

THE OFFICIALPATIENT'S  
SOURCEBOOK

*on*

ARTHRITIS OF  
THE KNEE



JAMES N. PARKER, M.D.  
AND PHILIP M. PARKER, PH.D., EDITORS

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ICON Health Publications  
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## Dedication

To the healthcare professionals dedicating their time and efforts to the study of arthritis of the knee.

## Acknowledgements

The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this sourcebook which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which directly or indirectly are dedicated to arthritis of the knee. All of the *Official Patient's Sourcebooks* draw from various agencies and institutions associated with the United States Department of Health and Human Services, and in particular, the Office of the Secretary of Health and Human Services (OS), the Administration for Children and Families (ACF), the Administration on Aging (AOA), the Agency for Healthcare Research and Quality (AHRQ), the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Healthcare Financing Administration (HCFA), the Health Resources and Services Administration (HRSA), the Indian Health Service (IHS), the institutions of the National Institutes of Health (NIH), the Program Support Center (PSC), and the Substance Abuse and Mental Health Services Administration (SAMHSA). In addition to these sources, information gathered from the National Library of Medicine, the United States Patent Office, the European Union, and their related organizations has been invaluable in the creation of this sourcebook. Some of the work represented was financially supported by the Research and Development Committee at INSEAD. This support is gratefully acknowledged. Finally, special thanks are owed to Tiffany LaRochelle for her excellent editorial support.

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- The Official Patient's Sourcebook on Arthritis of the Shoulder
- The Official Patient's Sourcebook on Chondromalacia
- The Official Patient's Sourcebook on Fibromyalgia
- The Official Patient's Sourcebook on Gout
- The Official Patient's Sourcebook on Iliotibial Band Syndrome
- The Official Patient's Sourcebook on Injuries to the Meniscus
- The Official Patient's Sourcebook on Juvenile Rheumatoid Arthritis
- The Official Patient's Sourcebook on Knee Ligament Injuries
- The Official Patient's Sourcebook on Knee Sprains and Strains
- The Official Patient's Sourcebook on Knee Tendinitis and Ruptured Tendons
- The Official Patient's Sourcebook on Lupus
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- The Official Patient's Sourcebook on Reiter's Syndrome
- The Official Patient's Sourcebook on Rheumatoid Arthritis

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## INTRODUCTION

### Overview

Dr. C. Everett Koop, former U.S. Surgeon General, once said, “The best prescription is knowledge.”<sup>1</sup> The Agency for Healthcare Research and Quality (AHRQ) of the National Institutes of Health (NIH) echoes this view and recommends that every patient incorporate education into the treatment process. According to the AHRQ:

Finding out more about your condition is a good place to start. By contacting groups that support your condition, visiting your local library, and searching on the Internet, you can find good information to help guide your treatment decisions. Some information may be hard to find – especially if you don't know where to look.<sup>2</sup>

As the AHRQ mentions, finding the right information is not an obvious task. Though many physicians and public officials had thought that the emergence of the Internet would do much to assist patients in obtaining reliable information, in March 2001 the National Institutes of Health issued the following warning:

The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading.<sup>3</sup>

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<sup>1</sup> Quotation from <http://www.drkoop.com>.

<sup>2</sup> The Agency for Healthcare Research and Quality (AHRQ):  
<http://www.ahrq.gov/consumer/diainfo.htm>.

<sup>3</sup> From the NIH, National Cancer Institute (NCI):  
<http://cancertrials.nci.nih.gov/beyond/evaluating.html>.

Since the late 1990s, physicians have seen a general increase in patient Internet usage rates. Patients frequently enter their doctor's offices with printed Web pages of home remedies in the guise of latest medical research. This scenario is so common that doctors often spend more time dispelling misleading information than guiding patients through sound therapies. *The Official Patient's Sourcebook on Arthritis of the Knee* has been created for patients who have decided to make education and research an integral part of the treatment process. The pages that follow will tell you where and how to look for information covering virtually all topics related to arthritis of the knee, from the essentials to the most advanced areas of research.

The title of this book includes the word "official." This reflects the fact that the sourcebook draws from public, academic, government, and peer-reviewed research. Selected readings from various agencies are reproduced to give you some of the latest official information available to date on arthritis of the knee.

Given patients' increasing sophistication in using the Internet, abundant references to reliable Internet-based resources are provided throughout this sourcebook. Where possible, guidance is provided on how to obtain free-of-charge, primary research results as well as more detailed information via the Internet. E-book and electronic versions of this sourcebook are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). Hard copy users of this sourcebook can type cited Web addresses directly into their browsers to obtain access to the corresponding sites. Since we are working with ICON Health Publications, hard copy *Sourcebooks* are frequently updated and printed on demand to ensure that the information provided is current.

In addition to extensive references accessible via the Internet, every chapter presents a "Vocabulary Builder." Many health guides offer glossaries of technical or uncommon terms in an appendix. In editing this sourcebook, we have decided to place a smaller glossary within each chapter that covers terms used in that chapter. Given the technical nature of some chapters, you may need to revisit many sections. Building one's vocabulary of medical terms in such a gradual manner has been shown to improve the learning process.

We must emphasize that no sourcebook on arthritis of the knee should affirm that a specific diagnostic procedure or treatment discussed in a research study, patent, or doctoral dissertation is "correct" or your best option. This sourcebook is no exception. Each patient is unique. Deciding on

appropriate options is always up to the patient in consultation with their physician and healthcare providers.

## Organization

This sourcebook is organized into three parts. Part I explores basic techniques to researching arthritis of the knee (e.g. finding guidelines on diagnosis, treatments, and prognosis), followed by a number of topics, including information on how to get in touch with organizations, associations, or other patient networks dedicated to arthritis of the knee. It also gives you sources of information that can help you find a doctor in your local area specializing in treating arthritis of the knee. Collectively, the material presented in Part I is a complete primer on basic research topics for patients with arthritis of the knee.

Part II moves on to advanced research dedicated to arthritis of the knee. Part II is intended for those willing to invest many hours of hard work and study. It is here that we direct you to the latest scientific and applied research on arthritis of the knee. When possible, contact names, links via the Internet, and summaries are provided. It is in Part II where the vocabulary process becomes important as authors publishing advanced research frequently use highly specialized language. In general, every attempt is made to recommend “free-to-use” options.

Part III provides appendices of useful background reading for all patients with arthritis of the knee or related disorders. The appendices are dedicated to more pragmatic issues faced by many patients with arthritis of the knee. Accessing materials via medical libraries may be the only option for some readers, so a guide is provided for finding local medical libraries which are open to the public. Part III, therefore, focuses on advice that goes beyond the biological and scientific issues facing patients with arthritis of the knee.

## Scope

While this sourcebook covers arthritis of the knee, your doctor, research publications, and specialists may refer to your condition using a variety of terms. Therefore, you should understand that arthritis of the knee is often considered a synonym or a condition closely related to the following:

- Arthritic Inflammation of the Knee
- Joint Inflammation of the Knee

- Knee Arthritis

In addition to synonyms and related conditions, physicians may refer to arthritis of the knee using certain coding systems. The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) is the most commonly used system of classification for the world's illnesses. Your physician may use this coding system as an administrative or tracking tool. The following classification is commonly used for arthritis of the knee:<sup>4</sup>

- 715 osteoarthritis and allied disorders

For the purposes of this sourcebook, we have attempted to be as inclusive as possible, looking for official information for all of the synonyms relevant to arthritis of the knee. You may find it useful to refer to synonyms when accessing databases or interacting with healthcare professionals and medical librarians.

## **Moving Forward**

Since the 1980s, the world has seen a proliferation of healthcare guides covering most illnesses. Some are written by patients or their family members. These generally take a layperson's approach to understanding and coping with an illness or disorder. They can be uplifting, encouraging, and highly supportive. Other guides are authored by physicians or other healthcare providers who have a more clinical outlook. Each of these two styles of guide has its purpose and can be quite useful.

As editors, we have chosen a third route. We have chosen to expose you to as many sources of official and peer-reviewed information as practical, for the purpose of educating you about basic and advanced knowledge as recognized by medical science today. You can think of this sourcebook as your personal Internet age reference librarian.

Why "Internet age"? All too often, patients diagnosed with arthritis of the knee will log on to the Internet, type words into a search engine, and receive several Web site listings which are mostly irrelevant or redundant. These patients are left to wonder where the relevant information is, and how to

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<sup>4</sup> This list is based on the official version of the World Health Organization's 9th Revision, International Classification of Diseases (ICD-9). According to the National Technical Information Service, "ICD-9CM extensions, interpretations, modifications, addenda, or errata other than those approved by the U.S. Public Health Service and the Health Care Financing Administration are not to be considered official and should not be utilized. Continuous maintenance of the ICD-9-CM is the responsibility of the federal government."

obtain it. Since only the smallest fraction of information dealing with arthritis of the knee is even indexed in search engines, a non-systematic approach often leads to frustration and disappointment. With this sourcebook, we hope to direct you to the information you need that you would not likely find using popular Web directories. Beyond Web listings, in many cases we will reproduce brief summaries or abstracts of available reference materials. These abstracts often contain distilled information on topics of discussion.

While we focus on the more scientific aspects of arthritis of the knee, there is, of course, the emotional side to consider. Later in the sourcebook, we provide a chapter dedicated to helping you find peer groups and associations that can provide additional support beyond research produced by medical science. We hope that the choices we have made give you the most options available in moving forward. In this way, we wish you the best in your efforts to incorporate this educational approach into your treatment plan.

*The Editors*





# **PART I: THE ESSENTIALS**

## **ABOUT PART I**

Part I has been edited to give you access to what we feel are “the essentials” on arthritis of the knee. The essentials of a disease typically include the definition or description of the disease, a discussion of who it affects, the signs or symptoms associated with the disease, tests or diagnostic procedures that might be specific to the disease, and treatments for the disease. Your doctor or healthcare provider may have already explained the essentials of arthritis of the knee to you or even given you a pamphlet or brochure describing arthritis of the knee. Now you are searching for more in-depth information. As editors, we have decided, nevertheless, to include a discussion on where to find essential information that can complement what your doctor has already told you. In this section we recommend a process, not a particular Web site or reference book. The process ensures that, as you search the Web, you gain background information in such a way as to maximize your understanding.



## **CHAPTER 1. THE ESSENTIALS ON ARTHRITIS OF THE KNEE: GUIDELINES**

### **Overview**

Official agencies, as well as federally-funded institutions supported by national grants, frequently publish a variety of guidelines on arthritis of the knee. These are typically called “Fact Sheets” or “Guidelines.” They can take the form of a brochure, information kit, pamphlet, or flyer. Often they are only a few pages in length. The great advantage of guidelines over other sources is that they are often written with the patient in mind. Since new guidelines on arthritis of the knee can appear at any moment and be published by a number of sources, the best approach to finding guidelines is to systematically scan the Internet-based services that post them.

### **The National Institutes of Health (NIH)<sup>5</sup>**

The National Institutes of Health (NIH) is the first place to search for relatively current patient guidelines and fact sheets on arthritis of the knee. Originally founded in 1887, the NIH is one of the world's foremost medical research centers and the federal focal point for medical research in the United States. At any given time, the NIH supports some 35,000 research grants at universities, medical schools, and other research and training institutions, both nationally and internationally. The rosters of those who have conducted research or who have received NIH support over the years include the world's most illustrious scientists and physicians. Among them are 97 scientists who have won the Nobel Prize for achievement in medicine.

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<sup>5</sup> Adapted from the NIH: <http://www.nih.gov/about/NIHoverview.html>.

There is no guarantee that any one Institute will have a guideline on a specific disease, though the National Institutes of Health collectively publish over 600 guidelines for both common and rare diseases. The best way to access NIH guidelines is via the Internet. Although the NIH is organized into many different Institutes and Offices, the following is a list of key Web sites where you are most likely to find NIH clinical guidelines and publications dealing with arthritis of the knee and associated conditions:

- Office of the Director (OD); guidelines consolidated across agencies available at <http://www.nih.gov/health/consumer/conkey.htm>
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc. ) with guidelines available at <http://www.nlm.nih.gov/medlineplus/healthtopics.html>
- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS); fact sheets and guidelines at <http://www.nih.gov/niams/healthinfo/>

Among those listed above, the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) is especially noteworthy. The mission of NIAMS, a part of the National Institutes of Health (NIH), is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases, the training of basic and clinical scientists to carry out this research, and the dissemination of information on research progress in these diseases. The National Institute of Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse is a public service sponsored by the NIAMS that provides health information and information sources. The NIAMS provides the following guideline concerning arthritis of the knee.<sup>6</sup>

### **What Do the Knees Do? How Do They Work?<sup>7</sup>**

The knees provide stable support for the body and allow the legs to bend and straighten. Both flexibility and stability are needed for standing and for motions like walking, running, crouching, jumping, and turning.

Several kinds of supporting and moving parts, including bones, cartilage, muscles, ligaments, and tendons, help the knees do their job. Any of these parts can be involved in pain or dysfunction.

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<sup>6</sup> This and other passages are adapted from the NIH and NIAMS (<http://www.niams.nih.gov/hi/index.htm>). “Adapted” signifies that the text is reproduced with attribution, with some or no editorial adjustments.

<sup>7</sup> Adapted from The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS): <http://www.niams.nih.gov/hi/topics/kneeprobs/kneeqa.htm>.

## What Causes Knee Problems?

There are two general kinds of knee problems:

- Mechanical
- Inflammatory

### Mechanical Knee Problems

Some knee problems result from injury, such as a direct blow or sudden movements that strain the knee beyond its normal range of movement. Other problems, such as osteoarthritis in the knee, result from wear and tear on its parts.

### Inflammatory Knee Problems

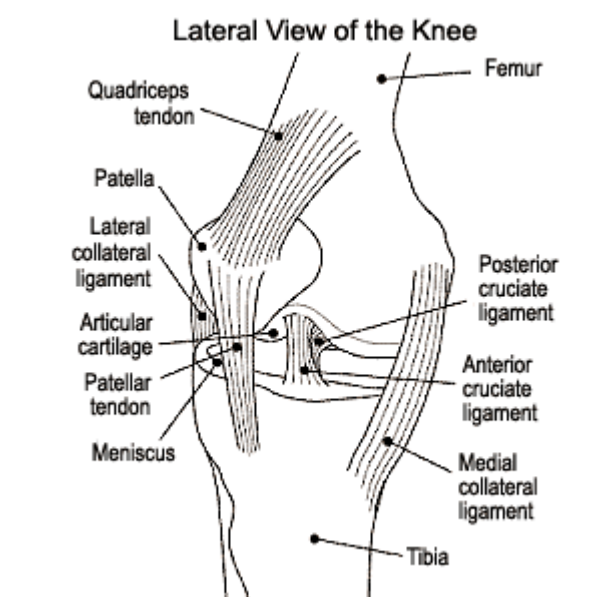
Inflammation that occurs in certain rheumatic diseases, such as rheumatoid arthritis and systemic lupus erythematosus, can damage the knee.

### Joint Basics

The point at which two or more bones are connected is called a joint. In all joints, the bones are kept from grinding against each other by padding called cartilage. Bones are joined to bones by strong, elastic bands of tissue called ligaments. Tendons are tough cords of tissue that connect muscle to bone. Muscles work in opposing pairs to bend and straighten joints. While muscles are not technically part of a joint, they're important because strong muscles help support and protect joints.

## What Are the Parts of the Knee?

Like any joint, the knee is composed of bones and cartilage, ligaments, tendons, and muscles.



### Bones and Cartilage

The knee joint is the junction of three bones: the femur (thigh bone or upper leg bone), the tibia (shin bone or larger bone of the lower leg), and the patella (knee cap). The patella is 2 to 3 inches wide and 3 to 4 inches long. It sits over the other bones at the front of the knee joint and slides when the leg moves. It protects the knee and gives leverage to muscles.

The ends of the three bones in the knee joint are covered with articular cartilage, a tough, elastic material that helps absorb shock and allows the knee joint to move smoothly. Separating the bones of the knee are pads of connective tissue. One pad is called a meniscus (muh-NISS-kus). The plural is menisci (muh-NISS-sky). The menisci are divided into two crescent-shaped discs positioned between the tibia and femur on the outer and inner sides of each knee. The two menisci in each knee act as shock absorbers, cushioning the lower part of the leg from the weight of the rest of the body as well as enhancing stability.

### Muscles

There are two groups of muscles at the knee. The quadriceps muscle comprises four muscles on the front of the thigh that work to straighten the leg from a bent position. The hamstring muscles, which bend the leg at the knee, run along the back of the thigh from the hip to just below the knee. Keeping these muscles strong with exercises such as walking up stairs or riding a stationary bicycle helps support and protect the knee.

## **Tendons and Ligaments**

The quadriceps tendon connects the quadriceps muscle to the patella and provides the power to extend the leg. Four ligaments connect the femur and tibia and give the joint strength and stability:

- The medial collateral ligament (MCL) provides stability to the inner (medial) part of the knee.
- The lateral collateral ligament (LCL) provides stability to the outer (lateral) part of the knee.
- The anterior cruciate ligament (ACL), in the center of the knee, limits rotation and the forward movement of the tibia.
- The posterior cruciate ligament (PCL), also in the center of the knee, limits backward movement of the tibia.

Other ligaments are part of the knee capsule, which is a protective, fiber-like structure that wraps around the knee joint. Inside the capsule, the joint is lined with a thin, soft tissue called synovium.

## **How Are Knee Problems Diagnosed?**

Doctors use several methods to diagnose knee problems including:

- Medical history
- Physical examination
- Diagnostic tests

### **Medical History**

The patient tells the doctor details about symptoms and about any injury, condition, or general health problem that might be causing the pain.

### **Physical Examination**

The doctor bends, straightens, rotates (turns), or presses on the knee to feel for injury and discover the limits of movement and the location of pain. The patient may be asked to stand, walk, or squat to help the doctor assess the knee's function.

## Diagnostic Tests

The doctor uses one or more tests to determine the nature of a knee problem.

- **X ray (radiography)**--An x-ray beam is passed through the knee to produce a two-dimensional picture of the bones.
- **Computerized axial tomography (CAT) scan**--X rays lasting a fraction of a second are passed through the knee at different angles, detected by a scanner, and analyzed by a computer. This produces a series of clear cross-sectional images ("slices") of the knee tissues on a computer screen. CAT scan images show soft tissues such as ligaments or muscles more clearly than conventional x rays. The computer can combine individual images to give a three-dimensional view of the knee.
- **Bone scan (radionuclide scanning)**--A very small amount of radioactive material is injected into the patient's bloodstream and detected by a scanner. This test detects blood flow to the bone and cell activity within the bone and can show abnormalities in these processes that may aid diagnosis.
- **Magnetic resonance imaging (MRI)**--Energy from a powerful magnet (rather than x rays) stimulates knee tissue to produce signals that are detected by a scanner and analyzed by a computer. This creates a series of cross-sectional images of a specific part of the knee. An MRI is particularly useful for detecting soft tissue damage or disease. Like a CAT scan, a computer is used to produce three-dimensional views of the knee during MRI.
- **Arthroscopy**--The doctor manipulates a small, lighted optic tube (arthroscope) that has been inserted into the joint through a small incision in the knee. Images of the inside of the knee joint are projected onto a television screen. While the arthroscope is inside the knee joint, removal of loose pieces of bone or cartilage or the repair of torn ligaments and menisci is also possible.
- **Biopsy**--The doctor removes tissue to examine under a microscope.

## What Is Arthritis of the Knee?

Arthritis of the knee is most often osteoarthritis. In this disease, the cartilage in the joint gradually wears away. In rheumatoid arthritis, which can also



affect the knees, the joint becomes inflamed and cartilage may be destroyed.<sup>8</sup> Arthritis not only affects joints; it can also affect supporting structures such as muscles, tendons, and ligaments.

Osteoarthritis may be caused by excess stress on the joint from deformity, repeated injury, or excess weight. It most often affects middle-aged and older people. A young person who develops osteoarthritis may have an inherited form of the disease or may have experienced continuous irritation from an unrepaired torn meniscus or other injury. Rheumatoid arthritis often affects people at an earlier age than osteoarthritis.

### **Signs and Diagnosis**

Someone who has arthritis of the knee may experience pain, swelling, and a decrease in knee motion. A common symptom is morning stiffness that lessens as the person moves around. Sometimes the joint locks or clicks when the knee is bent and straightened, but these signs may occur in other knee disorders as well. The doctor may confirm the diagnosis by performing a physical examination and examining x rays, which typically show a loss of joint space. Blood tests may be helpful for diagnosing rheumatoid arthritis, but other tests may be needed too. Analyzing fluid from the knee joint may be helpful in diagnosing some kinds of arthritis. The doctor may use arthroscopy to directly see damage to cartilage, tendons, and ligaments and to confirm a diagnosis, but arthroscopy is usually done only if a repair procedure is to be performed.

### **Treatment**

Most often, osteoarthritis of the knee is treated with pain-reducing medicines, such as aspirin or acetaminophen (Tylenol<sup>9</sup>); nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Nuprin, Advil); and exercises to restore joint movement and strengthen the knee. Losing excess weight can also help people with osteoarthritis.

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<sup>8</sup> The National Institute of Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse has separate publications on osteoarthritis, rheumatoid arthritis, and knee replacement. See the end of this booklet for contact information.

<sup>9</sup> Brand names are provided as examples only and their inclusion does not mean that these products are endorsed by the National Institutes of Health or any other Government agency. Also, if a particular brand name is not mentioned, this does not mean or imply that the product is unsatisfactory.

Rheumatoid arthritis of the knee may require physical therapy and more powerful medications. In people with arthritis of the knee, a seriously damaged joint may need to be replaced with an artificial one. (A new procedure designed to stimulate the growth of cartilage by using a patient's own cartilage cells is being used experimentally to repair cartilage injuries at the end of the femur at the knee. It is not, however, a treatment for arthritis.)

## **What Kinds of Doctors Treat Knee Problems?**

Extensive injuries and diseases of the knees are usually treated by an orthopaedic surgeon, a doctor who has been trained in the nonsurgical and surgical treatment of bones, joints, and soft tissues such as ligaments, tendons, and muscles. Patients seeking nonsurgical treatment of arthritis of the knee may also consult a rheumatologist (a doctor specializing in the diagnosis and treatment of arthritis and related disorders).

## **How Can People Prevent Knee Problems?**

Some knee problems, such as those resulting from an accident, can't be foreseen or prevented. However, a person can prevent many knee problems by following these suggestions:

- Before exercising or participating in sports, warm up by walking or riding a stationary bicycle, then do stretches. Stretching the muscles in the front of the thigh (quadriceps) and back of the thigh (hamstrings) reduces tension on the tendons and relieves pressure on the knee during activity.
- Strengthen the leg muscles by doing specific exercises (for example, by walking up stairs or hills, or by riding a stationary bicycle). A supervised workout with weights is another way to strengthen the leg muscles that support the knee.
- Avoid sudden changes in the intensity of exercise. Increase the force or duration of activity gradually.
- Wear shoes that both fit properly and are in good condition to help maintain balance and leg alignment when walking or running. Knee problems can be caused by flat feet or overpronated feet (feet that roll inward). People can often reduce some of these problems by wearing special shoe inserts (orthotics). Maintain a healthy weight to reduce stress

on the knee. Obesity increases the risk of degenerative (wearing) conditions such as osteoarthritis of the knee.

## **What Types of Exercise Are Most Suitable for Someone with Knee Problems?**

Three types of exercise are best for people with arthritis:

- Range-of-motion exercises help maintain normal joint movement and relieve stiffness. This type of exercise helps maintain or increase flexibility.
- Strengthening exercises help keep or increase muscle strength. Strong muscles help support and protect joints affected by arthritis.
- Aerobic or endurance exercises improve function of the heart and circulation and help control weight. Weight control can be important to people who have arthritis because extra weight puts pressure on many joints. Some studies show that aerobic exercise can reduce inflammation in some joints.

## **Where Can I Find More Information about Knee Problems?**

For more information, contact:

### **National Institute of Arthritis and Musculoskeletal and Skin**

Diseases Information Clearinghouse

National Institutes of Health

1 AMS Circle

Bethesda, MD 20892-3675

Phone: 301-495-4484 or

877-22-NIAMS (226-4267) (free of charge)

TTY: 301-565-2966

Fax: 301-718-6366

**<http://www.niams.nih.gov/>**

The clearinghouse provides information about various forms of arthritis and rheumatic disease and bone, muscle, and skin diseases. It distributes patient and professional education materials and refers people to other sources of information. Additional information and updates can also be found on the NIAMS Web site.

**American Academy of Orthopaedic Surgeons**

P.O. Box 2058

Des Plaines, IL 60017

Phone: 800-824-BONE (2663) (free of charge)

Fax: 847-823-8025

**www.aaos.org**

The academy publishes several brochures on the knee. Single copies of a brochure are available free of charge by sending a self-addressed, stamped (business-size) envelope to (*name of brochure*) at the address above.

### **American College of Rheumatology**

1800 Century Place, Suite 250

Atlanta, GA 30329

Phone: 404-633-3777

Fax: 404-633-1870

**www.rheumatology.org**

This national professional organization can provide referrals to rheumatologists and allied health professionals, such as physical therapists. One-page fact sheets are available on various forms of arthritis. Lists of specialists by geographic area and fact sheets are also available on this Web site.

### **American Physical Therapy Association**

1111 N. Fairfax Street

Alexandria, VA 22314

Phone: 800-999-APTA (2782) (free of charge)

**www.apta.org**

The association publishes a free brochure titled "Taking Care of the Knees."

### **Arthritis Foundation**

1330 West Peachtree Street

Atlanta, GA 30309

Phone: 404-872-7100 or 800-283-7800 (free of charge)

or call your local chapter (listed in the local telephone directory)

**www.arthritis.org**

The foundation has several free brochures about coping with arthritis, taking nonsteroid and steroid medicines, and exercise. A free brochure on protecting your joints is titled "Using Your Joints Wisely." The foundation also can provide addresses and phone numbers for local chapters and physician and clinic referrals.

## More Guideline Sources

The guideline above on arthritis of the knee is only one example of the kind of material that you can find online and free of charge. The remainder of this chapter will direct you to other sources which either publish or can help you find additional guidelines on topics related to arthritis of the knee. Many of the guidelines listed below address topics that may be of particular relevance to your specific situation or of special interest to only some patients with arthritis of the knee. Due to space limitations these sources are listed in a concise manner. Do not hesitate to consult the following sources by either using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

### Topic Pages: MEDLINEplus

For patients wishing to go beyond guidelines published by specific Institutes of the NIH, the National Library of Medicine has created a vast and patient-oriented healthcare information portal called MEDLINEplus. Within this Internet-based system are “health topic pages.” You can think of a health topic page as a guide to patient guides. To access this system, log on to <http://www.nlm.nih.gov/medlineplus/healthtopics.html>.

If you do not find topics of interest when browsing health topic pages, then you can choose to use the advanced search utility of MEDLINEplus at <http://www.nlm.nih.gov/medlineplus/advancedsearch.html>. This utility is similar to the NIH Search Utility, with the exception that it only includes material linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

### The National Guideline Clearinghouse™

The National Guideline Clearinghouse™ offers hundreds of evidence-based clinical practice guidelines published in the United States and other countries. You can search their site located at <http://www.guideline.gov> by using the keyword “arthritis of the knee” or synonyms. The following was recently posted:

- **AAOS clinical guideline on knee injury.**

Source: American Academy of Family Physicians/American Academy of Orthopaedic Surgeons/American College of Emergency Physicians.; 2001; 7 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=002223&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=002223&sSearch_string=arthritis+of+the+knee)

- **ACR Appropriateness Criteria™ for non traumatic knee pain.**

Source: American College of Radiology.; 1995 (revised 1999); 10 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=001651&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001651&sSearch_string=arthritis+of+the+knee)

- **Clinical guideline on knee pain.**

Source: American Academy of Orthopaedic Surgeons/American Association of Neurological Surgeons/American College of Physical Medicine and Rehabilitation/American College of Rheumatology.; 1996; 12 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=000933&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=000933&sSearch_string=arthritis+of+the+knee)

- **Criteria for knee surgery.**

Source: Washington State Department of Labor and Industries/Washington State Medical Association.; 1999; 1 page

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=001119&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001119&sSearch_string=arthritis+of+the+knee)

- **Guidelines for the management of rheumatoid arthritis.**

Source: American College of Rheumatology.; 1996 May; 10 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=000681&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=000681&sSearch_string=arthritis+of+the+knee)

- **Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update.**

Source: American College of Rheumatology.; 2000 September; 11 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=002161&sSearch\\_string=arthritis+of+the+knee](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=002161&sSearch_string=arthritis+of+the+knee)

### **Healthfinder™**

Healthfinder™ is an additional source sponsored by the U.S. Department of Health and Human Services which offers links to hundreds of other sites that contain healthcare information. This Web site is located at <http://www.healthfinder.gov>. Again, keyword searches can be used to find guidelines. The following was recently found in this database:

- **Age Page - Arthritis Advice**

Summary: This online fact sheet addresses your concerns about your arthritis and the treatment your doctor may have prescribed.

Source: National Institute on Aging, National Institutes of Health

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=2373>

- **Arthritis & Rheumatism (Journal)**

Summary: The official journal of the American College of Rheumatology, this publication contains peer-reviewed articles on diagnosis, treatment, laboratory research, and socioeconomic issues related to all

Source: Nonprofit/Professional Entity--Follow the Resource URL for More Information

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=1938>

- **Arthritis Information for Teens**

Summary: Teens with arthritis can explore this web site to find out more about their disease, how it is treated, what events they can participate in and more.

Source: Arthritis Foundation

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5780>

- **Arthritis Today**

Summary: A magazine for people who have arthritis, their family members and caregivers.

Source: Arthritis Foundation

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5638>

- **Arthritis: Timely Treatments for an Ageless Disease**

Summary: This guide explains the types of arthritis, new treatments available, unproven remedies to guard against, and more.

Source: Federal Consumer Information Center, U.S. General Services Administration

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5977>

- **Calendar and Events - National Institute of Arthritis and Musculoskeletal and Skin Diseases**

Summary: This page offers up-to-date listings of upcoming conferences, events, national meetings, and national health observances related to the services and programs of the National Institute of Arthritis and

Source: National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=1909>

- **Childhood Sports Injuries and Their Prevention: A Guide for Parents with Ideas for Kids**

Summary: This fact sheet is written to educate parents about the risks of injury to children who play sports and what to do to prevent a sport-related injury.

