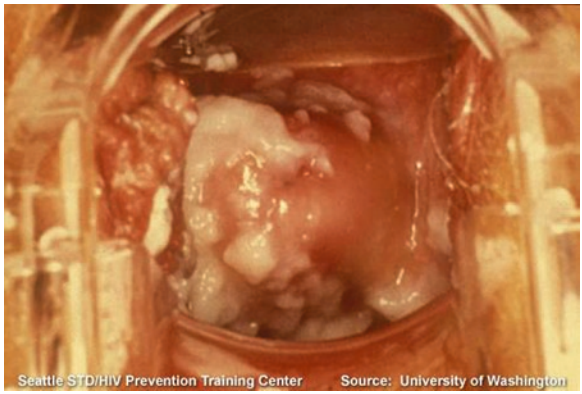


Figure 7. Candida vaginal discharge.

For other treatments and further information check website: http://www.cdc.gov/std/treatment/2006/vaginal-discharge.htm#vagdis4

Urethritis and Cervicitis

Symptoms: Males with urethritis are often, but not always, symptomatic with pruritus, dysuria, or a urethral discharge. Females with cervicitis may be asymptomatic, have vaginal discharge, or some intermenstrual vaginal bleeding

Signs: Males may have a scant to copius clear, purulent, or mucopurulent urethral discharge; females may have mucopurulent cervicitis (Figs. 8–10).

Diagnosis: In males, a gram stain of the urethral discharge that shows five or more WBC per oil field is consistent with urethritis (Fig. 11).

The presence of gram negative intracellular diplococci establishes a gonococcal infection (Fig. 12).

Chlamydia and gonorrhea nucleic acid amplification testing (NAAT) should be sent on first catch urine (preferably) or urethral discharge.

In females, the gram stain has little value in establishing a diagnosis. Cervical or urine specimen is best with cervical specimens preferred. NAAT is not cleared by the FDA to test for rectal and oropharyngeal infections caused by Chlamydia trachomatis and N. gonorrhoeae. In females, cervical (preferably) or urine specimens should be sent for NAAT to establish presence of gonorrhea or

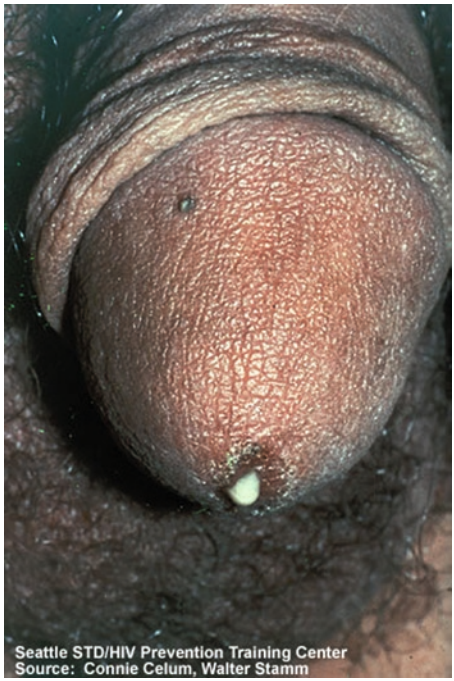


Figure 8. Gonococcal urethritis.

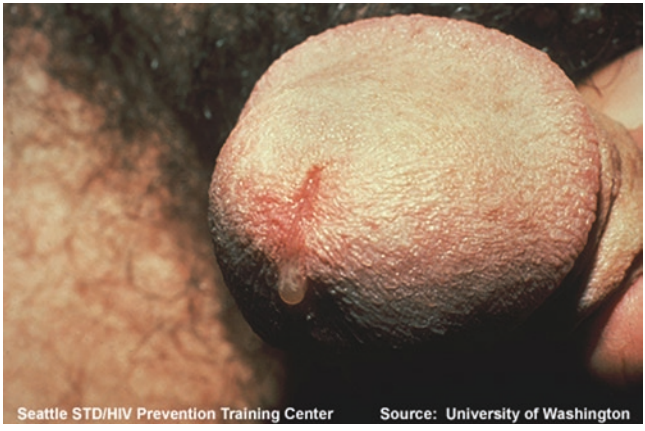


Figure 9. Non-gonococcal urethritis.

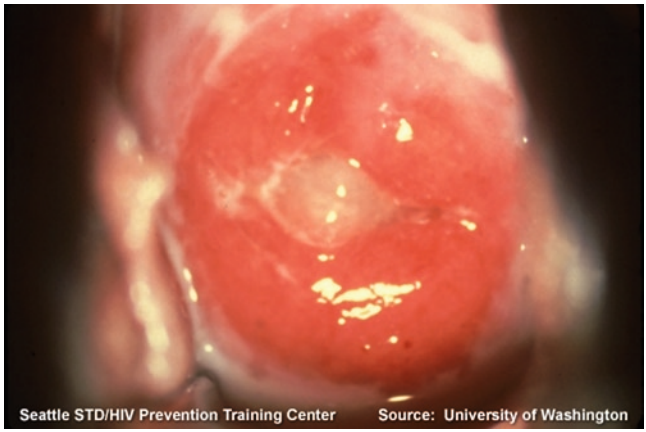


Figure 10. Chlamydia cervicitis.

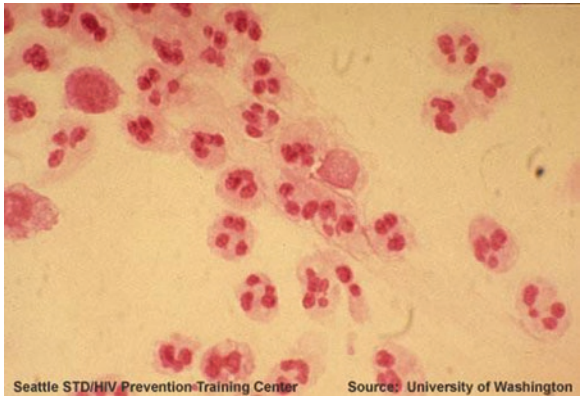


Figure 11. Urethral gram stain as seen in non-gonococcal urethritis.

chlamydial infection. A wet prep of cervical secretions will help to evaluate the presence of BV or trichomoniasis.

Recommended regimens: azithromycin 1 gram orally in a single dose or doxycycline 100 mg twice a day for seven days.

Treatment: A number of treatment options are available; Use the CDC website: http://www.cdc.gov/std/treatment/2006/urethritis-and-cervicitis.htm for a Hernative regimens.

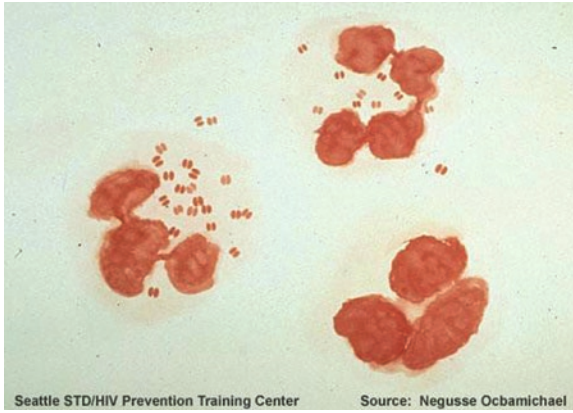


Figure 12. Intracellular gram negative diplococci.

Also note fluroquinolones are not indicated for the treatment of gonorrhea due to resistant GC. Please see updated guidelines at: http://www.cdc.gov/std/treatment/2006/updated-regimens.htm

Generally, if a patient is diagnosed with gonorrhea, then treatment should be given for concurrent chlamydia infection.

Management of Sex Partners: Patients with non-gonococcal urethritis should refer all sexual partners from the past 60 days for treatment. Patients diagnosed with gonorrhea should refer all sexual partners from the past 60 days; if a patient last had intercourse more than 60 days before the symptoms began or diagnosis established, that partner should be referred for evaluation.

Follow up: Generally, follow-up is not needed unless there is persistence of symptoms, pregnancy, or a question of medication compliance.

Pelvic Inflammatory Disease

Symptoms: PID is a spectrum of inflammatory disorders of the upper female genital tract.

Thus, symptoms could be secondary to endometritis, salpingitis, tubo-ovarian abscess, and/or peritonitis. Symptoms could range from vaginal discharge, dyspareunia, abnormal vaginal bleeding, dysuria, nausea, vomiting, or pain.

Signs: Abdominal tenderness with or without rebound. Pelvic examination may show vaginal discharge, mucopurulent cervicitis, uterine or

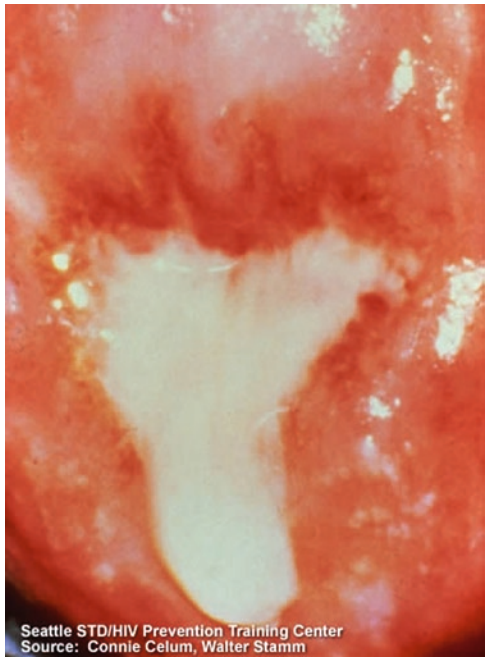


Figure 13. Mucopurulent cervicitis.

adnexal tenderness, cervical motion tenderness, or an adnexal mass (Fig. 13).

Diagnosis: PID is an imprecise diagnosis. Any sexually active female adolescent with pelvic or lower abdominal pain should be tested for PID, if another etiology has not been established. In addition, one or more of the following should be present for empiric treatment of PID: cervical motion tenderness or uterine tenderness or adnexal tenderness.

Treatment: A decision should be made if the patient should be treated with oral medication or parenteral medication. In addition, all treatment regimens must be effective against gonorrhea and chlamydia. Hospitalization and parenteral treatment are based on one or more of these criteria: patient is severely ill with nausea, vomiting, or high fever; patient is pregnant; patient is unable or cannot tolerate outpatient oral medications; surgical emergency cannot be ruled out; patient does not respond to oral antimicrobials; patient has a tubo-ovarian abscess. This website has up-to-date information on the

currently recommended treatment regimens for PID: http://www.cdc.gov/std/treatment/2006/pid.htm

Management of sex partners: Regardless of the etiology of the PID, male sex partners who had sexual contact with the patient within the 60 days prior to her developing symptoms should be evaluated and treated empirically for chlamydia and gonorrhea. The patient is at high risk for reinfection if this is not done, and there is a strong likelihood that the male partner has an infection with chlamydia, gonorrhea, or both.

Follow up: Regardless of treatment, patients should show clinical evidence of improvement within 72 h of treatment initiation. If not, an examination should be done and therapeutic options considered. Some recommend rescreening for chlamydia and gonorrhea 4–6 weeks after completion of therapy if one or both of these agents were identified in the patient.

GENITAL LESIONS

Papules

Molluscum Contagiosum

Symptoms: Often asymptomatic, the lesions may appear on external genitalia and in the pubic region and upper legs; rarely pruritic

Signs: Multiple raised, flesh colored, or erythematous domed-shaped papules often umbilicated ranging in size from 1 to 5 mm; giant mollusca may be seen in HIV-infected patients

Diagnosis: Clinical appearance (Fig. 14)

Treatment: Most lesions will disappear without treatment; cryotherapy with liquid nitrogen is effective.

Apply liquid nitrogen to the lesion for 20 s. Curettage is also effective.

Scabies

Symptoms: Pruritus especially at night

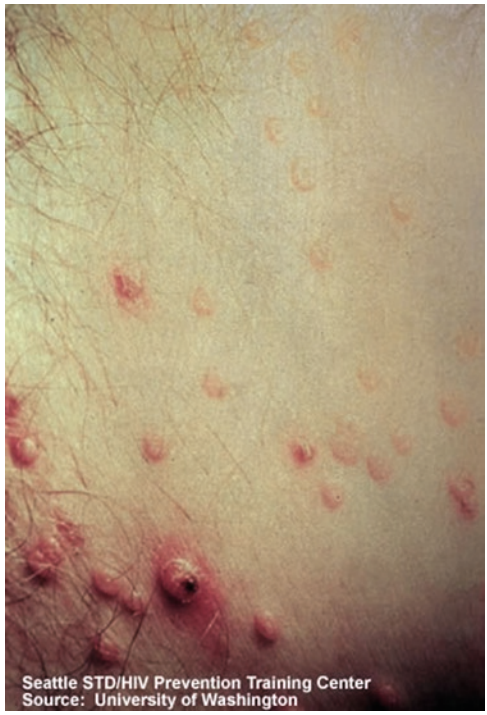


Figure 14. Molluscum.

Signs: Papular rash often on genital areas including penis and vulva, flexor areas of the wrists, interdigital folds, areolae, abdomen, buttocks, intergluteal cleft; nodules may appear in the axillae or groin; secondary infections due to scratching may be seen.

Diagnosis: Scrape a lesion with a No. 15 scalpel blade after applying mineral oil and look for parts of the mite, eggs, and feces under microscopy; some clinicians may diagnose based on clinical appearance (Fig. 15) or parts of mite figure 22 (left).

Treatment: Permethrin cream (5%) applied to all areas of the body from neck down and washed off 8–14 h later. Itch may persist for 2 weeks. Decontaminate bedding and clothing by machine wash and dry, or by dry cleaning.

Management of sex partners: Contacts within the preceding month should be examined and treated.

Follow up: Some recommend re-treatment if the patient is still symptomatic after 1–2 weeks.

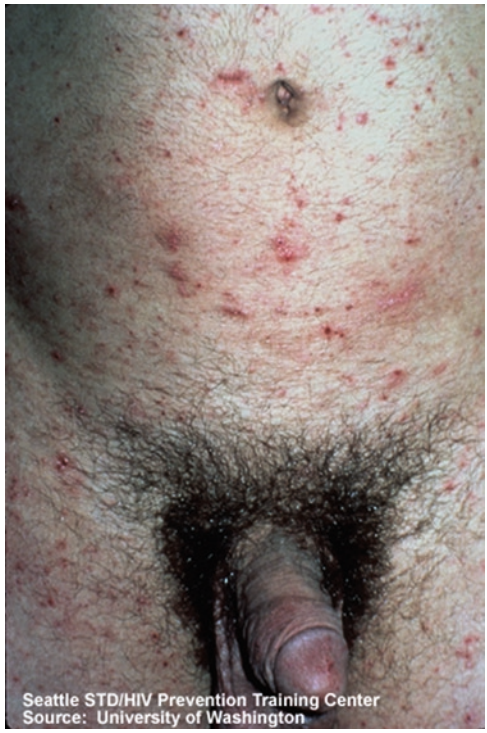


Figure 15. Scabies.

VESICULAR AND/OR ULCERATIVE LESIONS

Genital Herpes

Symptoms and signs: Local symptoms may include a vesicular and/or ulcerative genital rash, pain, dysuria, local swelling, pruritus, adenopathy. Systemic symptoms may include fever, malaise, headache, and myalgias especially in primary herpes infections (Fig. 16).

Diagnosis: For first-time diagnosis, isolation of the virus in cell culture, PCR assays for HSV DNA are more sensitive. Further options are noted in link below.

Treatment: Management is complicated depending on patient's level of illness and whether it is the primary episode or a recurrence. In addition, suppressive therapy is an available option. For first-time infection, acyclovir 400 mg orally three times a day for 7–10 days, or

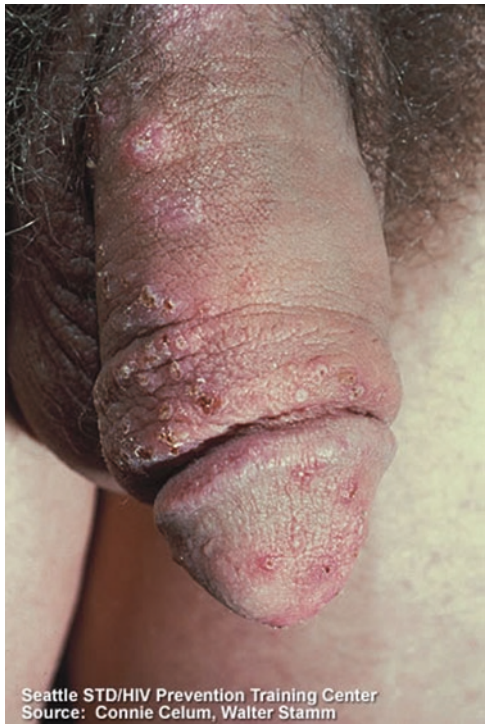


Figure 16. Genital herpes lesions.

acyclovir 200 mg five times a day for 7–10 days, or famciclovir 250 mg three times a day for 7–10 days, or valacyclovir 1 g twice a day for 7–10 days. Adolescents may be more compliant with less frequent dosage schedules. See link for further information. http://www.cdc.gov/std/treatment/2006/genital-ulcers.htm#genulc3

Management of sex partners: Symptomatic partners should be evaluated and treated; asymptomatic partners should be questioned and offered type-specific serologic testing for HSV infection.

SYPHILIS

Symptoms: Primary syphilis presents with a painless chancre at the site of inoculation (Fig. 17). Secondary syphilis is characterized by a generalized body rash that may also be located on mucous membranes. See link for more information and symptoms of tertiary syphilis.

Signs: The chancre has an indurated generally painless perimeter; the chancre may be solitary or possibly multiple at the inoculation site.

Lesions of secondary syphilis may present as macules, papules, or pustules and be seen on palms and soles, or as mucous patches on the oral mucosa or lesions on other body areas. Some may have scale and multiple types of lesions, and may be present at any one time (Figs. 18 and 19).

Diagnosis: In primary syphilis, dark-field microscopy or direct fluorescent antibody tests from lesion exudates are definitive. Serological testing may be done first with a screening non-treponemal antibody test (RPR or VDRL) followed by a treponemal serologic test if the screening test is positive.

Treatment: Penicillin G is the treatment of choice for all stages of syphilis. See link for details on treatment. http://www.cdc.gov/std/treatment/2006/genital-ulcers.htm#genulc6

Management of sex partners: Sexual partners within 90 days prior to diagnosis of primary, secondary, or early latent syphilis may be infected even if seronegative and should be treated presumptively. Check link for details.

CHANCROID

Symptoms: A tender papule that becomes pustular then a painful, friable ulcer.

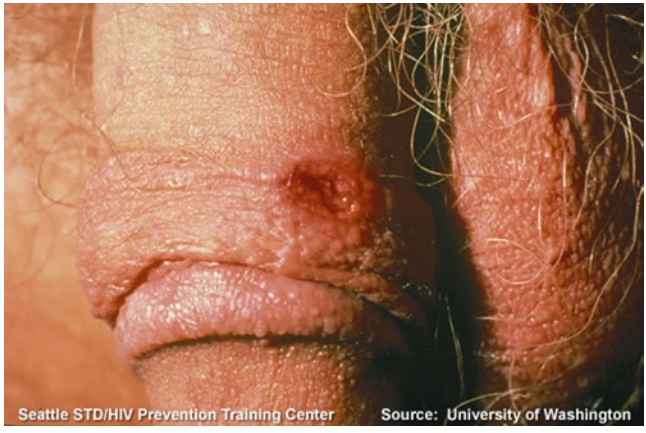


Figure 17. Primary syphilis.

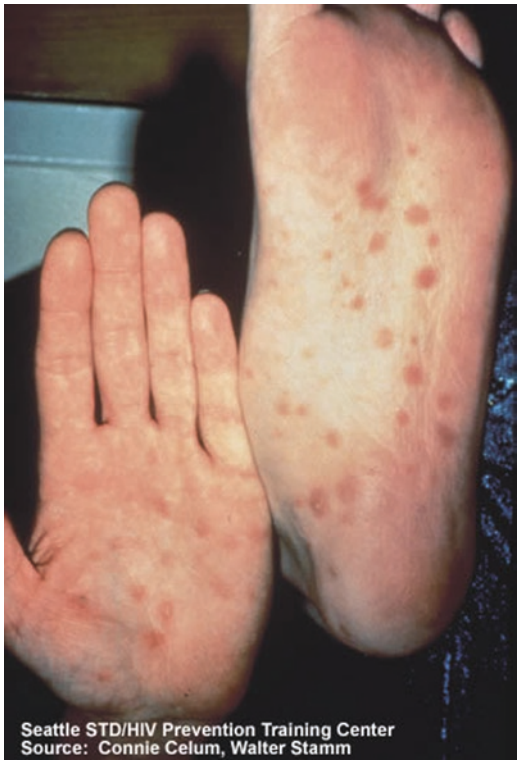


Figure 18. Secondary syphilis.

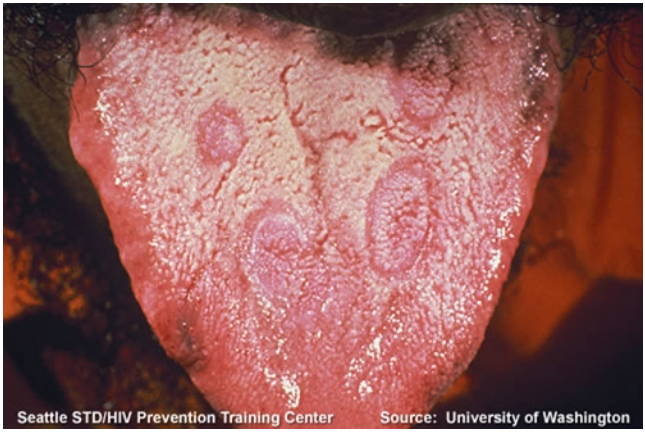


Figure 19. Secondary syphilis.

Signs: The ulcer is 1–20 mm in size, with a purulent exudate and a granulomatous base. In contrast to the chancre in syphilis, the edges are nonindurated and the chancre is painful (Fig. 20).

Diagnosis: Rule out syphilis and HSV; culture (if available) for *H. ducreyi*.

Treatment: Azithromycin 1 g orally in a single dose. See link for further treatment options and additional information. http://www.cdc.gov/std/treatment/2006/genital-ulcers.htm#genulc2

Follow-up: Patients should be reexamined 3–7 days after therapy begins. See link for further details

Management of sex partners: Partners who have had sexual contact with the patient in the 10 days prior to the patient's onset of symptoms should be examined and treated regardless of symptoms.

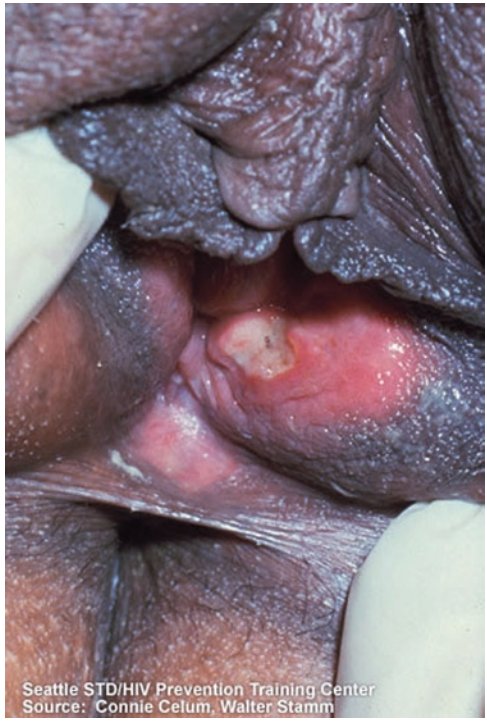


Figure 20. Chancroid.

GRANULOMA INGUINALE (DONOVANOSIS)

This illness is caused by Klebsiella granulomatous and occurs only rarely in the United States.

Symptoms: Single or multiple subcutaneous nodules that progress to larger and more vascular ulcers with regional lymphadenopathy. Diagnosis rests on demonstration of Donovan bodies on a tissue sample. Treatment is doxycycline. See link for further information: http://www.cdc.gov/std/treatment/2006/genital-ulcers.htm#genulc4

LYMPHOGRANULOMA VENEREUM

This is an invasive lymphatic infection beginning with an initial ulcerative lesion on the genitals. This is followed by tender, suppurative inguinal and possibly femoral adenopathy. Rectal exposure in MSM or women having anal intercourse may present with proctocolitis. The causative agent is Chlamydia trachomatis serovars L1, L2, or L3. Definitive diagnosis is best made by isolating the organism. See link for further information and treatment recommendations: http://www.cdc.gov/std/treatment/2006/genital-ulcers.htm#genulc5

VERRUCOUS LESIONS

Genital Warts

Symptoms: Verrucous lesions in genital regions including cervix, vulva, vagina, pubic regions, penis, scrotum, anus (Fig. 21).
Signs: In large crops, there could be maceration or urethral/anal obstruction

Diagnosis: Visual diagnosis is possible; hand lens may be helpful

Treatment: Cryotherapy is effective with two 30 s freeze thaw treatments and follow-up. Trichloroacetic acid (TCA) or bichloroacetic acid (BCA) may be used.

Patients may apply podofilox 0.5% solution or gel or imiquimod 5% cream. For large numbers of warts, lasers may be used. See link for further treatment options including cervical, anal, and urethral warts. http://www.cdc.gov/std/treatment/2006/hpv.htm

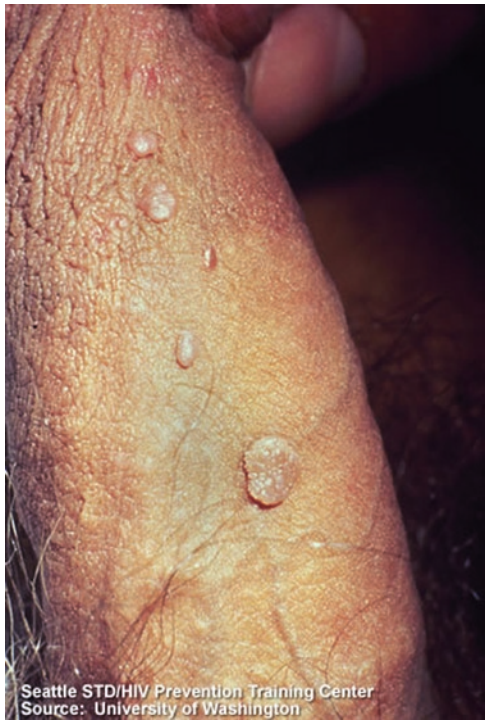


Figure 21. Genital warts.

NONGENITAL LESIONS: ECTOPARASITES

Pubic Lice

Symptoms: Itch in the pubic region

Signs: Excoriations

Diagnosis: nits on pubic hair; live lice (Fig. 22).

Treatment: Permethrin 1% cream applied to affected areas and rinsed off after 10 min. See link for further options. http://www.cdc.gov/std/treatment/2006/ectoparasitic.htm

Management of sex partners: Partners in the previous month should be treated.

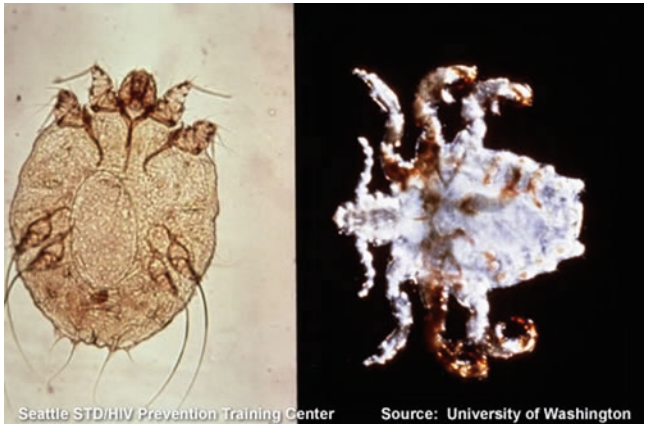


Figure 22. Mite and crab louse.

SCABIES

See entry on papules.

Hepatitis A

Symptoms: Malaise, fatigue, abdominal pain, jaundice, anorexia

Signs: Icterus, tender liver edge

Diagnosis: Elevated transaminases, IgM antibody to HAV

Treatment: Supportive

See link for further information: http://www.cdc.gov/std/treatment/2006/hepatitis-a.htm

Hepatitis B

Symptoms: Malaise, fatigue, abdominal pain, jaundice, anorexia

Signs: icterus, tender liver edge

Diagnosis:

Early acute infection: +HBsAg

Acute infection: +HBsAg, +total anti-HBc, +IgM anti-HBc

Acute resolving infection: +total anti-HBc, +IgM anti-HBc

Chronic infection: +HBsAg, +total anti-HBc

Treatment: Supportive treatment for acute infection; patients with chronic HBV should be referred to a physician experienced in treatment protocols

See link for more information: http://www.cdc.gov/std/treatment/2006/hepatitis-b.htm

Hepatitis C

The role of sexual activity in respect to the transmission of Hepatitis C is controversial. See link for further information: http://www.cdc.gov/std/treatment/2006/hepatitis-c.htm

HIV

Adolescents are able to provide written and informed consent to HIV testing. Testing should be voluntary and available to all adolescents who seek evaluation and treatment for STIs. Positive screening tests must be confirmed by a western blot or immunofluorescence assay. Before adolescents with a positive HIV test are referred to a treatment facility, prevention counseling should be given. Consultation with an HIV treatment specialist should be immediate.

In conjunction with an HIV specialist, an initial evaluation of the HIV positive adolescent can include a detailed history and physical including a gynecological examination. This should include information on sexual and substance abuse history, vaccinations, previous STIs, HIV symptoms, and other diagnoses. Screening should be performed for gonorrhea, chlamydia, Pap, wet mount of vaginal secretions, CBC, chemistries, toxoplasmosis antibody, RPR, testing for Hepatitis C and immune serologies for Hepatitis A and B, urinalysis, chest x-ray, PPD, CD4 count, and HIV plasma viral load. Arrangements should be made for a psychosocial evaluation. Minors under age 18 should be encouraged to involve their parent(s) or guardian. Further information is available at this link: http://www.cdc.gov/std/treatment/2006/hiv.htm

Epididymitis

See Chap. 5 Male Genitourinary Examination for description. Treatment guidelines: http://www.cdc.gov/std/treatment/2006/updated-regimens.htm

REFERENCES AND ADDITIONAL READINGS

American Academy of Pediatrics, Committee on Adolescence. Care of the adolescent sexual assault victim. Pediatrics 2008;122:462–70.

Braverman PK, Rosenfeld WD, Eds. Sexually transmitted infections. Adolesc. Med

Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines, 2006. MMWR 2006;55 (No. RR-11).

Ekcert LO. Acute vulvovaginitis. N Engl J Med 2006;355:1244–52.

Freeto JP, Jay MS. "What's really going on down there?" A practical approach to the adolescent who has gynecologic complaints. Pediatr Clin N Am 2006;53:529–45.

Gupta R, Warren T, Wald A. Genital herpes. Lancet 2007;370:2127–37.

National Network of STD/HIV Prevention Training Centers (NNPTC) and Centers for Disease Control and Prevention. NNPTC Online Case Series. This is a web-based case series for clinicians who diagnose, treat, and manage patients with, or at risk for, STIs. Available at:http://www.stdhivtraining.net/nnptc/start.cfm

Peipert JF. Genital chlamydial infections. N Engl J Med 2003; 349:2424–30.

18

Delayed Puberty, Short Stature, and Tall Stature

Michelle Katz and Madhusmita Misra

Division of Pediatric Endocrinology, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mlkatz@partners.org

Division of Pediatric Endocrinology, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mmisra@partners.org

Normal Puberty: The onset of puberty is heralded by an increase in pulsatile GnRH secretion by the hypothalamus, which leads to increased secretion of LH and FSH by the pituitary and of testosterone and estrogen by the gonads. The normal age range for onset of puberty is 8–13 years in girls and 9–14 years in boys. This often corresponds to a bone age of 11 in girls or 12 in boys. The onset of puberty is characterized by breast budding in girls (thelarche or Tanner II breast development) or testicular size greater than 3 mL in boys, most easily measured with a Prader orchidometer. The development of axillary and pubic hair, adult body odor, and acne may be related to the increased secretion of androgens subsequent to maturation of the gonads (gonadarche), or adrenals (adrenarche), or both.

Delayed Puberty: This is defined as lack of breast development by 13 years of age in girls, or lack of testicular enlargement by 14 years of age in boys. This should be distinguished from delayed menarche, which is the failure to reach menarche by age 15 or by 2–3 years after thelarche in girls.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_18,

Constitutional Delay: Constitutional delay of puberty is the most common cause of pubertal delay, especially in boys. Typically, adolescents will be short and have a bone age delayed more than two standard deviations from their chronological age. In general, children grow at a rate of 4–6 cm/year until about 12 years of age, following which height velocity decreases until the adolescent goes into puberty. Therefore, adolescents with constitutional delay may have a markedly diminished growth velocity. There are standardized curves of growth velocity for early, late, and typical maturers, and plotting an adolescent's growth velocity on one of these growth charts may be helpful both in the evaluation of short stature and in explaining this condition to his/her parents. There is often a family history of pubertal delay. LH, FSH, and testosterone will be at prepubertal levels. Despite short stature during adolescence, adult height is preserved. Boys may opt to be treated with low dose testosterone for a short period of time (4–6 months) in an attempt to "jump start" puberty. This therapy does not change adult height but may lead to an earlier growth spurt (Table 1).

Hypogonadotropic Hypogonadism (or secondary hypogonadism): Hypogonadotropic hypogonadism is characterized by low LH and FSH secretion from the pituitary leading to lack of pubertal onset or progression. Intracranial processes such as tumors, irradiation, infection, severe head trauma, or granulomas can all lead to hypogonadotropic hypogonadism and may be associated with other hormone deficiencies. Isolated hypogonadotropic hypogonadism with anosmia is Kallmann syndrome, an X-linked recessive or autosomal dominant disorder caused by the failed migration of GnRH neurons from the olfactory placode associated with aplasia or hypoplasia of the olfactory bulb. Additionally, systemic chronic disease such as chronic renal disease, malnutrition, or eating disorders can lead to hypogonadotropic hypogonadism. As in constitutional delay, LH, FSH, and testosterone levels will be in the prepubertal range. Clinical features and the leuprolide stimulation test aid in diagnosis. Diagnosis of hypogonadotropic hypogonadism in the absence of systemic illnesses should prompt evaluation of the other pituitary axes and a brain MRI.

Hypergonadotropic Hypogonadism (or primary hypogonadism): Hypergonadotropic hypogonadism is caused by a primary dysfunction of the gonads, and is associated with high levels of LH and FSH and low levels of testosterone or estrogen. Radiation to the gonads, chemotherapy, surgery such as orchidopexy for highly placed testes, and infections such as mumps can all lead to gonadal failure. In addition, gonadal

Table 1
Causes of delayed puberty

Low LH and FSH	High LH and FSH
Constitutional delay	Genetic syndromes - Turner syndrome - Klinefelter syndrome
CNS pathology - Tumor, radiation therapy - Granulomatous disease - Langerhan's histiocytosis - Midline defects - Vascular defects - Severe head trauma	- Gonadal dysgenesis
Gonadotropin deficiency	"Late effects" of childhood cancer
- Kallmann syndrome	- Chemotherapy, Radiation therapy
- Isolated deficiencies of LH or FSH - DAX1 mutation - Others	
Syndromes	
- Prader–Willi	LH/FSH resistance
- Bardet–Biedl - Others	- Synthetic enzyme defects, AIDS
Functional deficiency - Nutritional deficiency - Eating disorders - GI disease - AIDS - Chronic renal disease	Metabolic disease (galactosemia)
Endocrine causes - Hypothyroidism - Cushing's disease - Hyperprolactinemia - Poorly controlled diabetes mellitus	Rare syndromic associations

dysgenesis can occur in both XX and XY individuals and cause primary gonadal failure. In short girls, Turner syndrome should always be considered (XO, XX/XO, and other mosaic karyotypes). Associated findings in Turner Syndrome include a low hairline, webbing of the neck, broad "shield" chest, dysplasia of the nails, widened carrying angle, and renal and left-sided heart abnormalities. Klinefelter's syndrome (47 XXY karyotype and mosaics) is associated with tall stature, learning problems, and small testicular size in adolescent boys.

In general, the workup for pubertal delay should include a bone age, and morning (8 a.m.) serum LH, FSH, and testosterone or estradiol. A leuprolide stimulation test, evaluation of the entire pituitary axis, a karyotype, and an MRI are useful in some cases. It may be difficult to distinguish between constitutional delay and isolated hypogonadotropic hypogonadism, and watchful waiting may be indicated to differentiate between the two conditions.

Short Stature: Short stature is defined as having a height more than two standard deviations below the mean for age and sex, whether the cause is physiologic or pathologic. In general, an adolescent growing along his/her own curve below the 5th percentile is much less concerning than an adolescent whose growth velocity is not keeping pace with his/her peers and who is crossing percentile lines. Height is inherited to a great degree, and the mid-parental height is calculated by adding 5 in. to the maternal height and averaging this with the paternal height in boys and, subtracting 5 in. from the paternal height and averaging it with the maternal height in girls. Most children will be within 4 in. (two SDs) of this height, and a predicted adult height (based on current height and bone age) falling outside this range should raise a red flag for clinicians.

Idiopathic Short Stature: Idiopathic short stature (ISS) is defined as an adult height prediction below 5′ 3″ for males or 4′ 11″ for females in an otherwise healthy child in the absence of pathological causes for short stature. This includes constitutional delay of growth and puberty (see above) and familial short stature. Familial short stature describes patients who have a family history of short stature and whose heights are appropriate for their parental heights. ISS, including familial short stature but not constitutional delay, is an FDA-approved indication for recombinant human (rh) growth hormone (GH) therapy. Therapy is expensive (in tens of thousands of dollars per year), gains are modest (about 2–3″ after years of therapy), and insurance rarely covers this indication.

Endocrine Causes: GH deficiency, which may be isolated or associated with broader pituitary abnormalities or intracranial processes, may cause short stature. Children with GH deficiency tend to have a cherubic appearance because they have increased fat mass and decreased muscle mass. A deficiency of GH is also suspected in Prader–Willi syndrome. Treatment with rhGH leads to a dramatic increase in growth rate in children who are GH deficient. Other endocrine causes of short stature include hypothyroidism and hypercortisolism. In both conditions, children have a dramatic plateauing of

their growth curves and exhibit reasonable, though often not complete, catch-up growth once the condition is adequately treated.

Intrinsic or Skeletal Causes: The SHOX gene located in the pseudoautosomal region of sex chromosomes appears to have a dose-dependent effect on height, such that girls with Turner syndrome are short and boys with Klinefelter syndrome are tall. SHOX mutations cause short stature with or without other skeletal abnormalities, and are an indication for rhGH therapy. Another intrinsic cause of short stature is a mutation in the FGFR3 gene causing hypochondroplasia or achondroplasia. Turner and Noonan syndromes are both associated with intrinsic short stature and are indications for rhGH therapy.

Systemic Diseases: Short stature may also be secondary to systemic diseases such as renal tubular acidosis, inflammatory bowel disease, celiac disease, cystic fibrosis, malnutrition, or chronic anemias such as sickle cell disease. Children who are small for gestational age and who do not have catch-up growth in the first few years of life leading to short stature also qualify for rhGH therapy.

For the evaluation of a child with short stature, a complete history and an accurate growth chart are invaluable. Measurements of height and comparison with arm span and upper: lower segment ratios help to differentiate skeletal dysplasias from other causes of short stature. Screening labs for children presenting with short stature include levels of IGF-1, IGFBP3 (especially helpful in very young children, and also thin children who may have low IGF-1 levels from undernutrition), CBC, ESR, complete metabolic panel, celiac screening, TSH, fT4, and, in the right clinical setting, prolactin, LH, FSH, and estradiol or testosterone levels. A karyotype should be strongly considered in girls. A bone age is helpful for distinguishing between familial short stature and constitutional delay and can aid in predicting adult height potential. The bone age may also be delayed in GH or thyroid hormone deficiency. In the case of a low IGF-1 or IGFBP3 level, growth hormone testing with provocative stimuli is indicated. Random GH levels independent from GH stimulation testing are of limited utility because of its pulsatile nature.

A failed GH stimulation test should prompt an MRI in order to exclude intracranial pathology before initiating rhGH therapy. GH is available by daily injection only and is generally continued until adolescents have completed most of their skeletal growth or until they wish to stop treatment. Risks associated with rhGH therapy include pseudotumor cerebri, insulin resistance and hyperglycemia, SCFE from the rapid growth, edema, arthralgias and a worsening of

scoliosis. In adolescent boys who do not qualify for rhGH therapy, aromatase inhibitors, which prevent conversion of testosterone to estrogen, may be used to prevent bone age advancement, thus extending the time available for skeletal growth.

Tall Stature: Tall stature is a rare complaint in adolescents. Constitutional early maturers may have a period of being taller than their peers. Some girls with familial tall stature desire estrogen therapy to close their epiphyses. However, use of high dose estrogen is fraught with side effects and is controversial. In very rare instances, tall stature is secondary to a GH secreting tumor. These patients often have particularly large hands and feet and a coarsening of their facial features over time. Screening for a GH secreting tumor can involve obtaining a random IGF-1 and GH level, followed by GH suppression testing with oral glucose and a brain MRI. Transphenoidal surgery is considered first-line therapy for GH secreting adenomas, although recent data suggest improved outcomes with initial use of somatostatin analogs.

REFERENCES AND ADDITIONAL READINGS

Brook C., Brown R., Handbook of Clinical Pediatric Endocrinology. Hoboken, NJ: Wiley-Blackwell, 2008.

Rogol A., diagnostic approach to short stature. In B. Rose (Ed.), UpToDate. Available from http://www.uptodateonline.com

Saenger P., Overview of precocious puberty. In B. Rose (Ed.),UpToDate. available from http://www.uptodateonline.com

Sperling M., ed. Pediatric Endocrinology, Third Edition. Philadelphia: W.B. Saunders, 2008.

Styne D., Pediatric Endocrinology. Core Handbooks in Pediatrics. Philadelphia: Lippincott Williams & Wilkins, 2004.

Part III

Mental Health and Transition of Care Issues

19

Adolescent Substance Abuse

Mark A. Goldstein

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 175 Cambridge Street, 5th Floor, Boston, MA 02114, USA
mgoldstein@partners.org

Prevalence: According to Monitoring the Future 1975–2007, the annual prevalence of 12th grade students using illicit drugs was 36%. Tenth grade students' prevalence was 28% and 8th graders was 13%. With respect to the use of licit drugs (alcohol and tobacco), 26% of 12th grade students, 22% of 10th graders, and 10% of 8th grade students reported heavy alcohol drinking in the past 2 weeks; this is defined as five alcoholic drinks in a row. The good news is that there appears to be a decline in current smoking among high school students between 1996 and 1997 and 2007. For example, current smoking prevalence in 12th grade students declined from 37% in 1997 to 22% in 2007. Risk factors for adolescent substance abuse are delineated in Table 1, and protective factors against adolescent substance abuse are noted in Table 2.

RISK FACTORS

Warning symptoms of possible adolescent substance abuse (Table 3):

- Decline in school performance or attendance
- Dramatic changes in mood or behavior including irritability, angry outbursts, or erratic behavior

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_19,

Table 1
Risk factors for adolescent substance abuse
(Adapted from Hazen et al. 2010)

Domain	Risk factors
Individual	Male gender; untreated psychiatric illness especially ADHD, mood disorders, PTSD and learning disorder; low self-esteem; academic underachievement; poor social skills; limited coping skills
Family	Family history of substance abuse; poor parental modeling behaviors; chaotic home environment; poor parent–teen communication
Community	High prevalence of substance abuse in the community including availability of substances and tolerance of their use

Table 2
Protective factors against adolescent substance abuse
(Adapted from Hazen et al. 2010)

Domain	Factors
Parents	Positive modeling behaviors; excellent communication skills; appropriate supervision; limit setting
Peers	Non-substance using friends
Community	Zero tolerance policies
School	Extracurricular activities; sports; positive role modeling in teachers and coaches; educational programming

- Leaving activities such as sports teams or school groups
- Loss of motivation
- Dropping old friends and developing a new peer group, especially with peers who have delinquent behavior or little interest in school
- Sudden changes in appearance, including adopting more eccentric styles or paying less attention to hygiene
- Violating curfew, sneaking out of the house, or other delinquent behavior
- Stealing money from parents or asking for money more frequently
- Becoming increasingly secretive about whereabouts and activities and avoiding parents when returning home after being out
- Frequently appearing or complaining of feeling tired

Screening for Drug Use. Adapted from Massachusetts Department of Public Health Bureau of Substance Abuse Services, Provider Guide.