Source: National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5652>



- **Do I Have Arthritis?**

Summary: This booklet describes the two known types of arthritis, provides general facts about arthritis and advises arthritis sufferers on coping with the disorder for effective management of their daily

Source: National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5651>

- **FAQ - About Ankylosing Spondylitis (AS)**

Summary: Online answers to consumers most commonly asked questions concerning this chronic, inflammatory condition that usually involves primarily the spine and joints of the extremities (such as shoulders,

Source: Spondylitis Association of America

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=2155>

- **FAQ - About Arthritis**

Summary: This site offers in-depth answers to common questions about arthritis as well as provide links to related brochures, articles, news releases, newsletters and resources.

Source: Arthritis Foundation

<http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=1425>

### **The NIH Search Utility**

After browsing the references listed at the beginning of this chapter, you may want to explore the NIH Search Utility. This allows you to search for documents on over 100 selected Web sites that comprise the NIH-WEB-SPACE. Each of these servers is “crawled” and indexed on an ongoing basis. Your search will produce a list of various documents, all of which will relate in some way to arthritis of the knee. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific

disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: <http://search.nih.gov/index.html>.

### Additional Web Sources

A number of Web sites that often link to government sites are available to the public. These can also point you in the direction of essential information. The following is a representative sample:

- AOL: <http://search.aol.com/cat.adp?id=168&layer=&from=subcats>
- drkoop.com<sup>®</sup>: <http://www.drkoop.com/conditions/ency/index.html>
- Family Village: <http://www.familyvillage.wisc.edu/specific.htm>
- Google:  
[http://directory.google.com/Top/Health/Conditions\\_and\\_Diseases/](http://directory.google.com/Top/Health/Conditions_and_Diseases/)
- Med Help International: <http://www.medhelp.org/HealthTopics/A.html>
- Open Directory Project:  
[http://dmoz.org/Health/Conditions\\_and\\_Diseases/](http://dmoz.org/Health/Conditions_and_Diseases/)
- Yahoo.com: [http://dir.yahoo.com/Health/Diseases\\_and\\_Conditions/](http://dir.yahoo.com/Health/Diseases_and_Conditions/)
- WebMD<sup>®</sup>Health: [http://my.webmd.com/health\\_topics](http://my.webmd.com/health_topics)

### Vocabulary Builder

The material in this chapter may have contained a number of unfamiliar words. The following Vocabulary Builder introduces you to terms used in this chapter that have not been covered in the previous chapter:

**Acetaminophen:** Analgesic antipyretic derivative of acetanilide. It has weak anti-inflammatory properties and is used as a common analgesic, but may cause liver, blood cell, and kidney damage. [NIH]

**Aerobic:** 1. having molecular oxygen present. 2. growing, living, or occurring in the presence of molecular oxygen. 3. requiring oxygen for respiration. [EU]

**Arthroscopy:** Endoscopic examination, therapy and surgery of the joint. [NIH]

**Biopsy:** The removal and examination, usually microscopic, of tissue from the living body, performed to establish precise diagnosis. [EU]

**Degenerative:** Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause

degeneration. [EU]

**Elastic:** Susceptible of resisting and recovering from stretching, compression or distortion applied by a force. [EU]

**Endocrinology:** A subspecialty of internal medicine concerned with the metabolism, physiology, and disorders of the endocrine system. [NIH]

**Femur:** The longest and largest bone of the skeleton, it is situated between the hip and the knee. [NIH]

**Ibuprofen:** A nonsteroidal anti-inflammatory agent with analgesic properties used in the therapy of rheumatism and arthritis. [NIH]

**Incision:** 1. cleft, cut, gash. 2. an act or action of incising. [EU]

**Inflammation:** A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

**Ligament:** A band of fibrous tissue that connects bones or cartilages, serving to support and strengthen joints. [EU]

**Lupus:** A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

**Optic:** Of or pertaining to the eye. [EU]

**Orthopaedic:** Pertaining to the correction of deformities of the musculoskeletal system; pertaining to orthopaedics. [EU]

**Osteoarthritis:** Noninflammatory degenerative joint disease occurring chiefly in older persons, characterized by degeneration of the articular cartilage, hypertrophy of bone at the margins, and changes in the synovial membrane. It is accompanied by pain and stiffness, particularly after prolonged activity. [EU]

**Patella:** The flat, triangular bone situated at the anterior part of the KNEE. [NIH]

**Posterior:** Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

**Radiography:** The making of film records (radiographs) of internal structures of the body by passage of x-rays or gamma rays through the body to act on specially sensitized film. [EU]

**Radiology:** A specialty concerned with the use of x-ray and other forms of radiant energy in the diagnosis and treatment of disease. [NIH]

**Rheumatoid:** Resembling rheumatism. [EU]

**Rheumatology:** A subspecialty of internal medicine concerned with the

study of inflammatory or degenerative processes and metabolic derangement of connective tissue structures which pertain to a variety of musculoskeletal disorders, such as arthritis. [NIH]

**Systemic:** Pertaining to or affecting the body as a whole. [EU]

**Tibia:** The second longest bone of the skeleton. It is located on the medial side of the lower leg, articulating with the fibula laterally, the talus distally, and the femur proximally. [NIH]

**Tomography:** The recording of internal body images at a predetermined plane by means of the tomograph; called also body section roentgenography. [EU]

## CHAPTER 2. SEEKING GUIDANCE

### Overview

Some patients are comforted by the knowledge that a number of organizations dedicate their resources to helping people with arthritis of the knee. These associations can become invaluable sources of information and advice. Many associations offer aftercare support, financial assistance, and other important services. Furthermore, healthcare research has shown that support groups often help people to better cope with their conditions.<sup>10</sup> In addition to support groups, your physician can be a valuable source of guidance and support. Therefore, finding a physician that can work with your unique situation is a very important aspect of your care.

In this chapter, we direct you to resources that can help you find patient organizations and medical specialists. We begin by describing how to find associations and peer groups that can help you better understand and cope with arthritis of the knee. The chapter ends with a discussion on how to find a doctor that is right for you.

### Associations and Arthritis of the Knee

As mentioned by the Agency for Healthcare Research and Quality, sometimes the emotional side of an illness can be as taxing as the physical side.<sup>11</sup> You may have fears or feel overwhelmed by your situation. Everyone has different ways of dealing with disease or physical injury. Your attitude, your expectations, and how well you cope with your condition can all

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<sup>10</sup> Churches, synagogues, and other houses of worship might also have groups that can offer you the social support you need.

<sup>11</sup> This section has been adapted from <http://www.ahcpr.gov/consumer/diaginf5.htm>.

influence your well-being. This is true for both minor conditions and serious illnesses. For example, a study on female breast cancer survivors revealed that women who participated in support groups lived longer and experienced better quality of life when compared with women who did not participate. In the support group, women learned coping skills and had the opportunity to share their feelings with other women in the same situation. There are a number of directories that list additional medical associations that you may find useful. While not all of these directories will provide different information, by consulting all of them, you will have nearly exhausted all sources for patient associations.

### **The National Health Information Center (NHIC)**

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about arthritis of the knee. For more information, see the NHIC's Web site at <http://www.health.gov/NHIC/> or contact an information specialist by calling 1-800-336-4797.

### **DIRLINE**

A comprehensive source of information on associations is the DIRLINE database maintained by the National Library of Medicine. The database comprises some 10,000 records of organizations, research centers, and government institutes and associations which primarily focus on health and biomedicine. DIRLINE is available via the Internet at the following Web site: <http://dirline.nlm.nih.gov/>. Simply type in "arthritis of the knee" (or a synonym) or the name of a topic, and the site will list information contained in the database on all relevant organizations.

### **The Combined Health Information Database**

Another comprehensive source of information on healthcare associations is the Combined Health Information Database. Using the "Detailed Search" option, you will need to limit your search to "Organizations" and "arthritis of the knee". Type the following hyperlink into your Web browser: <http://chid.nih.gov/detail/detail.html>. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." By making

these selections and typing in “arthritis of the knee” (or synonyms) into the “For these words:” box, you will only receive results on organizations dealing with arthritis of the knee. You should check back periodically with this database since it is updated every 3 months.

### **The National Organization for Rare Disorders, Inc.**

The National Organization for Rare Disorders, Inc. has prepared a Web site that provides, at no charge, lists of associations organized by specific diseases. You can access this database at the following Web site: <http://www.rarediseases.org/cgi-bin/nord/searchpage>. Select the option called “Organizational Database (ODB)” and type “arthritis of the knee” (or a synonym) in the search box.

### **Online Support Groups**

In addition to support groups, commercial Internet service providers offer forums and chat rooms for people with different illnesses and conditions. WebMD<sup>®</sup>, for example, offers such a service at their Web site: <http://boards.webmd.com/roundtable>. These online self-help communities can help you connect with a network of people whose concerns are similar to yours. Online support groups are places where people can talk informally. If you read about a novel approach, consult with your doctor or other healthcare providers, as the treatments or discoveries you hear about may not be scientifically proven to be safe and effective. The following Internet sites may be of particular interest:

- **Arthritis Support**  
<http://www.arthritissupport.com>
- **Focus on Arthritis**  
<http://www.focusonarthritis.com>
- **Med Help International**  
<http://www.medhelp.org/HealthTopics/Arthritis.html>

### **Finding Doctors**

One of the most important aspects of your treatment will be the relationship between you and your doctor or specialist. All patients with arthritis of the

knee must go through the process of selecting a physician. While this process will vary from person to person, the Agency for Healthcare Research and Quality makes a number of suggestions, including the following:<sup>12</sup>

- If you are in a managed care plan, check the plan's list of doctors first.
- Ask doctors or other health professionals who work with doctors, such as hospital nurses, for referrals.
- Call a hospital's doctor referral service, but keep in mind that these services usually refer you to doctors on staff at that particular hospital. The services do not have information on the quality of care that these doctors provide.
- Some local medical societies offer lists of member doctors. Again, these lists do not have information on the quality of care that these doctors provide.

Additional steps you can take to locate doctors include the following:

- Check with the associations listed earlier in this chapter.
- Information on doctors in some states is available on the Internet at <http://www.docboard.org>. This Web site is run by "Administrators in Medicine," a group of state medical board directors.
- The American Board of Medical Specialties can tell you if your doctor is board certified. "Certified" means that the doctor has completed a training program in a specialty and has passed an exam, or "board," to assess his or her knowledge, skills, and experience to provide quality patient care in that specialty. Primary care doctors may also be certified as specialists. The AMBS Web site is located at <http://www.abms.org/newsearch.asp>.<sup>13</sup> You can also contact the ABMS by phone at 1-866-ASK-ABMS.
- You can call the American Medical Association (AMA) at 800-665-2882 for information on training, specialties, and board certification for many licensed doctors in the United States. This information also can be found in "Physician Select" at the AMA's Web site: <http://www.ama-assn.org/aps/amahg.htm>.

If the previous sources did not meet your needs, you may want to log on to the Web site of the National Organization for Rare Disorders (NORD) at

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<sup>12</sup> This section has been adapted from the AHRQ:  
<http://www.ahrq.gov/consumer/qntascii/qntdr.htm>.

<sup>13</sup> While board certification is a good measure of a doctor's knowledge, it is possible to receive quality care from doctors who are not board certified.



<http://www.rarediseases.org/>. NORD maintains a database of doctors with expertise in various rare diseases. The Metabolic Information Network (MIN), 800-945-2188, also maintains a database of physicians with expertise in various metabolic diseases.

## Finding a Rheumatologist

The American College of Rheumatology (ACR) maintains a geographic directory of member physicians called “Find a Rheumatologist.” To access this database, log on to <http://www.rheumatology.org/directory/geo.asp>. You will be given the option to search for a rheumatologist by name, by U.S. State, or by country. To contact the ACR, you can use the following information:

**American College of Rheumatology**  
 1800 Century Place, Suite 250  
 Atlanta, GA 30345  
 Phone: (404) 633-3777  
 Fax: (404) 633-1870  
 E-mail: [acr@rheumatology.org](mailto:acr@rheumatology.org)

## Selecting Your Doctor<sup>14</sup>

When you have compiled a list of prospective doctors, call each of their offices. First, ask if the doctor accepts your health insurance plan and if he or she is taking new patients. If the doctor is not covered by your plan, ask yourself if you are prepared to pay the extra costs. The next step is to schedule a visit with your chosen physician. During the first visit you will have the opportunity to evaluate your doctor and to find out if you feel comfortable with him or her. Ask yourself, did the doctor:

- Give me a chance to ask questions about arthritis of the knee?
- Really listen to my questions?
- Answer in terms I understood?
- Show respect for me?
- Ask me questions?
- Make me feel comfortable?

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<sup>14</sup> This section has been adapted from the AHRQ:  
[www.ahrq.gov/consumer/qntascii/qntdr.htm](http://www.ahrq.gov/consumer/qntascii/qntdr.htm).

- Address the health problem(s) I came with?
- Ask me my preferences about different kinds of treatments for arthritis of the knee?
- Spend enough time with me?

Trust your instincts when deciding if the doctor is right for you. But remember, it might take time for the relationship to develop. It takes more than one visit for you and your doctor to get to know each other.

### **Working with Your Doctor<sup>15</sup>**

Research has shown that patients who have good relationships with their doctors tend to be more satisfied with their care and have better results. Here are some tips to help you and your doctor become partners:

- You know important things about your symptoms and your health history. Tell your doctor what you think he or she needs to know.
- It is important to tell your doctor personal information, even if it makes you feel embarrassed or uncomfortable.
- Bring a “health history” list with you (and keep it up to date).
- Always bring any medications you are currently taking with you to the appointment, or you can bring a list of your medications including dosage and frequency information. Talk about any allergies or reactions you have had to your medications.
- Tell your doctor about any natural or alternative medicines you are taking.
- Bring other medical information, such as x-ray films, test results, and medical records.
- Ask questions. If you don't, your doctor will assume that you understood everything that was said.
- Write down your questions before your visit. List the most important ones first to make sure that they are addressed.
- Consider bringing a friend with you to the appointment to help you ask questions. This person can also help you understand and/or remember the answers.

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<sup>15</sup> This section has been adapted from the AHRQ:  
[www.ahrq.gov/consumer/qntascii/qntdr.htm](http://www.ahrq.gov/consumer/qntascii/qntdr.htm).

- Ask your doctor to draw pictures if you think that this would help you understand.
- Take notes. Some doctors do not mind if you bring a tape recorder to help you remember things, but always ask first.
- Let your doctor know if you need more time. If there is not time that day, perhaps you can speak to a nurse or physician assistant on staff or schedule a telephone appointment.
- Take information home. Ask for written instructions. Your doctor may also have brochures and audio and videotapes that can help you.
- After leaving the doctor's office, take responsibility for your care. If you have questions, call. If your symptoms get worse or if you have problems with your medication, call. If you had tests and do not hear from your doctor, call for your test results. If your doctor recommended that you have certain tests, schedule an appointment to get them done. If your doctor said you should see an additional specialist, make an appointment.

By following these steps, you will enhance the relationship you will have with your physician.

## Broader Health-Related Resources

In addition to the references above, the NIH has set up guidance Web sites that can help patients find healthcare professionals. These include:<sup>16</sup>

- Caregivers:  
<http://www.nlm.nih.gov/medlineplus/caregivers.html>
- Choosing a Doctor or Healthcare Service:  
<http://www.nlm.nih.gov/medlineplus/choosingadoctororhealthcareservice.html>
- Hospitals and Health Facilities:  
<http://www.nlm.nih.gov/medlineplus/healthfacilities.html>

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<sup>16</sup> You can access this information at:  
<http://www.nlm.nih.gov/medlineplus/healthsystem.html>.



## CHAPTER 3. CLINICAL TRIALS AND ARTHRITIS OF THE KNEE

### Overview

Very few medical conditions have a single treatment. The basic treatment guidelines that your physician has discussed with you, or those that you have found using the techniques discussed in Chapter 1, may provide you with all that you will require. For some patients, current treatments can be enhanced with new or innovative techniques currently under investigation. In this chapter, we will describe how clinical trials work and show you how to keep informed of trials concerning arthritis of the knee.

### What Is a Clinical Trial?<sup>17</sup>

Clinical trials involve the participation of people in medical research. Most medical research begins with studies in test tubes and on animals. Treatments that show promise in these early studies may then be tried with people. The only sure way to find out whether a new treatment is safe, effective, and better than other treatments for arthritis of the knee is to try it on patients in a clinical trial.

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<sup>17</sup> The discussion in this chapter has been adapted from the NIH and the NEI: [www.nei.nih.gov/netrials/ctivr.htm](http://www.nei.nih.gov/netrials/ctivr.htm).

## What Kinds of Clinical Trials Are There?

Clinical trials are carried out in three phases:

- **Phase I.** Researchers first conduct Phase I trials with small numbers of patients and healthy volunteers. If the new treatment is a medication, researchers also try to determine how much of it can be given safely.
- **Phase II.** Researchers conduct Phase II trials in small numbers of patients to find out the effect of a new treatment on arthritis of the knee.
- **Phase III.** Finally, researchers conduct Phase III trials to find out how new treatments for arthritis of the knee compare with standard treatments already being used. Phase III trials also help to determine if new treatments have any side effects. These trials--which may involve hundreds, perhaps thousands, of people--can also compare new treatments with no treatment.

## How Is a Clinical Trial Conducted?

Various organizations support clinical trials at medical centers, hospitals, universities, and doctors' offices across the United States. The "principal investigator" is the researcher in charge of the study at each facility participating in the clinical trial. Most clinical trial researchers are medical doctors, academic researchers, and specialists. The "clinic coordinator" knows all about how the study works and makes all the arrangements for your visits.

All doctors and researchers who take part in the study on arthritis of the knee carefully follow a detailed treatment plan called a protocol. This plan fully explains how the doctors will treat you in the study. The "protocol" ensures that all patients are treated in the same way, no matter where they receive care.

Clinical trials are controlled. This means that researchers compare the effects of the new treatment with those of the standard treatment. In some cases, when no standard treatment exists, the new treatment is compared with no treatment. Patients who receive the new treatment are in the treatment group. Patients who receive a standard treatment or no treatment are in the "control" group. In some clinical trials, patients in the treatment group get a new medication while those in the control group get a placebo. A placebo is a harmless substance, a "dummy" pill, that has no effect on arthritis of the knee. In other clinical trials, where a new surgery or device (not a medicine) is being tested, patients in the control group may receive a "sham

treatment.” This treatment, like a placebo, has no effect on arthritis of the knee and does not harm patients.

Researchers assign patients “randomly” to the treatment or control group. This is like flipping a coin to decide which patients are in each group. If you choose to participate in a clinical trial, you will not know which group you will be appointed to. The chance of any patient getting the new treatment is about 50 percent. You cannot request to receive the new treatment instead of the placebo or sham treatment. Often, you will not know until the study is over whether you have been in the treatment group or the control group. This is called a “masked” study. In some trials, neither doctors nor patients know who is getting which treatment. This is called a “double masked” study. These types of trials help to ensure that the perceptions of the patients or doctors will not affect the study results.

### **Natural History Studies**

Unlike clinical trials in which patient volunteers may receive new treatments, natural history studies provide important information to researchers on how arthritis of the knee develops over time. A natural history study follows patient volunteers to see how factors such as age, sex, race, or family history might make some people more or less at risk for arthritis of the knee. A natural history study may also tell researchers if diet, lifestyle, or occupation affects how a disease or disorder develops and progresses. Results from these studies provide information that helps answer questions such as: How fast will a disease or disorder usually progress? How bad will the condition become? Will treatment be needed?

### **What Is Expected of Patients in a Clinical Trial?**

Not everyone can take part in a clinical trial for a specific disease or disorder. Each study enrolls patients with certain features or eligibility criteria. These criteria may include the type and stage of disease or disorder, as well as, the age and previous treatment history of the patient. You or your doctor can contact the sponsoring organization to find out more about specific clinical trials and their eligibility criteria. If you are interested in joining a clinical trial, your doctor must contact one of the trial's investigators and provide details about your diagnosis and medical history.

If you participate in a clinical trial, you may be required to have a number of medical tests. You may also need to take medications and/or undergo

surgery. Depending upon the treatment and the examination procedure, you may be required to receive inpatient hospital care. Or, you may have to return to the medical facility for follow-up examinations. These exams help find out how well the treatment is working. Follow-up studies can take months or years. However, the success of the clinical trial often depends on learning what happens to patients over a long period of time. Only patients who continue to return for follow-up examinations can provide this important long-term information.

## Recent Trials on Arthritis of the Knee

The National Institutes of Health and other organizations sponsor trials on various diseases and disorders. Because funding for research goes to the medical areas that show promising research opportunities, it is not possible for the NIH or others to sponsor clinical trials for every disease and disorder at all times. The following lists recent trials dedicated to arthritis of the knee.<sup>18</sup> If the trial listed by the NIH is still recruiting, you may be eligible. If it is no longer recruiting or has been completed, then you can contact the sponsors to learn more about the study and, if published, the results. Further information on the trial is available at the Web site indicated. Please note that some trials may no longer be recruiting patients or are otherwise closed. Before contacting sponsors of a clinical trial, consult with your physician who can help you determine if you might benefit from participation.

- **Acupuncture Safety/Efficacy in Knee Osteoarthritis**

Condition(s): Osteoarthritis, Knee

Study Status: This study is currently recruiting patients.

Sponsor(s): National Center for Complementary and Alternative Medicine (NCCAM)

Purpose - Excerpt: The goal of this research is to determine the efficacy and safety of Traditional Chinese Acupuncture (TCA) in patients with osteoarthritis of the knee. A three arm randomized controlled trial (RCT) using sham TCA, true TCA, and an education/attention comparison group with a total sample of 525 is proposed. Primary hypothesis to be tested is that patients randomized to true TCA will have significantly more improvement in pain and function as measured by the Womac Pain & Function Scales and patient global assessments than patients randomized to the sham acupuncture and education/attention control groups. Secondary aims of the study are to 1) determine if improvement with TCA differs between patients below age 65 vs. those aged 65 and

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<sup>18</sup> These are listed at [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).



above, 2) to determine if improvement with TCA differs by racial/ethnic group (ie., Caucasian, Black, Hispanic), and 3) to determine if improvement with TCA differs by stage of radiographic severity of knee OA at baseline (KL grade 2, 3 or 4)

Phase(s): Phase III

Study Type: Interventional

Contact(s): see Web site below

Web Site: <http://clinicaltrials.gov/ct/gui/c/w2r/show/NCT00010946>

- **Shoe Insert Study**

Condition(s): Osteoarthritis, Knee

Study Status: This study is currently recruiting patients.

Sponsor(s): National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

Purpose - Excerpt: This trial will test shoe inserts for the treatment of knee osteoarthritis, the most common form of knee arthritis. Those with disease on the inner (medial) aspect of the knee will be studied.

Phase(s): Phase III

Study Type: Interventional

Contact(s): Massachusetts; Boston University Medical Center, Boston, Massachusetts, 02118, United States; Recruiting; Joyce P. Goggins, M.P.H. 617-638-4462 [jgoggins@bu.edu](mailto:jgoggins@bu.edu); Kristin Baker, Ph.D. 617-638-5452 [kbaker@bu.edu](mailto:kbaker@bu.edu); David T. Felson, M.D., M.P.H., Principal Investigator

Web Site: <http://clinicaltrials.gov/ct/gui/c/w2r/show/NCT00032240>

- **Muscle Strengthening Device for Knee Osteoarthritis**

Condition(s): Osteoarthritis

Study Status: This study is no longer recruiting patients.

Sponsor(s): National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

Purpose - Excerpt: Studies have shown that isometric strengthening helps people with osteoarthritis of the knee. Isometric strengthening is muscle-strengthening exercise without movement, in which a person applies a force against a resistant object--for example, pushing against a brick wall. This study will test the effectiveness of a portable isometric exercise device for home use that guides a person through an exercise program using various forms of feedback. We will look at whether people exercising with the device achieve better outcomes (results) in pain,

stiffness, strength, and functional measures compared to people who do not use the device or people exercising according to printed material from arthritis organizations.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site: <http://clinicaltrials.gov/ct/gui/c/w2r/show/NCT00007241>

- **Cost-effectiveness of & Long-term Outcomes Following Acupuncture Treatment for Osteoarthritis of the Knee**

Condition(s): Osteoarthritis of the knee

Study Status: This study is not yet open for patient recruitment.

Sponsor(s): National Center for Complementary and Alternative Medicine (NCCAM)

Purpose - Excerpt: The total cost to the U.S. economy in 1992 of arthritis was estimated at \$64.8 billion. Osteoarthritis (OA) makes up the vast majority of the disability and economic costs. The knee is the most common site and OA of the knee is a common cause of disability and the leading indication of total knee replacement in the elderly. There are presently no curative therapies for OA. Recently, increased attention has focused on the use of complementary and alternative medicine (CAM) therapies, such as acupuncture, especially for patients who have failed to respond to more standard therapy. Little is known of the long-term health services utilization and outcomes of patients with knee OA. In conjunction with a randomized, controlled trial (RCT) of acupuncture for OA of the knee, this project will: 1) enroll patients participating in RCT into this long-term outcomes study; 2) collect data on costs of implementation of the intervention in the 3 trial groups; 3) collect data on short-term utilization of health services during participation in the RCT; and 4) collect long-term data on outcomes, including pain and physical function measured with the Medical Outcomes Short Form (SF)-36, and utilization of health services measured with the Health Assessment Questionnaire as developed and implemented by the Arthritis, Rheumatism, and Aging Medical Information System (ARAMIS). These data will be analyzed to estimate the cost-effectiveness of the acupuncture intervention in the RCT as well as to determine the long-term outcomes and health care utilization and costs of a cohort patients with OA of the knee.

Study Type: Treatment

Contact(s): Brian Berman Complementary Medicine Program, Kernan Hospital Mansion 2200 Kernan Drive Baltimore, Maryland, 21207-6697,

United States 1-410-448-6871; Maryland; University of Maryland Baltimore, Baltimore, Maryland, 21207, United States. Study chairs or principal investigators: Dr. Marc C. Hochberg, Principal Investigator; University of Maryland Osteoporosis Clinic St. Agnes Medical Center 3455 Wilkins Avenue Baltimore, Maryland, 21229, United States

Web Site: <http://clinicaltrials.gov/ct/gui/c/w2r/show/NCT00010647>

## Benefits and Risks<sup>19</sup>

### What Are the Benefits of Participating in a Clinical Trial?

If you are interested in a clinical trial, it is important to realize that your participation can bring many benefits to you and society at large:

- A new treatment could be more effective than the current treatment for arthritis of the knee. Although only half of the participants in a clinical trial receive the experimental treatment, if the new treatment is proved to be more effective and safer than the current treatment, then those patients who did not receive the new treatment during the clinical trial may be among the first to benefit from it when the study is over.
- If the treatment is effective, then it may improve health or prevent diseases or disorders.
- Clinical trial patients receive the highest quality of medical care. Experts watch them closely during the study and may continue to follow them after the study is over.
- People who take part in trials contribute to scientific discoveries that may help other people with arthritis of the knee. In cases where certain diseases or disorders run in families, your participation may lead to better care or prevention for your family members.

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<sup>19</sup> This section has been adapted from ClinicalTrials.gov, a service of the National Institutes of Health:

[http://www.clinicaltrials.gov/ct/gui/c/a1r/info/whatis?JServSessionIdzone\\_ct=9jmun6f291](http://www.clinicaltrials.gov/ct/gui/c/a1r/info/whatis?JServSessionIdzone_ct=9jmun6f291).

## **The Informed Consent**

Once you agree to take part in a clinical trial, you will be asked to sign an “informed consent.” This document explains a clinical trial's risks and benefits, the researcher’s expectations of you, and your rights as a patient.

### **What Are the Risks?**

Clinical trials may involve risks as well as benefits. Whether or not a new treatment will work cannot be known ahead of time. There is always a chance that a new treatment may not work better than a standard treatment. There is also the possibility that it may be harmful. The treatment you receive may cause side effects that are serious enough to require medical attention.

### **How Is Patient Safety Protected?**

Clinical trials can raise fears of the unknown. Understanding the safeguards that protect patients can ease some of these fears. Before a clinical trial begins, researchers must get approval from their hospital's Institutional Review Board (IRB), an advisory group that makes sure a clinical trial is designed to protect patient safety. During a clinical trial, doctors will closely watch you to see if the treatment is working and if you are experiencing any side effects. All the results are carefully recorded and reviewed. In many cases, experts from the Data and Safety Monitoring Committee carefully monitor each clinical trial and can recommend that a study be stopped at any time. You will only be asked to take part in a clinical trial as a volunteer giving informed consent.

### **What Are a Patient's Rights in a Clinical Trial?**

If you are eligible for a clinical trial, you will be given information to help you decide whether or not you want to participate. As a patient, you have the right to:

- Information on all known risks and benefits of the treatments in the study.
- Know how the researchers plan to carry out the study, for how long, and where.
- Know what is expected of you.

- Know any costs involved for you or your insurance provider.
- Know before any of your medical or personal information is shared with other researchers involved in the clinical trial.
- Talk openly with doctors and ask any questions.

After you join a clinical trial, you have the right to:

- Leave the study at any time. Participation is strictly voluntary. However, you should not enroll if you do not plan to complete the study.
- Receive any new information about the new treatment.
- Continue to ask questions and get answers.
- Maintain your privacy. Your name will not appear in any reports based on the study.
- Know whether you participated in the treatment group or the control group (once the study has been completed).

### **What about Costs?**

In some clinical trials, the research facility pays for treatment costs and other associated expenses. You or your insurance provider may have to pay for costs that are considered standard care. These things may include inpatient hospital care, laboratory and other tests, and medical procedures. You also may need to pay for travel between your home and the clinic. You should find out about costs before committing to participation in the trial. If you have health insurance, find out exactly what it will cover. If you don't have health insurance, or if your insurance company will not cover your costs, talk to the clinic staff about other options for covering the cost of your care.

### **What Should You Ask before Deciding to Join a Clinical Trial?**

Questions you should ask when thinking about joining a clinical trial include the following:

- What is the purpose of the clinical trial?
- What are the standard treatments for arthritis of the knee? Why do researchers think the new treatment may be better? What is likely to happen to me with or without the new treatment?

- What tests and treatments will I need? Will I need surgery? Medication? Hospitalization?
- How long will the treatment last? How often will I have to come back for follow-up exams?
- What are the treatment's possible benefits to my condition? What are the short- and long-term risks? What are the possible side effects?
- Will the treatment be uncomfortable? Will it make me feel sick? If so, for how long?
- How will my health be monitored?
- Where will I need to go for the clinical trial? How will I get there?
- How much will it cost to be in the study? What costs are covered by the study? How much will my health insurance cover?
- Will I be able to see my own doctor? Who will be in charge of my care?
- Will taking part in the study affect my daily life? Do I have time to participate?
- How do I feel about taking part in a clinical trial? Are there family members or friends who may benefit from my contributions to new medical knowledge?

## **Keeping Current on Clinical Trials**

Various government agencies maintain databases on trials. The U.S. National Institutes of Health, through the National Library of Medicine, has developed ClinicalTrials.gov to provide patients, family members, and physicians with current information about clinical research across the broadest number of diseases and conditions.

The site was launched in February 2000 and currently contains approximately 5,700 clinical studies in over 59,000 locations worldwide, with most studies being conducted in the United States. ClinicalTrials.gov receives about 2 million hits per month and hosts approximately 5,400 visitors daily. To access this database, simply go to their Web site ([www.clinicaltrials.gov](http://www.clinicaltrials.gov)) and search by "arthritis of the knee" (or synonyms).

While ClinicalTrials.gov is the most comprehensive listing of NIH-supported clinical trials available, not all trials are in the database. The database is updated regularly, so clinical trials are continually being added. The

following is a list of specialty databases affiliated with the National Institutes of Health that offer additional information on trials:

- For clinical studies at the Warren Grant Magnuson Clinical Center located in Bethesda, Maryland, visit their Web site:  
<http://clinicalstudies.info.nih.gov/>
- For clinical studies conducted at the Bayview Campus in Baltimore, Maryland, visit their Web site:  
<http://www.jhbmc.jhu.edu/studies/index.html>
- For trials on arthritis, musculoskeletal and skin diseases, visit newly revised site of the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the National Institutes of Health:  
<http://www.niams.nih.gov/hi/studies/index.htm>

## General References

The following references describe clinical trials and experimental medical research. They have been selected to ensure that they are likely to be available from your local or online bookseller or university medical library. These references are usually written for healthcare professionals, so you may consider consulting with a librarian or bookseller who might recommend a particular reference. The following includes some of the most readily available references (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **A Guide to Patient Recruitment : Today's Best Practices & Proven Strategies** by Diana L. Anderson; Paperback - 350 pages (2001), CenterWatch, Inc.; ISBN: 1930624115;  
<http://www.amazon.com/exec/obidos/ASIN/1930624115/icongroupinterna>
- **A Step-By-Step Guide to Clinical Trials** by Marilyn Mulay, R.N., M.S., OCN; Spiral-bound - 143 pages Spiral edition (2001), Jones & Bartlett Pub; ISBN: 0763715697;  
<http://www.amazon.com/exec/obidos/ASIN/0763715697/icongroupinterna>
- **The CenterWatch Directory of Drugs in Clinical Trials** by CenterWatch; Paperback - 656 pages (2000), CenterWatch, Inc.; ISBN: 0967302935;  
<http://www.amazon.com/exec/obidos/ASIN/0967302935/icongroupinterna>
- **The Complete Guide to Informed Consent in Clinical Trials** by Terry Hartnett (Editor); Paperback - 164 pages (2000), PharmSource Information Services, Inc.; ISBN: 0970153309;  
<http://www.amazon.com/exec/obidos/ASIN/0970153309/icongroupinterna>

- **Dictionary for Clinical Trials** by Simon Day; Paperback - 228 pages (1999), John Wiley & Sons; ISBN: 0471985961;  
<http://www.amazon.com/exec/obidos/ASIN/0471985961/icongroupinterna>
- **Extending Medicare Reimbursement in Clinical Trials** by Institute of Medicine Staff (Editor), et al; Paperback 1st edition (2000), National Academy Press; ISBN: 0309068886;  
<http://www.amazon.com/exec/obidos/ASIN/0309068886/icongroupinterna>
- **Handbook of Clinical Trials** by Marcus Flather (Editor); Paperback (2001), Remedica Pub Ltd; ISBN: 1901346293;  
<http://www.amazon.com/exec/obidos/ASIN/1901346293/icongroupinterna>

## Vocabulary Builder

The following vocabulary builder gives definitions of words used in this chapter that have not been defined in previous chapters:

**Curative:** Tending to overcome disease and promote recovery. [EU]

**Osteoporosis:** Reduction in the amount of bone mass, leading to fractures after minimal trauma. [EU]



## **PART II: ADDITIONAL RESOURCES AND ADVANCED MATERIAL**

### **ABOUT PART II**

In Part II, we introduce you to additional resources and advanced research on arthritis of the knee. All too often, patients who conduct their own research are overwhelmed by the difficulty in finding and organizing information. The purpose of the following chapters is to provide you an organized and structured format to help you find additional information resources on arthritis of the knee. In Part II, as in Part I, our objective is not to interpret the latest advances on arthritis of the knee or render an opinion. Rather, our goal is to give you access to original research and to increase your awareness of sources you may not have already considered. In this way, you will come across the advanced materials often referred to in pamphlets, books, or other general works. Once again, some of this material is technical in nature, so consultation with a professional familiar with arthritis of the knee is suggested.



## CHAPTER 4. STUDIES ON ARTHRITIS OF THE KNEE

### Overview

Every year, academic studies are published on arthritis of the knee or related conditions. Broadly speaking, there are two types of studies. The first are peer reviewed. Generally, the content of these studies has been reviewed by scientists or physicians. Peer-reviewed studies are typically published in scientific journals and are usually available at medical libraries. The second type of studies is non-peer reviewed. These works include summary articles that do not use or report scientific results. These often appear in the popular press, newsletters, or similar periodicals.

In this chapter, we will show you how to locate peer-reviewed references and studies on arthritis of the knee. We will begin by discussing research that has been summarized and is free to view by the public via the Internet. We then show you how to generate a bibliography on arthritis of the knee and teach you how to keep current on new studies as they are published or undertaken by the scientific community.

### The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and arthritis of the knee, you will need to use the advanced search options. First, go to <http://chid.nih.gov/index.html>. From there, select the “Detailed Search” option (or go directly to that page with the following hyperlink: <http://chid.nih.gov/detail/detail.html>). The trick in extracting studies is found in the drop boxes at the bottom of the search page where “You may refine your search by.” Select the dates and language you prefer, and the

format option "Journal Article." At the top of the search form, select the number of records you would like to see (we recommend 100) and check the box to display "whole records." We recommend that you type in "arthritis of the knee" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is a sample of what you can expect from this type of search:

- **Osteoarthritis of the Knee: A Special Report**

Source: Physician and Sportsmedicine. Special Report. May 2000.

Contact: Available from McGraw-Hill Healthcare Information, 4530 West 77th Street, Floor 3, Minneapolis, MN 55435. (800) 525-5003 or (609) 426-7070 (for subscriptions) or (952) 835-3222 (for back issues).

Summary: This special report presents a series of articles that provide health professionals with information on osteoarthritis (OA) of the knee. The first article reviews the pathophysiological characteristics of OA and discusses its etiology, diagnosis, and evaluation. OA is caused by multiple factors, including genetic, metabolic, biochemical, enzymatic, biomechanical, and environmental factors. The history, physical examination, and radiographic examination help establish the diagnosis. The second article offers an overview of the nonoperative management of OA of the knee. Nonoperative techniques can be effective in relieving pain and improving functional ability. Nonpharmacologic treatment options include decreasing physical activity, exercising, losing weight, using supports and braces, and undergoing physiotherapy. Topical treatments include nonsteroidal anti-inflammatory drugs (NSAIDs) and capsaicin. Systemic therapies include nonnarcotic and narcotic analgesics, antidepressants, NSAIDs, chondroitin, and glucosamine. Intra-articular therapies include corticosteroids and viscosupplementation. The third article discusses operative treatment for the arthritic knee, focusing on the role of arthroscopy, the indications for joint replacement, and the new area of articular cartilage restoration and resurfacing. The choice of procedure is based on the patient's age, the extent of disease, and the desired level of physical activity. The fourth article presents case reports of active patients with arthritis who underwent viscosupplementation. The fifth article uses a question and answer format to provide health professionals with information on traditional and innovative treatments for OA of the knee. The final article is a continuing medical education activity. 5 tables and 95 references.

- **Osteoarthritis of the Knee and Hip: Practical Nondrug Steps to Successful Therapy**

Source: *Consultant*. 39(6): 1707-1712,1714. June 1999.

Summary: This journal article, the first of a two-part series, provides health professionals with information on practical nondrug methods of treating osteoarthritis (OA) of the knee and hip. Patient education is the first step in the nonpharmacologic treatment of OA. One example is the Arthritis Self-Help Course, which is administered by the Arthritis Foundation. People who participate in self-management programs generally report decreased pain and frequency of physician visits, as well as overall improvement in quality of life. Written materials can be invaluable in reinforcing the self-management program. If an office does not have a person to deliver self-care educational programs, a reasonable alternative is to refer the patient for physical therapy. Most therapy facilities discharge patients with a home exercise program and provide a handout that details the exercise and the educational aspects of the program. To forestall the loss of motion that can occur with disuse, affected joints need to be put through range of motion exercises. Properly performed quadriceps strengthening exercises, such as quadriceps sets and wall slides, are recommended for patients who have knee OA. Aquatic exercise programs can improve endurance, aerobic capacity, joint range of motion, and muscle strength. In addition, warm water tends to enhance the analgesic effect. When referring a patient for physical therapy, the physician should be sure to discuss and monitor the home exercise program because failure to do so almost always leads to patient noncompliance. 2 figures, 3 tables, and 39 references. (AA-M).

## **Federally-Funded Research on Arthritis of the Knee**

The U.S. Government supports a variety of research studies relating to arthritis of the knee and associated conditions. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.<sup>20</sup> CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally-funded biomedical research projects conducted at universities, hospitals, and other institutions. Visit the CRISP

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<sup>20</sup> Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).

Web site at [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket). You can perform targeted searches by various criteria including geography, date, as well as topics related to arthritis of the knee and related conditions.

For most of the studies, the agencies reporting into CRISP provide summaries or abstracts. As opposed to clinical trial research using patients, many federally-funded studies use animals or simulated models to explore arthritis of the knee and related conditions. In some cases, therefore, it may be difficult to understand how some basic or fundamental research could eventually translate into medical practice.

## The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine. The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to the public.<sup>21</sup> If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

To generate your own bibliography of studies dealing with arthritis of the knee, simply go to the PubMed Web site at [www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed). Type “arthritis of the knee” (or synonyms) into the search box, and click “Go.”

## Vocabulary Builder

**Agonist:** In anatomy, a prime mover. In pharmacology, a drug that has affinity for and stimulates physiologic activity at cell receptors normally stimulated by naturally occurring substances. [EU]

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<sup>21</sup> PubMed was developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the National Institutes of Health (NIH). The PubMed database was developed in conjunction with publishers of biomedical literature as a search tool for accessing literature citations and linking to full-text journal articles at Web sites of participating publishers. Publishers that participate in PubMed supply NLM with their citations electronically prior to or at the time of publication.

**Alopecia:** Baldness; absence of the hair from skin areas where it normally is present. [EU]

**Analgesic:** An agent that alleviates pain without causing loss of consciousness. [EU]

**Androgens:** A class of sex hormones associated with the development and maintenance of the secondary male sex characteristics, sperm induction, and sexual differentiation. In addition to increasing virility and libido, they also increase nitrogen and water retention and stimulate skeletal growth. [NIH]

**Anovulation:** Suspension or cessation of ovulation in animals and humans. [NIH]

**Antibacterial:** A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

**Antidepressant:** An agent that stimulates the mood of a depressed patient, including tricyclic antidepressants and monoamine oxidase inhibitors. [EU]

**Antigen:** Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

**Antimicrobial:** Killing microorganisms, or suppressing their multiplication or growth. [EU]

**Antioxidant:** One of many widely used synthetic or natural substances added to a product to prevent or delay its deterioration by action of oxygen in the air. Rubber, paints, vegetable oils, and prepared foods commonly contain antioxidants. [EU]

**Assay:** Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

**Benign:** Not malignant; not recurrent; favourable for recovery. [EU]

**Biochemical:** Relating to biochemistry; characterized by, produced by, or involving chemical reactions in living organisms. [EU]

**Carcinoma:** A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [EU]

**Catabolism:** Any destructive metabolic process by which organisms convert substances into excreted compounds. [EU]

**Cerebellar:** Pertaining to the cerebellum. [EU]

**Cerebellum:** Part of the metencephalon that lies in the posterior cranial

fossa behind the brain stem. It is concerned with the coordination of movement. [NIH]

**Clomiphene:** A stilbene derivative that functions both as a partial estrogen agonist and complete estrogen antagonist depending on the target tissue. It antagonizes the estrogen receptor thereby initiating or augmenting ovulation in anovulatory women. [NIH]

**Cytokines:** Non-antibody proteins secreted by inflammatory leukocytes and some non-leukocytic cells, that act as intercellular mediators. They differ from classical hormones in that they are produced by a number of tissue or cell types rather than by specialized glands. They generally act locally in a paracrine or autocrine rather than endocrine manner. [NIH]

**Cytosine:** A pyrimidine base that is a fundamental unit of nucleic acids. [NIH]

**Defensins:** Family of antimicrobial peptides that have been identified in humans, animals, and plants. They are thought to play a role in host defenses against infections, inflammation, wound repair, and acquired immunity. Based on the disulfide pairing of their characteristic six cysteine residues, they are divided into alpha-defensins and beta-defensins. [NIH]

**Edema:** Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

**Embryo:** In animals, those derivatives of the fertilized ovum that eventually become the offspring, during their period of most rapid development, i.e., after the long axis appears until all major structures are represented. In man, the developing organism is an embryo from about two weeks after fertilization to the end of seventh or eighth week. [EU]

**Endogenous:** Developing or originating within the organisms or arising from causes within the organism. [EU]

**Enzyme:** A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. [EU]

**Epidermal:** Pertaining to or resembling epidermis. Called also epidermic or epidermoid. [EU]

**Estradiol:** The most potent mammalian estrogenic hormone. It is produced in the ovary, placenta, testis, and possibly the adrenal cortex. [NIH]

**Exocrine:** 1. secreting outwardly, via a duct;. [EU]

**Exogenous:** Developed or originating outside the organism, as exogenous disease. [EU]



**Finasteride:** An orally active testosterone 5-alpha-reductase inhibitor. It is used as a surgical alternative for treatment of benign prostatic hyperplasia. [NIH]

**FSH:** A gonadotropic hormone found in the pituitary tissues of mammals. It regulates the metabolic activity of ovarian granulosa cells and testicular Sertoli cells, induces maturation of Graafian follicles in the ovary, and promotes the development of the germinal cells in the testis. [NIH]

**Gels:** Colloids with a solid continuous phase and liquid as the dispersed phase; gels may be unstable when, due to temperature or other cause, the solid phase liquifies; the resulting colloid is called a sol. [NIH]

**Genital:** Pertaining to the genitalia. [EU]

**Gestation:** The period of development of the young in viviparous animals, from the time of fertilization of the ovum until birth. [EU]

**Glucose:** D-glucose, a monosaccharide (hexose),  $C_6H_{12}O_6$ , also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the normal blood of all animals. It is the end product of carbohydrate metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the urine in diabetes mellitus. [EU]

**Heterozygote:** An individual having different alleles at one or more loci in homologous chromosome segments. [NIH]

**Hirsutism:** Abnormal hairiness, especially an adult male pattern of hair distribution in women. [EU]

**Homozygote:** An individual in which both alleles at a given locus are identical. [NIH]

**Hormones:** Chemical substances having a specific regulatory effect on the activity of a certain organ or organs. The term was originally applied to substances secreted by various endocrine glands and transported in the bloodstream to the target organs. It is sometimes extended to include those substances that are not produced by the endocrine glands but that have similar effects. [NIH]

**Hyperplasia:** The abnormal multiplication or increase in the number of normal cells in normal arrangement in a tissue. [EU]

**Hypertension:** Persistently high arterial blood pressure. Various criteria for its threshold have been suggested, ranging from 140 mm. Hg systolic and 90 mm. Hg diastolic to as high as 200 mm. Hg systolic and 110 mm. Hg diastolic. Hypertension may have no known cause (essential or idiopathic h.) or be associated with other primary diseases (secondary h.). [EU]

**Idiopathic:** Of the nature of an idiopathy; self-originated; of unknown causation. [EU]

**Inbreeding:** The mating of plants or non-human animals which are closely related genetically. [NIH]

**Induction:** The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

**Infertility:** The diminished or absent ability to conceive or produce an offspring while sterility is the complete inability to conceive or produce an offspring. [NIH]

**Insecticides:** Pesticides designed to control insects that are harmful to man. The insects may be directly harmful, as those acting as disease vectors, or indirectly harmful, as destroyers of crops, food products, or textile fabrics. [NIH]

**Insulin:** A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

**Isoenzymes:** One of various structurally related forms of an enzyme, each having the same mechanism but with differing chemical, physical, or immunological characteristics. [NIH]

**Isotretinoin:** A topical dermatologic agent that is used in the treatment of acne vulgaris and several other skin diseases. The drug has teratogenic and other adverse effects. [NIH]

**LH:** A small glycoprotein hormone secreted by the anterior pituitary. LH plays an important role in controlling ovulation and in controlling secretion of hormones by the ovaries and testes. [NIH]

**Lipid:** Any of a heterogeneous group of fats and fatlike substances characterized by being water-insoluble and being extractable by nonpolar (or fat) solvents such as alcohol, ether, chloroform, benzene, etc. All contain as a major constituent aliphatic hydrocarbons. The lipids, which are easily stored in the body, serve as a source of fuel, are an important constituent of cell structure, and serve other biological functions. Lipids may be considered to include fatty acids, neutral fats, waxes, and steroids. Compound lipids comprise the glycolipids, lipoproteins, and phospholipids. [EU]

**Malignant:** Tending to become progressively worse and to result in death. Having the properties of anaplasia, invasion, and metastasis; said of tumours. [EU]

**Melanoma:** A tumour arising from the melanocytic system of the skin and other organs. When used alone the term refers to malignant melanoma. [EU]

**Menstruation:** The cyclic, physiologic discharge through the vagina of blood and mucosal tissues from the nonpregnant uterus; it is under hormonal control and normally recurs, usually at approximately four-week intervals, in the absence of pregnancy during the reproductive period (puberty through menopause) of the female of the human and a few species of primates. It is the culmination of the menstrual cycle. [EU]

**Methoprene:** Juvenile hormone analog and insect growth regulator used to control insects by disrupting metamorphosis. Has been effective in controlling mosquito larvae. [NIH]

**Modulator:** A specific inductor that brings out characteristics peculiar to a definite region. [EU]

**Molecular:** Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

**Neurotoxic:** Poisonous or destructive to nerve tissue. [EU]

**Nisin:** A 34-amino acid polypeptide antibiotic produced by *Streptococcus lactis*. It has been used as a food preservative in canned fruits and vegetables, and cheese. [NIH]

**Norethindrone:** A synthetic progestational hormone with actions similar to those of progesterone but functioning as a more potent inhibitor of ovulation. It has weak estrogenic and androgenic properties. The hormone has been used in treating amenorrhea, functional uterine bleeding, endometriosis, and for contraception. [NIH]

**Obstetrics:** A medical-surgical specialty concerned with management and care of women during pregnancy, parturition, and the puerperium. [NIH]

**Oral:** Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

**Parenteral:** Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

**Pernicious:** Tending to a fatal issue. [EU]

**Pharmacokinetics:** The action of drugs in the body over a period of time, including the processes of absorption, distribution, localization in tissues, biotransformation, and excretion. [EU]

**Photosensitivity:** An abnormal cutaneous response involving the interaction between photosensitizing substances and sunlight or filtered or artificial light at wavelengths of 280-400 nm. There are two main types : photoallergy and phototoxicity. [EU]

**Porphyryns:** A group of compounds containing the porphin structure, four pyrrole rings connected by methine bridges in a cyclic configuration to which a variety of side chains are attached. The nature of the side chain is indicated by a prefix, as uroporphyrin, hematoporphyrin, etc. The porphyryns, in combination with iron, form the heme component in biologically significant compounds such as hemoglobin and myoglobin. [NIH]

**Progesterone:** Pregn-4-ene-3,20-dione. The principal progestational hormone of the body, secreted by the corpus luteum, adrenal cortex, and placenta. Its chief function is to prepare the uterus for the reception and development of the fertilized ovum. It acts as an antiovarulatory agent when administered on days 5-25 of the menstrual cycle. [NIH]

**Prostatism:** A symptom complex resulting from compression or obstruction of the urethra, due most commonly to hyperplasia of the prostate; symptoms include diminution in the calibre and force of the urinary stream, hesitancy in initiating voiding, inability to terminate micturition abruptly (with postvoiding dribbling), a sensation of incomplete bladder emptying, and, occasionally, urinary retention. [EU]

**Proteins:** Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

**Psoriasis:** A common genetically determined, chronic, inflammatory skin disease characterized by rounded erythematous, dry, scaling patches. The lesions have a predilection for nails, scalp, genitalia, extensor surfaces, and the lumbosacral region. Accelerated epidermopoiesis is considered to be the fundamental pathologic feature in psoriasis. [NIH]

**Receptor:** 1. a molecular structure within a cell or on the surface characterized by (1) selective binding of a specific substance and (2) a specific physiologic effect that accompanies the binding, e.g., cell-surface receptors for peptide hormones, neurotransmitters, antigens, complement fragments, and immunoglobulins and cytoplasmic receptors for steroid hormones. 2. a sensory nerve terminal that responds to stimuli of various kinds. [EU]

**Salicylanilides:** 2-Hydroxy-N-phenylbenzamides. N-phenyl substituted salicylamides. Derivatives have been used as fungicides, anti-mildew agents and topical antifungal agents. In concentrated form may cause irritation of skin and mucous membranes. [NIH]

**Tolerance:** 1. the ability to endure unusually large doses of a drug or toxin. 2. acquired drug tolerance; a decreasing response to repeated constant doses of a drug or the need for increasing doses to maintain a constant response. [EU]

**Topical:** Pertaining to a particular surface area, as a topical anti-infective

applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

**Ventral:** 1. pertaining to the belly or to any venter. 2. denoting a position more toward the belly surface than some other object of reference; same as anterior in human anatomy. [EU]



## CHAPTER 5. BOOKS ON ARTHRITIS OF THE KNEE

### Overview

This chapter provides bibliographic book references relating to arthritis of the knee. You have many options to locate books on arthritis of the knee. The simplest method is to go to your local bookseller and inquire about titles that they have in stock or can special order for you. Some patients, however, feel uncomfortable approaching their local booksellers and prefer online sources (e.g. [www.amazon.com](http://www.amazon.com) and [www.bn.com](http://www.bn.com)). In addition to online booksellers, excellent sources for book titles on arthritis of the knee include the Combined Health Information Database and the National Library of Medicine. Once you have found a title that interests you, visit your local public or medical library to see if it is available for loan.

### Book Summaries: Online Booksellers

Commercial Internet-based booksellers, such as Amazon.com and Barnes & Noble.com, offer summaries which have been supplied by each title's publisher. Some summaries also include customer reviews. Your local bookseller may have access to in-house and commercial databases that index all published books (e.g. Books in Print®). The following have been recently listed with online booksellers as relating to arthritis of the knee (sorted alphabetically by title; follow the hyperlink to view more details at Amazon.com):

- **Arthritis of the knee : clinical features and surgical management ; ISBN: 038709699X;**

<http://www.amazon.com/exec/obidos/ASIN/038709699X/icongroupinterna>

- **Basic data on arthritis : knee, hip, and sacroiliac joints in adults ages 25-74 years, United States, 1971-1975** by Kurt Maurer; ISBN: 0840601581; <http://www.amazon.com/exec/obidos/ASIN/0840601581/icongroupinterna>

## The National Library of Medicine Book Index

The National Library of Medicine at the National Institutes of Health has a massive database of books published on healthcare and biomedicine. Go to the following Internet site, <http://locatorplus.gov/>, and then select "Search LOCATORplus." Once you are in the search area, simply type "arthritis of the knee" (or synonyms) into the search box, and select "books only." From there, results can be sorted by publication date, author, or relevance. The following was recently catalogued by the National Library of Medicine:<sup>22</sup>

- **Arthritis of the knee: clinical features and surgical management.** Author: edited by M. A. R. Freeman; with contributions of J. H. Aubriot ... [et al.]; Year: 1980; Berlin; New York: Springer-Verlag, 1980; ISBN: 354009699X
- **Arthroscopy of the knee: a diagnostic color atlas.** Author: David J. Dandy; Year: 1984; Philadelphia: Lea & Febiger; London; New York: Gower Medical Pub., c1984; ISBN: 0812109120  
<http://www.amazon.com/exec/obidos/ASIN/0812109120/icongroupinterna>
- **Arthroscopy of the knee: diagnosis and treatment.** Author: [edited by] W. Norman Scott; Year: 1990; Philadelphia: Saunders, 1990; ISBN: 0721680321  
<http://www.amazon.com/exec/obidos/ASIN/0721680321/icongroupinterna>

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<sup>22</sup> In addition to LOCATORPlus, in collaboration with authors and publishers, the National Center for Biotechnology Information (NCBI) is adapting biomedical books for the Web. The books may be accessed in two ways: (1) by searching directly using any search term or phrase (in the same way as the bibliographic database PubMed), or (2) by following the links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a facsimile of the abstract in which some phrases are hypertext links. These phrases are also found in the books available at NCBI. Click on hyperlinked results in the list of books in which the phrase is found. Currently, the majority of the links are between the books and PubMed. In the future, more links will be created between the books and other types of information, such as gene and protein sequences and macromolecular structures. See <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books>.



- **Arthroscopy of the knee.** Author: Reinhard Aigner and Jan Gillquist, with contributions by Karola Sommerlath and Martin Pilstl; foreword by David Dandy; [translated by Claus Röhrborn, with the cooperation of Karl H. Mueller; illustrated by Martin Pilstl and J; Year: 1991; Stuttgart; New York: G. Thieme Verlag; New York: Thieme Medical Publishers, 1991; ISBN: 3137432014 (G. Thieme Verlag)  
<http://www.amazon.com/exec/obidos/ASIN/3137432014/icongroupinterna>
- **Arthroscopy of the knee.** Author: Vincent Chassaing and Jacques Parier; foreword by M. Lemarie; translated and edited by Reginald Elson; Year: 1988; London: Dunitz, 1988; ISBN: 0948269235
- **Basic data on arthritis - knee, hip, and sacroiliac joints in adults 25-74 years, United States, 1971-1975.** Author: [Kurt Maurer]; Year: 1979; Hyattsville, Md.: U. S. Dept. of Health, Education, and Welfare, Public Health Service, Office of Health, Research, Statistics, and Technology, National Center for Health Statistics, 1979; ISBN: 0840601581  
<http://www.amazon.com/exec/obidos/ASIN/0840601581/icongroupinterna>
- **Biology and biomechanics of the traumatized synovial joint: the knee as a model.** Author: edited by Gerald A.M. Finerman, Frank R. Noyes; Year: 1992; Rosemont, IL: American Academy of Orthopaedic Surgeons, c1992; ISBN: 0892030704  
<http://www.amazon.com/exec/obidos/ASIN/0892030704/icongroupinterna>
- **Control of pain in arthritis of the knee.** Author: Paul Notrik; Year: 1984; Franklin, TN: Rheumatoid Disease Foundation, c1984; ISBN: 0931150140 (pbk.)
- **Diagnostic and operative arthroscopy of the knee joint.** Author: Werner Glinz; translated from the German by Edith Späti; Year: 1990; Toronto; Lewiston, NY: Hogrefe & Huber, c1990; ISBN: 0920887341  
<http://www.amazon.com/exec/obidos/ASIN/0920887341/icongroupinterna>
- **Diagnostic evaluation of the knee.** Author: Michael Strobel, Hans-Werner Stedtfeld; with a foreword by John A. Feagin; translation by Terry C. Telger; Year: 1990; Berlin; New York: Springer-Verlag, c1990; ISBN: 3540507108 (alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/3540507108/icongroupinterna>
- **Effect of high tibial and double osteotomy on osteoarthritic and rheumatoid deformity of the knee.** Author: Vratislav Rybka; Year: 1979; Praha: Univerzita Karlova, 1979

- **Health care guideline: diagnosis and treatment of adult degenerative joint disease (DJD) of the knee.** Author: Institute for Clinical Systems Improvement; Year: 2000; Bloomington, MN: ICSI, 2000
- **Hyaluronan-based therapy for osteoarthritis of the knee.** Author: ECRI; Year: 2001; Plymouth Meeting, PA: ECRI, c2001
- **Imaging anatomy of the knee region: anatomy--CT--NMR: frontal slices, sagittal slices, horizontal slices.** Author: Henri Sick, Jean-Louis Burguet; Year: 1988; München: Bergmann, c1988; ISBN: 3807003738  
<http://www.amazon.com/exec/obidos/ASIN/3807003738/icongroupinterna>
- **Imaging of the knee: techniques and applications.** Author: A.M. Davies, V.N. Cassar-Pullicino (eds.); with contributions by J. Beltran; foreword by A.L Baert; Year: 2002; Berlin; New York: Springer, c2002; ISBN: 3540672923 (alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/3540672923/icongroupinterna>
- **Ligament and extensor mechanism injuries of the knee: diagnosis and treatment.** Author: [edited by] W. Norman Scott; illustrations by Elizabeth Roselius; Year: 1991; St. Louis: Mosby Year Book, c1991; ISBN: 0801662303  
<http://www.amazon.com/exec/obidos/ASIN/0801662303/icongroupinterna>
- **Ligaments of the knee.** Author: edited by Alfred J. Tria, Jr.; with illustrations by Rong-Zeng Li; Year: 1995; New York: Churchill Livingstone, 1995; ISBN: 044308954X  
<http://www.amazon.com/exec/obidos/ASIN/044308954X/icongroupinterna>
- **Magnetic resonance imaging of the knee.** Author: Crowe, Bernard L; Year: 1993; New York: Raven Press, c1993; ISBN: 0881679364  
<http://www.amazon.com/exec/obidos/ASIN/0881679364/icongroupinterna>
- **MRI of the knee: a discussion paper.** Author: Bernard L. Crowe, David M. Hailey; Year: 1994; Canberra, ACT: Australian Institute of Health and Welfare, c1994
- **MRI of the knee.** Author: editors, Peter L. Munk, Clyde A. Helms; Year: 1996; Philadelphia: Lippincott-Raven, c1996; ISBN: 0397516428  
<http://www.amazon.com/exec/obidos/ASIN/0397516428/icongroupinterna>
- **MRI of the knee.** Author: [edited by] Peter L. Munk, Clyde A. Helms, with A. Dale Vellet; Year: 1992; Gaithersburg, Md.: Aspen Publishers, 1992; ISBN: 0834202468

<http://www.amazon.com/exec/obidos/ASIN/0834202468/icongroupinterna>

- **Physical therapy of the knee.** Author: edited by Robert E. Mangine; Year: 1995; New York: Churchill Livingstone, 1995; ISBN: 0443089167  
<http://www.amazon.com/exec/obidos/ASIN/0443089167/icongroupinterna>
- **Reconstruction of the knee joint.** Author: S. Niwa ... [et al.], (eds.); Year: 1997; Tokyo; New York: Springer, c1997; ISBN: 4431701702 (alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/4431701702/icongroupinterna>
- **Rehabilitation of the knee: a problem-solving approach.** Author: [edited by] Bruce H. Greenfield; Year: 1993; Philadelphia: F.A. Davis, c1993; ISBN: 0803643357 (hardcover: alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/0803643357/icongroupinterna>
- **Repair of the knee: Orthopaedic consultation: selected cases.** Author: Albert B. Ferguson, Jr., editor; Year: 1990; New York, NY: HP Pub. Co., c1990; ISBN: 0913800368  
<http://www.amazon.com/exec/obidos/ASIN/0913800368/icongroupinterna>
- **Surgery of the knee.** Author: edited by John N. Insall ... [et al.]; with illustrations by Elizabeth Roselius and Virginia M. Ferrante; Year: 1993; New York: Churchill Livingstone, 1993; ISBN: 0443087342  
<http://www.amazon.com/exec/obidos/ASIN/0443087342/icongroupinterna>
- **Traumatic arthritis of the knee.** Author: Cameron, Bruce Molloy; Year: 1949; [Minneapolis] 1949
- **Traumatic disorders of the knee.** Author: John M. Siliski, editor; line illustrations by Laurel Cook Lhowe; Year: 1994; New York: Springer-Verlag, c1994; ISBN: 0387941711 (alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/0387941711/icongroupinterna>

## Chapters on Arthritis of the Knee

Frequently, arthritis of the knee will be discussed within a book, perhaps within a specific chapter. In order to find chapters that are specifically dealing with arthritis of the knee, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and arthritis of the knee using the "Detailed Search" option.