Table 3
Symptoms and signs of adolescent substance abuse (Adapted from Hazen et al. 2010)

System	Symptom/sign	Substance
Vital signs	Hypertension	Cocaine, amphetamine, anabolic steroids, LSD, phencyclidine, ecstasy, ketamine
	Hypotension	Opiates, barbiturates
	Tachycardia	Marijuana, cocaine, LSD, amphetamine, ecstasy, ketamine
	Hyperthermia	Cocaine, amphetamine, LSD, ecstasy
	Hypothermia	Heroin
Skin	Track marks, abscesses	Intravenous drugs
	Acne, stretch marks	Anabolic steroids
	Itchiness	Opiates
Eyes/nose	Injected conjunctivae	Marijuana
	Dilated pupils	Marijuana, cocaine, amphetamine, LSD, ketamine
	Constricted pupils	Heroin/opiates
	Nystagmus	Benzodiazepines, barbiturates
	Lacrimation	LSD
	Nasal irritation, mucosal erosion	Cocaine, glue sniffing
Heart	Arrhythmia	Heroin, cocaine, amphetamines Inhalants, phencyclidine
GI	Constipation	Opiates
	Increased appetite	Marijuana
Neurologic	Hyperreflexia and hyporeflexia	Marijuana, cocaine, amphetamines
	Ataxia	Amphetamines, alcohol, psilocybin, ketamine, inhalants
	Seizure	Cocaine, phencyclidine
Mental status	Decreased libido	Anabolic steroids
	Rapid speech	Amphetamines, cocaine
	Slurred speech	Alcohol, benzodiazepines, inhalants
	Drowsiness	Marijuana, benzodiazepines
	Hallucinations	LSD, psilocybin, amphetamines, ketamine, inhalants
	Agitation	Phencyclidine, amphetamines
	Trance-like state	Salvia divinorum
	Paranoia	Amphetamines
	Rage	Ketamine
	Flashbacks	Phencyclidine, LSD Anabolic steroids, cocaine LSD, psilocybin, ketamine

THE CRAFFT SCREENING QUESTIONS

Part A: During the past 12 months, did the adolescent

1. Drink any alcohol (more than a few sips)
2. Smoke any marijuana or hashish
3. Use anything else to get high (including illegal drugs, OTC, and prescription drugs) and things that are sniffed or "huffed"

If the adolescent answered No to ALL three questions, then ask B1 and then stop. If the teen answered Yes to any of the three questions, ask B1 through B6.

Part B: During the past 12 months, did the adolescent

1. Ride in a car driven by someone, including the adolescent who was "high" or had been using alcohol or drugs
2. Ever use alcohol or drugs to relax, feel better, or fit in
3. Ever use alcohol or drugs when alone
4. Ever forget things while using alcohol or drugs
5. Family or friends ever tell him or her to cut down on drinking or drug use
6. Ever get into trouble while using alcohol or drugs

CRAFFT interventions:

If the adolescent answers No to A1–3 and No to B1, then praise the teen.

If the adolescent answers No to A1–3 and Yes to B1, ask the teen to avoid riding with a driver using alcohol or drugs.

If the adolescent answers Yes to one or more of A1–3, then B1–6 needs to be administered with each Yes answer to B1–6 receiving one point.

If there is a Yes only to B1, then ask the adolescent to avoid riding in a car with a driver who has used drugs or alcohol.

If the CRAFFT score is 0 or 1 using questions B2–B6, then counsel the teen to stop using substances and review how substance use may lead to undesirable outcomes in the social, academic, and health domains; follow up at the next visit.

If the CRAFFT score is 2 or more using questions B2–B6, then further assessment is indicated that may include a brief assessment of substance use, follow-up in primary care, or referral to a treatment program.

Further assessment by the pediatrician may include asking for more history about the alcohol and substance use, if the use has caused any problems for the teen and if the adolescent has tried to quit and why. Based on the additional information, the pediatrician may decide whether further evaluation by another professional is needed. If there appears to be no major problems and the adolescent believes that he/she can change, then arrange a follow-up visit to ascertain if the adolescent has stopped the use of substances.

TESTING FOR DRUG USE (ADAPTED FROM THE AMERICAN ACADEMY OF PEDIATRICS POLICY)

Voluntary Drug Testing

Drug testing among adolescents is voluntary if they are competent to consent to the testing. Competency is the adolescent's ability to understand the relationship between the use of a drug, its consequences, and testing for the presence of the drug. Most teens who understand the consequences of drug testing and are users would probably decline to be tested. Those adolescents who have not been using drugs for some time may volunteer to obtain a negative test. But, those adolescents who refuse to volunteer for drug testing may endure negative consequences.

Involuntary Drug Testing

Parental permission is not sufficient for involuntary screening of older competent adolescents (<18 years). However, consent from the older adolescent may be waived if there is reason to believe the teen is not competent, or if there is evidence by history or physical examination that strongly suggests that the teen is at high risk for substance abuse and/or injury from drug use. Involuntary drug testing may be done with parental permission for those adolescents who do not have the capacity to make informed judgments.

Drug testing of an adolescent <18 years requires his/her consent unless

- An adolescent lacks decision-making capacity or
- There are strong medical indications or legal requirements to proceed with involuntary testing

Urine samples are generally used for drug testing, although some drugs can be detected by blood testing. Teens may intentionally alter urine samples by substituting another person's urine, diluting it with another fluid, substituting another fluid such as Mountain Dew™, using diuretics or drinking excessive fluids to lower the specific gravity, or using substances such as goldenseal tea to alter the test results.

Screening tests such as thin-layer chromatography or immunoassay tests are inexpensive, highly sensitive, and useful in emergency situations. Both may be influenced by an adulterated urine sample. Confirmatory tests such as gas chromatography or mass spectrometry are expensive, highly specific, and very accurate.

Guidelines for Management and Referral of Adolescents Involved in Substance Abuse (Adapted from the American Academy of Pediatrics Policy Statement).

Five stages have been described to define adolescent substance abuse:

1. Potential for abuse: availability of substances, need for peer acceptance, decreased impulse control, need for immediate gratification.
2. Experimentation – learning the euphoria: use of substances with friends with few or no consequences, little change in behavior.
3. Regular use – seeking the euphoria: use of other drugs, behavioral changes with some consequences, increased frequency of use including alone; buying or stealing drugs.
4. Regular use – preoccupation with the "high": daily use of drugs, loss of control, multiple consequences and risk-taking, estrangement from family and "straight" friends.
5. Burnout – use of drugs to feel normal: use of multiple substances, guilt, withdrawal, shame, remorse, depression, physical and mental deterioration, increased risk-taking, suicidal or self-destructive behavior.

Pediatricians should have a role in the office management of adolescents who are at stage 2. Brief counseling, office follow-up, and teen/family education may be effective. Adolescent substance use occurs in the context of parents, peers, school, community, media, industry (alcohol, tobacco, etc.), government, and law as these groups may serve to potentiate adolescent substance abuse. In addition to the patient, the pediatrician may play a role in the groups that may promote substance abuse.

Adolescents who have been identified as abusing substances should have a complete psychosocial history, physical examination,

and mental status evaluation as there may be a dual psychiatric diagnosis along with the substance abuse. There are five levels of care for adolescents who are abusing substance (see reference for details):

Level O.5: Early intervention: no withdrawal risk
Level I: Outpatient treatment: no withdrawal risk
Level II: Intensive outpatient treatment: manifests no overt symptoms of withdrawal risk
Level III: Medically monitored intensive inpatient treatment: risk of withdrawal syndrome present but manageable
Level IV: Medically managed intensive inpatient treatment: severe withdrawal risk

LICIT DRUGS

Tobacco

It is known that delaying an adolescent's use of tobacco until at least age 18 will significantly decrease the chance that the teen will become an established smoker. Most teens who try tobacco smoke their first cigarette between ages 14 and 15 and become regular users between 16 and 17 years. Most teens are in a trajectory from early users of tobacco to tobacco addiction when initially screened by the clinician.

Pediatricians should be comfortable in reducing tobacco use in adolescents (and their parents) by screening for tobacco use and intervening if tobacco use is detected. The following is a brief scheme with more details in the reference Pbert et al.:

ASK if the teen uses tobacco; if No, then congratulate and encourage abstinence; if Yes, then

ADVISE the teen to quit and offer the teen your help

ASSESS whether the teen will make a quit attempt in the next 30 days; if No, then provide motivational intervention. If Yes then

ASSIST in helping the teen to quit tobacco by helping to develop a quit plan, giving key advice to successful quitting and consider the use of pharmacologic treatment

ARRANGE for follow-up; that may include referring the teen to intensive services and reviewing the teen's progress in quitting

Tobacco cessation methods consist of behavioral interventions, pharmacologic treatments, or a combination. The reference section

has a citation and website (Fiore et al.) endorsed by the American Academy of Pediatrics for treatment of tobacco use and dependence. Successful behavioral programs have the following qualities: easy accessibility, adolescent friendly and adolescent specific, and provision of ongoing support to teens trying to quit tobacco.

Alcohol

Widely used by adolescents, alcohol is a CNS depressant rapidly absorbed. At mild levels, euphoria and disinhibition occurs; at moderate levels, there is sedation and ataxia and slurred speech; and at high levels there may be coma, respiratory depression, and death. Motor vehicle accidents, violence, and other injuries may occur secondary to use. The best test is the blood alcohol level. Adolescents who require medical care for intoxication need follow-up and appropriate counseling.

ILLICIT DRUGS

Marijuana (Joints, Blunts, Bongs)

This is the most commonly used illicit drug in adolescence generally by smoking or less commonly by ingestion. Effects include euphoria, time distortion, memory issues; at higher levels, teen may encounter anxiety, panic, or hallucinations. No lethal potential from the drug itself, but injury could occur from the drug's effects on the user's behavior. Drug is detectable in the urine up to 30 days after use especially in chronic users. Level 3 or higher should require outside the office intervention.

Opiates

These include the illicit drug heroin as well as prescription morphine, oxycodone, meperidine, methadone, hydromorphone, and others that are obtained in an illicit manner. Opiates may be taken by a variety of routes. Effects include euphoria, sedation, diminished reflexes, analgesia, and somnolence. Overdose can cause cardio respiratory arrest and death. Heroin is the most widely abused opiate, and it is detectable for 24 h in the urine; other opiates are detectable for 2–3 days and synthetic opiates, e.g., fentanyl are not detectable in the urine.

Cocaine (Crack)

This is used by snorting or freebasing (smoking "crack"); its use leads to CNS and peripheral nervous system stimulation. Effects include anxiety, agitation, paranoia, delirium, and hallucinations. It is detectable in the urine for 4–6 days. Complications may include erosion of the nasal septum. Crack has higher potential for addiction.

Amphetamines (Speed)

This could be a licit medication such as dextroampehetamine, or methylphenidate, or an illicit form such as crystal meth (methamphetamine). Amphetamines produce CNS stimulation. Effects include euphoria, alertness, reduced fatigue, insomnia, panic, and occasionally hallucinations. In overdose, coma, circulatory collapse, arrhythmias, and stroke may occur. Crash may occur with a withdrawal syndrome seen also in cocaine. Amphetamines are detectable in the urine for 48 h.

Hallucinogens (Acid, Angel Dust, Shrooms)

These drugs, such as LSD, phencyclidine (PCP), and psilocybin, produce alterations in perception, illusions, loss of time sense, depersonalization, body image changes, and hallucinations. Teens may present with restlessness, paranoia, and anxiety. LSD is not detectable in the urine, but PCP may be noted in urine testing for 1–2 weeks. Flashbacks may occur after the drugs have worn off.

Depressants

Barbiturates and benzodiazepines may be very short, short, intermediate, or long acting in their effects. They produce sedation, drowsiness, fatigue, and euphoria and can depress the vital signs. Barbiturates are the second most common cause of fatal accidental overdose in young individuals; benzodiazepines are much less lethal than barbiturates although more commonly used by adults. Both barbiturates and benzodiazepines are detectable in the blood and urine. Usually, the longer acting barbiturates may be detected for more than 7 days in the urine and less so for shorter acting forms. Benzodiazepines may be detected for 3 days although there are relative high false negative tests.

Inhalants

These drugs are more commonly used among young male adolescents often in group activities. Forms include model airplane glue, rubber cement, correction fluid, paint thinner, gasoline, butane, and aerosol propellants. Effects include euphoria, giddiness, impaired judgment, and drowsiness. Hallucinations and psychosis have been reported. Use of plastic bags or tents to enhance inhalation has produced fatalities. These drugs are not detectable in the urine or blood, but examination may show a rash on the face, odor to the teen's breath, or eye irritation.

Club Drugs

These include MDMA, ketamine, GHB, and rohypnol termed as "club drugs" because they are often used in social gatherings. MDMA (ecstasy) can produce euphoria, calm, and an increase in perception and empathy. Ketamine (Special K) produces a disconnected feeling, pain relief, and visual hallucinations. Flashbacks may occur after long-term use. GHB (liquid ecstasy) produces euphoria, relaxation, and drowsiness; it has the potential to suppress pulse, blood pressure, and respiration. It may be used by body builders to increase muscle mass; some have used it as a "date rape" drug. Rohypnol (roofies) is an illegal fast-acting benzodiazepine that may lead to physical dependence; it has been used as a date rape drug.

Performance-Enhancing Drugs

These substances are used to enhance performance or to improve body image. There are pharmacologic agents (such as methylphenidate), agents to reduce weight (such as diuretics and laxatives), nutritional supplements, blood doping, OTC agents to increase muscle mass (such as creatine), and human growth hormones and anabolic steroids. The use of performance-enhancing drugs should be strongly discouraged in adolescents by pediatricians, parents, schools, and other sports organizations. Serious side effects may occur from their use especially with anabolic steroids, human growth hormone, laxatives, and diuretics.

REFERENCES AND ADDITIONAL READINGS

American Academy of Pediatrics, Committee on Substance Abuse. Testing for drugs of abuse in children and adolescents. Pediatrics 1996;98:305–7.

American Academy of Pediatrics, Committee on Substance Abuse. Indications for management and referral of patients involved in substance abuse. Pediatrics 2000;106:143–48.

American Academy of Pediatrics. Committee on Substance Abuse. Use of performance-enhancing substances. Pediatrics 2005;115:1103–6.

Fiore MC, Jaen CR, Baker TB et al. Treating Tobacco Use and Dependence: 2008 Update-Clinical Practice Guideline. Rockville, MD: Public Health Service, US Department of Health and Human Services; 2008. Available at: http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat2.chapter.28163

Hazen EP, Goldstein MA, Goldstein MC (2010). Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Clinicians. Piscataway, NJ: Rutgers University Press.

Johnston LD, O'Malley PM, Bachman JG, Schulenber JE (2008). Monitoring the future national survey results on drug use, 1975–2007: Volume I, Secondary school students (NIH Publication No. 08-6418A). Bethesda, MD: National Institute on Drug Abuse.

Klein JD, Camenga DR. Tobacco prevention and cessation in pediatric patients. Pediatr Rev 2004;25:17–26.

Massachusetts Department of Public Health Bureau of Substance Abuse Services. Provider guide: Adolescent screening, brief intervention, and referral to treatment using the CRAFFT screening tool. Boston, MA: Massachusetts Department of Public Health, 2009.

Pbert L, Moolchan ET, Muramoto MD et al. The state of office-base interventions for youth tobacco use. Pediatrics 2003;111:e6650–60.

Toumbourou JW, Stockwell T, Neighbors C et al. Interventions to reduce harm associated with adolescent substance use. Lancet 2007;369:1391–1401.

20

Adolescent Mental Health Disorders

Brian Kurtz

Child Psychiatry Service, Department of Psychiatry, Massachusetts General Hospital, 55 Fruit Street, Yawkey 6A, Boston, MA 02114, USA

Mental health problems are frequently encountered in adolescents due to high prevalence in this population in general and particularly in those adolescents who present to clinical attention. Even the most experienced clinician may find that these problems pose special challenges to identification, diagnosis, treatment, and even referral. Pediatricians, however, who make an effort to familiarize themselves with some of the basic concepts and tools for dealing with mental health issues, will find that they are able to make a great impact in the health of this vulnerable population.

EPIDEMIOLOGY

Prevalence estimates for mental illness in the adolescent population vary somewhat depending on data source, but it is estimated that one in five of those aged 9–17 have a mental health problem. Age of onset of mental illness peaks in adolescence, and half of adults with mental illness today had symptoms at 14 years of age. Among the most commonly encountered problems are attention deficit-hyperactivity disorder (ADHD), affective disorders (most commonly depression and less commonly bipolar disorder), and anxiety disorders. One of the most

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_20,

confusing characteristics of mental health problems, especially in youth, is that co-morbidity is very common; patients who meet criteria for one disorder are at high risk for others. Common examples of this include the co-occurrence of mood and anxiety disorders, mood disorders and substance use, and ADHD and learning disabilities (LD).

THE PRESENCE OF A DISORDER

The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) provides a listing of mental health diagnoses, with lists of the criteria needed to diagnose individual disorders. Although some of the diagnoses in the DSM-IV-TR were developed with the pediatric population in mind, most others were originally identified and studied in adults and later applied to children and adolescents. For every disorder, there is a prerequisite that functioning in an individual's life be impaired to a clinically significant degree; the individual may have insight into this impairment, such as the adolescent whose social and school functioning is crippled when panic attacks make him avoid crowded situations, or the impairment may not be acknowledged by the individual but observed by others, such as the adolescent with conduct disorder who is aggressive and engages in criminal activity.

Another good determinant of whether a behavioral health issue rises to the level of a disorder is to determine whether the developmental trajectory of the adolescent is threatened by a set of symptoms or behaviors. For example, although a parent may describe her teenaged child as "irritable" due to frequent arguments about how loud music may be played in the house or his unwillingness to dress as the parent would prefer, parent–child disagreement alone does not constitute a mental health problem, and in fact the desire to express an identity distinct from parents is developmentally appropriate. However, when an adolescent is so easily set off by minor annoyances that there is a disruption in her academic progress and peer relationships, accompanied by low self-esteem and loss of interest in previously cherished activities, the clinical picture is more suggestive of depression. Intervention is warranted to prevent the adverse consequences of academic failure and social isolation, which are destructive to normal adolescent development.

For any adolescent in whom there are prominent psychosocial issues, it may be helpful to use a mnemonic for areas of screening

such as "HEADSSS" (see this topic in Chapter 2). Since adolescents with difficulties in one domain (e.g., family conflict) are at higher risk for other problems (e.g., substance use), this will help ensure that major areas of impairment are not missed.

THE ROLE OF THE PRIMARY CARE PEDIATRICIAN

Primary care pediatricians for adolescents are on the "front line" when it comes to mental health problems. Teens and their parents present with a wide range of complaints and symptoms that challenge the clinician's skills in identification, diagnosis, and management of complex problems. When attempting to refer to mental health treatment, pediatricians may find a range of frustrating barriers to care, including the lack of mental health service availability, poor insurance coverage for mental health services, and patient and family reluctance to pursue mental health treatment. For this reason, it is important that pediatricians familiarize themselves with the basic principles of diagnosis and management of less complex mental health problems, and the knowledge base to identify and triage more complicated problems.

Mental health problems are treated with varying combinations of psychosocial treatments, notably psychotherapy, and medications. In general, the combination of these two strategies leads to the most favorable outcome. However, for some disorders, such as ADHD, the evidence base favoring medication management compared with psychosocial treatments is particularly strong, and for other conditions, such as substance abuse, the role of medication is more peripheral in the overall management. This has important implications for clinicians because some conditions may be more easily managed in a primary care practice, while others must be identified and referred by primary care providers but will be less amenable to treatment in that setting.

ADHD

Of all the mental health problems encountered in adolescents, ADHD is one of the most prevalent and most comfortably diagnosed and treated by pediatricians, who are likely to receive training and experience in management of this disorder. ADHD is also often highly treatable with medications which can dramatically improve symptoms and functioning.

PREVALENCE

Estimates of ADHD prevalence for any age group vary widely, but some evidence points to between 5% and 10% of children, and around 2.7% of adolescents, with approximately a 2.4 times higher rate in boys compared with girls; estimates based on referred samples tend to estimate a higher male: female ratio.

EVALUATION

ADHD is a syndrome of hyperactivity, inattention, and impulsivity which the DSM-IV-TR classifies as one of three subtypes: predominantly inattentive type, predominantly hyperactive-impulsive type, and combined type. Some symptoms are typically observed in early childhood, and in fact the diagnostic criteria require the presence of symptoms causing impairment prior to the age of 6. Many children are diagnosed prior to adolescence; half of adults now diagnosed with ADHD were diagnosed by age 7. For those who are diagnosed prior to the teenage years, the primary management task with ADHD may be to continue and optimize treatment of symptoms while minimizing side effects of treatment for as long as needed. This may be a long time, since although the number of symptoms may dip below the number needed to meet diagnostic criteria for ADHD as age advances, impairing symptoms continue into adulthood in the majority of individuals. For other patients, ADHD may first present to clinical attention during adolescence, when increased demands such as more difficult academic work and less tolerance for disruptive behavior overwhelm the ability of compensatory strategies to maintain adequate functioning.

A common trait of ADHD that may be confusing is the tendency of those with the disorder to appear markedly different depending on the setting. For instance, the mother of a 14-year-old boy may tell you that he "can't have ADHD" because he can stay fixated on a video game for hours on end, despite the fact that his teachers describe him as constantly fidgety and disruptive, and unable to pay attention or follow-through on instructions. Similarly, it may be puzzling to try to reconcile the patient who arrives at the quiet, structured office with the individual described by parents and teachers. In fact, ADHD symptoms are often more apparent in situations requiring sustained mental effort or unstructured or boring settings. For this reason,

absence of observable symptoms in the office is not a reliable way to exclude the diagnosis. Instead, it may be helpful to use a standardized rating scale, completed separately by a parent and a teacher, who see the adolescent in different settings, which place different demands on the patient. Using such an instrument together with targeted questions about behavior may improve the reliability of an ADHD diagnosis made in the primary care setting.

Commonly used ADHD-specific rating scales include the Conner's Rating Scales and the Vanderbilt rating scale; more broadband child behavior rating scales which are factor analytic in nature and contain a component addressing ADHD symptoms are the Child Behavior Checklist (CBCL) and the Behavior Assessment System for Children (BASC).

The core deficits in ADHD that are addressed by the DSM-IV-TR criteria are in the areas of inattention, hyperactivity, and impulsivity. Inattention is described as a short attention span or a tendency to be distractible, showing an inability to sustain concentration, especially for difficult tasks; there may be a failure to follow through on instructions or tasks, difficulty organizing tasks and activities, and a tendency to lose things or be forgetful. Hyperactivity is seen when the patient is in constant motion, fidgeting or talking excessively, unable to sit still for activities where staying seated is expected, and often "fiddles" with objects. Overt hyperactive behavior tends to diminish as a child ages, and as noted in the criteria, adolescents may simply feel or appear restless. Impulsivity occurs when the patient fails to inhibit responses appropriately, is unable to wait for his turn, interrupts and blurts, and acts without thinking of the consequences. These individuals are seen by others as impatient and intrusive. An additional problem seen in ADHD (which overlaps with the core deficits listed above) is poor executive function, manifesting as generalized disorganization and messiness, and lost homework and assignments. Individuals may have difficulty organizing a task in an effective manner and sequence, managing time, or knowing how long things will take.

Other important diagnoses in the differential for ADHD include learning disabilities, mental retardation or borderline intellectual functioning, substance use, sleep disorders, child abuse and neglect, mood disorder, and situational anxiety. Because teens are often brought to attention for problems arising in the academic environment, an undiagnosed learning disorder may be mistaken for ADHD, with a patient who struggles academically or even is so frustrated by certain kinds of

academic situations that they are unable to maintain motivation and attention. LD have a prevalence of about 5–10% in the school age population, similar to the prevalence of ADHD. In addition, ADHD and LD are frequently co-morbid. Recent estimates from the Centers for Disease Control and Prevention (CDC) indicate that approximately 5% of children had ADHD without LD, 5% had LD without ADHD, and 4% had both conditions. Within the scope of LD, dyslexia (reading disability) is seen in 80% of LD individuals, with dyscalculia (mathematical disability) being somewhat less common. Compared with ADHD, LD are less amenable to diagnosis in the office setting based on history reported by the patient, parent, and teachers; neuropsychological or educational testing is often needed to identify these disorders. An initial step that may be taken by the primary care provider if a learning disorder is a possibility is to educate the patient and family about their right to academic testing through the school, and recommend that this be formally requested. This will include a variety of psychometrics and may uncover a learning disorder.

MANAGEMENT

A large study has been conducted looking at treatments for ADHD in school-age children, providing the most comprehensive data available about effective treatments. Groups of patients receiving medication management, psychosocial interventions, or both were compared. The psychosocial intervention involved intensive multi-component behavior therapy, including parent training, school consultation, and a summer treatment program. In general, the greatest number of patients (67%) who received both interventions were successfully treated, compared with 56% of the medication management group and 34% of the psychosocial intervention group; follow-up assessments showed that patients receiving medication management or combined treatment continued to fare better. This finding was consistent with clinical experience and previous research in establishing that medication is an effective treatment for ADHD. Psychosocial treatments may be used to augment medication management for patients who have difficulty tolerating medications, for those who do not accept medication management, or for medication-refractory patients. For these individuals, referral to cognitive-behavioral therapy (CBT) to target ADHD symptoms, either individually or in a group setting, may be beneficial.

The mainstay of medication management of ADHD is stimulant medication, either methylphenidate or amphetamine-derived compounds (see Table 1. for details). Studies comparing these two compounds have found few differences. As the immediate-release forms of each of these medications have a short half-life, they are commonly dosed more than once per day or given in an extended-release preparation. Relatively recent formulations of stimulants include transdermal methylphenidate (Daytrana™) and the prodrug lisdexamfetamine (which must be hydrolyzed in the GI system to become active). Along with OROS methylphenidate (Concerta™), which has a unique delivery system, these formulations are less likely to be successfully used recreationally and therefore more resistant to drug diversion. Less commonly than methylphenidate or amphetamine-derived medications, modafinil (Provigil™) may be used for treatment, although it is not approved for ADHD or use in children for any purpose.

Choosing a stimulant medication is often based on the prescriber's experience and comfort level with a given medication and insurance formulary considerations. Other factors include previous medication trials and side effects in the patient, the feasibility of multiple dosings throughout the day, the likelihood of drug diversion, and the inability to tolerate swallowing pills. Using an immediate-release or an extended-release stimulant are each reasonable initiation strategies, starting low and titrating upward based on response and side effects. An extended-release stimulant during the school day may be complemented with an immediate-release dose later in the day after initial dose of the medication has worn off, which often makes homework much more difficult. Common side effects include decreased appetite, weight loss, abdominal pain, headaches, and insomnia (especially when taken later in the day). Less common side effects include mood changes and irritability, social withdrawal, rebound over activity, mildly elevated blood pressure, and anxiety. For patients with bipolar disorder, which occurs co-morbidly in a small number of ADHD patients, a stimulant may be destabilizing. Transient motor tics may emerge with stimulant treatment, influenced in part by the fact that tics and Tourette's Disorder occur more frequently in patients with ADHD than in the general population.

Recent recommendations released by the American Heart Association (AHA) for children and adolescents receiving medication for ADHD have brought into focus the question of sudden cardiac death and other cardiac effects. This group recommended screening

Table 1
Medications Used for Treatment of Attention Deficit Disorder

Class	Advantages	Disadvantages
Stimulants:		
Methylphenidate forms	Used for decades	Most forms are subject to abuse by overdose, snorting, or smoking
Methylphenidate (Ritalin™)	Immediate release forms	
Methylin™	Long acting forms	Stimulants may induce appetite loss, weight loss, tachycardia, and insomnia
Ritalin LA™	Long acting forms	
Ritalin SR™	Long acting forms	
Methylin ER™	Long acting forms	These meds may be used by teens to lose weight
Metadate CD™	Long acting forms	
Metadate ER™		
Concerta™	Osmotically released and less likely to be abused	Not available in generic form
		Four different strengths
Focalin™	Isomer prep.; short acting	Four different strengths
Focalin XR™	Isomer prep.; long acting	Long acting can cause insomnia
Daytrana™	Transdermal patch	
Amphetamines	Used for decades	Skin irritation
Dexedrine™	Short acting	Frequent doses needed
Dexedrine Spansule™	Long acting form	
Adderall™	Immediate release	Subject to abuse in most dosage forms
Adderall XR™	Can be sprinkled on food	
Vyvanse™	Less likely to be abused as it needs to be hydrolyzed in the GI system to become active	
Nonstimulants:		
Atomoxetine (Strattera™)	Not subject to abuse; not a schedule II	May take weeks to reach full therapeutic effect
Buproprion (Wellbutrin™)	Useful in depression also	Lowers seizure threshold
Clonidine (Catapres™)	Good for patients with Tourette's (treats tics)	May lower blood pressure
Guanfacine (Tenex™)	Reduces aggression	May lower blood pressure
Other agent:		
Modafanil (Provigil™)	Some studies show effect on ADHD; used for narcolepsy	Not approved for use in ADHD

ECGs for children before starting medication. However, the American Academy of Pediatrics (AAP) and American Academy of Child and Adolescent Psychiatry do not recommend routine use of ECG. The AHA later revised its language to state that it is reasonable to consider obtaining an ECG as part of the evaluation, but not mandatory. The AAP advises obtaining a patient and family history of sudden death, syncope, palpitations/arrhythmias, hypertrophic cardiomyopathy, long QT syndrome, and other cardiac disease during the evaluation.

Non stimulant medications are listed in Table 1. These include atomoxetine (Strattera™), buproprion (Wellbutrin™), the alpha-2 adrenergic agonists clonidine (Catapres™), and guanfacine (Tenex™). The treatment response in ADHD is less robust with these medications than stimulants, but may be considered to augment stimulant treatment, when stimulants are not well tolerated, when stimulants are not accepted by the patient or family, in the presence of co-morbid disorders, or to minimize drug diversion. Examples include the use of atomoxetine when there is co-morbid anxiety or stimulant medication causes anxiety, use of buproprion when there is co-morbid depression, and use of clonidine or guanfacine to target hyperactivity or insomnia.

MOOD DISORDERS

Although the DSM-IV-TR criteria for major depressive disorder (MDD) and bipolar disorder were largely developed with adults in mind, both of these disorders occur in adolescents and result in an acute and chronic morbidity. However, it has become apparent that the clinical features of mood disorders may differ somewhat from the "classic" presentation usually seen in adults.

DEPRESSION

Depression in adolescence is common and often not identified or adequately treated. Although estimates of prevalence have varied widely, a recent meta-analysis identified a prevalence of 5.7% in 13–18-year olds, with a slightly higher figure in girls (5.9%) than boys (4.6%). This is significantly higher than the prevalence in children under 13 (2.8%).

EVALUATION

Depression in adults is characterized by the presence of a number of so-called "neurovegetative" symptoms. Although in some cases adolescents may report these symptoms prominently, in other cases they are inferred from observations. For instance, a presenting complaint by an adolescent's parent of school failure may be due to withdrawal of effort in school, a manifestation of decreased interest, decreased energy, and hopelessness which are common in depression. In addition to school problems, other common signs of depression in adolescents may be conduct problems, poor sleep, family conflict, somatic complaints (such as headaches and stomach pains), and withdrawal from social activities.

It is common for the mood of depressed adolescents to be irritable rather than sad, which may present major barriers to diagnosis. However, a history of irritability together with neurovegetative symptoms of depression is highly suggestive of a depressive disorder that may benefit from treatment. These symptoms are recalled by the mnemonic device "SIG: E CAPS" (an imaginary prescription for energy capsules that a doctor might prescribe to a depressed patient). The symptoms relate to the following parameters: sleep (insomnia or hypersomnia), interest (little interest or pleasure in activities), guilt (excessive or inappropriate guilt or feelings of worthlessness), energy (fatigue or loss of energy), concentration (diminished ability to think or concentrate or indecisiveness), appetite (decrease or increase of appetite, often with weight loss or gain, or failure to make expected weight gain), psychomotor (slowing or restlessness of body movements), and suicide (recurrent thoughts of death or suicidal ideation). Presence of four of these symptoms for 2 weeks together with mood disturbance (either down or irritable) satisfies criteria for a major depressive episode.

If depression is suspected, the adolescent should be interviewed alone at some point because he or she may be more open when the parent is absent. If possible, the parent should also be interviewed alone as the parent may report concerns that the adolescent does not endorse.

Safety is the most important area of assessment in every situation in which depression is suspected. A safety assessment is more reliable if questions are asked in more than one way during the interview. One way of performing an assessment is as follows: "I am going to ask you a few questions that have to do with your safety. Have you ever wished you were dead, or have you felt that people would be better off if you

were dead? Have you ever wished you were never born? Have you ever thought about injuring yourself or ending your life?" In addition, if a screening tool for depression is used during the appointment, a glance at the portion of the tool relating to suicidality is important to ensure that an emergent concern does not go unaddressed.

A major depressive episode occurs most commonly in the context of MDD, but also in bipolar disorder, a depressive disorder due to a substance, or a general medical condition. Many substances may have effects that result in or overlap with depressive symptoms, but among the most common are alcohol, marijuana, opioids, sedatives such as benzodiazepines, and withdrawal from stimulants or cocaine. Medical causes of depressive symptoms in adolescents are also varied but notably include hypothyroidism, anemia, and AIDS. Many clinicians will order thyroid function tests, a complete blood count, and a toxicology screen if a mood disorder is being considered.

A committee of experts has recently developed a set of standards called the Guidelines for Adolescent Depression in Primary Care (GLAD-PC). Among the recommendations are to evaluate for depression in high-risk adolescents as well as those who present with emotional problems as the chief complaint. Screening tools are often useful, notably the Columbia Depression Scale (CDS), the Patient Health Questionnaire-9 (PHQ-9), the Kutcher Adolescent Depression Scale (KADS), and the Beck Depression Inventory (BDI). Several of these tools, along with other relevant information, have been included in a toolkit designed to help primary care practices implement the GLAD-PC. These are available at www.glad-pc.org.

MANAGEMENT

Guidelines for the initial management of depression in adolescents include education and counseling to patients and families about depression and options for treatment, development of a treatment plan with specific goals in key areas of functioning, establishing links with mental health resources available in the community, and development of a safety plan. It is recommended to determine whether depression is mild, moderate, or severe, as this will likely impact treatment decisions. With respect to mild depression, GLAD-PC recommends considering a period of active support and monitoring before starting other treatments. For moderate and severe depression, or when depression is complicated by other conditions, consultation

with a mental health professional should be considered. The primary care clinician should recommend scientifically tested and proven treatments, including psychotherapies or antidepressant medication. If antidepressant medications are prescribed, patients should be monitored for the emergence of adverse events. Outcomes with regard to treatment goals, symptoms, and functioning should be assessed periodically. If no improvement is seen after 6–8 weeks of treatment, diagnosis and initial treatment should be reassessed, and mental health consultation should be considered. Similarly, if only partial improvement is seen after the primary care clinician's diagnostic and therapeutic approaches are exhausted, consultation should be considered.

The mainstays of treatment for depression are psychotherapy and antidepressant medication. Within the category of psychotherapy, two standardized treatment approaches which have been shown to be effective in depressed adolescents include CBT and interpersonal therapy (IPT). A major advantage of these two approaches is that their highly standardized methods make them amenable to scientific study, establishing their evidence base. Other forms of psychotherapy may be very helpful but have not undergone such rigorous study. Although a description of the theoretical models and course of treatment for CBT and IPT are beyond the scope of this discussion, becoming more acquainted with the basics of psychotherapeutic approaches will help primary care providers to educate and counsel patients and families about treatment options and communicate with therapists.

Antidepressants may be categorized into tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), selective norepinephrine reuptake inhibitors (SNRIs), and "others." TCAs were more commonly used in the past to treat depression; currently their role in the primary care setting is limited. Two TCAs that are encountered in primary care include nortriptyline and amitriptyline, although these are usually prescribed for indications other than depression.

SSRIs are considered the first-line antidepressants for most patients, particularly with children and adolescents. For several years beginning in 2003, fluoxetine (Prozac™) was the only medication approved by the FDA for the treatment of depression in the pediatric population, until escitalopram (Lexapro™) was approved in 2009 to treat depression in adolescents. However, several other SSRIs, especially citalopram (Celexa™) and sertraline (Zoloft™), and to a lesser

extent fluvoxamine (Luvox™) and paroxetine (Paxil™), have been prescribed off-label to treat depression in adolescents. Several of these medications have FDA approval in the pediatric population for other indications. Many clinicians expect that citalopram and escitalopram will have similar effects, since escitalopram is simply a selection of the active S-isomer of the compound. The Texas Children's Medication Algorithm on medication treatment of childhood MDD suggests using fluoxetine, citalopram, or sertraline as first-line medication. Considerations for choosing among these options include prescriber comfort level and the fact that the greatest amount of collective experience exists for using fluoxetine to treat adolescent depression, balanced by the fact that fluoxetine has a very long half-life, which can be potentially problematic if adverse effects arise.

SNRIs include venlafaxine (Effexor™) and duloxetine (Cymbalta™); other antidepressants include buproprion (Wellbutrin™) and mirtazapine (Remeron™). Generally speaking, these medications are not used first-line with adolescents but may be reserved for special circumstances, such as a family history of positive response to the medication, prominent insomnia or loss of appetite (mirtazapine), comorbid ADHD (buproprion), or co morbid pain syndromes (duloxetine). They may be used in patients who are refractory to an SSRI, although many clinicians will choose to try at least one alternative SSRI before switching outside the class.

A good rule of thumb for antidepressant medication, and indeed all psychiatric medications in the adolescent population, is to start low, go slow, and follow up. For instance, the smallest pill dosages available for fluoxetine, citalopram, and sertraline are 10, 10, and 25 mg, respectively. It is commonplace to start a patient at the lowest available dose or even to use half of this as the starting dose. This may help to allow titration to the lowest effective dose while minimizing intolerable side effects.

In 2003, the FDA issued a "black box warning" regarding the use of antidepressant medications in children and the emergence of suicidal ideation. Mental health clinicians are working to understand the degree of risk posed by antidepressants, weighing study outcomes showing increased occurrence of suicidal ideation but no completed suicides with the apparent spike in adolescent suicide rates nationwide that coincided with a decline in prescription of SSRIs as a result of the black box warning. In any case, the role of the primary care provider is to be informed about the issue of suicide and antidepressants, educate patients and family members, and to develop a

thoughtful safety and treatment plan. The FDA recommends face-to-face follow-up with a patient or family member weekly for the first 4 weeks after initiation of treatment, then every other week for the next 4 weeks, then at 12 weeks and as clinically appropriate thereafter. Many clinicians find that telephone contact may help maintain the goal of close follow-up and decrease the need for strict adherence to the FDA recommendation, which is not evidence-based. However, rigorous studies are needed to better elucidate the safety considerations. It is important to document that suicidal ideation and the black box warning were discussed with patients and families.

Possible side effects include nausea, diarrhea, headaches, changes in sleep, dry mouth, dizziness, and feeling nervous; often these resolve a few days after the medication is started or the dosage is increased, although occasionally they persist. Less commonly, but more worrisome, there may be a drastic change in mood and behavior which signals a shift to mania (see below). Infrequently, co-administration with other antidepressants or triptans may cause serotonin syndrome, characterized by mental status changes, hyperthermia and other autonomic changes, hyperreflexia, and clonus.

BIPOLAR DISORDER

Some mood disturbances in adolescence are more properly characterized as bipolar disorder rather than MDD. It was once thought that individuals may develop symptoms of bipolar disorder for the first time in late adolescence, but that the disorder did not exist in children and younger adolescents. Starting in the mid-1990s, new evidence has come to light that children can meet criteria for manic episodes and bipolar disorder.

As originally described in adults, bipolar disorder is characterized by episodes of both depression and mania (in bipolar I disorder) or hypomania (in bipolar II disorder). Mania and hypomania are characterized by abnormally elevated, expansive, or irritable mood accompanied by symptoms including decreased need for sleep, pressured speech, flight of ideas, distractibility, risky behaviors, psychomotor activation, and grandiosity. Sometimes psychosis is seen. When these features are seen together with a persistent period of elevated mood, the disorder may be more easily recognizable as mania; however, earlier onset pediatric bipolar disorder seems to vary from classic descriptions in adults and is associated

with less elevated mood and grandiosity and more irritability, which is a less specific clinical feature, and with shorter discrete episodes of mania.

There is a lack of consensus in the field of child and adolescent psychiatry about the precise clinical features of pediatric bipolar disorder, posing a particular problem to primary care providers who would like to ensure accurate diagnosis and management of mental health problems in their patients. Some adolescent patients may present with symptoms of a mood episode that is more clearly recognizable as adult-type mania, but for others the symptoms may be less clear. A further complication is the high degree of co-morbidity with ADHD, substance use, oppositional defiant disorder and conduct disorder, and anxiety. Prevalence is hard to estimate in adolescents, but lifetime prevalence of bipolar I disorder is around 1%. Mainstays of pharmacologic management of bipolar disorder include mood-stabilizing anticonvulsants and antipsychotics, and lithium, with which primary care providers are often less familiar and less comfortable than other psychiatric medications. For all of these reasons, primary care clinicians working with adolescents should focus on identification and referral of suspected cases of bipolar disorder rather than accurate diagnosis and management. This stands in contrast to MDD, which is far more common and may be diagnosed and managed far more readily by primary care providers.

In an adolescent in whom there are significant mental health concerns, avenues of inquiry by the primary care provider which may help elucidate features of bipolar disorder include whether there are distinct period of mood changes associated with sleep disturbance and psychomotor activation, intense irritability (usually more violent than the irritability seen in depression) and reckless behaviors, history of depressive episodes, worsening of symptoms with antidepressants or stimulants, and family history of bipolar disorder. One should always screen for suicidality.

The primary care provider may collaborate with mental health providers by monitoring for the appearance of adverse effects such as weight gain, glucose intolerance, dyslipidemia, and sedation from antipsychotics, liver function abnormalities and polycystic ovary syndrome from valproate (Depakote™), neutropenia from carbamazepine (Tegretol™), Stevens-Johnson syndrome from lamotrigine (Lamictal™), and kidney and thyroid function abnormalities from lithium. In addition, birth defects are known to be associated with some anticonvulsant medications (notably neural tube defects in

valproate and carbamazepine) and lithium (the cardiac defect of the tricuspid valve Ebstein's anomaly); female patients taking these medications should be educated and use of contraception aggressively advocated.

ANXIETY DISORDERS

Anxiety and fear are feeling states experienced by everyone at one time or another. They represent a pathway, involving both subjective and physiological reactivity, related to perceiving threatening stimuli and producing defensive responses. What differentiates those adolescents with anxiety disorders from their peers is extraordinary and persistent distress that interrupts functioning. Fears that are often normal for adolescents include social acceptance, school performance, death, and bodily injury. Some indicators that fears are disordered rather than normal include the following: stimuli are perceived and responded to as threatening grossly out of proportion to actual danger, subjective distress bothers the individual or leads to somatic complaints that interfere with quality of life, and functioning is impaired at school, home, or with peers.