Go to the following hyperlink: <http://chid.nih.gov/detail/detail.html>. To find book chapters, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Book Chapter." By making these selections and typing in "arthritis of the knee" (or synonyms) into the "For these words:" box, you will only receive results on chapters in books.

## General Home References

In addition to references for arthritis of the knee, you may want a general home medical guide that spans all aspects of home healthcare. The following list is a recent sample of such guides (sorted alphabetically by title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **All About Joints** by Irwin M. Siegel; Paperback - 224 pages 1st edition (December 15, 2001), Demos Medical Publishing; ISBN: 1888799560;  
<http://www.amazon.com/exec/obidos/ASIN/1888799560/icongroupinterna>
- **Arthritis Sourcebook : Basic Consumer Health Information About Specific Forms of Arthritis and Related Disorders** by Allan R. Cook (Editor); Hardcover - 600 pages 1 edition (October 1998), Omnigraphics, Inc.; ISBN: 0780802012;  
<http://www.amazon.com/exec/obidos/ASIN/0780802012/icongroupinterna>
- **Primer on the Rheumatic Diseases** by John H. Klippel, et al; Paperback - 700 pages, 12th edition (December 2001), National Book Network; ISBN: 0912423293;  
<http://www.amazon.com/exec/obidos/ASIN/0912423293/icongroupinterna>

## CHAPTER 6. MULTIMEDIA ON ARTHRITIS OF THE KNEE

### Overview

Information on arthritis of the knee can come in a variety of formats. Among multimedia sources, video productions, slides, audiotapes, and computer databases are often available. In this chapter, we show you how to keep current on multimedia sources of information on arthritis of the knee. We start with sources that have been summarized by federal agencies, and then show you how to find bibliographic information catalogued by the National Library of Medicine. If you see an interesting item, visit your local medical library to check on the availability of the title.

### Bibliography: Multimedia on Arthritis of the Knee

The National Library of Medicine is a rich source of information on healthcare-related multimedia productions including slides, computer software, and databases. To access the multimedia database, go to the following Web site: <http://locatorplus.gov/>. Select "Search LOCATORplus." Once in the search area, simply type in arthritis of the knee (or synonyms). Then, in the option box provided below the search box, select "Audiovisuals and Computer Files." From there, you can choose to sort results by publication date, author, or relevance. The following multimedia has been indexed on arthritis of the knee. For more information, follow the hyperlink indicated:

- **Anterolateral instability of the knee : diagnosis & treatment.** Year: 1982; Format: Videorecording; [Chicago, Ill.]: American Academy of Orthopaedic Surgeons, [1982]

- **Arthritic knee** . Year: 2000; Format: Electronic resource; Rosemont, Ill.: American Academy Orthopaedic Surgeons, c2000
- **Arthrography of the knee** . Year: 1972; Format: Slide; [Chicago, Ill.]: American Academy Orthopaedic Surgeons, [1972]
- **Arthroscopic surgery of the knee : the universal lateral portal**. Year: 1984; Format: Videorecording; [Chicago, Ill.]: American Academy Orthopaedic Surgeons, [1984]
- **Arthroscopy and maquet osteotomy for degenerative arthritis of the knee**. Source: produced by the Office of Educational Resources; Year: 1981; Format: Videorecording; [San Antonio, Tex.]: UTHSCSA, c1981
- **Arthroscopy of the knee**. Source: produced and distributed by Professional Research, Inc; Year: 1982; Format: Videorecording; Los Angeles, Calif.: PRI, c1982
- **Athletic injuries of the knee**. Source: produced by UT/TV, the University of Texas-Houston, Health Science Center; Year: 1993; Format: Videorecording; Research Triangle Park, NC: Glaxo, c1993
- **Biomechanics of the knee**. Source: American Academy of Orthopaedic Surgeons; Year: 1971; Format: Slide; [Chicago, Ill.]: The Academy, [1971]
- **Evaluation of the knee**. Source: Mosby; the University of Alabama; DCH Sports Medicine; Year: 1994; Format: Videorecording; [St. Louis, MO]: Mosby-Year Book, c1994
- **Examination of the knee**. Source: produced by Medical Sciences Teaching Laboratories, Television Section, School of Medicine, University of North Carolina at Chapel Hill; Year: 1985; Format: Videorecording; [Chapel Hill, N.C.]: The University, c1985
- **Examination of the peripheral joints**. Source: Paul J. Bilka; produced by Audio-visual Education Service, University of Minnesota; Year: 1961; Format: Motion picture; [Minneapolis]: The University: [for loan by its Audio Visual Library Service; Atlanta: for loan by National Medical Audiovisual Center], 1961
- **Functional anatomy of the knee** . Year: 1981; Format: Videorecording; [Park Ridge, Ill.]: American Academy of Orthopaedic Surgeons, [1981]
- **Functional and surgical anatomy of the extensor mechanism of the knee**. Source: produced by Hughston Sports Medicine Foundation; Year: 1988; Format: Videorecording; [S.l.: s.n., 1988]
- **High tibial osteotomy for osteoarthritis of the knee using Yokohama blade plate**. Source: the American Academy of Orthopaedic Surgeons; Year: 1986; Format: Videorecording; [Park Ridge, Ill.]: The Academy, [1986]

- **Internal derangements of the knee.** Source: the Radiological Society of North America; Year: 1988; Format: Videorecording; Oak Brook, Ill.: The Society, c1988
- **Introduction to arthroscopy of the knee joint : a video production.** Source: by Gordon Nealy; produced by Television Services, Medical College of Georgia; Year: 1983; Format: Videorecording; [Augusta, Ga.]: The College, c1983
- **Knee: releases for arthritic conditions.** Source: Department of Orthopaedic Surgery, Emory University, School of Medicine; Year: 1980; Format: Videorecording; Atlanta: Emory Medical Television Network: [for loan or sale by A. W. Calhoun Medical Library Library], 1980
- **Lateral shift of the tibia in arthritic knees.** Source: produced for Surgical Service, VA Central Office, in cooperation with Orthopedic Service, VAMC, Washington, DC; produced by Learning Resource Services, VAMC, Washington DC; Year: 1988; Format: Videorecording; [Washington D.C.]: Veterans Administration, 1988
- **Limb salvage surgical procedures in treating sarcomatous and locally aggressive bone tumors of the knee region.** Source: the American Academy of Orthopaedic Surgeons; Year: 1986; Format: Videorecording; [Park Ridge, Ill.]: The Academy, [1986]
- **MRI of sports injuries and ligaments of the knee .** Year: 1989; Format: Videorecording; [United States: s.n., 1989?]
- **MRI of the knee and menisci .** Year: 1989; Format: Videorecording; [United States: s.n., 1989?]
- **MRI of the knee.** Source: Radiological Society of North America; Year: 1990; Format: Videorecording; Oak Brook, Ill.: RSNA, c1990
- **New universal instrumentation system for total knee arthroplasty.** Source: the Johns Hopkins University, Division of Arthritis Surgery at the Good Samaritan Hospital [and] Department of Orthopedic Surgery, the Johns Hopkins University; produced; Year: 1981; Format: Videorecording; Baltimore, Md.: The University, [1981]
- **Osteonecrosis of the knee .** Year: 1981; Format: Slide; [Chicago, Ill.]: American Academy of Orthopaedic Surgeons, c1981
- **Physical activity recommendations for people living with knee joint arthritis.** Source: produced by MSTL Television, School of Medicine, University of North Carolina at Chapel Hill; Year: 1996; Format: Videorecording; Chapel Hill, N.C.: Medical Sciences Teaching Labs, School of Medicine, University of North Carolina at Chapel Hill, c1996

- **Posterior trans-septal portal for arthroscopic surgery of the knee joint.** Source: the American Academy of Orthopaedic Surgeons; Year: 2000; Format: Videorecording; Rosemont, Ill.: The Academy, [2000]
- **Proximal approach to arthroscopic surgery of the knee .** Year: 1980; Format: Videorecording; [S.l.]: Dinesh Patel, c1980
- **Surgery of the knee.** Source: John N. Insall, W. Norman Scott; illustrator, Christopher Wikoff; Year: 2001; Format: Edited by; New York: Churchill Livingstone, c2001
- **Synovectomy of the knee for rheumatoid arthritis.** Source: [presented by] the United States Army; Year: 1951; Format: Motion picture; United States: War Office, 1951



## **PART III. APPENDICES**

### **ABOUT PART III**

Part III is a collection of appendices on general medical topics which may be of interest to patients with arthritis of the knee and related conditions.



## **APPENDIX A. RESEARCHING YOUR MEDICATIONS**

### **Overview**

There are a number of sources available on new or existing medications which could be prescribed to patients with arthritis of the knee. While a number of hard copy or CD-Rom resources are available to patients and physicians for research purposes, a more flexible method is to use Internet-based databases. In this chapter, we will begin with a general overview of medications. We will then proceed to outline official recommendations on how you should view your medications. You may also want to research medications that you are currently taking for other conditions as they may interact with medications for arthritis of the knee. Research can give you information on the side effects, interactions, and limitations of prescription drugs used in the treatment of arthritis of the knee. Broadly speaking, there are two sources of information on approved medications: public sources and private sources. We will emphasize free-to-use public sources.

## Your Medications: The Basics<sup>23</sup>

The Agency for Health Care Research and Quality has published extremely useful guidelines on how you can best participate in the medication aspects of arthritis of the knee. Taking medicines is not always as simple as swallowing a pill. It can involve many steps and decisions each day. The AHCQRQ recommends that patients with arthritis of the knee take part in treatment decisions. Do not be afraid to ask questions and talk about your concerns. By taking a moment to ask questions early, you may avoid problems later. Here are some points to cover each time a new medicine is prescribed:

- Ask about all parts of your treatment, including diet changes, exercise, and medicines.
- Ask about the risks and benefits of each medicine or other treatment you might receive.
- Ask how often you or your doctor will check for side effects from a given medication.

Do not hesitate to ask what is important to you about your medicines. You may want a medicine with the fewest side effects, or the fewest doses to take each day. You may care most about cost, or how the medicine might affect how you live or work. Or, you may want the medicine your doctor believes will work the best. Telling your doctor will help him or her select the best treatment for you.

Do not be afraid to “bother” your doctor with your concerns and questions about medications for arthritis of the knee. You can also talk to a nurse or a pharmacist. They can help you better understand your treatment plan. Feel free to bring a friend or family member with you when you visit your doctor. Talking over your options with someone you trust can help you make better choices, especially if you are not feeling well. Specifically, ask your doctor the following:

- The name of the medicine and what it is supposed to do.
- How and when to take the medicine, how much to take, and for how long.
- What food, drinks, other medicines, or activities you should avoid while taking the medicine.
- What side effects the medicine may have, and what to do if they occur.

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<sup>23</sup> This section is adapted from AHCQRQ: <http://www.ahcpr.gov/consumer/ncpiebro.htm>.

- If you can get a refill, and how often.
- About any terms or directions you do not understand.
- What to do if you miss a dose.
- If there is written information you can take home (most pharmacies have information sheets on your prescription medicines; some even offer large-print or Spanish versions).

Do not forget to tell your doctor about all the medicines you are currently taking (not just those for arthritis of the knee). This includes prescription medicines and the medicines that you buy over the counter. Then your doctor can avoid giving you a new medicine that may not work well with the medications you take now. When talking to your doctor, you may wish to prepare a list of medicines you currently take, the reason you take them, and how you take them. Be sure to include the following information for each:

- Name of medicine
- Reason taken
- Dosage
- Time(s) of day

Also include any over-the-counter medicines, such as:

- Laxatives
- Diet pills
- Vitamins
- Cold medicine
- Aspirin or other pain, headache, or fever medicine
- Cough medicine
- Allergy relief medicine
- Antacids
- Sleeping pills
- Others (include names)

## Learning More about Your Medications

Because of historical investments by various organizations and the emergence of the Internet, it has become rather simple to learn about the medications your doctor has recommended for arthritis of the knee. One such source is the United States Pharmacopeia. In 1820, eleven physicians met in Washington, D.C. to establish the first compendium of standard drugs for the United States. They called this compendium the "U.S. Pharmacopeia (USP)." Today, the USP is a non-profit organization consisting of 800 volunteer scientists, eleven elected officials, and 400 representatives of state associations and colleges of medicine and pharmacy. The USP is located in Rockville, Maryland, and its home page is located at [www.usp.org](http://www.usp.org). The USP currently provides standards for over 3,700 medications. The resulting USP DI® Advice for the Patient® can be accessed through the National Library of Medicine of the National Institutes of Health. The database is partially derived from lists of federally approved medications in the Food and Drug Administration's (FDA) Drug Approvals database.<sup>24</sup>

While the FDA database is rather large and difficult to navigate, the Pharmacopeia is both user-friendly and free to use. It covers more than 9,000 prescription and over-the-counter medications. To access this database, simply type the following hyperlink into your Web browser: <http://www.nlm.nih.gov/medlineplus/druginformation.html>. To view examples of a given medication (brand names, category, description, preparation, proper use, precautions, side effects, etc.), simply follow the hyperlinks indicated within the United States Pharmacopoeia (USP). It is important to read the disclaimer by the United States Pharmacopoeia (<http://www.nlm.nih.gov/medlineplus/drugdisclaimer.html>) before using the information provided.

## Commercial Databases

In addition to the medications listed in the USP above, a number of commercial sites are available by subscription to physicians and their institutions. You may be able to access these sources from your local medical library or your doctor's office.

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<sup>24</sup> Though cumbersome, the FDA database can be freely browsed at the following site: [www.fda.gov/cder/da/da.htm](http://www.fda.gov/cder/da/da.htm).

### **Reuters Health Drug Database**

The Reuters Health Drug Database can be searched by keyword at the hyperlink: <http://www.reutershealth.com/frame2/drug.html>.

### **Mosby's GenRx**

Mosby's GenRx database (also available on CD-Rom and book format) covers 45,000 drug products including generics and international brands. It provides prescribing information, drug interactions, and patient information. Information in Mosby's GenRx database can be obtained at the following hyperlink: <http://www.genrx.com/Mosby/PhyGenRx/group.html>.

### **Physicians Desk Reference**

The Physicians Desk Reference database (also available in CD-Rom and book format) is a full-text drug database. The database is searchable by brand name, generic name or by indication. It features multiple drug interactions reports. Information can be obtained at the following hyperlink: [http://physician.pdr.net/physician/templates/en/acl/psuser\\_t.htm](http://physician.pdr.net/physician/templates/en/acl/psuser_t.htm).

### **Other Web Sites**

A number of additional Web sites discuss drug information. As an example, you may like to look at [www.drugs.com](http://www.drugs.com) which reproduces the information in the Pharmacopeia as well as commercial information. You may also want to consider the Web site of the Medical Letter, Inc. which allows users to download articles on various drugs and therapeutics for a nominal fee: <http://www.medletter.com/>.

## **Contraindications and Interactions (Hidden Dangers)**

Some of the medications mentioned in the previous discussions can be problematic for patients with arthritis of the knee--not because they are used in the treatment process, but because of contraindications, or side effects. Medications with contraindications are those that could react with drugs used to treat arthritis of the knee or potentially create deleterious side effects in patients with arthritis of the knee. You should ask your physician about any contraindications, especially as these might apply to other medications that you may be taking for common ailments.

Drug-drug interactions occur when two or more drugs react with each other. This drug-drug interaction may cause you to experience an unexpected side effect. Drug interactions may make your medications less effective, cause unexpected side effects, or increase the action of a particular drug. Some drug interactions can even be harmful to you.

Be sure to read the label every time you use a nonprescription or prescription drug, and take the time to learn about drug interactions. These precautions may be critical to your health. You can reduce the risk of potentially harmful drug interactions and side effects with a little bit of knowledge and common sense.

Drug labels contain important information about ingredients, uses, warnings, and directions which you should take the time to read and understand. Labels also include warnings about possible drug interactions. Further, drug labels may change as new information becomes available. This is why it's especially important to read the label every time you use a medication. When your doctor prescribes a new drug, discuss all over-the-counter and prescription medications, dietary supplements, vitamins, botanicals, minerals and herbals you take as well as the foods you eat. Ask your pharmacist for the package insert for each prescription drug you take. The package insert provides more information about potential drug interactions.

## **A Final Warning**

At some point, you may hear of alternative medications from friends, relatives, or in the news media. Advertisements may suggest that certain alternative drugs can produce positive results for patients with arthritis of the knee. Exercise caution--some of these drugs may have fraudulent claims, and others may actually hurt you. The Food and Drug Administration (FDA) is the official U.S. agency charged with discovering which medications are likely to improve the health of patients with arthritis of the knee. The FDA warns patients to watch out for<sup>25</sup>:

- Secret formulas (real scientists share what they know)
- Amazing breakthroughs or miracle cures (real breakthroughs don't happen very often; when they do, real scientists do not call them amazing or miracles)

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<sup>25</sup> This section has been adapted from  
<http://www.fda.gov/opacom/lowlit/medfraud.html>.



- Quick, painless, or guaranteed cures
- If it sounds too good to be true, it probably isn't true.

If you have any questions about any kind of medical treatment, the FDA may have an office near you. Look for their number in the blue pages of the phone book. You can also contact the FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332), or on the World Wide Web at [www.fda.gov](http://www.fda.gov).

## General References

In addition to the resources provided earlier in this chapter, the following general references describe medications (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Complete Guide to Prescription and Nonprescription Drugs 2001 (Complete Guide to Prescription and Nonprescription Drugs, 2001)** by H. Winter Griffith, Paperback 16th edition (2001), Medical Surveillance; ISBN: 0942447417;  
<http://www.amazon.com/exec/obidos/ASIN/039952634X/icongroupinterna>
- **The Essential Guide to Prescription Drugs, 2001** by James J. Rybacki, James W. Long; Paperback - 1274 pages (2001), Harper Resource; ISBN: 0060958162;  
<http://www.amazon.com/exec/obidos/ASIN/0060958162/icongroupinterna>
- **Handbook of Commonly Prescribed Drugs** by G. John Digregorio, Edward J. Barbieri; Paperback 16th edition (2001), Medical Surveillance; ISBN: 0942447417;  
<http://www.amazon.com/exec/obidos/ASIN/0942447417/icongroupinterna>
- **Johns Hopkins Complete Home Encyclopedia of Drugs 2nd ed.** by Simeon Margolis (Ed.), Johns Hopkins; Hardcover - 835 pages (2000), Rebus; ISBN: 0929661583;  
<http://www.amazon.com/exec/obidos/ASIN/0929661583/icongroupinterna>
- **Medical Pocket Reference: Drugs 2002** by Springhouse Paperback 1st edition (2001), Lippincott Williams & Wilkins Publishers; ISBN: 1582550964;  
<http://www.amazon.com/exec/obidos/ASIN/1582550964/icongroupinterna>
- **PDR** by Medical Economics Staff, Medical Economics Staff Hardcover - 3506 pages 55th edition (2000), Medical Economics Company; ISBN: 1563633752;  
<http://www.amazon.com/exec/obidos/ASIN/1563633752/icongroupinterna>

- **Pharmacy Simplified: A Glossary of Terms** by James Grogan; Paperback - 432 pages, 1st edition (2001), Delmar Publishers; ISBN: 0766828581;  
<http://www.amazon.com/exec/obidos/ASIN/0766828581/icongroupinterna>
- **Physician Federal Desk Reference** by Christine B. Fraizer; Paperback 2nd edition (2001), Medicode Inc; ISBN: 1563373971;  
<http://www.amazon.com/exec/obidos/ASIN/1563373971/icongroupinterna>
- **Physician's Desk Reference Supplements** Paperback - 300 pages, 53 edition (1999), ISBN: 1563632950;  
<http://www.amazon.com/exec/obidos/ASIN/1563632950/icongroupinterna>

## APPENDIX B. RESEARCHING ALTERNATIVE MEDICINE

### Overview

Complementary and alternative medicine (CAM) is one of the most contentious aspects of modern medical practice. You may have heard of these treatments on the radio or on television. Maybe you have seen articles written about these treatments in magazines, newspapers, or books. Perhaps your friends or doctor have mentioned alternatives.

In this chapter, we will begin by giving you a broad perspective on complementary and alternative therapies. Next, we will introduce you to official information sources on CAM relating to arthritis of the knee. Finally, at the conclusion of this chapter, we will provide a list of readings on arthritis of the knee from various authors. We will begin, however, with the National Center for Complementary and Alternative Medicine's (NCCAM) overview of complementary and alternative medicine.

### What Is CAM?<sup>26</sup>

Complementary and alternative medicine (CAM) covers a broad range of healing philosophies, approaches, and therapies. Generally, it is defined as those treatments and healthcare practices which are not taught in medical schools, used in hospitals, or reimbursed by medical insurance companies. Many CAM therapies are termed “holistic,” which generally means that the healthcare practitioner considers the whole person, including physical, mental, emotional, and spiritual health. Some of these therapies are also known as “preventive,” which means that the practitioner educates and

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<sup>26</sup> Adapted from the NCCAM: <http://nccam.nih.gov/nccam/fcp/faq/index.html#what-is>.

treats the person to prevent health problems from arising, rather than treating symptoms after problems have occurred.

People use CAM treatments and therapies in a variety of ways. Therapies are used alone (often referred to as alternative), in combination with other alternative therapies, or in addition to conventional treatment (sometimes referred to as complementary). Complementary and alternative medicine, or “integrative medicine,” includes a broad range of healing philosophies, approaches, and therapies. Some approaches are consistent with physiological principles of Western medicine, while others constitute healing systems with non-Western origins. While some therapies are far outside the realm of accepted Western medical theory and practice, others are becoming established in mainstream medicine.

Complementary and alternative therapies are used in an effort to prevent illness, reduce stress, prevent or reduce side effects and symptoms, or control or cure disease. Some commonly used methods of complementary or alternative therapy include mind/body control interventions such as visualization and relaxation, manual healing including acupressure and massage, homeopathy, vitamins or herbal products, and acupuncture.

### **What Are the Domains of Alternative Medicine?<sup>27</sup>**

The list of CAM practices changes continually. The reason being is that these new practices and therapies are often proved to be safe and effective, and therefore become generally accepted as “mainstream” healthcare practices. Today, CAM practices may be grouped within five major domains: (1) alternative medical systems, (2) mind-body interventions, (3) biologically-based treatments, (4) manipulative and body-based methods, and (5) energy therapies. The individual systems and treatments comprising these categories are too numerous to list in this sourcebook. Thus, only limited examples are provided within each.

#### **Alternative Medical Systems**

Alternative medical systems involve complete systems of theory and practice that have evolved independent of, and often prior to, conventional biomedical approaches. Many are traditional systems of medicine that are

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<sup>27</sup> Adapted from the NCCAM: <http://nccam.nih.gov/nccam/fcp/classify/index.html>.

practiced by individual cultures throughout the world, including a number of venerable Asian approaches.

Traditional oriental medicine emphasizes the balance or disturbances of qi (pronounced chi) or vital energy in health and disease, respectively. Traditional oriental medicine consists of a group of techniques and methods including acupuncture, herbal medicine, oriental massage, and qi gong (a form of energy therapy). Acupuncture involves stimulating specific anatomic points in the body for therapeutic purposes, usually by puncturing the skin with a thin needle.

Ayurveda is India's traditional system of medicine. Ayurvedic medicine (meaning "science of life") is a comprehensive system of medicine that places equal emphasis on body, mind, and spirit. Ayurveda strives to restore the innate harmony of the individual. Some of the primary Ayurvedic treatments include diet, exercise, meditation, herbs, massage, exposure to sunlight, and controlled breathing.

Other traditional healing systems have been developed by the world's indigenous populations. These populations include Native American, Aboriginal, African, Middle Eastern, Tibetan, and Central and South American cultures. Homeopathy and naturopathy are also examples of complete alternative medicine systems.

Homeopathic medicine is an unconventional Western system that is based on the principle that "like cures like," i.e., that the same substance that in large doses produces the symptoms of an illness, in very minute doses cures it. Homeopathic health practitioners believe that the more dilute the remedy, the greater its potency. Therefore, they use small doses of specially prepared plant extracts and minerals to stimulate the body's defense mechanisms and healing processes in order to treat illness.

Naturopathic medicine is based on the theory that disease is a manifestation of alterations in the processes by which the body naturally heals itself and emphasizes health restoration rather than disease treatment. Naturopathic physicians employ an array of healing practices, including the following: diet and clinical nutrition, homeopathy, acupuncture, herbal medicine, hydrotherapy (the use of water in a range of temperatures and methods of applications), spinal and soft-tissue manipulation, physical therapies (such as those involving electrical currents, ultrasound, and light), therapeutic counseling, and pharmacology.

### **Mind-Body Interventions**

Mind-body interventions employ a variety of techniques designed to facilitate the mind's capacity to affect bodily function and symptoms. Only a select group of mind-body interventions having well-documented theoretical foundations are considered CAM. For example, patient education and cognitive-behavioral approaches are now considered "mainstream." On the other hand, complementary and alternative medicine includes meditation, certain uses of hypnosis, dance, music, and art therapy, as well as prayer and mental healing.

### **Biological-Based Therapies**

This category of CAM includes natural and biological-based practices, interventions, and products, many of which overlap with conventional medicine's use of dietary supplements. This category includes herbal, special dietary, orthomolecular, and individual biological therapies.

Herbal therapy employs an individual herb or a mixture of herbs for healing purposes. An herb is a plant or plant part that produces and contains chemical substances that act upon the body. Special diet therapies, such as those proposed by Drs. Atkins, Ornish, Pritikin, and Weil, are believed to prevent and/or control illness as well as promote health. Orthomolecular therapies aim to treat disease with varying concentrations of chemicals such as magnesium, melatonin, and mega-doses of vitamins. Biological therapies include, for example, the use of laetrile and shark cartilage to treat cancer and the use of bee pollen to treat autoimmune and inflammatory diseases.

### **Manipulative and Body-Based Methods**

This category includes methods that are based on manipulation and/or movement of the body. For example, chiropractors focus on the relationship between structure and function, primarily pertaining to the spine, and how that relationship affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool.

In contrast, osteopaths place particular emphasis on the musculoskeletal system and practice osteopathic manipulation. Osteopaths believe that all of the body's systems work together and that disturbances in one system may have an impact upon function elsewhere in the body. Massage therapists manipulate the soft tissues of the body to normalize those tissues.

## Energy Therapies

Energy therapies focus on energy fields originating within the body (biofields) or those from other sources (electromagnetic fields). Biofield therapies are intended to affect energy fields (the existence of which is not yet experimentally proven) that surround and penetrate the human body. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in or through these fields. Examples include Qi gong, Reiki and Therapeutic Touch.

Qi gong is a component of traditional oriental medicine that combines movement, meditation, and regulation of breathing to enhance the flow of vital energy (qi) in the body, improve blood circulation, and enhance immune function. Reiki, the Japanese word representing Universal Life Energy, is based on the belief that, by channeling spiritual energy through the practitioner, the spirit is healed and, in turn, heals the physical body. Therapeutic Touch is derived from the ancient technique of “laying-on of hands.” It is based on the premises that the therapist’s healing force affects the patient's recovery and that healing is promoted when the body's energies are in balance. By passing their hands over the patient, these healers identify energy imbalances.

Bioelectromagnetic-based therapies involve the unconventional use of electromagnetic fields to treat illnesses or manage pain. These therapies are often used to treat asthma, cancer, and migraine headaches. Types of electromagnetic fields which are manipulated in these therapies include pulsed fields, magnetic fields, and alternating current or direct current fields.

## Can Alternatives Affect My Treatment?

A critical issue in pursuing complementary alternatives mentioned thus far is the risk that these might have undesirable interactions with your medical treatment. It becomes all the more important to speak with your doctor who can offer advice on the use of alternatives. Official sources confirm this view. Though written for women, we find that the National Women’s Health Information Center’s advice on pursuing alternative medicine is appropriate for patients of both genders and all ages.<sup>28</sup>

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<sup>28</sup> Adapted from <http://www.4woman.gov/faq/alternative.htm>.