The prevalence of anxiety disorders in adolescence is about 8–9%. Clinical characteristics of anxious adolescents may be variable. Although they may be described as "worriers," they often present to primary care settings with somatic complaints. In some adolescents who have anxiety disorders, characteristics include shyness, social withdrawal, lack of self-confidence, and hypersensitivity to criticism. Although impaired, these individuals may strive to please. Alternatively, anxiety may trigger behavior that appears disruptive and oppositional. One reason for this clinical observation is that anxiety disorders often involve avoidance of certain situations, and when it appears that avoidance will not be possible, behavioral dysregulation may occur.

The DSM-IV-TR outlines a number of specific anxiety disorders seen in adolescents. In addition, criteria are described for panic attacks, which are discrete episodes of intense fear and physical symptoms which may manifest in several different anxiety disorders. Panic attacks occur as symptoms of an anxiety disorder but are not diagnostic of one specific disorder. Characteristics of panic attacks and anxiety disorders are outlined in Table 2.

Table 2
Anxiety Disorders

Anxiety symptom/ disorder	Description
Panic attack	Discrete period of intense emotional, cognitive, and somatic symptoms similar to those seen in life-threatening situations; emotional symptoms include feelings of unreality or detachment; somatic symptoms include palpitations, chest pain, tingling, chills or hot flushes, sweating, dizziness, nausea, trembling/shaking, or choking sensation; cognitive symptoms include the feeling or fear of impending doom, losing control, going crazy, or dying. Reaches peak within a few minutes and gradually subsides.
Panic disorder (with or without agoraphobia)	Recurrent unexpected attacks with concern about having subsequent attacks and about the consequences of the attacks. With or without agoraphobia, i.e., anxiety about being in places or situations from which escape would be difficult or embarrassing.
Social phobia (also known as social anxiety disorder)	Marked and persistent fear of social or performance situations; worsened by unfamiliar people or anticipated scrutiny. Situations are avoided or only endured with intense anxiety or distress.
Generalized anxiety disorder (GAD)	Excessive worry about a number of activities or events that the person is unable to control, occurring more days than not, and associated with either restlessness, irritability, muscle tension, fatigue, sleep disturbance, or difficulty with concentration.
Specific phobias	Excessive or uncontrollable fear triggered by the presence or anticipation of a specific object or situation, leading to avoidance or intense anxiety or distress, including panic attacks.
OCD	Numerous repetitive obsessions and compulsions, which may change over time, causing distress and consuming time or interfering with activities and relationships. Obsessions: thoughts, impulses, or images that are intrusive and cause anxiety or distress. Compulsions: behaviors or mental acts that the person feels driven to perform in response to an obsession or rigidly applied rules. There is an association between OCD and tics.
PTSD	Following exposure to a traumatic event involving serious injury or threat of injury, the event is re-experienced through flashbacks, nightmares, intrusive recollections, and psychological distress and physiologic reactivity in response to cues associated with the trauma. There is avoidance of things and feelings associated with the trauma, detachment from relationships and activities, and restricted range of affect; and symptoms of persistent arousal, such as disturbance of sleep, hypervigilance, irritability, and exaggerated startle response.

EVALUATION

Anxiety disorders are evaluated by asking questions which further flesh out the situations where the adolescent is having subjective distress or objective impairment, and the associated symptoms. For the experienced clinician, it may be easier to hone in on a particular anxiety diagnosis and ask about clinical features specific to that disorder while ruling out other disorders with screening questions. For most primary care providers, it may be helpful to use a screening instrument such as the Screen for Child Anxiety Related Disorders (SCARED) accessed at: http://www.wpic.pitt.edu/research/carenet/CARE-NETPROVIDERS/PDFForms/ScaredChild-final.pdf.

The SCARED has both parent and child/adolescent report forms. When used to help clarify the clinical picture in patients believed to have psychosocial problems, this instrument may confirm the likelihood of an anxiety disorder and point in the direction of panic disorder, generalized anxiety disorder, or social phobia.

It is important to remember that some medical conditions, such as hyperthyroidism and hyperparathyroidism, may present with symptoms similar to a panic attack or an anxiety disorder. However, it is more common that somatic symptoms of anxiety are mistaken for pulmonary, cardiac, neurological, and gastrointestinal illnesses which have similar symptoms.

When an anxiety disorder is suspected, depression is often also being considered in the differential diagnosis. It may be helpful to differentiate between these conditions due to differences in the features and courses, and to some extent treatment, of these conditions; however, there is a high degree of co-morbidity between depression and anxiety, making it important to consider that it may be appropriate to diagnose the presence of both disorders.

MANAGEMENT

Similar to depression, the mainstays of treatment for anxiety disorders are psychotherapy, especially CBT, and pharmacotherapy, typically SSRIs. Similar principles apply for the treatment of anxiety disorders with SSRI medication as with depression. Fluoxetine, sertraline, and citalopram/escitalopram are all reasonable choices and probably confer similar risks and benefits. CBT techniques employed with anxiety may involve some combination of relaxation techniques,

Table 3
Initial Management Considerations for Adolescent Mental Health Disorders

Disorder	Initial Management
Any psychological disorder	Explore presenting symptoms and domains and severity of impairment with patient and parent
	Screen for other associated problems (e.g., HEADSSS)
	Consider use of appropriate screening instrument/rating scale
ADHD	Consider stimulant medication (usually long-acting) for most patients and non-stimulants in specific circumstances; titrate dose
	Psychological treatment adjunctively, as needed for incomplete response, or if medication is not accepted
Depression	Screen for suicidal ideation
	Consider SSRI (e.g., fluoxetine, citalopram/escitalopram, sertraline); start low and go slow
	Consider referral for psychotherapy (esp. CBT)
	Discuss suicidal ideation/black box warning and document
	Consider screening for medical conditions (e.g., hypothyroidism, anemia)
Bipolar disorder	Screen for suicidal ideation
	Strongly consider referral for psychopharmacologic and psychological management by mental health providers
Anxiety disorders (panic disorder, GAD, social phobia, specific phobias, OCD)	Consider SSRI (e.g., fluoxetine, citalopram/escitalopram, sertraline); start low and go slow
	Consider referral for psychotherapy (esp. CBT, specifically ERP for OCD)
PTSD	Consider referral for psychopharmacologic and psychological management by mental health providers
	Screen for ongoing risk factors for further trauma exposure

graded exposure, and analysis of cognitive distortions. Anti-anxiety medications such as buspirone (Buspar™) and benzodiazepines may be used. For many patients, buspirone is well-tolerated but not particularly potent. Benzodiazepines are less often favored in the primary care setting due to high frequency of side effects such as sedation and risk for abuse and dependence. It is especially advisable to avoid use of alprazolam (Xanax™) in the primary care setting with adolescents due to its extremely high abuse potential (Table 3).

A recent study of children and adolescents with a range of anxiety disorders compared sertraline, CBT, and the combination with placebo. Both sertraline and CBT were effective and the combination was superior to either alone. Primary care providers may find it helpful to manage mild anxiety by referral for psychotherapy and scheduled follow-up with primary care, moderate anxiety by SSRI medication and referral to psychotherapy and severe anxiety by SSRI medication, referral to psychotherapy, and referral to a psychiatric prescriber.

In obsessive-compulsive disorder (OCD), the mainstays of management continue to be SSRI medication and CBT, although to attain a proper response, the doses of SSRI medications often need to be higher than for other disorders. The specialized form of CBT used is called exposure and response prevention (ERP).

In post-traumatic stress disorder (PTSD), the approach to management may be somewhat different. Psychotherapy is helpful, and CBT techniques may be employed, but often there may be components of therapy that are specific to traumatized patients. Medications are useful to target symptoms, but the core disturbance often remains. There may still be a role for SSRIs, although the evidence for this is less clear than in other anxiety disorders. Patients with PTSD often benefit from referral to mental health resources, at minimum a psychotherapist or trauma support group, and often a referral to a psychiatric prescriber. Since patients with a history of trauma are at higher risk for continued exposure to trauma, it is appropriate to screen for and educate regarding ongoing risk factors for further trauma exposure.

SUMMARY (Table 3)

REFERENCES AND ADDITIONAL READINGS

American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fourth edition, text revision (DSM-IV-TR). Washington, DC: American Psychiatric Association; 2000.

Beresin B, DeLuca D, Falzone R, Goldstein M, Kutner L, Olson C, Schlozman S, Warner D. Diagnosing adolescent depression in pediatric practice. 2006. Available at: http://www.massgeneral.org/children/specialtiesandservices/adolescent_medicine/default.aspx

Biederman J, Monuteaux MC, Spencer T et al. Do stimulants protect against psychiatric disorders in youth with ADHD? A 10-year follow-up study. Pediatrics 2009;124:71-78.

Brookman RR, Sood AA. Disorders of mood and anxiety in adolescents. Adolesc Med Clin. 2006;17:79-95.

Brown RT, Amler RW, Freeman WS, et al. Treatment of attention-deficit/hyperactivity disorder: overview of the evidence. Pediatrics. 2005;115:e749-57.

Cheung AH, Zuckerbrot RA, Jensen PS, et al. Guidelines for adolescent depression in primary care (GLAD-PC): II. Treatment and ongoing management. Pediatrics. 2007;120:e1313-26.

Cheung AH, Dewa CS, Levitt AJ, Zuckerbrot RA. Pediatric depressive disorders: management priorities in primary care. Curr Opin Pediatry 2008;20:551-9.

Connolly SD, Bernstein GA; Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with anxiety disorders. J Am Acad Child Adolesc Psychiatry 2007;46:267-83.

Costello EJ, Erkanli A, Angold A. Is there an epidemic of child or adolescent depression? J Child Psychol Psychiatry 2006;47:1263-71.

Dulcan MK, Martini DR, Lake M. Concise guide to child and adolescent psychiatry, third edition. Arlington, VA: American Psychiatric Publishing, Inc.; 2003.

Friedman RA. Uncovering an epidemic-screening for mental illness in teens. N Engl J Med 2006; 355:2717-19.

Hughes CW, Emslie GJ, Crismon ML, et al. Texas Children's Medication Algorithm Project: update from Texas Consensus Conference Panel on Medication Treatment of Childhood Major Depressive Disorder. J Am Acad Child Adolesc Psychiatry 2007;46:667-86.

Kaye DL, Montgomery ME, Munson SW, eds. Child and adolescent mental health. Philadelphia, PA: Lippincott Williams & Wilkins; 2002.

Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national co morbidity survey replication. Arch Gen Psychiatry 2005;62:593-602.

McClellan J, Kowatch R, Findling RL; Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with bipolar disorder. J Am Acad Child Adolesc Psychiatry 2007;46:107-25.

Morris TL, March JS, eds. Anxiety disorders in children and adolescents, second edition. New York: Guilford Press; 2004.

Murray DW, Arnold LE, Swanson J, et al. A clinical review of outcomes of the multimodal treatment study of children with attention-deficit/hyperactivity disorder (MTA). Curr Psychiatry Rep 2008;10:424-31.

Pastor PN, Reuben CA. Diagnosed attention deficit hyperactivity disorder and learning disability: United States, 2004–2006. National Center for Health Statistics. Vital Health Stat 2008;10(237).

Perrin JM, Friedman RA, Knilans TK; Black Box Working Group; Section on Cardiology and Cardiac Surgery. Cardiovascular monitoring and stimulant drugs for attention-deficit/hyperactivity disorder. Pediatrics 2008;122:451-3.

Polanczyk G, Rohde LA. Epidemiology of attention-deficit/hyperactivity disorder across the lifespan. Curr Opin Psychiatry 2007;20:386-92.

Rappley MD. Attention deficit-hyperactivity disorder. N Engl J Med 2005;352: 165-73.

Sakolsky D, Birmaher B. Pediatric anxiety disorders: management in primary care. Curr Opin Pediatr. 2008;20:538-43.

Shaffer D, Fisher P, Dulcan MK, et al. The NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3): description, acceptability, prevalence rates, and performance in the MECA Study. Methods for the Epidemiology of Child and Adolescent Mental Disorders Study. J Am Acad Child Adolesc Psychiatry 1996;35:865-77.

Walkup JT, Albano AM, Piacentini J, et al. Cognitive behavioral therapy, sertraline, or a combination in childhood anxiety. N Engl J Med 2008;359:2753-66.

Wells KC, Pelham WE, Kotkin RA, et al. Psychosocial treatment strategies in the MTA study: rationale, methods, and critical issues in design and implementation. J Abnorm Child Psychol 2000;28:483-505.

Zuckerbrot RA, Cheung AH, Jensen PS, Stein et al. Guidelines for adolescent depression in primary care (GLAD-PC): I. Identification, assessment, and initial management. Pediatrics 2007;120:e1299-312.

21

Eating Disorders

Stephanie Corrado

Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 55 Fruit Street, Yawkey 6D, Boston, MA 02114, USA
scorrado@partners.org

Eating disorders are prevalent among adolescents and young adults with lifetime risk estimated to be 0.3–1% for the full disorder in women. Anorexia nervosa, bulimia, and eating disorder not otherwise specified (EDNOS) are the most common diagnoses and are classified by DSM IV criteria. Although a psychiatric diagnosis, it is important for the clinician to be well versed in the criteria to be able to effectively manage patients with eating disorders.

Anorexia nervosa is diagnosed when three of the four DSM IV criteria are present but must include amenorrhea for 3 or more months to meet the full diagnosis. There are subtypes of AN that include restrictive or binge/purge subtype. Of course, there may be combinations of the following, which would indicate that the patient did not meet the full criteria for diagnosis. However, even if the full diagnosis is not made but most of the criteria are met, the treatment is generally the same.

Certain behaviors with teens having eating disorders may suggest to the clinician that there is a problem. These behaviors include reluctance to be weighed, change in eating habits (new vegetarian, healthier eating), desire to eat alone, increased school absenteeism, deceptive behaviors, and an increase in exercise. In addition, some

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_21,

adolescents are noted to increase the use of bathroom facilities, take much longer time to eat a meal, become isolated in a social sense, and begin to wear layers of clothing.

ANOREXIA NERVOSA DSM IV CRITERIA

- Weight below 85% of ideal body weight (IBW) expected for age and height
- Intense fear of gaining weight
- Distorted body image, undue influence of weight on self-worth, denial of low body weight
- Amenorrhea for 3 months or more if post-menarche

Subtypes

1. Restrictive: limiting food intake to a suboptimal amount
2. Binge/purge: intermittent binge cycles followed by purging

The diagnosis of bulimia nervosa requires three of the four DSM IV criteria and must include the binge/purge cycles. There is no diagnostic criterion for menstrual cycle disturbance, but there may be amenorrhea, metrorrhagia, or menorrhagia. There are also no classified subtypes.

BULIMIA DSM IV CRITERIA

- Binge/purge cycles for >3 months
- Self-worth and preoccupation with body and weight
- Purging may include self-induced vomiting, hyper-exercising, diet pills or laxatives, or any other compensatory mechanism following a binge
- Occurs at least two times a week for at least 3 months.

If a patient has disordered eating without the full diagnosis of either anorexia nervosa or bulimia, then a diagnosis of EDNOS may be made.

EATING DISORDER NOT OTHERWISE SPECIFIED (EDNOS)

– Combination of the above criteria

Patient may exhibit criteria of both but does not meet all to make diagnosis.

EATING DISORDER EVALUATION

The office visit should include a detailed history and physical directed at establishing the diagnosis and patient medical stability. See "Life Style Questionnaire" in the Appendix for the format of an eating disorder history. Routine elements in the history include regular medical history along with the following:

– History of eating disorder
– Age at onset, previous treatment, current providers such as therapist or nutritionist
– Dietary recall over 24 h
– Exercise history including type of exercise and duration
– Body image
– Attitude about losing or gaining weight
– Purging behaviors: vomiting, diet pills, laxatives
– Menstrual history, periods of amenorrhea for more than 6 months

PHYSICAL EXAM

– Body weight and height to calculate body mass index (BMI)
– Calculated percent of IBW
– Orthostatic vital signs
– Complete physical including tanner staging in adolescents
– Evaluation for lanugo, cool extremities, hair thinning, temporal wasting, arrested pubertal development common in patients with anorexia.
– Check for parotid enlargement, dental erosion, knuckle abrasions, hair thinning, facial swelling in patients with bulimia.

DIAGNOSTIC STUDIES

The history and physical often yield the diagnosis of anorexia nervosa or bulimia. Laboratory studies should be obtained to evaluate for electrolyte abnormalities or, in the absence of menstruation, rule out other pathophysiology. An ESR and TSH are routinely obtained to rule out other etiologies of weight loss if the patient is not obviously diagnosed with anorexia. Thyroid tests may help to confirm the diagnosis of anorexia nervosa as both TSH, T3 and/or T4 may be low reflecting suppression of thyroid function in the setting of malnutrition. ESR will often be low as well in malnutrition. If there is a suspicion of celiac disease, screening test of serum tissue transglutaminase and an IGA could be sent.

Laboratory Tests

- CBC
- Comprehensive metabolic panel, magnesium, and phosphorous
- ESR
- TSH
- Urine dipstick
- Amylase and lipase

Further testing in the office should include an ECG for evaluation of bradycardia, QTc intervals, or acute changes due to electrolyte abnormalities. This should be done on the initial visit but does not need to be repeated at every office visit unless clinically indicated.

Adolescents with eating disorders may have electrolyte disturbances especially if there is binging and purging. Some patients with anorexia fluid load before weights are obtained. The following are some scenarios that may be seen:

Sodium: any change with vomiting, increased or normal with laxatives; decreased or normal with diuretics

Potassium: decreased with vomiting, laxatives, and diuretics

Chloride: decreased with vomiting and diuretics; increased or decreased with laxatives

Bicarbonate: increased with vomiting and diuretics; decreased or increased with laxatives

pH: increased with vomiting and diuretics; decreased or increased with laxatives

For amenorrhea of 6 or more months, a DEXA scan should be ordered for evaluation of bone mineralization density. Bone loss is prevalent in adolescents with anorexia. With severe undernutrition, female adolescents develop hypogonadotropic hypogonadism and estrogen deficiency. These adolescents also develop decreased IGF-1 and hypercortisolemia. These endocrinologic changes from anorexia work together to reduce bone mineralization density. Bone formation increases with weight gain; however, decreases in the resorption of bone only occur with adolescents who regain their menses and have adequate production of estrogen. Oral contraceptive pills do not help bone mineralization and in fact may confuse the clinical picture.

Female Athlete Triad

The constellation of low energy availability with or without an eating disorder, hypothalamic amenorrhea, and osteoporosis in the female athlete has recently been recognized as a more common occurrence and has been termed the female athlete triad. Most of these athletes manifest with low body fat composition, which contributes to a hypoestrogenic state hence causing amenorrhea. As in patients with anorexia, estrogen deficiency along with hypogonadotropic hypogonadism contribute to reduction in bone mineralization density. Excessive exercise also contributes to amenorrhea in causing hypogonadotropic hypogonadism. At times, the female athlete may be normal weighted but still present with low body fat and amenorrhea placing them at risk for osteopenia.

Two studies have looked at the occurrence of eating disorders in female athletes who present with low body weight and amenorrhea. In one study, 31% of the female athletes in sports that promoted leanness met DSM IV criteria for eating disorders compared to the general population where 5.5% had eating disorders. Another study found that 25% of elite female athletes had clinical eating disorders compared to 9% in the general population.

Diagnosis of the female athlete triad should begin with careful assessment of the female athlete's body weight, body fat, nutritional status, and menstrual history. Screening for eating disorders should also be performed. If low bodyweight or body fat composition is present along with primary or secondary amenorrhea, then a bone

density scan should be obtained for screening osteopenia or osteoporosis.

CALCULATION OF PERCENT IDEAL BODY WEIGHT

It is important to systematically calculate percentage of IBW. If done the same way every time, healthy weight ranges can be set and used to guide treatment. Usually, a healthy weight range goal is set between 92% and 100% of IBW. At least 92% of IBW is usually required for a patient to resume menstruation. An IBW of 85–92% usually indicates that a patient may be able to continue treatment as an outpatient. Less than 85% IBW indicates the patient has met one of the criteria for anorexia nervosa and treatment should be consistent and may need to be increased to partial, residential, or inpatient. Less than 75% of IBW usually indicates acute medical hospitalization.

Ideal Body Weight

For age 12–20 years: the IBW is calculated by squaring the height in meters x 50 percentile BMI for age based on the CDC Growth Chart "Body Mass Index for Age" (see Table 1)

http://www.cdc.gov/growthcharts/data/set1clinical/cj41l024.pdf girls BMI chart

http://www.cdc.gov/growthcharts/data/set1clinical/cj41l023.pdf boys BMI chart

Table 1
50% BMI by Age

	Females	Males
10 years	16.8	16.6
11 years	17.4	17.2
12 years	18.0	17.8
13 years	18.6	18.4
14 years	19.4	19.1
15 years	20.0	19.8
16 years	20.4	20.6
17 years	20.9	21.2
18 years	21.2	21.9
19 years	21.6	22.4
20 years	21.7	23.0

RESULT IS IN KILOGRAMS

Example: A 14-year-old female who is 64 in. in stature: 1.626 m^2 = 2.644. Multiple by 50% BMI (19.4) to reach value of 51.3 kg = 112.8 pounds ideal weight

For females aged 21 years and older: 100 lb for first 60 in. and then 5 lb per in. For males 21 years and older: 106 lb for the first 60 in. and then 6 lb per in.

How to Calculate % of Ideal Body Weight

Calculate BMI

BMI = patient's weight in pounds divided by height in inches squared × 703

1. Ideal BMI is the 50% BMI on the NHANES growth curve for males or females based on their age (e.g., 18-year-old female 50% BMI is 21.2).
2. % IBW = Patient's BMI/Ideal BMI

TREATMENT

Treatment options for anorexia or bulimia are either establishment of an outpatient team or higher levels of care such as partial, residential, or inpatient hospital admissions. Outpatient treatment teams include a physician, therapist, nutritionist and, if needed, a psychiatrist.

Outpatient management is usually the first line of treatment and, if failed, a higher level of care is recommended. If a patient with anorexia meets criteria for medical admission upon initial evaluation, then medical hospitalization is warranted (see Table 2 for criteria). Inpatient hospitalization is directed at stabilizing vital signs and preventing refeeding syndrome with careful attention to caloric increases and electrolyte monitoring. Various protocols for medical admissions have been developed, the majority advancing calories slowly for an estimated weight increase of 0.2 kg a day. If patients are unable to meet weight requirements, then nutritional supplements (e.g. Ensure ™ or Boost ™) are added. Vital signs are monitored with orthostatic changes measured daily and heart rate monitored 24 h. Once patients

Table 2
Admission Criteria for Anorexia

1. Less than 75% ideal body weight or ongoing weight loss despite intensive management
2. Refusal to eat
3. Heart rate less than 50 beats during daytime or less than 45 beats at night
4. Systolic BP less than 80/50 mmHg
5. Orthostatic changes in pulse greater than 20 beats/min or BP changes more than 10–20 mmHg
6. Temperature less than 96°
7. Arrhythmias
8. Very poor to poor motivation to recover
9. Suicidality

Table 3
Admission Criteria for Bulimia

1. Syncope
2. Serum K less than 3.2
3. Serum chlorides less than 88
4. Esophageal tears
5. Cardiac arrhythmias including prolonged QTc
6. Hypothermia
7. Suicide risk
8. Intractable vomiting
9. Hematemesis
10. Failure to respond to outpatient treatment

are medically stable at goal calories, then residential treatment, partial treatment, or outpatient treatment is recommended.

Adolescents with bulimia may need an acute medical admission for stabilization. The criteria for such an admission are listed in Table 3.

Residential treatment centers provide directed and supervised meals along with group and individual therapy and psychiatric evaluations. Patients reside at these programs for 1–3 months duration and usually step down to a partial program. Partial programs are day programs that provide two meals and a snack that are supervised along with group and individual therapy.

The treatment for anorexia and bulimia is long and complicated, and requires the collaboration of all providers to treat the physical and psychological components of the disease. Medical visits may occur once or twice weekly, bimonthly, or monthly depending on the

medical stability of the patient. Treating patients with eating disorders is both an art and a science as the complexity of the illness does not always allow for standardized procedures. However, the more structured the approach, the more optimal the outcome. As medical providers, we provide evaluation of the medical status and the structure in which the patient may make healthy changes.

It is critically important that all members of the treatment team including the physician, psychiatrist and/or therapist, nutritionist, and family therapist keep in touch in respect to how the patient is progressing. This communication needs to continue if the patient must go to a higher level of care. In addition, parents should be apprised of their adolescent's clinical situation. This may become difficult if the adolescent age 18 or older will not allow the clinician to speak with his or her parents. Sometimes, this requires psychiatric evaluation as to the competency of the adolescent to make treatment decisions. In some cases, parents have gone to court to seek legal guardianship in order to ensure their child continues to receive treatment.

The inpatient medical treatment for adolescents with an eating disorder may be complicated by medical and psychiatric issues. There must be excellent communication among all team members as well as with the patient and his or her family.

Refeeding Syndrome: Of special concern is the refeeding syndrome which may occur when there is a shift from fat to carbohydrate metabolism. Insulin is released, which facilitates the cellular uptake of phosphate, magnesium, and potassium. This may lead to decreased serum phosphorus levels. Medical consequences of a lower serum phosphorous may include rhabdomyolysis, decreased cardiac motility, cardiomyopathy, respiratory and cardiac failure, hemolysis, acute tubular necrosis, seizures, and delirium.

During inpatient refeeding, vital signs, orthostatic changes in blood pressure and pulse, and weight should be monitored to evaluate the patient for fluid retention. In addition, daily measurements of serum electrolytes, phosphorus, and magnesium should be performed during the first week. Please see the MassGeneral Hospital for Children Eating Disorder Protocol for inpatient management, which is included as supplementary material in the Appendix.

Treatment for the adolescent with female athlete triad is difficult and often requires a multidisciplinary approach with a physician, mental health professional, and nutritionist especially if a clinical eating disorder is present. In many athletes, low body weight and continued strenuous training is encouraged by the sport making it

difficult for the patient to decrease their training in order to increase energy availability and become eumenorrheic. Calcium and vitamin D supplementation along with weight-bearing exercise is recommended to help preserve bone health; but hormone supplementation has not been shown to be protective and can confuse the clinical evaluation of amenorrhea. In athletes with overt stress fractures, a bone density scan should be obtained despite menstrual history. The best protection for the female athlete's bone health is to remain eumenorrheic and maintain a healthy balance between exercise, energy availability, and body weight.

REFERENCES AND ADDITIONAL READINGS

American Psychiatric Association. Work Group on Eating Disorders. Practice Guideline for the Treatment of Patients with Eating Disorders. 3rd edn. Arlington, VA 2006.

Attia E, Walsh BT. Behavioral management for anorexia nervosa. N Engl J Med 2009;360:500–506.

Fisher, ME, Eating disorders in adolescents: A background paper. J Adolesc Health 1995;16:420–437.

Goldstein MA, Herzog DB, Misra M, Sagar P. A 19-year-old man with weight loss and abdominal pain. N Engl J Med 2008;359:1272–1283.

Gordon C, Grace E, Emans J et al. Changes in bone turnover markers and menstrual function after short term DHEA in young women with anorexia. J Bone Miner Res 1999;14:136–144.

Katzman DK. Medical complications in adolescents with anorexia nervosa: A review of the literature. Int J Eat Disord 2005;37:552–559.

Keel, PE. Long-term outcome of bulimia nervosa. Arch Gen Psychiatry 1999;56:63–69.

Kreipe, RA. Eating disorders in adolescents and older children. Pediatr Rev 1999;20:410–420.

Nattiv A, Loucks AB, Manore MM, Sanborn CF, Sungot-Borgen J, Warren MP. The female athlete triad. Med Sci Sports Exerc 2007;39:1867–1882.

Willett, WE. Guidelines for healthy weight. N Engl J Med 1999;341:427–434.

Yager, J. Anorexia nervosa. N Engl J Med 2005;353:1481–1488.

22

Adolescent Relationship Violence in Clinical Settings: Challenges for Identification and Intervention

Elizabeth Miller

UC Davis School of Medicine, Ticon II, 2516 Stockton Blvd., Rm 382, Sacramento, CA 95817, USA
elizabeth.miller@ucdmc.ucdavis.edu

Approximately one in three adolescent girls in the United States is a victim of physical, emotional, or verbal abuse from a dating partner – a figure that far exceeds victimization rates for other types of violence affecting youth. Nationwide, nearly one in ten high school students (8.9%) has been hit, slapped, or physically hurt on purpose by a boyfriend or girlfriend. The negative health consequences for adolescents and young adults include pregnancy, sexually transmitted infections, substance abuse, depression, and suicidality.

Adolescent relationship violence refers to a pattern of repeated acts that physically, sexually, or emotionally abuse a member of a heterosexual or homosexual couple in which one or both partners is a minor. In addition to sexual and physical violence, for adolescents, abusive behaviors may include a range of controlling behaviors: monitoring cell phone usage, telling a partner what he or she can wear, controlling where he or she goes, and manipulating contraceptive use.

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_22,

Table 1
Diverse Manifestations of Power and Control in Adolescent Relationships

Dimensions of abuse	Examples[a]
Emotional/ psychological	Name calling via instant messaging; telling partner what he or she can wear; threatening to spread rumors; threatening to commit suicide if partner tries to leave relationship; smashing things; breaking partner's things; treating partner like a slave
Social	Cell phone usage monitoring; preventing partner from going to school; calling or text messaging multiple times a day to monitor partner's whereabouts; getting angry if partner is talking to someone else
Financial	Controlling what partner can or cannot buy; refusing to pay for things that the abuser insisted the partner to purchase
Sexual	Insisting on sexual acts; videotaping (by cell phone) sexual acts, then threatening to put them on the Internet; preventing partner from using birth control; forcing partner to get pregnant; forcing partner to use drugs before sexual activity
Physical	Threatening to hit; threatening with a weapon; hurting the partner's pet

[a]These are examples of abuse in addition to physical and sexual violence (i.e., hitting, slapping, kicking, choking, forcing to engage in sex)

UNIQUE CHARACTERISTICS OF ADOLESCENT RELATIONSHIP VIOLENCE

Developmental Considerations

Depending on the adolescent's stage of social/emotional development, the young person may not recognize the warning signs of abuse, confusing the controlling behaviors and possessiveness as signs of "true love." Similarly, a young person may defer seeking care due to multiple barriers, including fear of breaches of confidentiality, lack of trust in adult care providers, and inability to access care. The health care provider should always consider the adolescent's developmental stage, and discuss concrete and specific behaviors ("does he or she get mad at you if you don't respond to his/her calls right away?") rather than vague questions such as "Are you in an abusive relationship?"

Teens and Electronic Media

Instant messaging, social networking sites, cell phones, all help teens to connect in ways that were unfathomable even a decade ago; this electronic networking may become an arena for exploitation and abuse, including excessive texting, "sexting" (transmitting nude images of oneself or one's partner), constant cell phone monitoring. [1] Discussion of risks associated with such electronic media with young patients and their parents are now requisite for health care providers. (See www.thatsnotcool.com for teens to learn about setting their own "digital line.")

Role of Adult Caregivers

Adolescents are far less likely to disclose experiences of relationship violence to adults than to their peers; those teens who are more "disconnected" from family, school, and their community are also the most vulnerable to abusive relationships. Adult caregivers (e.g., parents, teachers, health care providers) may dismiss warning signs of abuse among teens, assuming that teen relationships are less serious than adults. Family chaos and disruption (including family violence) are risk factors for adolescent relationship violence, underscoring that engaging parents/guardians in supporting youth experiencing violence also requires careful assessment of parental safety.

Minor Consent Laws and Confidentiality

A critical difference with adolescent relationship violence in comparison to adult domestic violence is that at least one of the partners involved is a minor. The health care provider is required to balance the safety of the minor while creating safe spaces that are confidential for teens to share experiences with their provider. Providers need to know their state's minor consent/confidentiality and mandated reporting requirements for child abuse, neglect, and sexual abuse. Knowledge of these reporting requirements and how to support a teen in the safest way possible requires consultation. Developing connections with colleagues (e.g., social workers, domestic violence agencies, rape crisis centers) to discuss options is essential. Reporting a case to an outside agency without carefully considering safety could place the young person at significantly greater risk for harm and even death.

ASSESSMENT FOR RELATIONSHIP VIOLENCE

Adolescents report disclosing relationship violence experiences to friends far more often than to adults. Providers are encouraged to share information with adolescents about relationship violence in the context of their friendships. For example, "We make sure to talk about unhealthy relationships with all of our patients, because you may know someone for whom this information might be useful. Please know that this is a safe place to bring friends whom you are concerned about."

Experiences of abuse and violence cluster with other common adolescent behaviors. An adolescent experiencing family violence is more likely to experience an abusive relationship (often in an attempt to escape the family context), may be depressed, using substances, and pregnant. This means that when addressing any other adolescent behavior relevant to a young person's health and well-being (whether it be smoking or school performance), the provider should consider the possibility of an abusive relationship as part of the differential.

In addition to universal, consistent, and frequent screening, however, providers should be alert to particular warning signs and

Table 2
Examples of Clinical Symptoms and Signs of Potential Intimate Partner Violence

Domain/system	Clinical symptoms and signs
Social functioning	School failure, disengaged from school activities, lack of friends, lack of hobbies, binge drinking
Constitutional	Frequent headaches, sleep disorders, rapid weight gain or weight loss
Ears, nose, throat	Frequent ear pain (from being slapped); sore throats (forced oral sex); palatal bruising (forced oral sex)
Reproductive health	Multiple requests for pregnancy tests; inconsistent or no contraceptive use; frequent use of EC; pelvic pain; vaginal discharge; dysuria
Gastrointestinal	Nonspecific abdominal pains; constipation and rectal pain (forced anal sex); irritable bowel syndrome
Musculoskeletal	Joint or limb pains; neck pain and low back pain; scratches or bruising
Mental health	Poor sleep; sad mood; suicidal ideation; substance use; withdrawn; depressed affect

symptoms that may signal the possibility of an abusive relationship. In the presence of such signs and symptoms, providers should conduct a more thorough assessment, providing education on what constitutes abusive behavior, identifying potential behaviors that may be placing the teen at increased risk for abuse and violence, as well as ensuring that the young person is aware of specific resources and supports in the community to support victims of violence.

CREATING A SAFE ENVIRONMENT FOR POSSIBLE DISCLOSURE

A supportive and safe environment includes having posters, brochures, and messages in the clinical space that reflect a teen's reality. Posters with concrete examples of what love is and what love is not communicates that the clinic staff care about the health of their adolescents. Brochures that provide education about relationship violence with checklists and questions for adolescents to consider lay the groundwork for a conversation with the provider. The materials used should be multicultural and reflect both heterosexual and same sex relationships. (See www.endabuse.org, www.loveisrespect.org, and www.loveisnotabuse.org for teen relevant materials.)

FRAMING THE "RIGHT" QUESTIONS

Every encounter with an adolescent in the health care setting is an opportunity to educate youth about the ways in which unhealthy relationships affect their health and how health care providers are prepared to support youth experiencing abuse and violence in their relationships.

> Universalizing – "Many of our teen patients have shared with us how they have experienced things in their relationships that made them feel uncomfortable and even scared. We care about this a lot as health care providers, because unhealthy relationships can really affect your health. We now ask all of our patients about their relationships because you and your health are really important to us."

Educational – "As unhealthy relationships have such an impact on the health of young people, we have been sharing this information with all of our patients, because it is likely you know someone who could use this information. We want you to know that this is a safe place for young people to share with us things they are concerned about."

Concrete – "Does this person ever tell you where you can go or who you can talk to?"

"Do they need to know where you are all the time? Like monitoring your cell phone ?" "Do they ever try to make you have sex when you don't want to?"

"Do you ever feel scared? Like do they ever totally lose it, throw things?"

COLLABORATIVE MODEL FOR CARE

Given the complexities and nuances of caring for teens, providers must know local resources and specialists in partner violence to consult.

- Identify allies in mental health, social work, pediatrics, as well as other local community resources, including domestic violence and rape crisis centers, child protection services, and legal advocates familiar with youth law.
- Create an adolescent-friendly environment in the clinical setting, and enlist other clinic staff in helping to create this "safe" space for teens that is respectful of a young person's strengths and growing independence.
- Ensure that all youth in the practice see information on relationship violence and healthy relationships, and that they leave the clinic knowing that the clinic team cares about them and their well-being.

REFERENCES AND ADDITIONAL READINGS

Davis A. MPH. 2008. Interpersonal and physical dating violence among teens. The National Council on Crime and Delinquency Focus. Available at: http://www.nccdcrc.org/nccd/pubs/Dating%20Violence%20Among%20Teens.pdf

Decker M, Silverman J, Raj A. Dating violence and sexually transmitted disease/HIV testing and diagnosis among adolescent females. Pediatrics 2005;116:272–276.

Grunbaum JA, Kann L, Kinchen S, et al. 2004. Youth Risk Behavior Surveillance – United States, 2003. Morbidity and Mortality Weekly Report. 53(SS02);1–96. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5302a1.htm

Liz Claiborne and TRU. 2007. Tech abuse in teen relationships study. Available at: http://www.loveisnotabuse.com/pdf/06-208%20Tech%20Relationship%20Abuse%20TPL.pdf

Silverman J, Raj A, et al. Dating violence against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy and suicidality. JAMA 2001; 286:572–579. Available at: http://jama.ama-assn.org/cgi/reprint/286/5/572

23

Bullying

Fiona Baumer[1] and Mark A. Goldstein[2]

[1]*Department of Medicine, Children's Hospital Boston, 300 Longwood Ave., Boston, MA 02115, USA*
fiona.baumer@childrens.harvard.edu
[2]*Division of Adolescent and Young Adult Medicine, MassGeneral Hospital for Children, 175 Cambridge Street, 5th floor, Boston, MA 02114, USA*
mgoldstein@partners.org

DEFINITION

Bullying is defined as repetitive acts of aggression committed with the intent to do harm against a victim who is less powerful – physically, emotionally, or socially – than the perpetrator. A survey of over 15,000 6–10th graders in the USA found that nearly 30% of students were involved in aggression on a regular basis, either as a perpetrator (13%), a target (10.6%), or both (6.3%). The rate of bullying is thought to peak in childhood and to decrease through adolescence, being nearly twice as common in 6th grade as in 12th grade. The majority of face-to-face bullying takes place at or on the way to and from school (see Table 1).

Despite its prevalence, bullying should not be accepted as a normal developmental bump because longitudinal research has found that bullying may have significant immediate and enduring consequences for both the victim and the perpetrator. Victims experience more depression, school avoidance, and suicidal ideation compared to non-bullied peers. Self-esteem and depression may persist into adulthood in those who are chronically bullied. Perpetrators have more conduct problems than their peers, and are likely to be convicted

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_23,

Table 1

Types of Bullying

Type of bullying	Physical	Verbal	Social	Cyber
Actions (Prevalence includes bully and victim)	Assault or property destruction	Insulting remarks or spreading rumors	Exclusion from groups	Technologies are used to send or post threatening or embarrassing information
	20.8%	53.6%	51.4%	13.6%

data from Wang et al.

of a crime as an adult. Victims and perpetrators have higher rates of violent behaviors.

SCREENING

There is no particular accepted screening tool. Pediatricians may consider screening all children for involvement in bullying, and they should be aware that children and adolescents with low levels of social support, obesity, and mental problems are at special risk for being bullied. Physicians should ask questions about bullying whenever patients present with onset of psychosomatic or behavioral symptoms, academic or social problems, or substance use.

Children who have been bullied have a higher risk of certain symptoms. These symptoms include problems with sleep, feeling unhappy or sad, and reports of stomachache or headache.

INTERVENTIONS

If a pediatrician identifies that a patient is a victim or perpetrator of bullying, intervention is required.

On an individual level, physicians could do the following:

1. Counsel families about the seriousness of bullying, and encourage parents to involve school personnel.
2. Screen children for other psychiatric conditions, especially depression and anxiety disorders in victims and conduct disorders in perpetrators.

Refer those who do screen positive for further psychiatric evaluation and therapy.
3. Consider family therapy for bullies and their families.

On a community level, physicians could advise the following:

1. Encourage the adolescent's school to adopt a comprehensive anti-bullying program that incorporates school-wide sanctions against bullying. In addition, promote the education of teachers, school personnel, parents, and children on how to recognize and stop bullying. Physicians may advise on development of social skills and conflict management curriculum as well as promote individual attention for victims and bullies. These multidisciplinary approaches are more effective than narrowly focused interventions in reducing bullying.
2. Physicians may also advocate for legislative actions in order to promote resources to prevent bullying or develop programming to treat perpetrators and victims.

REFERENCES AND ADDITIONAL READINGS

Gini G., Pozzoli T. Association between bullying and psychosomatic problems: A meta-analysis. Pediatrics 2009; 123:1059–65.

Glew G., Rivara F., Feudtner C. Bullying: Children hurting children. Pediatr Rev 2000; 21:183–190.

Kim YS., Koh YJ., Leventhal B. School bullying and suicidal risk in Korean middle school students. Pediatrics 2005; 115:357–63.

Nansel TR, Overpeck M, Pilla RS et al. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. JAMA 2001; 285:2094–100

Spector ND, Kelly SF. Pediatrician's role in screening and treatment: bullying, prediabetes, oral health. Curr Opin Pediatr 2006; 18:661–70.

Wang J, Iannotti RJ, Nansel TR. School bullying among adolescents in the United States: physical, verbal, relational, and cyber. J. Adolesc Health 2009; 45:368–75.

Van Cleave J., Davis MM. Bullying and peer victimization among children with special heath care needs. Pediatrics 2006; 118:e1212–19.

24

Transition of Care

Bradley Monash

Assistant Chief of Moffitt-Long Medical Service, Division of Hospital Medicine, University of California, San Francisco Medical Centrer
505 Parnassus Ave., San Francisco, CA 94142, USA
bmonash@medicine.ucsf.edu

All adolescent patients require a high-quality, comprehensive, patient-centered and developmentally appropriate care plan that effects a seamless transition of care into adulthood. The following seven critical steps are adapted with modification from the AAP/AAFP/ACP document "A Consensus Statement on Health Care Transitions for Young Adults With Special Health Care Needs." Indeed these apply to the care of all patients.

1. Identify a health care professional who assumes primary responsibility for the transition; ideally this is the pediatrician or adolescent health provider. Key collaborators include the patient, family, accepting adult primary care provider, pediatric and adult sub specialists, social services, and case managers. Communication must occur early and often.
2. Acquire the core knowledge and skills required to effect a developmentally appropriate, successful transition. Until these are incorporated into training and certification requirements, physicians in practice must utilize available tools and resources. Furthermore, transition participants may serve as resources and educators for one another (i.e., pediatricians may teach other providers about the care

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6_24,

of childhood-onset illness). Families may require assistance finding suitable adult providers.

3. Prepare and maintain a comprehensive "medical summary" analogous to an "off-service note." This must include an introductory paragraph, a review of the patient's medical history by problem, past and current medications, detailed listing of specific allergies or drug reactions, immunization history, relevant family and social history, contacts for all providers (including names, addresses, and telephone numbers), any special health care needs, or other practical information (tracheostomy or G-tube specifics, individualized education plans or employment information, living arrangements, any assistance required for activities of daily living). Incorporate a one to two page "transition summary" that communicates key information.
4. Establish a written health care transition plan by age 14 in consultation with the patient and family. Transitioning care represents a process rather than a point in time and creating a time line may help to maintain organization. Include all needed services, providers of these services and requisite finances. Planning should occur in the outpatient setting, at a time of relatively stable health.
5. Apply guidelines that address health maintenance and preventive care to all patients. Patients with chronic conditions are at the greatest risk of negligence to their primary care needs including developmentally appropriate counseling, anticipatory guidance, attention to sexual health, and routine screening.
6. Ensure continuous and affordable health insurance coverage that appropriately compensates transition planning and care coordination. New insurance may be required at age 18, and pursuing guardianship may be necessary for patients with borderline to low intelligence to facilitate ongoing and unobstructed care.
7. Transitioning from pediatric-centered to adult-centered care may prove psychologically and emotionally challenging for patients, families, and providers. Fear of the unknown, insecurities about knowledge gaps, reluctance to leave, and upheaval in a family's way of life may all contribute. Maintaining family involvement while cultivating patient control through empowering them to achieve and maintain health (understanding implications of diagnoses, knowing medications and doses, learning how to fill prescriptions and schedule appointments) will help to make the transition a positive experience for everyone involved (Table 1).