### **Is It Okay to Want Both Traditional and Alternative Medicine?**

Should you wish to explore non-traditional types of treatment, be sure to discuss all issues concerning treatments and therapies with your healthcare provider, whether a physician or practitioner of complementary and alternative medicine. Competent healthcare management requires knowledge of both conventional and alternative therapies you are taking for the practitioner to have a complete picture of your treatment plan.

The decision to use complementary and alternative treatments is an important one. Consider before selecting an alternative therapy, the safety and effectiveness of the therapy or treatment, the expertise and qualifications of the healthcare practitioner, and the quality of delivery. These topics should be considered when selecting any practitioner or therapy.

### **Finding CAM References on Arthritis of the Knee**

Having read the previous discussion, you may be wondering which complementary or alternative treatments might be appropriate for arthritis of the knee. For the remainder of this chapter, we will direct you to a number of official sources which can assist you in researching studies and publications. Some of these articles are rather technical, so some patience may be required.

#### **The Combined Health Information Database**

For a targeted search, The Combined Health Information Database is a bibliographic database produced by health-related agencies of the Federal Government (mostly from the National Institutes of Health). This database is updated four times a year at the end of January, April, July, and October. Check the titles, summaries, and availability of CAM-related information by using the "Simple Search" option at the following Web site: <http://chid.nih.gov/simple/simple.html>. In the drop box at the top, select "Complementary and Alternative Medicine." Then type "arthritis of the knee" (or synonyms) in the second search box. We recommend that you select 100 "documents per page" and to check the "whole records" options. The following was extracted using this technique:

- **Acupuncture for Osteoarthritis of the Knee: A Systematic Review**  
Source: Arthritis and Rheumatism. 44(4): 819-825. April 2001.



Summary: This journal article reviews the research literature (1966-1999) on acupuncture for osteoarthritis (OA) of the knee. Eight databases and 62 conference abstract series were searched. Randomized or quasi-randomized trials in all languages were included and evaluated for methodologic quality using the Jadad scale. Outcomes assessed were pain, function, global improvement, and imaging. Because data could not be pooled, a best-evidence synthesis was performed to determine the strength of evidence by control group. The adequacy of the acupuncture procedure was assessed by two acupuncturists trained in treating OA and blinded to study results. Seven trials involving 393 patients with OA of the knee were identified. For pain and function, there was limited evidence that acupuncture is more effective than being on a wait list for treatment or receiving treatment as usual. For pain, there was strong evidence that real acupuncture is more effective than sham acupuncture; however, for function, evidence regarding the efficacy of real versus sham acupuncture was inconclusive. There was insufficient evidence to determine whether the efficacy of acupuncture is similar to that of other treatments. The authors conclude that acupuncture may play a role in the treatment of knee OA. However, they recommend further research to define an optimal acupuncture treatment, measure quality of life, and assess acupuncture combined with other modalities. The article has 4 tables and 48 references. (AA-M).

- **Clinical Decisions in the Use of Acupuncture as an Adjunctive Therapy for Osteoarthritis of the Knee**

Source: *Alternative Therapies in Health and Medicine*. 7(4): 58-65. July-August 2001.

Summary: This journal article examines the influence of demographic, medical history, and arthritis assessment data on outcomes and rate of deterioration in patients with osteoarthritis (OA) treated with acupuncture. Seventy-three people with symptomatic OA of the knee were enrolled in a randomized controlled trial. Patients originally assigned to acupuncture treatment and those crossed over from the control condition received acupuncture twice weekly for 8 weeks. Outcomes were assessed with the self-rated Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and the Lequesne Algofunctional Index at baseline (n=73), 4 weeks (n=60), 8 weeks (n=58), and 12 weeks (n=52). Scores on both indexes improved at 4, 8, and 12 weeks. Although there was slight deterioration at 12 weeks (4 weeks after the end of acupuncture treatment), measures were still significantly improved over baseline. Patients with the least disability and pain at baseline rebounded to original levels to a greater extent than those who

were initially more disabled. Demographic and medical variables had no effect on outcome. The authors conclude that acupuncture for patients with OA of the knee should be used early in the treatment plan, with a methodical decrease in treatment frequency once acute treatment is complete to avoid a rebound effect. The article has 2 figures, 4 tables, and 50 references.

- **Randomized Trial of Acupuncture as an Adjunctive Therapy in Osteoarthritis of the Knee**

Source: *Rheumatology (Oxford)*. 38(4): 346-354. April 1999.

Summary: This journal article describes a randomized trial of acupuncture as an adjunctive therapy for older patients with osteoarthritis (OA) of the knee. Seventy-three patients with symptomatic OA, aged 49 to 86 years, were randomly assigned to acupuncture or standard care for 8 weeks. Patients in the acupuncture group received biweekly sessions and continued on their existing analgesic/antiinflammatory regimens. Those in the control group continued their oral therapy only. All patients completed the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Lequesne scale at baseline and 4, 8, and 12 weeks. Analysis was performed on last score carried forward to account for noncompleters. Members of the control group were offered acupuncture after 12 weeks, and the data for these patients were pooled with those from the original acupuncture group for within-group analysis. The patients randomized to acupuncture improved on both the WOMAC and Lequesne indices compared with those who received standard care only. Significant differences on the total WOMAC Scale were seen at 4 and 8 weeks. A slight decline in effect was observed at 4 weeks after cessation of treatment. No adverse effects of acupuncture were reported. The findings suggest that acupuncture may be an effective and safe adjunctive treatment for OA of the knee. The article has 3 figures, 3 tables, and 50 references.

- **Symptomatic Efficacy of Avocado/Soybean Unsaponifiables in the Treatment of Osteoarthritis of the Knee and Hip: A Prospective, Randomized, Double-Blind, Placebo-Controlled, Multicenter Clinical Trial**

Source: *Arthritis and Rheumatism*. 41(1): 81-91. January 1998.

Summary: This journal article describes a French study of the efficacy and safety of avocado/soybean unsaponifiables (ASUs) in the treatment of patients with symptomatic osteoarthritis (OA) of the knee or hip. A total of 164 patients with painful, primary OA of the knee (n=114) or hip

(n=50) were enrolled in a prospective, randomized, double-blind, placebo-controlled, multicenter trial with a 6-month treatment period and a 2-month posttreatment followup. Before entering the study, all patients underwent a 15-day washout period for nonsteroidal antiinflammatory drugs (NSAIDs). After entering the study, participants were allowed to use NSAIDs if needed. The primary outcome measures were Lequesne's functional index (LFI), pain on Huskisson's visual analog scale, intake of NSAIDs, and overall disability score. Seventy-five of 85 patients receiving ASUs and 69 of 79 receiving placebo completed the treatment period. There were significantly greater improvements on all of the outcome measures in the ASU group compared with the placebo group; this effect was evident at month 2 and persisted at followup. The success rate was 39 percent in the ASU group and 1 percent in the placebo group. Tolerance was good to excellent for most patients. The authors conclude that ASUs may help relieve symptoms and reduce NSAID consumption in patients with OA. The article has 3 figures, 4 tables, and 30 references.

### **National Center for Complementary and Alternative Medicine**

The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (<http://nccam.nih.gov>) has created a link to the National Library of Medicine's databases to allow patients to search for articles that specifically relate to arthritis of the knee and complementary medicine. To search the database, go to the following Web site: [www.nlm.nih.gov/nccam/camonpubmed.html](http://www.nlm.nih.gov/nccam/camonpubmed.html). Select "CAM on PubMed." Enter "arthritis of the knee" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine (CAM) that are related to arthritis of the knee:

### **Additional Web Resources**

A number of additional Web sites offer encyclopedic information covering CAM and related topics. The following is a representative sample:

- Alternative Medicine Foundation, Inc.: <http://www.herbmed.org/>
- AOL: <http://search.aol.com/cat.adp?id=169&layer=&from=subcats>
- Chinese Medicine: <http://www.newcenturynutrition.com/>
- drkoop.com<sup>®</sup>:  
<http://www.drkoop.com/InteractiveMedicine/IndexC.html>

- Family Village: [http://www.familyvillage.wisc.edu/med\\_altn.htm](http://www.familyvillage.wisc.edu/med_altn.htm)
- Google: <http://directory.google.com/Top/Health/Alternative/>
- Healthnotes: <http://www.thedacare.org/healthnotes/>
- Open Directory Project: <http://dmoz.org/Health/Alternative/>
- TPN.com: <http://www.tnp.com/>
- Yahoo.com: [http://dir.yahoo.com/Health/Alternative\\_Medicine/](http://dir.yahoo.com/Health/Alternative_Medicine/)
- WebMD® Health: [http://my.webmd.com/drugs\\_and\\_herbs](http://my.webmd.com/drugs_and_herbs)
- WellNet: <http://www.wellnet.ca/herbsa-c.htm>
- WholeHealthMD.com:  
<http://www.wholehealthmd.com/reflib/0,1529,,00.html>

The following is a specific Web list relating to arthritis of the knee; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **Alternative Therapy**

- **Homeopathy**

- Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

- Hyperlink:

- <http://www.drkoop.com/interactivemedicine/ConsModalities/Homeopathycm.html>

- **Light therapy**

- Source: WholeHealthMD.com, LLC.; [www.wholehealthmd.com](http://www.wholehealthmd.com)

- Hyperlink:

- [http://www.wholehealthmd.com/refshelf/substances\\_view/0,1525,713,00.html](http://www.wholehealthmd.com/refshelf/substances_view/0,1525,713,00.html)

- **Therapeutic touch**

- Source: WholeHealthMD.com, LLC.; [www.wholehealthmd.com](http://www.wholehealthmd.com)

- Hyperlink:

- [http://www.wholehealthmd.com/refshelf/substances\\_view/0,1525,739,00.html](http://www.wholehealthmd.com/refshelf/substances_view/0,1525,739,00.html)

- **Herbs and Supplements**

**Acetaminophen**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Acetylsalicylic Acid**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Ademetionine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Ademetionine**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Ademetionine**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Aleve**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Antidepressants**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Anti-Inflammatory Drugs**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Anti-Inflammatory Drugs**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

### **Antioxidants**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

### **Antioxidants**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Arnica**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Arnica montana**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Arthrotec**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Ashwagandha**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Aspirin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Aspirin**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Aspirin**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Ayurvedic Herbs**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Black Cohosh**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Boswellia**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Boswellia**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Bovine Cartilage**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Capsaicin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Capsaicin**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Cayenne**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Celecoxib**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Colchicine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Comfrey**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Devil's Claw**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Devil's Claw**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Devil's Claw**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>



**Diazepam**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Diclofenac**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Diclofenac**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Diclofenac**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Diflunisal**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**DMSO**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**DMSO**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink: <http://www.thedacare.org/healthnotes/Supp/DMSO.htm>

**DMSO**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**D-Phenylalanine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Etodolac**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Feldene**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Flaxseed**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Ginger**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Ginger**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Glucosamine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Glucosamine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Supp/Glucosamine.htm>

**Glucosamine**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Glucosamine**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000168.html>

**Glucosamine**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Glucosamine**

Source: WholeHealthMD.com, LLC.; [www.wholehealthmd.com](http://www.wholehealthmd.com)

Hyperlink:

[http://www.wholehealthmd.com/refshelf/substances\\_view/0,1525,790,00.html](http://www.wholehealthmd.com/refshelf/substances_view/0,1525,790,00.html)

**Glutathione**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Goldenrod**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Green-Lipped Mussel**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Harpagophytum procumbens**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Herbal Medicine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Horsetail**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Ibuprofen**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Ibuprofen**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Ibuprofen**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Indomethacin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Indomethacin**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Insulin**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Kava**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Ketoprofen**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Methionine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Methionine**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Methotrexate**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Methylsulfonylmethane**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Metoclopramide**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Motrin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Nabumetone**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Naproxen**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Naproxen**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Naproxen**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Nettle**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Nettle**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Nonsteroidal Anti-Inflammatory Drugs**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Nonsteroidal Anti-Inflammatory Drugs**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Orudis**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Oxaprozin**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Phenylalanine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Phenytoin**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Piroxicam**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Piroxicam**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Piroxicam**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Rofecoxib**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**S-Adenosylmethionine**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**S-Adenosylmethionine**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**S-Adenosylmethionine**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Salicylates**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Salsalate**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Sarsaparilla**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Silicon**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Sulindac**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Turmeric**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Tylenol**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Urtica**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>



**Urtica dioica**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**White Willow**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Willow**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Willow**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Willow**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Willow Bark**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Willow Bark**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Willow Bark**

Alternative names: There are several species of willow including Salix alba, Salix nigra, Salix fragilis, Salix purpurea, Salix babylonica, White Willow, European Willow, Black Willow, Pussy Willow, Crack Willow, Purple Willow, Weeping Willow, Liu-zhi

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsHerbs/WillowBarkch.html>

### **Yucca**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

- **Related Conditions**

### **Arthritis, Osteo-**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Osteoarthritis**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

### **Osteoarthritis**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Osteoarthritis**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

## **General References**

A good place to find general background information on CAM is the National Library of Medicine. It has prepared within the MEDLINEplus system an information topic page dedicated to complementary and alternative medicine. To access this page, go to the MEDLINEplus site at: **[www.nlm.nih.gov/medlineplus/alternativemedicine.html](http://www.nlm.nih.gov/medlineplus/alternativemedicine.html)**. This Web site provides a general overview of various topics and can lead to a number of general sources. The following additional references describe, in broad terms, alternative and complementary medicine (sorted alphabetically by

title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **The Arthritis Bible: A Comprehensive Guide to Alternative Therapies and Conventional Treatments for Arthritic Diseases** by Leonid Gordin, Craig Weatherby; Paperback - 244 pages, 1st edition (April 15, 1999), Inner Traditions Int'l Ltd.; ISBN: 0892818255;  
<http://www.amazon.com/exec/obidos/ASIN/0892818255/icongroupinterna>
- **Healing Joint Pain Naturally : Safe and Effective Ways to Treat Arthritis, Fibromyalgia, and Other Joint Diseases** by Ellen Hodgson Brown; Paperback - 262 pages (June 2001), Broadway Books; ISBN: 076790561X;  
<http://www.amazon.com/exec/obidos/ASIN/076790561X/icongroupinterna>
- **Healthy Bones & Joints: A Natural Approach to Treating Arthritis, Osteoporosis, Tendinitis, Myalgia & Bursitis** by David Hoffmann; Paperback - 128 pages (July 15, 2000), Storey Books; ISBN: 1580172539;  
<http://www.amazon.com/exec/obidos/ASIN/1580172539/icongroupinterna>
- **Joint Pains: A Guide to Successful Herbal Remedies** by Penelope Ody; Paperback - 172 pages (April 2002), Souvenir Press Ltd; ISBN: 0285636227;  
<http://www.amazon.com/exec/obidos/ASIN/0285636227/icongroupinterna>
- **Living Life Free from Pain: Treating Arthritis, Joint Pain, Muscle Pain, and Fibromyalgia with Maharishi Vedic Medicine** by Kumuda Reddy, et al; Paperback - 350 pages (August 2001), Lantern Books; ISBN: 1930051549;  
<http://www.amazon.com/exec/obidos/ASIN/1930051549/icongroupinterna>
- **The Posture Prescription : A Doctor's Rx for Eliminating Back, Muscle, and Joint Pain, Achieving Optimum Strength and Mobility, Living a Life of Fitne** by Arthur White, MD, et al; Paperback - 256 pages, 1st edition (January 8, 2002), Three Rivers Pr; ISBN: 0609806319;  
<http://www.amazon.com/exec/obidos/ASIN/0609806319/icongroupinterna>

For additional information on complementary and alternative medicine, ask your doctor or write to:

National Institutes of Health  
National Center for Complementary and Alternative Medicine  
Clearinghouse  
P. O. Box 8218  
Silver Spring, MD 20907-8218

## APPENDIX C. RESEARCHING NUTRITION

### Overview

Since the time of Hippocrates, doctors have understood the importance of diet and nutrition to patients' health and well-being. Since then, they have accumulated an impressive archive of studies and knowledge dedicated to this subject. Based on their experience, doctors and healthcare providers may recommend particular dietary supplements to patients with arthritis of the knee. Any dietary recommendation is based on a patient's age, body mass, gender, lifestyle, eating habits, food preferences, and health condition. It is therefore likely that different patients with arthritis of the knee may be given different recommendations. Some recommendations may be directly related to arthritis of the knee, while others may be more related to the patient's general health. These recommendations, themselves, may differ from what official sources recommend for the average person.

In this chapter we will begin by briefly reviewing the essentials of diet and nutrition that will broadly frame more detailed discussions of arthritis of the knee. We will then show you how to find studies dedicated specifically to nutrition and arthritis of the knee.

## Food and Nutrition: General Principles

### What Are Essential Foods?

Food is generally viewed by official sources as consisting of six basic elements: (1) fluids, (2) carbohydrates, (3) protein, (4) fats, (5) vitamins, and (6) minerals. Consuming a combination of these elements is considered to be a healthy diet:

- **Fluids** are essential to human life as 80-percent of the body is composed of water. Water is lost via urination, sweating, diarrhea, vomiting, diuretics (drugs that increase urination), caffeine, and physical exertion.
- **Carbohydrates** are the main source for human energy (thermoregulation) and the bulk of typical diets. They are mostly classified as being either simple or complex. Simple carbohydrates include sugars which are often consumed in the form of cookies, candies, or cakes. Complex carbohydrates consist of starches and dietary fibers. Starches are consumed in the form of pastas, breads, potatoes, rice, and other foods. Soluble fibers can be eaten in the form of certain vegetables, fruits, oats, and legumes. Insoluble fibers include brown rice, whole grains, certain fruits, wheat bran and legumes.
- **Proteins** are eaten to build and repair human tissues. Some foods that are high in protein are also high in fat and calories. Food sources for protein include nuts, meat, fish, cheese, and other dairy products.
- **Fats** are consumed for both energy and the absorption of certain vitamins. There are many types of fats, with many general publications recommending the intake of unsaturated fats or those low in cholesterol.

Vitamins and minerals are fundamental to human health, growth, and, in some cases, disease prevention. Most are consumed in your diet (exceptions being vitamins K and D which are produced by intestinal bacteria and sunlight on the skin, respectively). Each vitamin and mineral plays a different role in health. The following outlines essential vitamins:

- **Vitamin A** is important to the health of your eyes, hair, bones, and skin; sources of vitamin A include foods such as eggs, carrots, and cantaloupe.
- **Vitamin B<sup>1</sup>**, also known as thiamine, is important for your nervous system and energy production; food sources for thiamine include meat, peas, fortified cereals, bread, and whole grains.
- **Vitamin B<sup>2</sup>**, also known as riboflavin, is important for your nervous system and muscles, but is also involved in the release of proteins from

nutrients; food sources for riboflavin include dairy products, leafy vegetables, meat, and eggs.

- **Vitamin B<sup>3</sup>**, also known as niacin, is important for healthy skin and helps the body use energy; food sources for niacin include peas, peanuts, fish, and whole grains
- **Vitamin B<sup>6</sup>**, also known as pyridoxine, is important for the regulation of cells in the nervous system and is vital for blood formation; food sources for pyridoxine include bananas, whole grains, meat, and fish.
- **Vitamin B<sup>12</sup>** is vital for a healthy nervous system and for the growth of red blood cells in bone marrow; food sources for vitamin B<sup>12</sup> include yeast, milk, fish, eggs, and meat.
- **Vitamin C** allows the body's immune system to fight various diseases, strengthens body tissue, and improves the body's use of iron; food sources for vitamin C include a wide variety of fruits and vegetables.
- **Vitamin D** helps the body absorb calcium which strengthens bones and teeth; food sources for vitamin D include oily fish and dairy products.
- **Vitamin E** can help protect certain organs and tissues from various degenerative diseases; food sources for vitamin E include margarine, vegetables, eggs, and fish.
- **Vitamin K** is essential for bone formation and blood clotting; common food sources for vitamin K include leafy green vegetables.
- **Folic Acid** maintains healthy cells and blood and, when taken by a pregnant woman, can prevent her fetus from developing neural tube defects; food sources for folic acid include nuts, fortified breads, leafy green vegetables, and whole grains.

It should be noted that one can overdose on certain vitamins which become toxic if consumed in excess (e.g. vitamin A, D, E and K).

Like vitamins, minerals are chemicals that are required by the body to remain in good health. Because the human body does not manufacture these chemicals internally, we obtain them from food and other dietary sources. The more important minerals include:

- **Calcium** is needed for healthy bones, teeth, and muscles, but also helps the nervous system function; food sources for calcium include dry beans, peas, eggs, and dairy products.
- **Chromium** is helpful in regulating sugar levels in blood; food sources for chromium include egg yolks, raw sugar, cheese, nuts, beets, whole grains, and meat.

- **Fluoride** is used by the body to help prevent tooth decay and to reinforce bone strength; sources of fluoride include drinking water and certain brands of toothpaste.
- **Iodine** helps regulate the body's use of energy by synthesizing into the hormone thyroxine; food sources include leafy green vegetables, nuts, egg yolks, and red meat.
- **Iron** helps maintain muscles and the formation of red blood cells and certain proteins; food sources for iron include meat, dairy products, eggs, and leafy green vegetables.
- **Magnesium** is important for the production of DNA, as well as for healthy teeth, bones, muscles, and nerves; food sources for magnesium include dried fruit, dark green vegetables, nuts, and seafood.
- **Phosphorous** is used by the body to work with calcium to form bones and teeth; food sources for phosphorous include eggs, meat, cereals, and dairy products.
- **Selenium** primarily helps maintain normal heart and liver functions; food sources for selenium include wholegrain cereals, fish, meat, and dairy products.
- **Zinc** helps wounds heal, the formation of sperm, and encourage rapid growth and energy; food sources include dried beans, shellfish, eggs, and nuts.

The United States government periodically publishes recommended diets and consumption levels of the various elements of food. Again, your doctor may encourage deviations from the average official recommendation based on your specific condition. To learn more about basic dietary guidelines, visit the Web site: <http://www.health.gov/dietaryguidelines/>. Based on these guidelines, many foods are required to list the nutrition levels on the food's packaging. Labeling Requirements are listed at the following site maintained by the Food and Drug Administration: <http://www.cfsan.fda.gov/~dms/lab-cons.html>. When interpreting these requirements, the government recommends that consumers become familiar with the following abbreviations before reading FDA literature:<sup>29</sup>

- **DVs (Daily Values):** A new dietary reference term that will appear on the food label. It is made up of two sets of references, DRVs and RDIs.
- **DRVs (Daily Reference Values):** A set of dietary references that applies to fat, saturated fat, cholesterol, carbohydrate, protein, fiber, sodium, and potassium.

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<sup>29</sup> Adapted from the FDA: <http://www.fda.gov/fdac/special/foodlabel/dvs.html>.



- **RDIs (Reference Daily Intakes):** A set of dietary references based on the Recommended Dietary Allowances for essential vitamins and minerals and, in selected groups, protein. The name “RDI” replaces the term “U.S. RDA.”
- **RDAs (Recommended Dietary Allowances):** A set of estimated nutrient allowances established by the National Academy of Sciences. It is updated periodically to reflect current scientific knowledge.

### What Are Dietary Supplements?<sup>30</sup>

Dietary supplements are widely available through many commercial sources, including health food stores, grocery stores, pharmacies, and by mail. Dietary supplements are provided in many forms including tablets, capsules, powders, gel-tabs, extracts, and liquids. Historically in the United States, the most prevalent type of dietary supplement was a multivitamin/mineral tablet or capsule that was available in pharmacies, either by prescription or “over the counter.” Supplements containing strictly herbal preparations were less widely available. Currently in the United States, a wide array of supplement products are available, including vitamin, mineral, other nutrients, and botanical supplements as well as ingredients and extracts of animal and plant origin.

The Office of Dietary Supplements (ODS) of the National Institutes of Health is the official agency of the United States which has the expressed goal of acquiring “new knowledge to help prevent, detect, diagnose, and treat disease and disability, from the rarest genetic disorder to the common cold.”<sup>31</sup> According to the ODS, dietary supplements can have an important impact on the prevention and management of disease and on the maintenance of health.<sup>32</sup> The ODS notes that considerable research on the effects of dietary supplements has been conducted in Asia and Europe where the use of plant products, in particular, has a long tradition. However, the

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<sup>30</sup> This discussion has been adapted from the NIH:  
<http://ods.od.nih.gov/whatare/whatare.html>.

<sup>31</sup> Contact: The Office of Dietary Supplements, National Institutes of Health, Building 31, Room 1B29, 31 Center Drive, MSC 2086, Bethesda, Maryland 20892-2086, Tel: (301) 435-2920, Fax: (301) 480-1845, E-mail: [ods@nih.gov](mailto:ods@nih.gov).

<sup>32</sup> Adapted from <http://ods.od.nih.gov/about/about.html>. The Dietary Supplement Health and Education Act defines dietary supplements as “a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, mineral, amino acid, herb or other botanical; or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described above; and intended for ingestion in the form of a capsule, powder, softgel, or gelcap, and not represented as a conventional food or as a sole item of a meal or the diet.”

overwhelming majority of supplements have not been studied scientifically. To explore the role of dietary supplements in the improvement of health care, the ODS plans, organizes, and supports conferences, workshops, and symposia on scientific topics related to dietary supplements. The ODS often works in conjunction with other NIH Institutes and Centers, other government agencies, professional organizations, and public advocacy groups.

To learn more about official information on dietary supplements, visit the ODS site at <http://ods.od.nih.gov/whatare/whatare.html>. Or contact:

The Office of Dietary Supplements  
National Institutes of Health  
Building 31, Room 1B29  
31 Center Drive, MSC 2086  
Bethesda, Maryland 20892-2086  
Tel: (301) 435-2920  
Fax: (301) 480-1845  
E-mail: [ods@nih.gov](mailto:ods@nih.gov)

## **Finding Studies on Arthritis of the Knee**

The NIH maintains an office dedicated to patient nutrition and diet. The National Institutes of Health's Office of Dietary Supplements (ODS) offers a searchable bibliographic database called the IBIDS (International Bibliographic Information on Dietary Supplements). The IBIDS contains over 460,000 scientific citations and summaries about dietary supplements and nutrition as well as references to published international, scientific literature on dietary supplements such as vitamins, minerals, and botanicals.<sup>33</sup> IBIDS is available to the public free of charge through the ODS Internet page: <http://ods.od.nih.gov/databases/ibids.html>.

After entering the search area, you have three choices: (1) IBIDS Consumer Database, (2) Full IBIDS Database, or (3) Peer Reviewed Citations Only. We recommend that you start with the Consumer Database. While you may not find references for the topics that are of most interest to you, check back periodically as this database is frequently updated. More studies can be

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<sup>33</sup> Adapted from <http://ods.od.nih.gov>. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.

found by searching the Full IBIDS Database. Healthcare professionals and researchers generally use the third option, which lists peer-reviewed citations. In all cases, we suggest that you take advantage of the “Advanced Search” option that allows you to retrieve up to 100 fully explained references in a comprehensive format. Type “arthritis of the knee” (or synonyms) into the search box. To narrow the search, you can also select the “Title” field.

The following information is typical of that found when using the “Full IBIDS Database” when searching using “arthritis of the knee” (or a synonym):

- **Diclofenac/misoprostol compared with diclofenac in the treatment of osteoarthritis of the knee or hip: a randomized, placebo controlled trial. Arthrotec Osteoarthritis Study Group.**  
Author(s): Arthritis Center of Nebraska, Lincoln, USA.  
Source: Bocanegra, T S Weaver, A L Tindall, E A Sikes, D H Ball, J A Wallemark, C B Geis, G S Fort, J G J-Rheumatol. 1998 August; 25(8): 1602-11 0315-162X
- **Induction of micronuclei in peripheral blood lymphocytes of patients treated for rheumatoid or osteo-arthritis of the knee with dysprosium-165 hydroxide macroaggregates or yttrium-90 silicate.**  
Author(s): Biomedicine and Health Program, Australian Nuclear Science and Technology Organisation, Menai, NSW.  
Source: Prosser, J S Izard, B E Brown, J K Hetherington, E L Lambrecht, R M Cato, L Wallace, M Whitwell, J Wiseman, J Hoschl, R et al. Cytobios. 1993; 73(292): 7-15 0011-4529

## Federal Resources on Nutrition

In addition to the IBIDS, the United States Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) provide many sources of information on general nutrition and health. Recommended resources include:

- healthfinder®, HHS's gateway to health information, including diet and nutrition:  
<http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0>
- The United States Department of Agriculture's Web site dedicated to nutrition information: [www.nutrition.gov](http://www.nutrition.gov)
- The Food and Drug Administration's Web site for federal food safety information: [www.foodsafety.gov](http://www.foodsafety.gov)

- The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General:  
**<http://www.surgeongeneral.gov/topics/obesity/>**
- The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: **<http://vm.cfsan.fda.gov/>**
- Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: **<http://www.usda.gov/cnpp/>**
- Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: **<http://www.nal.usda.gov/fnic/>**
- Food and Nutrition Service sponsored by the United States Department of Agriculture: **<http://www.fns.usda.gov/fns/>**

### **Additional Web Resources**

A number of additional Web sites offer encyclopedic information covering food and nutrition. The following is a representative sample:

- AOL: **<http://search.aol.com/cat.adp?id=174&layer=&from=subcats>**
- Family Village: **[http://www.familyvillage.wisc.edu/med\\_nutrition.html](http://www.familyvillage.wisc.edu/med_nutrition.html)**
- Google: **<http://directory.google.com/Top/Health/Nutrition/>**
- Healthnotes: **<http://www.thedacare.org/healthnotes/>**
- Open Directory Project: **<http://dmoz.org/Health/Nutrition/>**
- Yahoo.com: **<http://dir.yahoo.com/Health/Nutrition/>**
- WebMD<sup>®</sup> Health: **<http://my.webmd.com/nutrition>**
- WholeHealthMD.com:  
**<http://www.wholehealthmd.com/reflib/0,1529,,00.html>**

The following is a specific Web list relating to arthritis of the knee; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **Vitamins**

**Niacinamide**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Niacinamide**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Niacinamide**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Vitamin D**

Source: WholeHealthMD.com, LLC.; [www.wholehealthmd.com](http://www.wholehealthmd.com)

Hyperlink:

[http://www.wholehealthmd.com/refshelf/substances\\_view/0,1525,905,00.html](http://www.wholehealthmd.com/refshelf/substances_view/0,1525,905,00.html)

- **Minerals**

**Boron**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Boron**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Calcium**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Chondroitin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Chondroitin**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Chondroitin**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Chondroitin**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000130.html>

**Diclofenac Sodium**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Diclofenac Sodium**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Glucosamine Hydrochloride**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Glucosamine Hydrochloride**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Glucosamine/Chondroitin**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

[http://www.thedacare.org/healthnotes/Supp/Glucosamine\\_Chondroitin.htm](http://www.thedacare.org/healthnotes/Supp/Glucosamine_Chondroitin.htm)

### **Manganese**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Molybdenum**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

### **Naproxen Sodium**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Nicotinamide**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

### **Spirolactone**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

### **Sulfur**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

- **Food and Diet**

### **Cartilage**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

### **Cartilage**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Cartilage**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

### **Chili**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Chili peppers**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Chondroitin Sulfate**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

[http://www.thedacare.org/healthnotes/Supp/Chondroitin\\_Sulfate.htm](http://www.thedacare.org/healthnotes/Supp/Chondroitin_Sulfate.htm)

### **Chondroitin Sulfate**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

### **Chondroitin Sulfate**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

### **Chondroitin Sulfate**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

### **Cod**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)



Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Cream**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Cream**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Cream**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Diabetes**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Fish**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Fish**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Glucosamine Sulfate**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Glucosamine Sulfate**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Glucosamine Sulfate**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Grains**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Mackerel**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Nuts**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Omega-3 Fatty Acids**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Omega-3 Fatty Acids**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Peppers**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Peppers**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)

Hyperlink:

<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Rabbit**

Source: Prima Communications, Inc.

Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Salmon**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)  
Hyperlink:  
<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Seafood**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)  
Hyperlink:  
<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Seeds**

Source: Prima Communications, Inc.  
Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Sugar**

Source: Prima Communications, Inc.  
Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Tomatoes**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)  
Hyperlink:  
<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Vegetables**

Source: Prima Communications, Inc.  
Hyperlink: <http://www.personalhealthzone.com/pg000264.html>

**Walnuts**

Source: Integrative Medicine Communications; [www.onemedicine.com](http://www.onemedicine.com)  
Hyperlink:  
<http://www.drkoop.com/interactivemedicine/ConsConditions/Osteoarthritiscc.html>

**Water**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)  
Hyperlink:  
<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

**Weight Loss**

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Concern/Osteoarthritis.htm>

## Vocabulary Builder

The following vocabulary builder defines words used in the references in this chapter that have not been defined in previous chapters:

**Capsules:** Hard or soft soluble containers used for the oral administration of medicine. [NIH]

**Carbohydrate:** An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water,  $(\text{CH}_2\text{O})_n$ . The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

**Cholesterol:** The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

**Diarrhea:** Passage of excessively liquid or excessively frequent stools. [NIH]

**Dysprosium:** Dysprosium. An element of the rare earth family that has the atomic symbol Dy, atomic number 66, and atomic weight 162.50. Dysprosium is a silvery metal used primarily in the form of various salts. [NIH]

**Iodine:** A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

**Micronuclei:** Nuclei, separate from and additional to the main nucleus of a cell, produced during the telophase of mitosis or meiosis by lagging chromosomes or chromosome fragments derived from spontaneous or experimentally induced chromosomal structural changes. This concept also includes the smaller, reproductive nuclei found in multinucleate protozoans. [NIH]

**Misoprostol:** A synthetic analog of natural prostaglandin E1. It produces a dose-related inhibition of gastric acid and pepsin secretion, and enhances mucosal resistance to injury. It is an effective anti-ulcer agent and also has oxytocic properties. [NIH]

**Neural:** 1. pertaining to a nerve or to the nerves. 2. situated in the region of the spinal axis, as the neutral arch. [EU]

**Niacin:** Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

**Overdose:** 1. to administer an excessive dose. 2. an excessive dose. [EU]

**Potassium:** An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

**Riboflavin:** Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

**Selenium:** An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]



## APPENDIX D. FINDING MEDICAL LIBRARIES

### Overview

At a medical library you can find medical texts and reference books, consumer health publications, specialty newspapers and magazines, as well as medical journals. In this Appendix, we show you how to quickly find a medical library in your area.

### Preparation

Before going to the library, highlight the references mentioned in this sourcebook that you find interesting. Focus on those items that are not available via the Internet, and ask the reference librarian for help with your search. He or she may know of additional resources that could be helpful to you. Most importantly, your local public library and medical libraries have Interlibrary Loan programs with the National Library of Medicine (NLM), one of the largest medical collections in the world. According to the NLM, most of the literature in the general and historical collections of the National Library of Medicine is available on interlibrary loan to any library. NLM's interlibrary loan services are only available to libraries. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.<sup>34</sup>

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<sup>34</sup> Adapted from the NLM: <http://www.nlm.nih.gov/psd/cas/interlibrary.html>.

## Finding a Local Medical Library

The quickest method to locate medical libraries is to use the Internet-based directory published by the National Network of Libraries of Medicine (NN/LM). This network includes 4626 members and affiliates that provide many services to librarians, health professionals, and the public. To find a library in your area, simply visit <http://nnlm.gov/members/adv.html> or call 1-800-338-7657.

## Medical Libraries Open to the Public

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries that are generally open to the public and have reference facilities. The following is the NLM's list plus hyperlinks to each library Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located):<sup>35</sup>

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), <http://www.uab.edu/infonet/>
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute), <http://www.asmi.org/LIBRARY.HTM>
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), <http://www.samaritan.edu/library/bannerlibs.htm>
- **California:** Kris Kelly Health Information Center (St. Joseph Health System), <http://www.humboldt1.com/~kkhic/index.html>
- **California:** Community Health Library of Los Gatos (Community Health Library of Los Gatos), <http://www.healthlib.org/orgresources.html>
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, <http://www.colapublib.org/services/chips.html>
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), <http://www-med.stanford.edu/healthlibrary/>

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<sup>35</sup> Abstracted from <http://www.nlm.nih.gov/medlineplus/libraries.html>.



- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), <http://sfghdean.ucsf.edu/barnett/PERC/default.asp>
- **California:** Redwood Health Library (Petaluma Health Care District), <http://www.phcd.org/rdwplib.html>
- **California:** San José PlaneTree Health Library, <http://planetreesanjose.org/>
- **California:** Sutter Resource Library (Sutter Hospitals Foundation), <http://go.sutterhealth.org/comm/resc-library/sac-resources.html>
- **California:** University of California, Davis. Health Sciences Libraries
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System), <http://www.valleycare.com/library.html>
- **California:** Washington Community Health Resource Library (Washington Community Health Resource Library), <http://www.healthlibrary.org/>
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), <http://www.exempla.org/conslib.htm>
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), <http://www.harthosp.org/library/>
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), <http://library.uchc.edu/departm/hnet/>
- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital), <http://www.waterburyhospital.com/library/consumer.shtml>
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute), [http://www.christianacare.org/health\\_guide/health\\_guide\\_pmri\\_health\\_info.cfm](http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm)
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine), <http://www.delamed.org/chls.html>
- **Georgia:** Family Resource Library (Medical College of Georgia), [http://cmc.mcg.edu/kids\\_families/fam\\_resources/fam\\_res\\_lib/frl.htm](http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm)
- **Georgia:** Health Resource Center (Medical Center of Central Georgia), <http://www.mccg.org/hrc/hrchome.asp>
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library), <http://hml.org/CHIS/>

- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center), <http://www.nicon.org/DeArmond/index.htm>
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Northwestern Memorial Hospital, Health Learning Center), [http://www.nmh.org/health\\_info/hlc.html](http://www.nmh.org/health_info/hlc.html)
- **Illinois:** Medical Library (OSF Saint Francis Medical Center), <http://www.osfsaintfrancis.org/general/library/>
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital), <http://www.centralbap.com/education/community/library.htm>
- **Kentucky:** University of Kentucky - Health Information Library (University of Kentucky, Chandler Medical Center, Health Information Library), <http://www.mc.uky.edu/PatientEd/>
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation), <http://www.ochsner.org/library/>
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, <http://lib-sh.lsuhscc.edu/>
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital), <http://www.fchn.org/fmh/lib.htm>
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center), <http://www.cmmc.org/library/library.html>
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare), <http://www.emh.org/hll/hpl/guide.htm>
- **Maine:** Maine Medical Center Library (Maine Medical Center), <http://www.mmc.org/library/>
- **Maine:** Parkview Hospital, <http://www.parkviewhospital.org/communit.htm#Library>
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center), <http://www.smmc.org/services/service.php3?choice=10>
- **Maine:** Stephens Memorial Hospital Health Information Library (Western Maine Health), [http://www.wmhcc.com/hil\\_frame.html](http://www.wmhcc.com/hil_frame.html)
- **Manitoba, Canada:** Consumer & Patient Health Information Service (University of Manitoba Libraries), <http://www.umanitoba.ca/libraries/units/health/reference/chis.html>
- **Manitoba, Canada:** J.W. Crane Memorial Library (Deer Lodge Centre), <http://www.deerlodge.mb.ca/library/libraryservices.shtml>

- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Md., Dept. of Public Libraries, Wheaton Regional Library), <http://www.mont.lib.md.us/healthinfo/hic.asp>
- **Massachusetts:** Baystate Medical Center Library (Baystate Health System), <http://www.baystatehealth.com/1024/>
- **Massachusetts:** Boston University Medical Center Alumni Medical Library (Boston University Medical Center), <http://med-libwww.bu.edu/library/lib.html>
- **Massachusetts:** Lowell General Hospital Health Sciences Library (Lowell General Hospital), <http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm>
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital), [http://www.nebh.org/health\\_lib.asp](http://www.nebh.org/health_lib.asp)
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital), <http://www.southcoast.org/library/>
- **Massachusetts:** Treadwell Library Consumer Health Reference Center (Massachusetts General Hospital), <http://www.mgh.harvard.edu/library/chrcindex.html>
- **Massachusetts:** UMass HealthNet (University of Massachusetts Medical School), <http://healthnet.umassmed.edu/>
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), <http://www.botsfordlibrary.org/consumer.htm>
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), <http://www.providence-hospital.org/library/>
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), <http://www.mgh.org/center.html>
- **Michigan:** Patient Education Resource Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center), <http://www.cancer.med.umich.edu/learn/leares.htm>
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information, <http://www.sladen.hfhs.org/library/consumer/index.html>
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center), <http://www.saintpatrick.org/chi/librarydetail.php3?ID=41>

- **National:** Consumer Health Library Directory (Medical Library Association, Consumer and Patient Health Information Section), <http://caphis.mlanet.org/directory/index.html>
- **National:** National Network of Libraries of Medicine (National Library of Medicine) - provides library services for health professionals in the United States who do not have access to a medical library, <http://nnlm.gov/>
- **National:** NN/LM List of Libraries Serving the Public (National Network of Libraries of Medicine), <http://nnlm.gov/members/>
- **Nevada:** Health Science Library, West Charleston Library (Las Vegas Clark County Library District), [http://www.lvccld.org/special\\_collections/medical/index.htm](http://www.lvccld.org/special_collections/medical/index.htm)
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library), [http://www.dartmouth.edu/~biomed/resources.html#conshealth.html#](http://www.dartmouth.edu/~biomed/resources.html#conshealth.html#/)
- **New Jersey:** Consumer Health Library (Rahway Hospital), <http://www.rahwayhospital.com/library.htm>
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center), <http://www.Englewoodhospital.com/links/index.htm>
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center), <http://www.geocities.com/ResearchTriangle/9360/>
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, <http://www.nypl.org/branch/health/links.html>
- **New York:** Health Information Center (Upstate Medical University, State University of New York), <http://www.upstate.edu/library/hic/>
- **New York:** Health Sciences Library (Long Island Jewish Medical Center), <http://www.lij.edu/library/library.html>
- **New York:** ViaHealth Medical Library (Rochester General Hospital), <http://www.nyam.org/library/>
- **Ohio:** Consumer Health Library (Akron General Medical Center, Medical & Consumer Health Library), <http://www.akrongeneral.org/hwlibrary.htm>
- **Oklahoma:** Saint Francis Health System Patient/Family Resource Center (Saint Francis Health System), <http://www.sfh-tulsa.com/patientfamilycenter/default.asp>

- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center), <http://www.mcmc.net/phrc/>
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center), <http://www.hmc.psu.edu/commhealth/>
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center), <http://www.geisinger.edu/education/commlib.shtml>
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital), <http://www.mth.org/healthwellness.html>
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System), <http://www.hslls.pitt.edu/chi/hhrcinfo.html>
- **Pennsylvania:** Koop Community Health Information Center (College of Physicians of Philadelphia), <http://www.collphyphil.org/koopp1.shtml>
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System), <http://www.shscare.org/services/lrc/index.asp>
- **Pennsylvania:** Medical Library (UPMC Health System), <http://www.upmc.edu/passavant/library.htm>
- **Quebec, Canada:** Medical Library (Montreal General Hospital), <http://ww2.mcgill.ca/mghlib/>
- **South Dakota:** Rapid City Regional Hospital - Health Information Center (Rapid City Regional Hospital, Health Information Center), <http://www.rcrh.org/education/LibraryResourcesConsumers.htm>
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), <http://hww.library.tmc.edu/>
- **Texas:** Matustik Family Resource Center (Cook Children's Health Care System), [http://www.cookchildrens.com/Matustik\\_Library.html](http://www.cookchildrens.com/Matustik_Library.html)
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), <http://www.kvch.com/>
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center), <http://www.swmedctr.com/Home/>



## APPENDIX E. QUESTIONS AND ANSWERS ABOUT ARTHRITIS PAIN

### Overview

Chronic pain is a major health problem in the United States and is one of the most weakening effects of arthritis. More than 40 million Americans are affected by some form of arthritis, and many have chronic pain that limits daily activity. Osteoarthritis is by far the most common form of arthritis, affecting over 20 million Americans, while rheumatoid arthritis, which affects about 2.1 million Americans, is the most disabling form of the disease.

This appendix reproduces a document prepared by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) describing issues relating to arthritis pain.<sup>36</sup>

### What Is Arthritis?

The word arthritis literally means joint inflammation, but it is often used to refer to a group of more than 100 rheumatic diseases that can cause pain, stiffness, and swelling in the joints. These diseases may affect not only the joints but also other parts of the body, including important supporting structures such as muscles, bones, tendons, and ligaments, as well as some internal organs. This appendix focuses on pain caused by two of the most common forms of arthritis--osteoarthritis and rheumatoid arthritis.

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<sup>36</sup> Adapted from the NIAMS: <http://www.niams.nih.gov/hi/topics/arthritis/arthpain.htm>.

## **What Is Pain?**

Pain is the body's warning system, alerting you that something is wrong. The International Association for the Study of Pain defines it as an unpleasant experience associated with actual or potential tissue damage to a person's body. Specialized nervous system cells (neurons) that transmit pain signals are found throughout the skin and other body tissues. These cells respond to things such as injury or tissue damage. For example, when a harmful agent such as a sharp knife comes in contact with your skin, chemical signals travel from neurons in the skin through nerves in the spinal cord to your brain, where they are interpreted as pain.

Most forms of arthritis are associated with pain that can be divided into two general categories: acute and chronic. Acute pain is temporary. It can last a few seconds or longer but wanes as healing occurs. Some examples of things that cause acute pain include burns, cuts, and fractures. Chronic pain, such as that seen in people with osteoarthritis and rheumatoid arthritis, ranges from mild to severe and can last weeks, months, and years to a lifetime.

## **What Causes Arthritis Pain? Why Is It So Variable?**

The pain of arthritis may come from different sources. These may include inflammation of the synovial membrane (tissue that lines the joints), the tendons, or the ligaments; muscle strain; and fatigue. A combination of these factors contributes to the intensity of the pain.

The pain of arthritis varies greatly from person to person, for reasons that doctors do not yet understand completely. Factors that contribute to the pain include swelling within the joint, the amount of heat or redness present, or damage that has occurred within the joint. In addition, activities affect pain differently so that some patients note pain in their joints after first getting out of bed in the morning, whereas others develop pain after prolonged use of the joint. Each individual has a different threshold and tolerance for pain, often affected by both physical and emotional factors. These can include depression, anxiety, and even hypersensitivity at the affected sites due to inflammation and tissue injury. This increased sensitivity appears to affect the amount of pain perceived by the individual. Social support networks can make an important contribution to pain management.



## How Do Doctors Measure Arthritis Pain?

Pain is a private, unique experience that cannot be seen. The most common way to measure pain is for the doctor to ask you, the patient, about your difficulties. For example, the doctor may ask you to describe the level of pain you feel on a scale of 1 to 10. You may use words like aching, burning, stinging, or throbbing. These words will give the doctor a clearer picture of the pain you are experiencing.

Since doctors rely on your description of pain to help guide treatment, you may want to keep a pain diary to record your pain sensations. You can begin a week or two before your visit to the doctor. On a daily basis, you can describe the situations that cause or alter the intensity of your pain, the sensations and severity of your pain, and your reactions to the pain. For example: "On Monday night, sharp pains in my knees produced by housework interfered with my sleep; on Tuesday morning, because of the pain, I had a hard time getting out bed. However, I coped with the pain by taking my medication and applying ice to my knees." The diary will give the doctor some insight into your pain and may play a critical role in the management of your disease.

## What Will Happen When You First Visit a Doctor for Your Arthritis Pain?

The doctor will usually do the following:

- Take your medical history and ask questions such as: How long have you been experiencing pain? How intense is the pain? How often does it occur? What causes it to get worse? What causes it to get better?
- Review the medications you are using
- Conduct a physical examination to determine causes of pain and how this pain is affecting your ability to function
- Take blood and/or urine samples and request necessary laboratory work
- Ask you to get x rays taken or undergo other imaging procedures such as a CAT scan (computerized axial tomography) or MRI (magnetic resonance imaging) to see how much joint damage has been done.

Once the doctor has done these things and reviewed the results of any tests or procedures, he or she will discuss the findings with you and design a

comprehensive management approach for the pain caused by your osteoarthritis or rheumatoid arthritis.

## **Who Can Treat Arthritis Pain?**

A number of different specialists may be involved in the care of a patient with arthritis--often a team approach is used. The team may include doctors who treat people with arthritis (rheumatologists), surgeons (orthopaedists), and physical and occupational therapists. Their goal is to treat all aspects of arthritis pain and help you learn to manage your pain. The physician, other health care professionals, and you, the patient, all play an active role in the management of arthritis pain.

## **How Is Arthritis Pain Treated?**

There is no single treatment that applies to everyone with arthritis, but rather the doctor will develop a management plan designed to minimize your specific pain and improve the function of your joints.

## **Short-Term Relief**

### **Medications**

Because people with osteoarthritis have very little inflammation, pain relievers such as acetaminophen (Tylenol) may be effective. Patients with rheumatoid arthritis generally have pain caused by inflammation and often benefit from aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Motrin or Advil).

### **Heat and Cold**

The decision to use either heat or cold for arthritis pain depends on the type of arthritis and should be discussed with your doctor or physical therapist. Moist heat, such as a warm bath or shower, or dry heat, such as a heating pad, placed on the painful area of the joint for about 15 minutes may relieve the pain. An ice pack (or a bag of frozen vegetables) wrapped in a towel and placed on the sore area for about 15 minutes may help to reduce swelling and stop the pain. If you have poor circulation, do not use cold packs.

## **Joint Protection**

Using a splint or a brace to allow joints to rest and protect them from injury can be helpful. Your physician or physical therapist can make recommendations.

## **Transcutaneous Electrical Nerve Stimulation (TENS)**

A small TENS device that directs mild electric pulses to nerve endings that lie beneath the skin in the painful area may relieve some arthritis pain. TENS seems to work by blocking pain messages to the brain and by modifying pain perception.

**Massage**--In this pain-relief approach, a massage therapist will lightly stroke and/or knead the painful muscle. This may increase blood flow and bring warmth to a stressed area. However, arthritis-stressed joints are very sensitive, so the therapist must be familiar with the problems of the disease.

## **Long-Term Relief**

Osteoarthritis and rheumatoid arthritis are chronic diseases that may last a lifetime. Learning how to manage your pain over the long term is an important factor in controlling the disease and maintaining a good quality of life. Following are some sources of long-term pain relief.

## **Medications**

Some of the medications used to treat arthritis pain include the following:

- **Biological response modifiers**--These new drugs used for the treatment of rheumatoid arthritis reduce inflammation in the joints by blocking the reaction of a substance called tumor necrosis factor, an immune system protein involved in immune system response. These drugs include Enbrel and Remicade.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs)**--These are a class of drugs including aspirin and ibuprofen that are used to reduce pain and inflammation and may be used for both short-term and long-term relief in people with osteoarthritis and rheumatoid arthritis. NSAIDs also include Celebrex and Vioxx, so-called COX-2 inhibitors that block an enzyme known to cause an inflammatory response.
- **Disease-modifying antirheumatic drugs (DMARDs)**--These are drugs used to treat people with rheumatoid arthritis who have not responded

to NSAIDs. Some of these include the new drug Arava and methotrexate, hydroxychloroquine, penicillamine, and gold injections. These drugs are thought to influence and correct abnormalities of the immune system responsible for a disease like rheumatoid arthritis. Treatment with these medications requires careful monitoring by the physician to avoid side effects.

- **Corticosteroids**--These are hormones that are very effective in treating arthritis but cause many side effects. Corticosteroids can be taken by mouth or given by injection. Prednisone is the corticosteroid most often given by mouth to reduce the inflammation of rheumatoid arthritis. In both rheumatoid arthritis and osteoarthritis, the doctor also may inject a corticosteroid into the affected joint to stop pain. Because frequent injections may cause damage to the cartilage, they should be done only once or twice a year.

### **Other Products**

Hyaluronic acid products like Hyalgan and Synvisc mimic a naturally occurring body substance that lubricates the knee joint and permits flexible joint movement without pain. A blood-filtering device called the ProSORBA Column is used in some health care facilities for filtering out harmful antibodies in people with severe rheumatoid arthritis.

### **Weight Reduction**

Excess pounds put extra stress on weight-bearing joints such as the knees or hips. Studies have shown that overweight women who lost an average of 11 pounds substantially reduced the development of osteoarthritis in their knees. In addition, if osteoarthritis has already affected one knee, weight reduction will reduce the chance of it occurring in the other knee.

### **Exercise**

Swimming, walking, low-impact aerobic exercise, and range-of-motion exercises may reduce joint pain and stiffness. In addition, stretching exercises are helpful. A physical therapist can help plan an exercise program that will give you the most benefit.

## **Surgery**

In select patients with arthritis, surgery may be necessary. The surgeon may perform an operation to remove the synovium (synovectomy), realign the joint (osteotomy), or in advanced cases replace the damaged joint with an artificial one (arthroplasty). Total joint replacement has provided not only dramatic relief from pain but also improvement in motion for many people with arthritis.

## **What Alternative Therapies May Relieve Arthritis Pain?**

Many people seek other ways of treating their disease, such as special diets or supplements. Although these methods may not be harmful in and of themselves, no research to date shows that they help. Some people have tried acupuncture, in which thin needles are inserted at specific points in the body. Others have tried glucosamine and chondroitin sulfate, two natural substances found in and around cartilage cells, for osteoarthritis of the knee.

Some alternative or complementary approaches may help you to cope with or reduce some of the stress of living with a chronic illness. It is important to inform your doctor if you are using alternative therapies. If the doctor feels the approach has value and will not harm you, it can be incorporated into your treatment plan. However, it is important not to neglect your regular health care or treatment of serious symptoms.

## **How Can You Cope with Arthritis Pain?**

The long-term goal of pain management is to help you cope with a chronic, often disabling disease. You may be caught in a cycle of pain, depression, and stress. To break out of this cycle, you need to be an active participant with the doctor and other health care professionals in managing your pain. This may include physical therapy, cognitive-behavioral therapy, occupational therapy, biofeedback, relaxation techniques (for example, deep breathing and meditation), and family counseling therapy.

The Multipurpose Arthritis and Musculoskeletal Diseases Center at Stanford University, supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), has developed an Arthritis Self-Help Course that teaches people with arthritis how to take a more active part in their arthritis care. The Arthritis Self-Help Course is taught by the

Arthritis Foundation and consists of a 12- to 15-hour program that includes lectures on osteoarthritis and rheumatoid arthritis, exercise, pain management, nutrition, medication, doctor-patient relationships, and nontraditional treatment.

Things you can do to manage arthritis pain:

- Eat a healthy diet.
- Get 8 to 10 hours of sleep at night.
- Keep a daily diary of pain and mood changes to share with your physician.
- Choose a caring physician.
- Join a support group.
- Stay informed about new research on managing arthritis pain.

You may want to contact some of the organizations listed at the end of this appendix for additional information on the Arthritis Self-Help Course and on coping with pain, as well as for information on support groups in your area.

## **What Research Is Being Conducted on Arthritis Pain?**

The NIAMS, part of the National Institutes of Health, is sponsoring research that will increase understanding of the specific ways to diagnose, treat, and possibly prevent arthritis pain. As part of its commitment to pain research, the Institute joined with many other NIH institutes and offices in 1998 in a special announcement to encourage more studies on pain.

At the Specialized Center of Research in Osteoarthritis at Rush-Presbyterian-St. Luke's Medical Center in Chicago, Illinois, researchers are studying the human knee and analyzing how injury in one joint may affect other joints. In addition, they are analyzing the effect of pain and analgesics on gait (walking) and comparing pain and gait before and after surgical treatment for knee osteoarthritis.

At the University of Maryland Pain Center in Baltimore, NIAMS researchers are evaluating the use of acupuncture on patients with osteoarthritis of the knee. Preliminary findings suggest that traditional Chinese acupuncture is both safe and effective as an additional therapy for osteoarthritis, and it significantly reduces pain and improves physical function.

At Duke University in Durham, North Carolina, NIAMS researchers have developed cognitive-behavioral therapy (CBT) involving both patients and their spouses. The goal of CBT for arthritis pain is to help patients cope more effectively with the long-term demands of a chronic and potentially disabling disease. Researchers are studying whether aerobic fitness, coping abilities, and spousal responses to pain behaviors diminish the patient's pain and disability.

NIAMS-supported research on arthritis pain also includes projects in the Institute's Multipurpose Arthritis and Musculoskeletal Diseases Centers. At the University of California at San Francisco, researchers are studying stress factors, including pain, that are associated with rheumatoid arthritis. Findings from this study will be used to develop patient education programs that will improve a person's ability to deal with rheumatoid arthritis and enhance quality of life. At the Indiana University School of Medicine in Indianapolis, health care professionals are looking at the causes of pain and joint disability in patients with osteoarthritis. The goal of the project is to improve doctor-patient communication about pain management and increase patient satisfaction.

The list of pain studies continues. A NIAMS-funded project at Stanford University in California is evaluating the effects of a patient education program that uses a book and videotape to control chronic pain. At Indiana University in Indianapolis, Institute-supported scientists are determining whether strength training can diminish the risk of severe pain from knee osteoarthritis. And a multicenter study funded by the National Center for Complementary and Alternative Medicine and NIAMS, and coordinated by the University of Utah School of Medicine, is investigating the effects of the dietary supplements glucosamine and chondroitin sulfate for knee osteoarthritis.

## **Where Can You Find More Information on Arthritis Pain?**

### **National Institute of Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse**

National Institutes of Health

1 AMS Circle

Bethesda, MD 20892-3675

Phone: 301-495-4484 or 877-22-NIAMS (226-4267) (free of charge)

TTY: 301-565-2966

Fax: 301-718-6366

<http://www.niams.nih.gov/>

The clearinghouse provides information about various forms of arthritis and rheumatic disease and bone, muscle, and skin diseases. It distributes patient and professional education materials and refers people to other sources of information. Additional information and updates can also be found on the NIAMS Web site.

**American Academy of Orthopaedic Surgeons**

P.O. Box 2058

Des Plaines, IL 60017

Phone: 800-824-BONE (2663) (free of charge)

**[www.aaos.org](http://www.aaos.org)**

This academy publishes brochures on arthritis and other subjects. Single copies of a brochure are available free of charge by sending a self-addressed, stamped (business-size) envelope to (*name of brochure*) at the address above.

**American College of Rheumatology**

1800 Century Place, Suite 250

Atlanta, GA 30345

Phone: 404-633-3777

Fax: 404-633-1870

**[www.rheumatology.org](http://www.rheumatology.org)**

This association provides referrals to doctors and health professionals who work on arthritis, rheumatic diseases, and related conditions. It also provides educational materials and guidelines.

**American Physical Therapy Association**

1111 North Fairfax Street

Alexandria, VA 22314-1488

Phone: 703-684-2782 or 800-999-2782, ext. 3395 (free of charge)

**[www.apta.org](http://www.apta.org)**

This association is a national professional organization representing physical therapists, allied personnel, and students. Its objectives are to improve research, public understanding, and education in the physical therapies.



**Arthritis Foundation**

1330 West Peachtree Street

Atlanta, GA 30309

Phone: 404-872-7100 or 800-283-7800 (free of charge)

or call your local chapter (listed in the telephone directory)

**[www.arthritis.org](http://www.arthritis.org)**

This is the major voluntary organization devoted to arthritis. The foundation publishes a free brochure, *Coping With Pain*, and a monthly magazine for members that provides up-to-date information on all forms of arthritis. The foundation also can provide addresses and phone numbers for local chapters and physician and clinic referrals.

**American Chronic Pain Association**

P.O. Box 850

Rocklin, CA 95677

Phone: 916-632-0922

**[www.theacpa.org](http://www.theacpa.org)**

This association provides information on positive ways to deal with chronic pain and can provide guidelines on selecting a pain management center.

**American Pain Society**

4700 West Lake Avenue

Glenview, IL 60025-1485

Phone: 847-375-4715

**[www.ampainsoc.org](http://www.ampainsoc.org)**

This society provides general information to the public and maintains a directory of resources, including referrals to pain centers.

**National Chronic Pain Outreach Association, Inc.**

7979 Old Georgetown Road, Suite 100

Bethesda, MD 20814-2429

Phone: 301-652-4948

Fax: 301-907-0745

**[neurosurgery.mgh.harvard.edu/ncpainoa.htm](http://neurosurgery.mgh.harvard.edu/ncpainoa.htm)**

This association operates an information clearinghouse offering publications and cassette tapes for people with pain. It also publishes a newsletter that includes information on pain management techniques, coping strategies, book reviews, and support groups.