Table 1
Transition Timeline for Adolescents
(Adapted from the Adolescent Health Transition Project, University of Washington)

All adolescents including those with special needs	Further considerations for adolescents with special needs
By age 12–16:	By age 12–16:
Build a trusting relationship	Assess teen's perception and knowledge of special needs and enhance understanding
Encourage and help teen to:	
Identify and build on strengths	Establish yourself as a resource and support that will persist throughout the transition of care
Develop stress management skills	
Develop own solutions to problems	
Build self-help and self-advocacy skills	Encourage and help teen to participate in relevant support groups and/or organizations, and sign up for Division of Developmental Disabilities (DDD), the earlier the better
Create and maintain medical record	
Identify role models and mentors	
Discuss relationships and sexuality	
Establish a written health care transition plan	Participate in IEP (if applicable)
	Participate in 504 meetings (if applicable)
	Develop transition plan from school to post-school option for teens on IEPs.
By age 16–18:	By age 16–18:
Encourage and help teen to:	Begin exploring health care financing options
Take responsibility for making and keeping medical appointments, filling prescriptions, and ordering supplies, etc.	Notify DVRS for adolescents with without IEPs by autumn of the year before they graduate
Begin exploring health care coverage that will be necessary after age 18	If appropriate, initiate guardianship procedures two months before the adolescent turns 18
Begin considering adult health care provider(s)	
Discuss career interests	Discuss those rights that will transfer to the adolescent upon reaching the "age of majority" (usually age 18)
Support interest in hobbies and leisure activities	
By age 18–21:	By age 18–21:
Encourage and help teen to:	Check eligibility for SSI prior to adolescent turning 18; finalize health coverage plan; investigate SSI Work Incentives, e.g., Plan for Achieving
Find work and volunteer activities.	

(continued)

Table 1 (Continued)

All adolescents including those with special needs	Further considerations for adolescents with special needs
Finalize transfer of medical care to adult provider	Self-Support (PASS); contact campus disabled student services to request accommodations (if attending college) If on an IEP, encourage young adult to stay in a school program until age 21 Notify DDD or DVRS for adult vocational services if not already done (and if appropriate)

REFERENCES AND ADDITIONAL READINGS

AAP/AAFP/ACP. A consensus statement on health care transitions for young adults with special health care needs. Pediatrics 2002; 110:1304–06

American Academy of Pediatrics. The national center of medical home initiatives for children with special needs. Available at: www.medicalhomeinfo.org

Peter NG, Forke CM, Ginsburg KR et al. Transition from pediatric to adult care: Internists' perspectives. Pediatrics 2009; 123:417–23.

Washington University. Adolescent health transition project. Available at: http://depts.washington.edu/healthtr/

Appendix

Blood Pressure Levels for Boys by Age and Height Percentile
Blood Pressure Levels for Girls by Age and Height Percentile
Life Style Questionnaire for adolescents with suspected eating disorders
MGHfC Eating Disorder Protocol
House Officers Guide to the Eating Disorder Protocol
Immunization Information
Organizations of importance for adolescent healthcare
Books of interest for adolescents and parents
Websites relevant to adolescent medical issues

Mark A. Goldstein (ed.), *The MassGeneral Hospital for Children Adolescent Medicine Handbook*, DOI 10.1007/978-1-4419-6845-6,

Blood Pressure Levels for Boys by Age and Height Percentile (From National Institutes of Health)

Age (Year)	BP Percentile	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		Percentile of height							Percentile of height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
11	50th	99	100	102	104	105	107	107	59	59	60	61	62	63	63
	90th	113	114	115	117	119	120	121	74	74	75	76	77	78	78
	95th	117	118	119	121	123	124	125	78	78	79	80	81	82	82
	99th	124	125	127	129	130	132	132	86	86	87	88	89	90	90
12	50th	101	102	104	106	108	109	110	59	60	61	62	63	63	64
	90th	115	116	118	120	121	123	123	74	75	75	76	77	78	79
	95th	119	120	122	123	125	127	127	78	79	80	81	82	82	83
	99th	126	127	129	131	133	134	135	86	87	88	89	90	90	91
13	50th	104	105	106	108	110	111	112	60	60	61	62	63	64	64
	90th	117	118	120	122	124	125	126	75	75	76	77	78	79	79
	95th	121	122	124	126	128	129	130	79	79	80	81	82	83	83
	99th	128	130	131	133	135	136	137	87	87	88	89	90	91	91
14	50th	106	107	109	111	113	114	115	60	61	62	63	64	65	65
	90th	120	121	123	125	126	128	128	75	76	77	78	79	79	80
	95th	124	125	127	128	130	132	132	80	80	81	82	83	84	84
	99th	131	132	134	136	138	139	140	87	88	89	90	91	92	92

15	50th	109	110	112	113	115	117	117	61	62	63	64	65	66	66
	90th	122	124	125	127	129	130	131	76	77	78	79	80	80	81
	95th	126	127	129	131	133	134	135	81	81	82	83	84	85	85
	99th	134	135	136	138	140	142	142	88	89	90	91	92	93	93
16	50th	111	112	114	116	118	119	120	63	63	64	65	66	67	67
	90th	125	126	128	130	131	133	134	78	78	79	80	81	82	82
	95th	129	130	132	134	135	137	137	82	83	83	84	85	86	87
	99th	136	137	139	141	143	144	145	90	90	91	92	93	94	94
17	50th	114	115	116	118	120	121	122	65	66	66	67	68	69	70
	90th	127	128	130	132	134	135	136	80	80	81	82	83	84	84
	95th	131	132	134	136	138	139	140	84	85	86	87	87	88	89
	99th	139	140	141	143	145	146	147	92	93	93	94	95	96	97

BP blood pressure

The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean

Blood Pressure Levels for Girls by Age and Height Percentile (From National Institutes of Health)

Age (Year)	BP Percentile	Systolic BP (mmHg) Percentile of height							Diastolic BP (mmHg) Percentile of height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
11	50th	100	101	102	103	105	106	107	60	60	60	61	62	63	63
	90th	114	114	116	117	118	119	120	74	74	74	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	78	79	80	81	81
	99th	125	125	126	128	129	130	131	85	85	86	87	87	88	89
12	50th	102	103	104	105	107	108	109	61	61	61	62	63	64	64
	90th	116	116	117	119	120	121	122	75	75	75	76	77	78	78
	95th	119	120	121	123	124	125	126	79	79	79	80	81	82	82
	99th	127	127	128	130	131	132	133	86	86	87	88	88	89	90
13	50th	104	105	106	107	109	110	110	62	62	62	63	64	65	65
	90th	117	118	119	121	122	123	124	76	76	76	77	78	79	79
	95th	121	122	123	124	126	127	128	80	80	80	81	82	83	83
	99th	128	129	130	132	133	134	135	87	87	88	89	89	90	91
14	50th	106	106	107	109	110	111	112	63	63	63	64	65	66	66
	90th	119	120	121	122	124	125	125	77	77	77	78	79	80	80
	95th	123	123	125	126	127	129	129	81	81	81	82	83	84	84
	99th	130	131	132	133	135	136	136	88	88	89	90	90	91	92

15	50th	107	108	109	110	111	113	113	64	64	64	65	66	67	67
	90th	120	121	122	123	125	126	127	78	78	78	79	80	81	81
	95th	124	125	126	127	129	130	131	82	82	82	83	84	85	85
	99th	131	132	133	134	136	137	138	89	89	90	91	91	92	93
16	50th	108	108	110	111	112	114	114	64	64	65	66	66	67	68
	90th	121	122	123	124	126	127	128	78	78	79	80	81	81	82
	95th	125	126	127	128	130	131	132	82	82	83	84	85	85	86
	99th	132	133	134	135	137	138	139	90	90	90	91	92	93	93
17	50th	108	109	110	111	113	114	115	64	65	65	66	67	67	68
	90th	122	122	123	125	126	127	128	78	79	79	80	81	81	82
	95th	125	126	127	129	130	131	132	82	83	83	84	85	85	86
	99th	133	133	134	136	137	138	139	90	90	91	91	92	93	93

BP blood pressure

The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean

Life Style Questionnaire

Division of Adolescent and Young Adult Medicine
Mass General Hospital for Children

Your Name: _____

Date: _____

Medical Doctor : _____

Nutritionist: _____

Mental Health Clinician(s): _____

I. Personal Health History
   A. Please list any major medical problems:
   _____
   _____
   B. Please list any medications you are currently taking:
   _____
   _____
   C. Please list any over the counter medications that you are currently taking:

II. Weight and Height History
   A. What is your present height? _____
   B. What is your present weight? _____
   C. What is your highest weight? _____
   D. When was your highest weight? _____
   E. What is your lowest weight? _____
   F. When was your lowest weight? _____
   G. What was your weight at the onset of the eating disorder? _____

Circle your answer to the following questions:

   H. Are you satisfied, dissatisfied, distressed with your current weight?
   I. Are you satisfied, dissatisfied, distressed with your current body shape?

J. Have you ever thought that you were too fat or in danger of getting too fat? Yes No

K. Do you feel that way now? Yes No

L. Do you enjoy losing weight or refusing food? Yes No

M. Have you ever been concerned that you are too thin? Yes No

N. How do you feel when you lose two pounds?

_____

O. How do you feel when you gain two pounds?

_____

P. At what weight would you like to be? _____

Q. How often do you weight yourself? _____

R. What percent of the day are your thoughts occupied with food, eating, body size or shape?

_____

III. Exercise History

A. Do you exercise regularly? Yes No

B. How frequently do you exercise?_____

C. If you exercise, what do you do? _____

D. How long are your workouts?_____

IV. Menstrual History (if applicable)

A. When was your very first menstrual period? _____

B. When was your last menstrual period? _____

C. How many menstrual periods have you had in the past 6 months? _____

V. Diet History

A. Do you restrict your calories? Yes No

How many calories do you eat in a day?_____

B. Do you restrict certain types of foods? If so, Do you skip meals? Yes No

Please list:_____

_____

C. Do you have problems controlling food intake? Yes No

D. Do you engage in any of the following behaviors (please circle)?

Vomiting	Yes	No
Spitting	Yes	No
Ruminating	Yes	No
Laxative use	Yes	No
Diuretic use	Yes	No
Diet pill use	Yes	No
Ipecac use	Yes	No

E. Please give a detail description of what you ate in the past 24 h:

_____

_____

_____

VI. Symptom Review

If you have experienced any of the following please circle:

1. Thinning hair
2. Diminished sleep
3. Sensitivity to cold
4. Shrinking muscle mass
5. Muscle cramping
6. Swollen glands in cheeks
7. Puffy face
8. Broken blood vessels under eyes
9. Weakness
10. Lightheadedness
11. Excessive thirst
12. Chronic sore throat
13. Slow heart beat
14. Rapid heart beat
15. Fat loss
16. Irregular heart beat
17. Diarrhea
18. Constipation
19. Stomach pain
20. Dry skin
21. Brittle nails
22. Problems with concentration
23. Depression
24. Anxiety
25. Loss of periods
26. Painful periods
27. Heavy periods
28. Anemia
29. Suicidal thoughts
30. Bone pain

MassGeneral Hospital for Children

Eating Disorder Protocol

We believe that an eating disorder protocol is an effective tool in helping the patient and family understand and comply with the treatment plan. However, we acknowledge that there is not a uniform treatment plan that is entirely effective for the treatment of patients with eating disorders.

You have been admitted to the pediatric inpatient unit at the Massachusetts General Hospital to assist in the treatment of an eating disorder. It is our goal to help you safely gain weight in a supportive environment and to assist you in addressing the complex issues involved with eating disorders. We hope to foster trust and open communications, a realistic body image, increased insight into food and eating behaviors, and adaptive coping skills for you and your family. It is very important that you have a thorough understanding of this protocol, so we encourage you to bring all questions and concerns promptly to the attention of your treatment team. The goals of your inpatient hospitalization are as follows:

- Correct your malnourished state in a slow and steady manner
- Promote weight gain
- Fix any disturbances in your body electrolytes, e.g., sodium, chloride, phosphorous, sugar
- Establish a normal pattern of bowel movements
- Prevent self-induced vomiting or other types of purging behaviors
- Increase your knowledge of your personal nutritional needs
- Teach you healthy eating behaviors
- Provide resources to help you address the complex emotional and family issues that are involved in eating disorders
- Support your continued physical and emotional development
- Arrange your follow up treatment after hospital discharge

We have carefully developed this protocol for the treatment of patients with eating disorders. As an individual, we respect your rights. But we have found that a standard protocol of care is very effective in preventing misunderstandings related to the treatment plan, providing consistency in your care during the hospitalization and making clear the treatment team's expectations of your behavior

and participation. In addition, this protocol provides you and your family with information on the role of each team member. This protocol is a general guideline that the treatment team will use to outline your specific treatment goals and care plan.

We approach your care with a multidisciplinary team, as there are a number of different team members who have specific areas of expertise that are used to plan your treatment. The team members are you, your parents, nurses, dietitians, physicians (pediatricians, adolescent medicine specialists, psychiatrists), social workers, and child life specialists. The team will meet regularly with you to discuss the plan of care and any changes in the plan that are needed based on your condition. All decisions will be made by the team to assist you and your family in meeting the goals of your hospitalization; your cooperation with the care plan is essential to your success. Team meetings are held shortly after your admission to the hospital and as often as necessary. You and your family are always encouraged to discuss any questions or concerns with members of the team. To encourage communications, we may invite you and your family to attend some of these team meetings.

Patient's Role

Your role is the most important of all the team. The team expects that you will share what is bothering you by open and honest communication with team members. We anticipate that our interactions with you will encourage and foster this approach. We expect you to participate actively in your care and to offer suggestions to the team about your treatment plan. Our expectations for you include:

- Reviewing the eating disorder protocol and signing the treatment contract
- Giving truthful information
- Sharing questions and concerns with the team members
- Completing your menu by 11:00 am each day
- Maintaining scheduled meetings with team members
- Adhering to the guidelines of the treatment plan and taking an active role in your treatment plan

Parent's Role

We understand there are many factors that can cause an eating disorder. Our intent is not to place blame on anyone. Rather, our goal is to

help the patient and family. Throughout the child's life, parents play a primary role. They assume the major responsibility for the child's care. The team is here to support and nurture that role. We want to build on your family's unique strengths and on the individual strengths of each family member. The treatment team recognizes that there is no single approach that is correct for all families, but over the years, this protocol has been ascertained to be an effective tool. The partnership between family members and professional staff is based on cooperation, respect, and the mutual goal of doing the best for the children in their care. The parent's role will include:

- Reviewing the eating disorder protocol and signing the treatment contract
- Maintaining an open and honest communication with the treatment team
- Assisting with the patient's medical history
- Attending meetings with the social worker, psychiatrist, and other team members
- Respecting the treatment plan
- Maintaining the visitation plan and checking in at the nursing station with your child's nurse prior to visiting your child

Nurse's Role

The registered nurse caring for you is a graduate of a nursing program who is trained and skilled in caring for children and adolescents with eating disorders. The nurse's role includes the following:

- Practicing primary nursing and accordingly a few nurses will play a key role in your care
- Obtaining a nursing assessment within 24 h of your admission
- Orienting you and your family to the unit and your room
- Reviewing the Eating Disorder protocol along with a physician with you and your family
- Checking your room and your personal effects daily to be sure there are no beverages, food or other prohibited items
- Coordinating your daily activities according to your predetermined schedule
- Answering your questions and acting as a liaison between you and other members of your team

Patient Care Associate's (PCA) Role

The PCA has training and certification as a Patient Care Associate. The role of the PCA includes the following:

- Working very closely with your nurse
- Taking your vital signs before you get out of bed and helping you to use a commode
- Obtaining your morning weight if not done by your nurse
- Setting up your bedside bath
- Answering questions is not part of the PCA role

Physician's Role

The attending physician, a pediatrician or adolescent medicine specialist, is responsible for and in charge of your overall care. This physician works with other team members, resident physicians in training as well as medical students to ensure you have appropriate high quality medical care while in the hospital. You will interact most frequently with resident physicians who will take an active role in your care. The roles of the physicians include the following:

- Performing an admission history and physical examination
- Writing orders for medications, intravenous fluids, monitoring, laboratory work, consultations, and your activity levels
- Rounding each day where they will examine you, discuss their findings, talk with you about the care plan, and answer your questions
- Responding to any medical issues that occur during the hospitalization
- Working with the other team members to ensure optimal care
- Reviewing your progress with you and your family, and collaborating with other team members to develop a treatment plan after you leave the hospital

The following is an explanation of the physicians' titles and roles:

- Resident Physicians (also known as House Officers): Residents are doctors who have graduated from medical school and are training in pediatrics. There is always at least one team of an intern and a senior resident in the hospital 24-h a day, who are available to address any questions or concerns. There is often a medical student working with the resident physicians.

  - Intern: A first year resident who will examine you every day and is usually the first person called with any questions or concerns.
  - Senior Resident: A third year resident who will oversee and help the intern with your care.
- Attending Physician: The supervising doctor who leads the team of doctors involved in your care. The attending will either be from your primary physician's office, a hospital-based physician (Hospitalist), or a sub-specialist physician.
- Consulting Physician: A physician with expertise in a particular subspecialty whom the team may ask to help them with the treatment plan. The consulting physician may make recommendations, but it is the attending physician who ultimately decides on the final treatment plan. Occasionally, consulting physician's work with a "fellow," who is a doctor ho has completed residency and is obtaining further training within that subspecialty.

Psychiatrist's Role

Your psychiatrist is a physician who has special training in the treatment of illnesses such as depression, anxiety, and eating disorders. He or she works closely with an attending child and adolescent psychiatrist. Your psychiatrist will meet with you and your parents to help better understand the factors that contribute to the development of the eating disorder. Your psychiatrist will:

- Meet with you for an in-depth interview to fully assess your current function and safety status. Sometimes, patients have problems with anxiety, depression, and/or substance abuse in addition to the eating disorder. It is important to identify these issues so that they can be appropriately addressed. Some patients need direct observation during hospitalization, and the psychiatrist will help determine whether this is necessary.
- Determine whether there is a role for psychiatric medication in your treatment. Any decision to start medication will involve you, your parents, and the treatment team.
- Talk with you for 10–15 min each day, Monday through Friday, to discuss your feelings about your medical treatment and your hospitalization. Your psychiatrist will set aside a longer period of time (30–50 min) twice per week to more

fully discuss your feelings about treatment as well as the factors that contributed to your hospitalization*
- Work closely with the other members of the treatment team to define treatment goals and help plan the course of your treatment after you leave the hospital.
- Provide consultation to the pediatric team after hours if needed.
- Discuss privileges with you and how you can gain them during your hospital stay

Dietitian's Role

A registered dietitian is a health care professional with a scientific background in food, nutrition, and metabolism, who applies this knowledge to promoting health, preventing disease, and providing counseling and education. The dietician is responsible for helping you choose foods that will restore your weight in a safe way. You will meet with the dietitian daily throughout your hospitalization to plan meals and snacks, and to learn more about nutrition in general. In addition, the dietician will assist you in the following:

- Meet with you daily to plan meals and snacks, and teach you about healthy eating
- Familiarize herself with your eating pattern and your food likes and dislikes
- Develop and adjust the amount of calories you need daily for appropriate weight gain
- Follow your blood work, vital signs and weight to see how your body is responding to the meals and adjust your daily meal plan based on the response
- Help you design a meal plan for weight stabilization when you are ready to leave the hospital

Social Worker's Role

Clinical social workers are licensed mental health professionals who are trained to help people find solutions to many problems from daily issues to life's most difficult situations. This is accomplished through a combination of counseling and direct connection with the network of hospital and community resources. Clinical social workers work with both inpatients and outpatients, and help patients and families to:

- Deal with crisis
- Cope with illness and life stressors

- Identify and solve problems with relationship
- Enhance communication with the medical treatment team to enable patients and families to be active partners in their own healthcare
- Access hospital and community resources

As part of this admission for an eating disorder, the social worker will be involved daily as part of the multidisciplinary team. Social worker duties include the following:

- Help you and your family cope with the feelings that come up for you during this hospitalization. Patients and families often experience a variety of emotions resulting from an admission for an eating disorder. It is important to try to understand these emotions and how they impact you, your family, and the course of your treatment.
- Meet to talk with you and in a more extensive way with your family throughout this admission
- Gather information about how your illness started and how it has progressed in order to assist your family in helping you to get better
- Assist you and your family, along with other members of your team, with aftercare planning and in obtaining any necessary resources

Child Life Specialist's Role

The child life specialist is a member of the health care team who is certified in the assessment and treatment of the developmental, emotional, and psychosocial issues of children and adolescents. Child life specialists have either a bachelor's degree or master's degree in the field of child life and family centered care. Their duties include the following:

- Provide emotional and social support to you and your family during your hospitalization
- Offer diversional materials to you while on bed rest (i.e., DVDs, books, crafts, games, music, video games)
- Arrange daily scheduled visits from volunteers, child life students, and/or child life specialists
- Help with creating a general, daily schedule (following the guidelines of the protocol)
- Assist in brainstorming ideas for your privilege list (must be approved by the team)

- Facilitate the transition from home to hospital to be as easy and comfortable as possible

Inpatient Eating Disorder Treatment Guidelines

The use of a protocol in your treatment helps prevent any confusion or misunderstanding. The following information is intended to provide you with an overview of the treatment plan; they are the guidelines of your care. As each individual is unique, modifications in the treatment plan may be made to keep you safe, and to help you and your family meet the goals of treatment.

Privileges: Based on your adherence with this treatment plan, your clinical status and your ability to meet daily weight gain goals, you will be granted certain unit activities. Privileges are earned and they may be withdrawn if you fail to comply with the treatment plan or if you are not gaining weight. Privileges include, but are not limited to:

- Extended visits for immediate family (mother, father, and siblings)
- Bathroom privileges
- Visitors outside of immediate family
- Increased use of the hospital telephone (up to 1 h three times daily)
- Ward privileges: being able to walk on the unit (only if the team deems that this is medically safe and appropriate)
- Off unit privileges (such as visits to the hospital store or chapel and only if the team deems that this is medically safe and appropriate)
- Internet access for 1 h per day (we expect that patients will only access appropriate sites, and Internet use may be monitored/supervised)

You and your psychiatrist will come up with a list of specific, approved privileges. The team will also have input into whether your list is appropriate. If you attain your weight goal for the day, you will earn the next privilege on your list. If you fail to meet your weight goal for the day but do not lose weight, you will neither earn nor lose privileges. If you lose weight, you will lose the most recently granted privilege on your list. In addition to your individual privileges, there are specific guidelines that must be followed.

Vital signs: Your vital signs including blood pressure, pulse, and temperature will be taken every morning before your weight is checked; if they fall below the certain parameters, you will be placed on bed rest. This means that you may not get out of bed for any reason. This is not a punishment; rather it is for your protection – your vital signs tell us how hard your heart is working and bed rest may be needed to prevent further stress to it. Your vital signs will then be taken every 4 h or even more frequently until they are determined to be within a normal range.

Weight: You will be weighed every morning after your vital signs and you have voided. You will be weighed with a hospital "Johnny" and underpants only and with your back to the scale. The treatment team will determine which weight, after your hospital admission, will be used as a baseline for establishing future privileges. If your weight is not increased by 0.2 kg (approximately 1/2 lb) daily, a supplement will be given. Your body needs daily requirements to function at a baseline level; by not gaining weight you put too much stress on your system to function properly.

Nutrition: The 24 h meal pattern in the treatment protocol is dinner-breakfast-lunch (and up to three snacks daily). Your treatment protocol will begin with dinner on the first night of your admission. You will be served your meal tray alone in your room unless you require direct observation while eating by the nursing staff. You are required to receive a tray for every meal.

Menu Guidelines:

- You are allowed to choose five food items from the menu that you will never have to eat. These five foods must be separate menu items. Whole food groups will not be accepted.
- No "light" or "diet" foods or drinks will be allowed.
- You will not be allowed to drink water even with medications.
- No food is allowed in the room except at meal and snack times.
- You must complete your menu by 11 am each day. The dietitian will pick up the menu after this and make changes as needed. There is no negotiation to these changes.
- Once the menu has been turned in, no substitutions are allowed.

Mealtime Guidelines:

- Initially you may be restricted to only the meals and snacks on your predetermined meal plan. As you stabilize, you will be allowed to eat above and beyond your meal plan if you so desire, but those foods will not be included in the daily goal, and cannot be used in place of predetermined meals and snacks.
- Only food provided by the MGH Department of Nutrition and Food Services will be included in your daily calorie goal.
- You must consume 100% of each meal and snack.
- The Nutrition Service Coordinator will leave the tray outside the room, and the nurse will check the tray before you receive it to be sure all of the menu items are accurate and complete.
- You will have 30 min to consume each meal, and 15 min to consume each snack.
- You must remain on bed rest for 1 h after each meal and 30 min after each snack.
- No visitors or phone calls are allowed during meal/snack times. Supplement Guidelines:
- If you do not meet the weight gain goal of 0.2 kg (1/2 lb) per day you will be required to drink a Boost™ or Ensure™ supplement in the morning before breakfast.
- At the end of each 24-h meal and snack period, the dietitian will add up the total calories you have not consumed from your meals and snacks (if any), and you will be required to make up those calories with an Ensure™ or Boost™ supplement.
- You will have 15 min to consume each supplement (if needed). If the supplement cannot be consumed in that time, a tube will be placed through your nose into your stomach, and the supplement will be administered through that tube.
- You must remain on bed rest for 30 min after each supplement.

Hospital Procedure:

Rules

- Personal computers are not allowed
- Food and fluids may not be kept in your room
- Cell phones are not allowed
- Curtains must be open unless the patient is using the bathroom

- Parents must check in at the nurses' station with their child's nurse prior to visiting the patient
- Patient may only use the hospital telephone when specifically allowed to do so
- Exercise is not permitted
- Patient may have only one large duffel bag or suitcase of personal items including clothing that is to be unpacked and then the bag or suitcase is to be taken home

You will be placed on bed rest on admission for at least the first 24 h while your physical status is being evaluated. It may be unsafe for you to be out of bed at this time due to the stress your disease may have placed on your body. Your activity status will be a team decision. Exercise is not permitted. You must observe scheduled bed rest times following meals and supplements. If you are on bed rest, meetings and any other activities will take place in your room. When not on bed rest you are encouraged to dress in your own clothes and participate in activities in the recreation room.

While on bed rest you will use a bedpan or a commode chair at the bedside. Your nurse must be called, and he/she will provide you with the bedpan or commode chair. The curtain to your room will be drawn but the nurse will remain in the room until you are finished. The amount of urine you produce and your stool will be monitored.

You will not be allowed to use the bathroom until this privilege is obtained. Bathroom privileges will not be granted until it is determined that it is safe for you to be in the bathroom unsupervised. You will be provided with a washbasin until bathroom privileges are obtained. You may use your own hygiene products.

Visitors are not allowed during meal times, supplement times, rest periods, or during scheduled meeting times with the team members. Initially only immediate family members are allowed to visit. This includes parents or guardians and brothers and sisters only. Visits with the family will take place during hospital visiting hours. Each visit may not exceed 1 h per day. Additional visitors are a privilege that must be contracted with the team. Phone calls are not allowed during mealtimes. Phone use is one half hour three times a day and must not interfere with your treatment plan.

Complete compliance with this treatment plan is mandatory and necessary for effective treatment during your hospitalization. Noncompliance, lying, and manipulative behavior will not be tolerated. These types of behavior will be confronted and documented in

your patient record. At team meetings your progress will be discussed. Your capability to be an active and cooperative participant in your treatment and your commitment to recovery will determine the treatment plan and be a major determinant of your future treatment once medical complications have been treated.

Eating Disorder Protocol Contract

Our eating disorder protocol is comprehensive and multidisciplinary. We feel that it is very important for everyone involved to have clearly defined roles and expectations in order to be most helpful to you and your family. For this reason, we ask that you read the protocol carefully and encourage you to ask the team for clarification if there are questions about the material. We will then ask you and your team to sign the following contract indicating your understanding of the protocol and your willingness to do the best you can to follow the expectations.

MassGeneral Hospital for Children Eating Disorder Protocol Contract: I have read the MassGeneral Hospital for Children Eating Disorder Protocol, I understand the expectations for my role in the treatment team, and I agree to fulfill those expectations to the best of my ability.

Patient	Date
Parent	Date
Pediatric/Adolescent Medicine Attending Physician	Date
Child and Adolescent Psychiatry Fellow	Date
Dietitian	Date
Social Worker	Date
Child Life Specialist	Date
Nurse	Date

HOUSE OFFICERS GUIDE TO THE MASSGENERAL HOSPITAL FOR CHILDREN

Eating Disorder Protocol

The primary goal of the MGH admission is to medically stabilize the patient, rule out other psychiatric comorbidities, improve nutrition, and arrange for comprehensive mental health, medical, and nutritional services in another setting.

No protocol can perfectly fit the presentation and needs of every patient with an eating disorder. An element of flexibility must be built into the protocol. It is vitally important that protocol changes in respect to a particular patient be approved by the attending.

The protocol should be reviewed with the patient (and family if possible) by a house officer and a nurse. If you are not sure how to interpret the protocol, ask a committee member or the attending.

Privileges:

Psychiatry and the patient will come up with a list of privileges. Some are inactive such as Internet use, and some are active some as showering. For active privileges, vital signs must be reviewed before they can be granted. We have found that orthostatic changes in pulse (>20 beats) may not stop for weeks even when the patient has had good nutritional rehabilitation. We ask that bradycardia (<50 beats per minute during the day or <40 beats during sleep) over the previous 24 h, more than 20 mmHg decrease in either the systolic or diastolic pressures during orthostatics, hypotension (<90/60 over the past 24 h), and hypothermia (<97.0°F) be the medical criteria used to establish if a patient may gain an active privilege.

Some eating disordered athletes normally have a resting pulse below 50; if so, discuss with the attending as how to proceed.

Weight:

The baseline weight is best determined 18–24 h after cessation of intravenous replacement fluids otherwise the weight may be inappropriately high. The patient needs to gain 0.2 kg every day to obtain a privilege; otherwise, privilege is not given and a supplement is given. Patients often lose weight for a few days before they start gaining.

Bed Rest:

All new eating disorder admissions go on bed rest automatically for at least the first 24 h. This means staying in bed except to use the bedside commode. Bed rest may be discontinued after the first 24 h if the patient has stable vital signs (no hypotension, no orthostatic changes in blood pressure, no hypothermia, and no bradycardia (see definitions above).

Nutrition:

If the dietitian is not available when the patient is admitted, please select an initial diet with a calorie count based on the following: approximate calories patient took in during the previous 24 h plus 250. We hope, in this situation, to start at least at 1250 calories. This will be adjusted once nutrition consults. Starting too high can cause the patient to have gastrointestinal and mental distress.

Once a patient is determined to be stable, she will be able to eat foods above and beyond the meal plan; only foods above and beyond the meal plan can be brought in from the outside. Only foods provided by the MGH Department of Nutrition are included in the patient's daily calorie count. Visitors and phone calls are not allowed during meals; phone calls are allowed during bed rest after meal. This can be modified if phone calls are causing problems with patient benefiting or abiding by the treatment plan.

Sitters are generally not required during meals and rest periods. However, if there are concerns such as purging or self harm, then a sitter should be considered.

Rules (not all are listed here):

- Personal computers are not allowed. There may be material on a patient's personal computer that could interfere with care.
- Exercise is not permitted. This includes exercise in bed.
- No suitcases or bags are allowed to stay with the patient. Some patients have been found to have contraband stored in suitcases.
- A patient on bed rest may attend meetings (such as family meetings) in a wheelchair.

Patients with anorexia have a medical and mental health illness. Anorexia has the highest fatality rate of any mental health diagnosis.

Often patients and their parents are in states of denial and guilt. Due to their illness, patients are not able to fully understand the seriousness of their condition. Accordingly, cooperation does not necessarily occur. In addition, patients frequently try to disrupt teamwork by overt or covert actions and behaviors. Although steady weight gain is a goal during the hospitalization, major work on the mental health issues needs to be done by the patient and the family for full patient recovery. This work must be done elsewhere and over an extended period of time. This often requires 24 h residential care, followed by a partial day program, then an evening program followed by frequent visits to a therapist, family therapist, physician, and nutritionist. The process ordinarily takes several years and there are relapses.

Sample Anorexia Orders:

Medications:

1. IV fluids (if needed); if not consider heplock
2. Neutra-Phos™ one packet (phosphorus 250 mg, potassium 7.1 mEq, sodium 7.1 mEq) p.o. two times a day (if needed) to prevent/treat hypophosphatemia.
3. One multivitamin tablet with zinc (15 mg) orally each day
4. Calcium 1200 mg daily orally.

Vital Signs:

1. Heart rate, blood pressure, respiratory rate, and temperature every 4 h
2. Orthostatic vital signs every am. Bed rest for systolic blood pressure change of 20 or more mmHg or diastolic blood pressure change of 20 mmHg
3. If the patient is on bed rest for low vital signs, keep the cardiac monitor on. Bed rest for systolic blood pressure less than or equal to 90, heart rate less than or equal to 50 or temperature less than 97°F.
4. Cardiac monitor with sleep
5. Admission weight and height
6. Baseline weight on am after admission or 24 h after final administration of intravenous fluids
7. Daily weights, post void, in a Johnny and underwear, back to scale

Activity Levels:

1. Best rest for the first 24 h; patient may use commode only.
2. Bed rest 1 h after meals and 30 min after supplements
3. Progress activity per protocol

Diet:

1. Dietitian consult
2. If dietitian is not available, begin calories 250 greater than recent daily intake
3. Purging precautions if necessary (remove wastebaskets from room and bags away from bed area; lock bathroom for 2 h after meals and ½ hour after snacks. Patient will need to be on bed rest for 2 h after meals).
4. Establish limit of total daily oral fluids with dietitian

Laboratory Tests on Admission:

1. CBC, diff, sedimentation rate
2. Comprehensive chemistry panel (follow K, Phos, Bicarb carefully)
3. Amylase (high in vomiting), lipase (rule out pancreatitis), g, phosphorous, ferritin, Fe, TIBC
4. HCG, TSH
5. EKG (check QTc, rate, rhythm)

Daily Labs:

1. Urine specific gravity with every am void (beware of dilute urine from water loading)
2. Electrolytes, phosphorous, Mg

Consults:

1. Child psychiatry
2. Social Service
3. Dietitian

Other Orders:

1. House officer and nurse to review ED protocol with patient and family
2. Notify attending physician of the admission
3. Rule out celiac disease if not done previously

Immunization Information

The Recommended Immunization Schedules for Persons Aged 0 Through 18 Years are approved by the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/recs/acip), the American Academy of Pediatrics (http://www.aap.org), and the American Academy of Family Physicians (http://www.aafp.org).
Department of Health and Human Services • Centers for Disease Control and Prevention
Recommended Immunization Schedule for Persons Aged 7 Through 18 Years—United States • 2010
This schedule includes recommendations in effect as of December 15, 2009. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Considerations should include provider assessment, patient preference, and the potential for adverse events. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations: http://www.cdc.gov/vaccines/pubs/acip-list.htm. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS) at http://www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap). (Minimum age: 10 years for Boostrix and 11 years for Adacel)
   - Administer at age 11 or 12 years for those who have completed the recommended childhood DTP/DTaP vaccination series and have not received a tetanus and diphtheria toxoid (Td) booster dose.
   - Persons aged 13 through 18 years who have not received Tdap should receive a dose.
   - A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose; however, a shorter interval may be used if pertussis immunity is needed.

2. Human papillomavirus vaccine (HPV). (Minimum age: 9 years)
   - Two HPV vaccines are licensed: a quadrivalent vaccine (HPV4) for the prevention of cervical, vaginal and vulvar cancers (in females), and genital warts (in females and males), and a bivalent vaccine (HPV2) for the prevention of cervical cancers in females.

- HPV vaccines are most effective for both males and females when given before exposure to HPV through sexual contact.
- HPV4 or HPV2 is recommended for the prevention of cervical precancers and cancers in females.
- HPV4 is recommended for the prevention of cervical, vaginal and vulvar precancers and cancers and genital warts in females.
- Administer the first dose to females at age 11 or 12 years.
- Administer the second dose 1–2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
- Administer the series to females at age 13 through 18 years if not previously vaccinated.
- HPV4 may be administered in a 3-dose series to males aged 9 through 18 years to reduce their likelihood of acquiring genital warts.

3. Meningococcal conjugate vaccine (MCV4).
   - Administer at age 11 or 12 years, or at age 13 through 18 years if not previously vaccinated.
   - Administer to previously unvaccinated college freshmen living in a dormitory.
   - Administer MCV4 to children aged 2 through 10 years with persistent complement component deficiency, anatomic or functional asplenia, or certain other conditions placing them at high risk.
   - Administer to children previously vaccinated with MCV4 or MPSV4 who remain at increased risk after 3 years (if first dose administered at age 2 through 6 years) or after 5 years (if first dose administered at age 7 years or older). Persons whose only risk factor is living in on-campus housing are not recommended to receive an additional dose. See MMWR 2009;58:1042–3.

4. Influenza vaccine (seasonal).
   - Administer annually to children aged 6 months through 18 years.
   - For healthy nonpregnant persons aged 7 through 18 years (i.e., those who do not have underlying medical conditions that predispose them to influenza complications), either LAIV or TIV may be used.
   - Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine

for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.
- For recommendations for use of influenza A (H1N1) 2009 monovalent vaccine. See MMWR 2009;58(No. RR-10).

5. Pneumococcal polysaccharide vaccine (PPSV).
   - Administer to children with certain underlying medical conditions, including a cochlear implant. A single revaccination should be administered after 5 years to children with functional or anatomic asplenia or an immunocompromising condition. See MMWR 1997;46(No. RR-8).

6. Hepatitis A vaccine (HepA).
   - Administer 2 doses at least 6 months apart.
   - HepA is recommended for children aged older than 23 months who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.

7. Hepatitis B vaccine (HepB).
   - Administer the 3-dose series to those not previously vaccinated.
   - A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB is licensed for children aged 11 through 15 years.

8. Inactivated poliovirus vaccine (IPV).
   - The final dose in the series should be administered on or after the fourth birthday and at least 6 months following the previous dose.
   - If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.

9. Measles, mumps, and rubella vaccine (MMR).
   - If not previously vaccinated, administer 2 doses or the second dose for those who have received only 1 dose, with at least 28 days between doses.

10. Varicella vaccine.
    - For persons aged 7 through 18 years without evidence of immunity (see MMWR 2007;56[No. RR-4]), administer 2 doses if not previously vaccinated or the second dose if only 1 dose has been administered.

- For persons aged 7 through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
- For persons aged 13 years and older, the minimum interval between doses is 28 days.

Organizations of Importance for Healthcare of Adolescents

American Academy of Child & Adolescent Psychiatry
3615 Wisconsin Avenue N.W.
Washington, D.C. 20016-3007
http://www.aacap.org/

American College of Sports Medicine
401 West Michigan Street
Indianapolis, IN 46202-3233
http://acsm.org

American Psychological Association
750 First Street N.E., #605
Washington, DC 20002
http://www.apa.org/

Harris Center for Education and Advocacy in Eating Disorders at Massachusetts General Hospital
2 Longfellow Place
Suite 200
Boston, MA 02114
http://www.harriscentermgh.org/

Society for Adolescent Health and Medicine
111 Deer Lake Road
Suite 100
Deerfield, IL 60015
http://www.adolescenthealth.org

Section on Adolescent Health
American Academy of Pediatrics
141 Northwest Point Blvd
Elk Grove Village, IL 60007
http://www.aap.org

Center for Adolescent Health & the Law (An organization promoting the health of adolescents and their access to comprehensive health care)
310 Kildaire Road
Suite 100
Chapel Hill, North Carolina 27516-4407
http://www.cahl.org

National Eating Disorders Association
603 Stewart Street
Suite 803
Seattle, Washington 98101
http://www.nationaleatingdisorders.org

The North American Society for Pediatric and Adolescent Gynecology
409 12th Street S.W.
Washington, D.C. 20024
http://www.naspag.org

BOOKS OF INTEREST FOR ADOLESCENTS AND PARENTS

Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Clinicians. Eric P. Hazen, Mark A. Goldstein, Myrna Chandler Goldstein, Rutgers University Press, 2010.

How to Talk So Teens Will Listen and Listen So Teens Will Talk. Adele Faber and Elaine Mazlish, William Morrow, 2005.

Yes, Your Teen is Crazy: Loving Your Kid without Losing Your Mind. Michael J. Bradley, Harbor Press, 2003.

Your Adolescent: Emotional, Behavioral, and Emotional Development from Early Adolescence through the Teen Years. David B. Pruitt, American Academy of Child & Adolescent Psychiatry, 1999.

Boys into Men: Staying Healthy Through the Teen Years. Mark A. Goldstein M.D. and Myrna Chandler Goldstein, the Greenwood Press, 2000.

Straight Talk about Psychiatric Medications for Kids. Timothy E. Wilens M.D., the Guilford Press, 2009.

A Parent's Guide to Building Resilience in Children and Teens: Giving Your Child Roots and Wings. Kenneth R. Ginsburg, American Academy of Pediatrics, 2007.

When Nothing Matters Anymore: A Survival Guide for Depressed Teens. Bev Cobain R.N. C., Free Spirit Publishing, 2006.

How to Raise a Drug-Free Kid: the Straight Dope for Parents. Joseph A. Califano, Fireside, 2009.

Unlocking the Mysteries of Eating Disorders. David B. Herzog M.D., Debra L. Franko Ph.D. and Pat Cable R.N., McGraw-Hill, 2007.

Just Kidding. Trudy Ludwig, Tricycle Press, 2006. (Bullying issues)

The Bully, the Bullied and the Bystander: From Preschool to High School-How Parents and Teachers Can Break the Cycle of Violence. Barbara Coloroso, Collins Living, 2004.

Adolescent Encounters with Death, Bereavement, and Coping. David Balk PhD, Charles Coor Ph.D., Springer Publishing Company, 2009.

Eight Stories Up: An Adolescent Chooses Hope Over Suicide. DeQuincy Lezine and David Brent. Oxford University Press, 2008.

Adolescents On The Autism Spectrum: A Parent's Guide to the Cognitive, Social, Physical, and Transition Needs of Teenagers with Autism Spectrum Disorders. Chantal Sicile-Kira and Temple Grandin., Perigree Trade, 2006.

Thinking In Pictures, Expanded Edition: My Life With Autism. Temple Grandin, Vintage, 2006.

WEBSITES RELEVANT FOR ADOLESCENT MEDICINE ISSUES

Pediatric Symptom Checklist (screening tools for emotional and behavioral problems in children and adolescents). This one to be completed by parent: http://www2.massgeneral.org/allpsych/pediatricsymptomchecklist/psc_english.pdf http://www2.massgeneral.org/allpsych/pediatricsymptomchecklist/psc_spanish.pdf

Pediatric Symptom Checklist: This one to be completed by Youth: http://www2.massgeneral.org/allpsych/pediatricsymptomchecklist/psc_english_y.pdf http://www2.massgeneral.org/allpsych/pediatricsymptomchecklist/psc_spanish_y.pdf

Antidepressant Medications for Children and Adolescents: http://www.nimh.nih.gov/health/topics/child-and-adolescent-mental-health/antidepressant-medications-for-children-and-adolescents-information-for-parents-and-caregivers.shtml
National Institute on Drug Abuse: www.nida.nih.gov
Connor's rating scales for ADHD: www.modern-psychiatry.com/rating_scale1.htm
Center for Disease Control and Prevention Growth Charts: http://www.cdc.gov/growthcharts/charts.htm
Adolescent Immunizations: http://www.cdc.gov/vaccines/spec-grps/preteens-adol.htm
Recommendations for HIV testing in adolescents: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm
Adolescent Injuries: http://www.cdc.gov/ncipc/factsheets/children.htm