## Vocabulary Builder

**Anxiety:** The unpleasant emotional state consisting of psychophysiological responses to anticipation of unreal or imagined danger, ostensibly resulting from unrecognized intrapsychic conflict. Physiological concomitants include increased heart rate, altered respiration rate, sweating, trembling, weakness, and fatigue; psychological concomitants include feelings of impending danger, powerlessness, apprehension, and tension. [EU]

**Fatigue:** The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

**Hypersensitivity:** A state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign substance. Hypersensitivity reactions are classified as immediate or delayed, types I and IV, respectively, in the Gell and Coombs classification (q.v.) of immune responses. [EU]

**Membrane:** A thin layer of tissue which covers a surface, lines a cavity or divides a space or organ. [EU]

**Methotrexate:** An antineoplastic antimetabolite with immunosuppressant properties. It is an inhibitor of dihydrofolate reductase and prevents the formation of tetrahydrofolate, necessary for synthesis of thymidylate, an essential component of DNA. [NIH]

**Neurons:** The basic cellular units of nervous tissue. Each neuron consists of a body, an axon, and dendrites. Their purpose is to receive, conduct, and transmit impulses in the nervous system. [NIH]

**Neurosurgery:** A surgical specialty concerned with the treatment of diseases and disorders of the brain, spinal cord, and peripheral and sympathetic nervous system. [NIH]

**Penicillamine:** 3-Mercapto-D-valine. The most characteristic degradation product of the penicillin antibiotics. It is used as an antirheumatic and as a chelating agent in Wilson's disease. [NIH]

**Prednisone:** A synthetic anti-inflammatory glucocorticoid derived from cortisone. It is biologically inert and converted to prednisolone in the liver. [NIH]

**Transcutaneous:** Transdermal. [EU]

## **APPENDIX F. MORE ON RHEUMATIC DISEASES AND ARTHRITIS**

### **Overview**

There are more than 100 rheumatic diseases. These diseases may cause pain, stiffness, and swelling in joints and other supporting structures of the body such as muscles, tendons, ligaments, and bones. Some rheumatic diseases can also affect other parts of the body, including various internal organs.

The following discussion was prepared by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS). It covers the basics of rheumatic diseases and arthritis.

### **What Are Rheumatic Diseases and What Is Arthritis?<sup>37</sup>**

Many people use the word “arthritis” to refer to all rheumatic diseases. However, the word literally means joint inflammation; that is, swelling, redness, heat, and pain caused by tissue injury or disease in the joint. The many different kinds of arthritis comprise just a portion of the rheumatic diseases. Some rheumatic diseases are described as connective tissue diseases because they affect the body’s connective tissue—the supporting framework of the body and its internal organs. Others are known as autoimmune diseases because they are caused by a problem in which the immune system harms the body’s own healthy tissues. Examples of some rheumatic diseases include:

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<sup>37</sup> Adapted from the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS): <http://www.niams.nih.gov/hi/topics/arthritis/artrheu.htm>.

## **Examples of Rheumatic Diseases**

### **Osteoarthritis**

Also known as degenerative joint disease, osteoarthritis is the most common type of arthritis, affecting an estimated 20.7 million adults in the United States. Osteoarthritis primarily affects cartilage, which is the tissue that cushions the ends of bones within the joint. Osteoarthritis occurs when cartilage begins to fray, wear, and decay. In extreme cases, the cartilage may wear away entirely, leaving a bone-on-bone joint. Bony spurs (pointy bulges of bone) may form at the edges of the joint. Osteoarthritis can cause joint pain, reduced joint motion, loss of function, and disability. Disability results most often when the disease affects the spine and the weight-bearing joints (the knees and hips).

### **Rheumatoid Arthritis**

Rheumatoid arthritis is an inflammatory disease of the synovium, or lining of the joint, that results in pain, stiffness, swelling, deformity, and loss of function in the joints. Inflammation most often affects joints of the hands and feet and tends to be symmetrical (occurring equally on both sides of the body). This symmetry helps distinguish rheumatoid arthritis from other types of arthritis. About 1 percent of the U.S. population (about 2.1 million people) has rheumatoid arthritis.

### **Fibromyalgia**

Fibromyalgia is a chronic disorder that causes pain and stiffness throughout the tissues that support and move the bones and joints. Pain and localized tender points occur in the muscles and tendons, particularly those of the neck, spine, shoulders, and hips. Patients may experience widespread pain, fatigue, and sleep disturbances.

### **Systemic Lupus Erythematosus**

Systemic lupus erythematosus (also known as lupus and SLE) is an autoimmune disease in which the immune system harms the body's own healthy cells and tissues. In SLE, this can result in inflammation of and damage to the joints, skin, kidneys, heart, lungs, blood vessels, and brain.

## **Scleroderma**

Also known as systemic sclerosis, the word scleroderma means “hard skin.” It refers to several diseases that almost always affect the skin, blood vessels, and joints. A more serious form also affects internal organs such as the lungs and kidneys. In scleroderma, there is an abnormal and excessive production of collagen (a fiber-like protein) in the skin or internal organs.

## **Juvenile Rheumatoid Arthritis**

This is the most common form of arthritis in childhood, causing pain, stiffness, swelling, and loss of function in the joints. The arthritis may be associated with rashes or fevers, or may affect other parts of the body.

## **Ankylosing Spondylitis**

This type of arthritis primarily affects the spine, but may also cause arthritis in the hips, shoulders, and knees. The tendons and ligaments around the bones and joints in the spine become inflamed, resulting in pain and stiffness, especially in the lower back. Ankylosing spondylitis tends to affect people in late adolescence or early adulthood.

## **Gout**

This type of arthritis results from deposits of needle-like crystals of uric acid in the connective tissue, joint spaces, or both. Uric acid is a normal breakdown product of purines, which are present in body tissues and in many foods. Usually, uric acid passes through the kidney into urine and is eliminated. If the concentration of uric acid in the blood rises above normal levels, sodium urate crystals may form in the tendons, ligaments, and cartilage of the joints. These needle-like crystals cause inflammation, swelling, and pain in the affected joint. The joint most commonly affected is the big toe.

## **Infectious Arthritis**

This is a general term used to describe forms of arthritis that are caused by infectious agents, such as bacteria or viruses. Parvovirus arthritis, gonococcal arthritis, and Lyme disease are examples of infectious arthritis. In those cases

caused by bacteria, early diagnosis and treatment with antibiotics relieve the arthritis symptoms and cure the disease.

### **Reactive Arthritis**

This form of arthritis develops after an infection involving the lower urinary tract, bowel, or other organs. It is commonly associated with eye problems, skin rashes, and mouth sores. Reiter's syndrome is an example of reactive arthritis.

### **Psoriatic Arthritis**

This form of arthritis occurs in some patients with psoriasis, a common scaling skin disorder. Psoriatic arthritis often affects the joints at the ends of the fingers and is accompanied by changes in the fingernails and toenails. Some people also have spinal involvement.

### **Bursitis**

This condition involves inflammation of the bursae, small, fluid-filled sacs that help reduce friction between bones and other moving structures in the joints. The inflammation may result from arthritis in the joint or injury or infection of the bursae. Bursitis produces pain and tenderness and may limit the movement of nearby joints.

### **Tendinitis (Tendonitis)**

This refers to inflammation of tendons (tough cords of tissue that connect muscle to bone) caused by overuse, injury, or related rheumatic conditions. Tendinitis produces pain and tenderness and may restrict movement of nearby joints.

## **What Causes Rheumatic Disease?**

The causes of rheumatic diseases vary depending on the type of disease. Researchers have pinpointed the cause or causes of some rheumatic diseases, such as infectious arthritis and gout.

The causes of most rheumatic diseases are still under investigation. In osteoarthritis, excessive stress on the joint, from repeated injury or inherited cartilage weakness, may play a role. In lupus, rheumatoid arthritis, and scleroderma, the combination of genetic factors that determine susceptibility, the influence of certain hormones, and environmental triggers are believed to be important.

Scientists are also studying the risk factors that determine why some people develop rheumatic diseases and others do not. For example, being overweight increases the likelihood that a person will develop osteoarthritis. The chance of developing osteoarthritis also increases with age. Genes and family history play a role in many rheumatic diseases including gout, rheumatoid arthritis, lupus, ankylosing spondylitis, scleroderma, and some others.

Certain rheumatic conditions, such as lupus, rheumatoid arthritis, scleroderma, and fibromyalgia, are more common among women. This indicates that hormones or other male-female differences play a role in the development of these conditions.

### **Who Is Affected by Arthritis and Rheumatic Conditions?**

An estimated 40 million people in the United States have arthritis or other rheumatic conditions. By the year 2020, this number is expected to reach 59 million. Rheumatic diseases are the leading cause of disability among adults age 65 and older.

Rheumatic diseases affect people of all races and ages. Some rheumatic conditions are more common among certain populations. For example:

- Rheumatoid arthritis occurs two to three times more often in women than in men.
- Scleroderma is more common in women than in men.
- Nine out of 10 people who have lupus are women.
- Nine out of 10 people who have fibromyalgia are women.
- Gout is more common in men than in women.
- Lupus is three times more common in African-American women than in Caucasian women.
- Ankylosing spondylitis is more common in men than in women.

## **What Are the Symptoms of Arthritis?**

Different types of arthritis have different symptoms. In general, people who have arthritis have pain and stiffness in the joints. Some of the more common symptoms are listed below. Early diagnosis and treatment help decrease further joint damage and help control symptoms of arthritis and many other rheumatic diseases.

Common symptoms of arthritis include:

- Swelling in one or more joints
- Stiffness around the joints that lasts for at least 1 hour in the early morning
- Constant or recurring pain or tenderness in a joint
- Difficulty using or moving a joint normally
- Warmth and redness in a joint

## **How Are Rheumatic Diseases Diagnosed?**

Diagnosing rheumatic diseases can be difficult because some symptoms and signs are common to many different diseases. A general practitioner or family doctor may be able to evaluate a patient or refer him or her to a rheumatologist: a doctor who specializes in treating arthritis and other rheumatic diseases.

The doctor will review the patient's medical history, conduct a physical examination, and obtain laboratory tests and X rays or other imaging tests. The doctor may need to see the patient more than once to make an accurate diagnosis.

## **Medical History**

It is vital for people with joint pain to give the doctor a complete medical history. Answers to the following questions will help the doctor make an accurate diagnosis:

- Is the pain in one or more joints?
- When does the pain occur?
- How long does the pain last?



- When did you first notice the pain?
- What were you doing when you first noticed the pain?
- Does activity make the pain better or worse?
- Have you had any illnesses or accidents that may account for the pain?
- Is there a family history of any arthritis or rheumatic diseases?
- What medicine(s) are you taking?

It may be helpful for people to keep a daily journal that describes the pain. Patients should write down what the affected joint looks like, how it feels, how long the pain lasts, and what they were doing when the pain started.

## Physical Examination and Laboratory Tests

The doctor will examine all of the patient's joints for redness, warmth, deformity, ease of movement, and tenderness. Because some forms of arthritis, such as lupus, may affect other organs, a complete physical examination including the heart, lungs, abdomen, nervous system, and eyes, ears, and throat may be necessary. The doctor may order some laboratory tests to help confirm a diagnosis.

### Common Laboratory Tests

- Antinuclear antibody (ANA) – This test checks blood levels of antibodies that are often present in people who have connective tissue diseases or other autoimmune disorders, such as lupus. Since the antibodies react with material in the cell's nucleus (control center), they are referred to as antinuclear antibodies. There are also tests for individual types of ANA's that may be more specific to people with certain autoimmune disorders. ANA's are also sometimes found in healthy people. Therefore, having ANA's in the blood does not necessarily mean that a person has a disease.
- Arthrocentesis – Arthrocentesis or joint aspiration is done to obtain a sample of synovial fluid. The doctor injects a local anesthetic, inserts a thin, hollow needle into the joint, and removes the synovial fluid into a syringe. The test provides important diagnostic information. For example, the test allows the doctor to see whether crystals (found in patients with gout or other types of crystal-induced arthritis) or bacteria or viruses (found in patients with infectious arthritis) are present in the joint.

- Complement—This test measures the level of complement, a group of proteins in the blood. Complement helps destroy foreign substances, such as germs, that enter the body. A low blood level of complement is common in people who have active lupus.
- Complete blood count (CBC)—This test determines the number of white blood cells, red blood cells, and platelets present in a sample of blood. Some rheumatic conditions or drugs used to treat arthritis are associated with a low white blood count (leukopenia), low red blood count (anemia), or low platelet count (thrombocytopenia). When doctors prescribe medications that affect the CBC, they periodically test the patient's blood.
- Creatinine—This blood test is commonly ordered in patients who have rheumatic diseases to monitor for underlying kidney disease.
- Erythrocyte sedimentation rate (sed rate)—This blood test is used to detect inflammation in the body. Higher sed rates indicate the presence of inflammation and are typical of many forms of arthritis, such as rheumatoid arthritis and ankylosing spondylitis, and many of the connective tissue diseases.
- Hematocrit (PCV, packed cell volume)—This test and the test for hemoglobin (a substance in the red blood cells that carries oxygen through the body) measure the number of red blood cells present in a sample of blood. A decrease in the number of red blood cells (anemia) is common in people with inflammatory arthritis and rheumatic diseases.
- Rheumatoid factor—This test determines whether rheumatoid factor is present in the blood. Rheumatoid factor is an antibody found in the blood of most (but not all) people who have rheumatoid arthritis. Rheumatoid factor may be found in many other diseases besides rheumatoid arthritis, and sometimes in normal, healthy people.
- Urinalysis—In this test, a urine sample is studied for protein, red blood cells, white blood cells, or casts. These abnormalities indicate kidney disease, which may be seen in several rheumatic diseases such as lupus or vasculitis. Some medications used to treat arthritis can also cause abnormal findings on urinalysis.
- White blood cell count (WBC)—This test determines the number of white blood cells present in a sample of blood. The number may increase as a result of infection or decrease in response to certain medications, or with certain diseases, such as lupus. Low numbers of white blood cells increase a person's risk of infections.

## **Work with Your Doctor to Limit Your Pain**

The role you play in developing your treatment plan is very important. It is vital for you to have a good relationship with your doctor so that you can work together. You should not be afraid to ask questions about your condition or treatment. You must understand the treatment plan and tell the doctor whether or not it is helping you. Studies have shown that patients who are well informed and participate actively in their own care experience less pain and make fewer visits to the doctor than other patients do.

## **X Rays and Other Imaging Procedures**

To see what the joint looks like inside, the doctor may order X rays or other imaging procedures. X rays provide an image of the bones, but they do not show the cartilage, muscles, and ligaments. Other noninvasive imaging methods such as computed tomography (CT or CAT), magnetic resonance imaging (MRI), and arthrography (joint X ray) show the whole joint. The doctor may also use an arthroscope (a small, flexible tube that transmits the image of the inside of a joint to a video screen) to examine damage to a joint. The arthroscope is inserted into the affected joint through a very small incision in the skin. This procedure, called arthroscopy, allows the doctor to see inside the joint. Doctors also use arthroscopy to perform surgery for some types of joint injury.

## **What Are the Treatments?**

Treatments for arthritis include rest and relaxation, exercise, proper diet, medication, and instruction about the proper use of joints and ways to conserve energy. Other treatments include the use of pain relief methods and assistive devices, such as splints or braces. In severe cases, surgery may be necessary. The doctor and the patient work together to develop a treatment plan that helps the patient maintain or improve his or her lifestyle. Treatment plans usually combine several types of treatment and vary depending on the rheumatic condition and the patient.

### **Rest, Exercise, and Diet**

People who have a rheumatic disease should develop a comfortable balance between rest and activity. One sign of many rheumatic conditions is fatigue. Patients must pay attention to signals from their bodies. For example, when

experiencing pain or fatigue, it is important to take a break and rest. Too much rest, however, may cause muscles and joints to become stiff.

Physical exercise can reduce joint pain and stiffness and increase flexibility, muscle strength, and endurance. It also helps with weight reduction and contributes to an improved sense of well-being. Before starting any exercise program, people with arthritis should talk with their doctor. People with arthritis can participate in a variety of sports and exercise programs. Exercises that doctors often recommend include:

- Range-of-motion exercises to help maintain normal joint movement, maintain or increase flexibility, and relieve stiffness.
- Strengthening exercises to maintain or increase muscle strength. Strong muscles help support and protect joints affected by arthritis.
- Aerobic or endurance exercises to improve cardiovascular fitness, help control weight, and improve overall well-being. Studies show that aerobic exercise can also reduce inflammation in some joints.

Another important part of a treatment program is a well-balanced diet. Along with exercise, a well-balanced diet helps people manage their body weight and stay healthy. Weight control is important to people who have arthritis because extra weight puts extra pressure on some joints and can aggravate many types of arthritis. Diet is especially important for people who have gout. People with gout should avoid alcohol and foods that are high in purines, such as organ meats (liver, kidney), sardines, anchovies, and gravy.

### **Medications**

A variety of medications are used to treat rheumatic diseases. The type of medication depends on the rheumatic disease and on the individual patient. At this time, the medications used to treat most rheumatic diseases do not provide a cure, but rather limit the symptoms of the disease. The one exception is treatments for infectious arthritis. If caught early enough, arthritis associated with an infection (such as Lyme disease) can usually be cured with antibiotics.

Medications commonly used to treat rheumatic diseases provide relief from pain and inflammation. In some cases, the medication may slow the course of the disease and prevent further damage to joints or other parts of the body. This fact sheet describes the medications most commonly used to treat pain and inflammation.

The doctor may delay using medications until a definite diagnosis is made, because medications can hide important symptoms (such as fever and swelling) and thereby interfere with diagnosis. Patients taking any medication, either prescription or over-the-counter, should always follow the doctor's instructions. The doctor should be notified immediately if the medicine is making the symptoms worse or causing other problems, such as an upset stomach, nausea, or headache. The doctor may be able to change the dosage or medicine to reduce these side effects.

Analgesics (pain relievers) such as aspirin; other nonsteroidal anti-inflammatory drugs (NSAID's) such as ibuprofen (Motrin,<sup>1</sup> Advil, Nuprin); and acetaminophen (Tylenol) are used to reduce the pain caused by many rheumatic conditions. Aspirin and NSAID's have the added benefit of decreasing the inflammation associated with arthritis. Certain analgesics, such as aspirin and NSAID's, can have side effects, such as stomach irritation, that can be reduced by changing the dosage or the medication. The dosage will vary depending on the particular illness and the overall health of the patient. The doctor and patient must work together to determine which analgesic to use and the appropriate amount. If analgesics do not ease the pain, the doctor may use other medications, depending on the diagnosis.

Corticosteroids, such as prednisone, cortisone, solumedrol, and hydrocortisone, are used to treat many rheumatic conditions because they decrease inflammation and suppress the immune system. The dosage of these medications will vary depending on the diagnosis and the patient; again, the patient and doctor must work together to determine what dose is best for the patient.

Corticosteroids can be given by mouth, in creams applied to the skin, or by injection. Short-term side effects of corticosteroids include swelling, increased appetite, weight gain, and emotional ups and downs. These side effects generally stop when the drug is stopped. It can be dangerous to stop taking corticosteroids suddenly, so it is very important that the doctor and patient work together when changing the corticosteroid dose. Side effects that may occur after long-term use of corticosteroids include stretch marks, excessive hair growth, osteoporosis, high blood pressure, damage to the arteries, high blood sugar, infections, and cataracts.

Although some rheumatic diseases respond to analgesics and corticosteroids, others may not. Rheumatoid arthritis, gout, lupus, scleroderma, and fibromyalgia are some of the rheumatic diseases that routinely require other medications; these are prescribed to slow the course of the disease or to treat disease-specific symptoms.

## **Heat and Cold Therapies**

Heat and cold can both be used to reduce the pain and inflammation of arthritis. Both therapies come in different forms, and the patient and doctor can determine which form works best. Studies have shown heat and cold therapies to be equally effective in reducing pain, although they are usually avoided in acute gout.

Heat therapy increases blood flow, tolerance for pain, and flexibility. Heat therapy can involve treatment with paraffin wax, microwaves, ultrasound, or moist heat. Physical therapists are needed to apply paraffin wax, or use microwave or ultrasound therapy, but patients can apply moist heat themselves. Some ways to apply moist heat include placing warm towels or hot packs on the inflamed joint or taking a warm bath or shower.

Cold therapy numbs the nerves around the joint (which reduces pain) and relieves inflammation and muscle spasms. Cold therapy can involve cold packs, ice massage, soaking in cold water, or over-the-counter sprays and ointments that cool the skin and joints.

## **Hydrotherapy, Mobilization Therapy, and Relaxation Therapy**

Hydrotherapy involves exercising or relaxing in warm water, which helps relax tense muscles and relieve pain. Exercising in a large pool is easier because water takes some weight off painful joints. This type of exercise improves muscle strength and joint movement.

Mobilization therapies include traction (gentle, steady pulling), massage, and manipulation (using the hands to restore normal movement to stiff joints). When done by a trained professional, these methods can help control pain, increase joint motion, and improve muscle and tendon flexibility.

Relaxation therapy helps reduce pain by teaching people various ways to release muscle tension throughout the body. In one method of relaxation therapy, known as progressive relaxation, the patient tightens a muscle group and then slowly releases the tension. Doctors and physical therapists can teach patients progressive relaxation and other relaxation techniques.

## **Assistive Devices**

The most common assistive devices for treating arthritis pain are splints and braces, which are used to support weakened joints or allow them to rest. Some of these devices prevent the joint from moving; others allow some movement. A splint or brace should be used only when recommended by a doctor or therapist, who will show the patient the correct way to put the device on, ensure that it fits properly, and explain when and for how long it should be worn. The incorrect use of a splint or brace can cause joint damage, stiffness, and pain.

A person with arthritis can use other kinds of devices to ease the pain. For example, the use of a cane when walking can reduce some of the weight placed on an arthritic knee or hip. A shoe insert (orthotic) can ease the pain of walking caused by arthritis of the foot or knee.

## **Surgery**

Surgery may be required to repair damage to a joint after trauma (a torn meniscus, for example) or to restore function or relieve pain in a joint damaged by arthritis. The doctor may recommend arthroscopic surgery, bone fusion (surgery in which bones in the joint are fused or joined together), or arthroplasty (also known as total joint replacement, in which the damaged joint is removed and replaced with an artificial one).

## **Myths about Treating Arthritis**

At this time, the only type of arthritis that can be cured is that caused by infections. Although symptoms of other types of arthritis can be effectively managed with rest, exercise, and medication, there are no cures. Some people claim to have been cured by treatment with herbs, oils, chemicals, special diets, radiation, or other products. However, there is no scientific evidence that such treatments are helpful in patients with arthritis and, moreover, they may actually cause harm with the development of side effects. Patients should talk to their doctor before using any therapy that has not been prescribed or recommended by the health care team caring for the patient.

## **What Can Be Done to Help?**

Studies show that an estimated 18 percent of Americans who have arthritis or other rheumatic conditions believe that their condition limits their activities. People with arthritis may find that they can no longer participate in some of their favorite activities, which can affect their overall well-being. Even when arthritis impairs only one joint, a person may have to change many daily activities to protect that joint from further damage and reduce pain. When arthritis affects the entire body, as it does in people with rheumatoid arthritis or fibromyalgia, many daily activities have to be changed to deal with pain, fatigue, and other symptoms.

Changes in the home may help a person with chronic arthritis continue to live safely, productively, and with less pain. People with arthritis may become weak, lose their balance, or fall in the bathroom. Installing grab bars in the tub or shower and by the toilet, placing a secure seat in the tub, and raising the height of the toilet seat can help. Special kitchen utensils can accommodate arthritic hands to make meal preparation easier. An occupational therapist can help people who have rheumatic conditions identify and make adjustments in their homes to create a safer, less painful, and more efficient environment.

Friends and family can help a patient with a rheumatic condition by learning about that condition and understanding how it affects the patient's life. Friends and family can provide emotional and physical assistance. Their support, as well as support from other people who have the same disease, can make it easier to cope. The Arthritis Foundation (see the list of resources at the end of this fact sheet) has a wealth of information to help people with arthritis.

## **What Is Some of the Current Research Being Done on Arthritis?**

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), a part of the National Institutes of Health (NIH), leads the Federal medical research effort in arthritis and rheumatic diseases. The NIAMS sponsors research and research training on the NIH campus in Bethesda, Maryland, and at universities and medical centers throughout the United States.



The NIAMS supports three types of centers: Multipurpose Arthritis and Musculoskeletal Diseases Centers (MAMDC's), Specialized Centers of Research (SCOR's), and Core Centers.

The MAMDC's foster a multidisciplinary approach to the many problems of arthritis and musculoskeletal diseases and develop new capabilities for research into other diseases. Centers develop and carry out research in basic or laboratory and clinical science, professional and patient education, and epidemiology and health services.

Each SCOR focuses on a single disease: currently, rheumatoid arthritis, systemic lupus erythematosus, osteoarthritis, osteoporosis, and scleroderma. By doing laboratory and clinical studies under one roof, these centers aim to speed up basic research on the causes of these diseases and to hasten transfer of advances from the laboratory to the bedside and improve patient care.

Core Centers promote interdisciplinary collaborative efforts among scientists engaged in high-quality research related to a common theme. By providing funding for facilities, pilot and feasibility studies, and program enrichment activities at the Core Center, the Institute reinforces and amplifies investigations already ongoing in NIAMS program areas. Core Centers are currently targeted for skin diseases (Skin Disease Research Core Centers) and for musculoskeletal disorders (Core Centers for Musculoskeletal Disorders).

Some current NIAMS research efforts in rheumatoid arthritis, osteoarthritis, lupus, and scleroderma are outlined below.

### **Rheumatoid Arthritis**

Researchers are trying to identify the causes of rheumatoid arthritis in the hope that understanding the cause will lead to new treatments. They are examining the role that the endocrine (hormonal), nervous, and immune systems play, and the ways in which these systems interact with environmental and genetic factors in the development of rheumatoid arthritis. Some scientists are trying to determine whether an infectious agent triggers rheumatoid arthritis. Others are studying the role of certain enzymes (specialized proteins in the body that carry out biochemical reactions) in breaking down cartilage. Researchers are also trying to identify the genetic factors that place some people at higher risk than others for developing rheumatoid arthritis.

Moreover, scientists are looking at new ways to treat rheumatoid arthritis. They are experimenting with new drugs and “biologic agents” that selectively block certain immune system activities associated with inflammation. Recent studies suggest that these represent promising approaches to treatment. Other investigators have shown that minocycline and doxycycline, two antibiotic medications in the tetracycline family, have a modest benefit for people with rheumatoid arthritis.

### **Osteoarthritis**

Researchers are working to understand what role certain enzymes play in the breakdown of joint cartilage in osteoarthritis and are testing drugs that block the action of these enzymes. In addition, a gene that may be linked to an inherited form of osteoarthritis has recently been discovered.

### **Systemic Lupus Erythematosus**

Researchers are looking at how genetic, environmental, and hormonal factors influence the development of systemic lupus erythematosus. They are trying to find out why lupus is more common in certain populations. There has been very promising progress in identifying the genes that may be responsible for lupus. Promising areas of treatment research include biologic agents; newer, more selective drugs that suppress the immune system; and efforts to correct immune abnormalities with bone marrow transplantation. Clinical studies are underway to determine the safety of estrogens for hormone replacement therapy and birth control in women with lupus. Contrary to the widely held belief that estrogens can make the disease worse, recent data suggest that these drugs may be safe for some women with lupus.

### **Scleroderma**

Current studies on scleroderma are focusing on three areas of the disease: overproduction of collagen, blood vessel injury, and abnormal immune system activity. Researchers hope to discover how these three elements interact with each other to cause and promote scleroderma. In one recent study, researchers found evidence of fetal cells within the blood and skin lesions of women who had been pregnant years before developing scleroderma. The study suggests that fetal cells may play a role in

scleroderma by maturing immune cells that promote the overproduction of collagen. Scientists are continuing to study the implications of this finding.

## Vocabulary Builder

**Adolescence:** The period of life beginning with the appearance of secondary sex characteristics and terminating with the cessation of somatic growth. The years usually referred to as adolescence lie between 13 and 18 years of age. [NIH]

**Anemia:** A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

**Antibiotic:** A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [EU]

**Antibody:** An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their mode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Cataract:** An opacity, partial or complete, of one or both eyes, on or in the lens or capsule, especially an opacity impairing vision or causing blindness. The many kinds of cataract are classified by their morphology (size, shape, location) or etiology (cause and time of occurrence). [EU]

**Collagen:** The protein substance of the white fibres (collagenous fibres) of skin, tendon, bone, cartilage, and all other connective tissue; composed of molecules of tropocollagen (q.v.), it is converted into gelatin by boiling. collagenous pertaining to collagen; forming or producing collagen. [EU]

**Doxycycline:** A synthetic tetracycline derivative with a range of antimicrobial activity and mode of action similar to that of tetracycline, but more effective against many species. Animal studies suggest that it may cause less tooth staining than other tetracyclines. [NIH]

**Estrogens:** A class of sex hormones associated with the development and maintenance of secondary female sex characteristics and control of the cyclical changes in the reproductive cycle. They are also required for pregnancy maintenance and have an anabolic effect on protein metabolism and water retention. [NIH]

**Gout:** Hereditary metabolic disorder characterized by recurrent acute arthritis, hyperuricemia and deposition of sodium urate in and around the joints, sometimes with formation of uric acid calculi. [NIH]

**Hematocrit:** Measurement of the volume of packed red cells in a blood specimen by centrifugation. The procedure is performed using a tube with graduated markings or with automated blood cell counters. It is used as an indicator of erythrocyte status in disease. For example, anemia shows a low hematocrit, polycythemia, high values. [NIH]

**Hydrocortisone:** The main glucocorticoid secreted by the adrenal cortex. Its synthetic counterpart is used, either as an injection or topically, in the treatment of inflammation, allergy, collagen diseases, asthma, adrenocortical deficiency, shock, and some neoplastic conditions. [NIH]

**Lesion:** Any pathological or traumatic discontinuity of tissue or loss of function of a part. [EU]

**Minocycline:** A semisynthetic antibiotic effective against tetracycline-resistant staphylococcus infections. [NIH]

**Mobilization:** The process of making a fixed part or stored substance mobile, as by separating a part from surrounding structures to make it accessible for an operative procedure or by causing release into the circulation for body use of a substance stored in the body. [EU]

**Nausea:** An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

**Ointments:** Semisolid preparations used topically for protective emollient effects or as a vehicle for local administration of medications. Ointment bases are various mixtures of fats, waxes, animal and plant oils and solid and liquid hydrocarbons. [NIH]

**Paraffin:** A mixture of solid hydrocarbons obtained from petroleum. It has a wide range of uses including as a stiffening agent in ointments, as a lubricant, and as a topical anti-inflammatory. It is also commonly used as an embedding material in histology. [NIH]

**Parvovirus:** A genus of the family parvoviridae, subfamily parvovirinae, infecting a variety of vertebrates including humans. Parvoviruses are responsible for a number of important diseases but also can be non-pathogenic in certain hosts. The type species is mice minute virus. [NIH]

**Progressive:** Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

**Purines:** A series of heterocyclic compounds that are variously substituted in nature and are known also as purine bases. They include adenine and guanine, constituents of nucleic acids, as well as many alkaloids such as caffeine and theophylline. Uric acid is the metabolic end product of purine

metabolism. [NIH]

**Sedimentation:** The act of causing the deposit of sediment, especially by the use of a centrifugal machine. [EU]

**Stomach:** An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

**Tetracycline:** An antibiotic originally produced by *Streptomyces viridifaciens*, but used mostly in synthetic form. It is an inhibitor of aminoacyl-tRNA binding during protein synthesis. [NIH]

**Thrombocytopenia:** Decrease in the number of blood platelets. [EU]

**Viruses:** Minute infectious agents whose genomes are composed of DNA or RNA, but not both. They are characterized by a lack of independent metabolism and the inability to replicate outside living host cells. [NIH]



## ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries and glossaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: <http://www.nlm.nih.gov/medlineplus/encyclopedia.html>
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.):  
<http://www.medterms.com/Script/Main/hp.asp>
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.):  
<http://www.intelihealth.com/IH/>
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish:  
<http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html>
- On-line Medical Dictionary (CancerWEB):  
<http://www.graylab.ac.uk/omd/>
- Technology Glossary (National Library of Medicine) - Health Care Technology: <http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm>
- Terms and Definitions (Office of Rare Diseases):  
[http://rarediseases.info.nih.gov/ord/glossary\\_a-e.html](http://rarediseases.info.nih.gov/ord/glossary_a-e.html)

Beyond these, MEDLINEplus contains a very user-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia Web site address is <http://www.nlm.nih.gov/medlineplus/encyclopedia.html>. ADAM is also available on commercial Web sites such as [drkoop.com](http://www.drkoop.com/) (<http://www.drkoop.com/>) and Web MD ([http://my.webmd.com/adam/asset/adam\\_disease\\_articles/a\\_to\\_z/a](http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a)). Topics of interest can be researched by using keywords before continuing elsewhere, as these basic definitions and concepts will be useful in more advanced areas of research. You may choose to print various pages specifically relating to arthritis of the knee and keep them on file.

## Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries and glossaries:

- Medical Dictionaries: Medical & Biological (World Health Organization):  
**<http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical>**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library):  
**<http://mel.lib.mi.us/health/health-dictionaries.html>**
- Patient Education: Glossaries (DMOZ Open Directory Project):  
**[http://dmoz.org/Health/Education/Patient\\_Education/Glossaries/](http://dmoz.org/Health/Education/Patient_Education/Glossaries/)**
- Web of Online Dictionaries (Bucknell University):  
**<http://www.yourdictionary.com/diction5.html#medicine>**



## ARTHRITIS OF THE KNEE GLOSSARY

The following is a complete glossary of terms used in this sourcebook. The definitions are derived from official public sources including the National Institutes of Health [NIH] and the European Union [EU]. After this glossary, we list a number of additional hardbound and electronic glossaries and dictionaries that you may wish to consult.

**Abdomen:** That portion of the body that lies between the thorax and the pelvis. [NIH]

**Acetaminophen:** Analgesic antipyretic derivative of acetanilide. It has weak anti-inflammatory properties and is used as a common analgesic, but may cause liver, blood cell, and kidney damage. [NIH]

**Acne:** An inflammatory disease of the pilosebaceous unit, the specific type usually being indicated by a modifying term; frequently used alone to designate common acne, or acne vulgaris. [EU]

**ACTH:** Adrenocorticotrophic hormone. [EU]

**Adolescence:** The period of life beginning with the appearance of secondary sex characteristics and terminating with the cessation of somatic growth. The years usually referred to as adolescence lie between 13 and 18 years of age. [NIH]

**Aerobic:** 1. having molecular oxygen present. 2. growing, living, or occurring in the presence of molecular oxygen. 3. requiring oxygen for respiration. [EU]

**Agonist:** In anatomy, a prime mover. In pharmacology, a drug that has affinity for and stimulates physiologic activity at cell receptors normally stimulated by naturally occurring substances. [EU]

**Alopecia:** Baldness; absence of the hair from skin areas where it normally is present. [EU]

**Analgesic:** An agent that alleviates pain without causing loss of consciousness. [EU]

**Androgenic:** Producing masculine characteristics. [EU]

**Androgens:** A class of sex hormones associated with the development and maintenance of the secondary male sex characteristics, sperm induction, and sexual differentiation. In addition to increasing virility and libido, they also increase nitrogen and water retention and stimulate skeletal growth. [NIH]

**Anemia:** A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

**Ankle:** That part of the lower limb directly above the foot. [NIH]

**Anovulation:** Suspension or cessation of ovulation in animals and humans. [NIH]

**Antibacterial:** A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

**Antibiotic:** A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [EU]

**Antibody:** An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their mode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Antidepressant:** An agent that stimulates the mood of a depressed patient, including tricyclic antidepressants and monoamine oxidase inhibitors. [EU]

**Antigen:** Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

**Antimicrobial:** Killing microorganisms, or suppressing their multiplication or growth. [EU]

**Antioxidant:** One of many widely used synthetic or natural substances added to a product to prevent or delay its deterioration by action of oxygen in the air. Rubber, paints, vegetable oils, and prepared foods commonly contain antioxidants. [EU]

**Anxiety:** The unpleasant emotional state consisting of psychophysiological responses to anticipation of unreal or imagined danger, ostensibly resulting from unrecognized intrapsychic conflict. Physiological concomitants include increased heart rate, altered respiration rate, sweating, trembling, weakness, and fatigue; psychological concomitants include feelings of impending danger, powerlessness, apprehension, and tension. [EU]

**Arteries:** The vessels carrying blood away from the heart. [NIH]

**Arthroplasty:** Surgical reconstruction of a joint to relieve pain or restore

motion. [NIH]

**Arthroscopy:** Endoscopic examination, therapy and surgery of the joint. [NIH]

**Articular:** Of or pertaining to a joint. [EU]

**Aspiration:** The act of inhaling. [EU]

**Assay:** Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

**Benign:** Not malignant; not recurrent; favourable for recovery. [EU]

**Biochemical:** Relating to biochemistry; characterized by, produced by, or involving chemical reactions in living organisms. [EU]

**Biomechanics:** The study of the application of mechanical laws and the action of forces to living structures. [NIH]

**Biopsy:** The removal and examination, usually microscopic, of tissue from the living body, performed to establish precise diagnosis. [EU]

**Blepharitis:** Inflammation of the eyelids. [EU]

**Capsules:** Hard or soft soluble containers used for the oral administration of medicine. [NIH]

**Carbohydrate:** An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH<sub>2</sub>O)<sub>n</sub>. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

**Carcinoma:** A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [EU]

**Cardiovascular:** Pertaining to the heart and blood vessels. [EU]

**Catabolism:** Any destructive metabolic process by which organisms convert substances into excreted compounds. [EU]

**Cataract:** An opacity, partial or complete, of one or both eyes, on or in the lens or capsule, especially an opacity impairing vision or causing blindness. The many kinds of cataract are classified by their morphology (size, shape, location) or etiology (cause and time of occurrence). [EU]

**Cerebellar:** Pertaining to the cerebellum. [EU]

**Cerebellum:** Part of the metencephalon that lies in the posterior cranial fossa behind the brain stem. It is concerned with the coordination of movement. [NIH]

**Cholesterol:** The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

**Chronic:** Persisting over a long period of time. [EU]

**Clomiphene:** A stilbene derivative that functions both as a partial estrogen agonist and complete estrogen antagonist depending on the target tissue. It antagonizes the estrogen receptor thereby initiating or augmenting ovulation in anovulatory women. [NIH]

**Collagen:** The protein substance of the white fibres (collagenous fibres) of skin, tendon, bone, cartilage, and all other connective tissue; composed of molecules of tropocollagen (q.v.), it is converted into gelatin by boiling. collagenous pertaining to collagen; forming or producing collagen. [EU]

**Curative:** Tending to overcome disease and promote recovery. [EU]

**Cytokines:** Non-antibody proteins secreted by inflammatory leukocytes and some non-leukocytic cells, that act as intercellular mediators. They differ from classical hormones in that they are produced by a number of tissue or cell types rather than by specialized glands. They generally act locally in a paracrine or autocrine rather than endocrine manner. [NIH]

**Cytosine:** A pyrimidine base that is a fundamental unit of nucleic acids. [NIH]

**Defensins:** Family of antimicrobial peptides that have been identified in humans, animals, and plants. They are thought to play a role in host defenses against infections, inflammation, wound repair, and acquired immunity. Based on the disulfide pairing of their characteristic six cysteine residues, they are divided into alpha-defensins and beta-defensins. [NIH]

**Degenerative:** Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

**Dermatology:** A medical specialty concerned with the skin, its structure, functions, diseases, and treatment. [NIH]

**Diarrhea:** Passage of excessively liquid or excessively frequent stools. [NIH]

**Doxycycline:** A synthetic tetracycline derivative with a range of antimicrobial activity and mode of action similar to that of tetracycline, but more effective against many species. Animal studies suggest that it may cause less tooth staining than other tetracyclines. [NIH]

**Dysprosium:** Dysprosium. An element of the rare earth family that has the atomic symbol Dy, atomic number 66, and atomic weight 162.50. Dysprosium is a silvery metal used primarily in the form of various salts. [NIH]

**Edema:** Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

**Elastic:** Susceptible of resisting and recovering from stretching, compression or distortion applied by a force. [EU]

**Embryo:** In animals, those derivatives of the fertilized ovum that eventually become the offspring, during their period of most rapid development, i.e.,

after the long axis appears until all major structures are represented. In man, the developing organism is an embryo from about two weeks after fertilization to the end of seventh or eighth week. [EU]

**Endocrinology:** A subspecialty of internal medicine concerned with the metabolism, physiology, and disorders of the endocrine system. [NIH]

**Endogenous:** Developing or originating within the organisms or arising from causes within the organism. [EU]

**Enzyme:** A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. [EU]

**Epidermal:** Pertaining to or resembling epidermis. Called also epidermic or epidermoid. [EU]

**Estradiol:** The most potent mammalian estrogenic hormone. It is produced in the ovary, placenta, testis, and possibly the adrenal cortex. [NIH]

**Estrogens:** A class of sex hormones associated with the development and maintenance of secondary female sex characteristics and control of the cyclical changes in the reproductive cycle. They are also required for pregnancy maintenance and have an anabolic effect on protein metabolism and water retention. [NIH]

**Exocrine:** 1. secreting outwardly, via a duct;. [EU]

**Exogenous:** Developed or originating outside the organism, as exogenous disease. [EU]

**Fatigue:** The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

**Femur:** The longest and largest bone of the skeleton, it is situated between the hip and the knee. [NIH]

**Finasteride:** An orally active testosterone 5-alpha-reductase inhibitor. It is used as a surgical alternative for treatment of benign prostatic hyperplasia. [NIH]

**FSH:** A gonadotropic hormone found in the pituitary tissues of mammals. It regulates the metabolic activity of ovarian granulosa cells and testicular Sertoli cells, induces maturation of Graafian follicles in the ovary, and promotes the development of the germinal cells in the testis. [NIH]

**Glucose:** D-glucose, a monosaccharide (hexose), C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>, also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the

normal blood of all animals. It is the end product of carbohydrate metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the urine in diabetes mellitus. [EU]

**Gout:** Hereditary metabolic disorder characterized by recurrent acute arthritis, hyperuricemia and deposition of sodium urate in and around the joints, sometimes with formation of uric acid calculi. [NIH]

**Gynecology:** A medical-surgical specialty concerned with the physiology and disorders primarily of the female genital tract, as well as female endocrinology and reproductive physiology. [NIH]

**Hematocrit:** Measurement of the volume of packed red cells in a blood specimen by centrifugation. The procedure is performed using a tube with graduated markings or with automated blood cell counters. It is used as an indicator of erythrocyte status in disease. For example, anemia shows a low hematocrit, polycythemia, high values. [NIH]

**Heterozygote:** An individual having different alleles at one or more loci in homologous chromosome segments. [NIH]

**Hirsutism:** Abnormal hairiness, especially an adult male pattern of hair distribution in women. [EU]

**Hormones:** Chemical substances having a specific regulatory effect on the activity of a certain organ or organs. The term was originally applied to substances secreted by various endocrine glands and transported in the bloodstream to the target organs. It is sometimes extended to include those substances that are not produced by the endocrine glands but that have similar effects. [NIH]

**Hydrocortisone:** The main glucocorticoid secreted by the adrenal cortex. Its synthetic counterpart is used, either as an injection or topically, in the treatment of inflammation, allergy, collagen diseases, asthma, adrenocortical deficiency, shock, and some neoplastic conditions. [NIH]

**Hyperplasia:** The abnormal multiplication or increase in the number of normal cells in normal arrangement in a tissue. [EU]

**Hypersensitivity:** A state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign substance. Hypersensitivity reactions are classified as immediate or delayed, types I and IV, respectively, in the Gell and Coombs classification (q.v.) of immune responses. [EU]

**Hypertension:** Persistently high arterial blood pressure. Various criteria for its threshold have been suggested, ranging from 140 mm. Hg systolic and 90 mm. Hg diastolic to as high as 200 mm. Hg systolic and 110 mm. Hg

diastolic. Hypertension may have no known cause (essential or idiopathic h.) or be associated with other primary diseases (secondary h.). [EU]

**Ibuprofen:** A nonsteroidal anti-inflammatory agent with analgesic properties used in the therapy of rheumatism and arthritis. [NIH]

**Idiopathic:** Of the nature of an idiopathy; self-originated; of unknown causation. [EU]

**Inbreeding:** The mating of plants or non-human animals which are closely related genetically. [NIH]

**Induction:** The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

**Infertility:** The diminished or absent ability to conceive or produce an offspring while sterility is the complete inability to conceive or produce an offspring. [NIH]

**Inflammation:** A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

**Insecticides:** Pesticides designed to control insects that are harmful to man. The insects may be directly harmful, as those acting as disease vectors, or indirectly harmful, as destroyers of crops, food products, or textile fabrics. [NIH]

**Insulin:** A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

**Iodine:** A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

**Isoenzymes:** One of various structurally related forms of an enzyme, each having the same mechanism but with differing chemical, physical, or immunological characteristics. [NIH]

**Isotretinoin:** A topical dermatologic agent that is used in the treatment of acne vulgaris and several other skin diseases. The drug has teratogenic and other adverse effects. [NIH]

**Lesion:** Any pathological or traumatic discontinuity of tissue or loss of

function of a part. [EU]

**LH:** A small glycoprotein hormone secreted by the anterior pituitary. LH plays an important role in controlling ovulation and in controlling secretion of hormones by the ovaries and testes. [NIH]

**Ligament:** A band of fibrous tissue that connects bones or cartilages, serving to support and strengthen joints. [EU]

**Lipid:** Any of a heterogeneous group of fats and fatlike substances characterized by being water-insoluble and being extractable by nonpolar (or fat) solvents such as alcohol, ether, chloroform, benzene, etc. All contain as a major constituent aliphatic hydrocarbons. The lipids, which are easily stored in the body, serve as a source of fuel, are an important constituent of cell structure, and serve other biological functions. Lipids may be considered to include fatty acids, neutral fats, waxes, and steroids. Compound lipids comprise the glycolipids, lipoproteins, and phospholipids. [EU]

**Lipophilic:** Having an affinity for fat; pertaining to or characterized by lipophilia. [EU]

**Lupus:** A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

**Malignant:** Tending to become progressively worse and to result in death. Having the properties of anaplasia, invasion, and metastasis; said of tumours. [EU]

**Melanoma:** A tumour arising from the melanocytic system of the skin and other organs. When used alone the term refers to malignant melanoma. [EU]

**Membrane:** A thin layer of tissue which covers a surface, lines a cavity or divides a space or organ. [EU]

**Menstruation:** The cyclic, physiologic discharge through the vagina of blood and mucosal tissues from the nonpregnant uterus; it is under hormonal control and normally recurs, usually at approximately four-week intervals, in the absence of pregnancy during the reproductive period (puberty through menopause) of the female of the human and a few species of primates. It is the culmination of the menstrual cycle. [EU]

**Metabolite:** Any substance produced by metabolism or by a metabolic process. [EU]

**Methoprene:** Juvenile hormone analog and insect growth regulator used to control insects by disrupting metamorphosis. Has been effective in controlling mosquito larvae. [NIH]

**Methotrexate:** An antineoplastic antimetabolite with immunosuppressant properties. It is an inhibitor of dihydrofolate reductase and prevents the formation of tetrahydrofolate, necessary for synthesis of thymidylate, an



essential component of DNA. [NIH]

**Micronuclei:** Nuclei, separate from and additional to the main nucleus of a cell, produced during the telophase of mitosis or meiosis by lagging chromosomes or chromosome fragments derived from spontaneous or experimentally induced chromosomal structural changes. This concept also includes the smaller, reproductive nuclei found in multinucleate protozoans. [NIH]

**Minocycline:** A semisynthetic antibiotic effective against tetracycline-resistant staphylococcus infections. [NIH]

**Misoprostol:** A synthetic analog of natural prostaglandin E1. It produces a dose-related inhibition of gastric acid and pepsin secretion, and enhances mucosal resistance to injury. It is an effective anti-ulcer agent and also has oxytocic properties. [NIH]

**Mobility:** Capability of movement, of being moved, or of flowing freely. [EU]

**Mobilization:** The process of making a fixed part or stored substance mobile, as by separating a part from surrounding structures to make it accessible for an operative procedure or by causing release into the circulation for body use of a substance stored in the body. [EU]

**Modulator:** A specific inductor that brings out characteristics peculiar to a definite region. [EU]

**Molecular:** Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

**Nausea:** An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

**Neural:** 1. pertaining to a nerve or to the nerves. 2. situated in the region of the spinal axis, as the neutral arch. [EU]

**Neurons:** The basic cellular units of nervous tissue. Each neuron consists of a body, an axon, and dendrites. Their purpose is to receive, conduct, and transmit impulses in the nervous system. [NIH]

**Neurosurgery:** A surgical specialty concerned with the treatment of diseases and disorders of the brain, spinal cord, and peripheral and sympathetic nervous system. [NIH]

**Neurotoxic:** Poisonous or destructive to nerve tissue. [EU]

**Niacin:** Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

**Nisin:** A 34-amino acid polypeptide antibiotic produced by *Streptococcus lactis*. It has been used as a food preservative in canned fruits and vegetables, and cheese. [NIH]

**Norethindrone:** A synthetic progestational hormone with actions similar to those of progesterone but functioning as a more potent inhibitor of ovulation. It has weak estrogenic and androgenic properties. The hormone has been used in treating amenorrhea, functional uterine bleeding, endometriosis, and for contraception. [NIH]

**Obstetrics:** A medical-surgical specialty concerned with management and care of women during pregnancy, parturition, and the puerperium. [NIH]

**Ointments:** Semisolid preparations used topically for protective emollient effects or as a vehicle for local administration of medications. Ointment bases are various mixtures of fats, waxes, animal and plant oils and solid and liquid hydrocarbons. [NIH]

**Oral:** Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

**Orthopaedic:** Pertaining to the correction of deformities of the musculoskeletal system; pertaining to orthopaedics. [EU]

**Osteoarthritis:** Noninflammatory degenerative joint disease occurring chiefly in older persons, characterized by degeneration of the articular cartilage, hypertrophy of bone at the margins, and changes in the synovial membrane. It is accompanied by pain and stiffness, particularly after prolonged activity. [EU]

**Osteoporosis:** Reduction in the amount of bone mass, leading to fractures after minimal trauma. [EU]

**Ovary:** Either of the paired glands in the female that produce the female germ cells and secrete some of the female sex hormones. [NIH]

**Overdose:** 1. to administer an excessive dose. 2. an excessive dose. [EU]

**Ovulation:** The discharge of a secondary oocyte from a vesicular follicle of the ovary. [EU]

**Paraffin:** A mixture of solid hydrocarbons obtained from petroleum. It has a wide range of uses including as a stiffening agent in ointments, as a lubricant, and as a topical anti-inflammatory. It is also commonly used as an embedding material in histology. [NIH]

**Parenteral:** Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

**Parvovirus:** A genus of the family parvoviridae, subfamily parvovirinae, infecting a variety of vertebrates including humans. Parvoviruses are responsible for a number of important diseases but also can be non-pathogenic in certain hosts. The type species is mice minute virus. [NIH]

**Patella:** The flat, triangular bone situated at the anterior part of the knee. [NIH]

**Penicillamine:** 3-Mercapto-D-valine. The most characteristic degradation product of the penicillin antibiotics. It is used as an antirheumatic and as a chelating agent in Wilson's disease. [NIH]

**Pernicious:** Tending to a fatal issue. [EU]

**Pharmacokinetics:** The action of drugs in the body over a period of time, including the processes of absorption, distribution, localization in tissues, biotransformation, and excretion. [EU]

**Photosensitivity:** An abnormal cutaneous response involving the interaction between photosensitizing substances and sunlight or filtered or artificial light at wavelengths of 280-400 nm. There are two main types : photoallergy and phototoxicity. [EU]

**Porphyryns:** A group of compounds containing the porphyrin structure, four pyrrole rings connected by methine bridges in a cyclic configuration to which a variety of side chains are attached. The nature of the side chain is indicated by a prefix, as uroporphyrin, hematoporphyrin, etc. The porphyryns, in combination with iron, form the heme component in biologically significant compounds such as hemoglobin and myoglobin. [NIH]

**Posterior:** Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

**Potassium:** An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

**Prednisone:** A synthetic anti-inflammatory glucocorticoid derived from cortisone. It is biologically inert and converted to prednisolone in the liver. [NIH]

**Progesterone:** Pregn-4-ene-3,20-dione. The principal progestational hormone of the body, secreted by the corpus luteum, adrenal cortex, and placenta. Its chief function is to prepare the uterus for the reception and development of the fertilized ovum. It acts as an antiovarian agent when administered on days 5-25 of the menstrual cycle. [NIH]

**Progressive:** Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

**Prostate:** A gland in males that surrounds the neck of the bladder and the urethra. It secretes a substance that liquifies coagulated semen. It is situated in the pelvic cavity behind the lower part of the pubic symphysis, above the deep layer of the triangular ligament, and rests upon the rectum. [NIH]

**Prostatism:** A symptom complex resulting from compression or obstruction

of the urethra, due most commonly to hyperplasia of the prostate; symptoms include diminution in the calibre and force of the urinary stream, hesitancy in initiating voiding, inability to terminate micturition abruptly (with postvoiding dribbling), a sensation of incomplete bladder emptying, and, occasionally, urinary retention. [EU]

**Proteins:** Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

**Psoriasis:** A common genetically determined, chronic, inflammatory skin disease characterized by rounded erythematous, dry, scaling patches. The lesions have a predilection for nails, scalp, genitalia, extensor surfaces, and the lumbosacral region. Accelerated epidermopoiesis is considered to be the fundamental pathologic feature in psoriasis. [NIH]

**Purines:** A series of heterocyclic compounds that are variously substituted in nature and are known also as purine bases. They include adenine and guanine, constituents of nucleic acids, as well as many alkaloids such as caffeine and theophylline. Uric acid is the metabolic end product of purine metabolism. [NIH]

**Radiography:** The making of film records (radiographs) of internal structures of the body by passage of x-rays or gamma rays through the body to act on specially sensitized film. [EU]

**Radiology:** A specialty concerned with the use of x-ray and other forms of radiant energy in the diagnosis and treatment of disease. [NIH]

**Receptor:** 1. a molecular structure within a cell or on the surface characterized by (1) selective binding of a specific substance and (2) a specific physiologic effect that accompanies the binding, e.g., cell-surface receptors for peptide hormones, neurotransmitters, antigens, complement fragments, and immunoglobulins and cytoplasmic receptors for steroid hormones. 2. a sensory nerve terminal that responds to stimuli of various kinds. [EU]

**Rectal:** Pertaining to the rectum (= distal portion of the large intestine). [EU]

**Retina:** The ten-layered nervous tissue membrane of the eye. It is continuous with the optic nerve and receives images of external objects and transmits visual impulses to the brain. Its outer surface is in contact with the choroid and the inner surface with the vitreous body. The outer-most layer is pigmented, whereas the inner nine layers are transparent. [NIH]

**Retinoids:** Derivatives of vitamin A. Used clinically in the treatment of severe cystic acne, psoriasis, and other disorders of keratinization. Their possible use in the prophylaxis and treatment of cancer is being actively explored. [NIH]

**Rheumatology:** A subspecialty of internal medicine concerned with the

study of inflammatory or degenerative processes and metabolic derangement of connective tissue structures which pertain to a variety of musculoskeletal disorders, such as arthritis. [NIH]

**Riboflavin:** Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

**Salicylanilides:** 2-Hydroxy-N-phenylbenzamides. N-phenyl substituted salicylamides. Derivatives have been used as fungicides, anti-mildew agents and topical antifungal agents. In concentrated form may cause irritation of skin and mucous membranes. [NIH]

**Sebum:** The oily substance secreted by sebaceous glands. It is composed of keratin, fat, and cellular debris. [NIH]

**Secretion:** 1. the process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. any substance produced by secretion. [EU]

**Sedimentation:** The act of causing the deposit of sediment, especially by the use of a centrifugal machine. [EU]

**Selenium:** An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

**Sensitization:** 1. administration of antigen to induce a primary immune response; priming; immunization. 2. exposure to allergen that results in the development of hypersensitivity. 3. the coating of erythrocytes with antibody so that they are subject to lysis by complement in the presence of homologous antigen, the first stage of a complement fixation test. [EU]

**Serum:** The clear portion of any body fluid; the clear fluid moistening serous membranes. 2. blood serum; the clear liquid that separates from blood on clotting. 3. immune serum; blood serum from an immunized animal used for passive immunization; an antiserum; antitoxin, or antivenin. [EU]

**Spondylitis:** Inflammation of the vertebrae. [EU]

**Stomach:** An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

**Symptomatic:** 1. pertaining to or of the nature of a symptom. 2. indicative (of a particular disease or disorder). 3. exhibiting the symptoms of a particular disease but having a different cause. 4. directed at the allaying of

symptoms, as symptomatic treatment. [EU]

**Synovial:** Of pertaining to, or secreting synovia. [EU]

**Systemic:** Pertaining to or affecting the body as a whole. [EU]

**Tendinitis:** Inflammation of tendons and of tendon-muscle attachments. [EU]

**Teratogenic:** Tending to produce anomalies of formation, or teratism (= anomaly of formation or development : condition of a monster). [EU]

**Tetracycline:** An antibiotic originally produced by *Streptomyces viridifaciens*, but used mostly in synthetic form. It is an inhibitor of aminoacyl-tRNA binding during protein synthesis. [NIH]

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

**Tibia:** The second longest bone of the skeleton. It is located on the medial side of the lower leg, articulating with the fibula laterally, the talus distally, and the femur proximally. [NIH]

**Tolerance:** 1. the ability to endure unusually large doses of a drug or toxin. 2. acquired drug tolerance; a decreasing response to repeated constant doses of a drug or the need for increasing doses to maintain a constant response. [EU]

**Tomography:** The recording of internal body images at a predetermined plane by means of the tomograph; called also body section roentgenography. [EU]

**Topical:** Pertaining to a particular surface area, as a topical anti-infective applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

**Transcutaneous:** Transdermal. [EU]

**Transplantation:** The grafting of tissues taken from the patient's own body or from another. [EU]

**Ventral:** 1. pertaining to the belly or to any venter. 2. denoting a position more toward the belly surface than some other object of reference; same as anterior in human anatomy. [EU]

**Viruses:** Minute infectious agents whose genomes are composed of DNA or RNA, but not both. They are characterized by a lack of independent metabolism and the inability to replicate outside living host cells. [NIH]

## General Dictionaries and Glossaries

While the above glossary is essentially complete, the dictionaries listed here cover virtually all aspects of medicine, from basic words and phrases to

more advanced terms (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Dictionary of Medical Acronymms & Abbreviations** by Stanley Jablonski (Editor), Paperback, 4th edition (2001), Lippincott Williams & Wilkins Publishers, ISBN: 1560534605,  
<http://www.amazon.com/exec/obidos/ASIN/1560534605/iconegroupinterna>
- **Dictionary of Medical Terms : For the Nonmedical Person (Dictionary of Medical Terms for the Nonmedical Person, Ed 4)** by Mikel A. Rothenberg, M.D, et al, Paperback - 544 pages, 4th edition (2000), Barrons Educational Series, ISBN: 0764112015,  
<http://www.amazon.com/exec/obidos/ASIN/0764112015/iconegroupinterna>
- **A Dictionary of the History of Medicine** by A. Sebastian, CD-Rom edition (2001), CRC Press-Parthenon Publishers, ISBN: 185070368X,  
<http://www.amazon.com/exec/obidos/ASIN/185070368X/iconegroupinterna>
- **Dorland's Illustrated Medical Dictionary (Standard Version)** by Dorland, et al, Hardcover - 2088 pages, 29th edition (2000), W B Saunders Co, ISBN: 0721662544,  
<http://www.amazon.com/exec/obidos/ASIN/0721662544/iconegroupinterna>
- **Dorland's Electronic Medical Dictionary** by Dorland, et al, Software, 29th Book & CD-Rom edition (2000), Harcourt Health Sciences, ISBN: 0721694934,  
<http://www.amazon.com/exec/obidos/ASIN/0721694934/iconegroupinterna>
- **Dorland's Pocket Medical Dictionary (Dorland's Pocket Medical Dictionary, 26th Ed)** Hardcover - 912 pages, 26th edition (2001), W B Saunders Co, ISBN: 0721682812,  
<http://www.amazon.com/exec/obidos/ASIN/0721682812/iconegroupinterna/103-4193558-7304618>
- **Melloni's Illustrated Medical Dictionary (Melloni's Illustrated Medical Dictionary, 4th Ed)** by Melloni, Hardcover, 4th edition (2001), CRC Press-Parthenon Publishers, ISBN: 85070094X,  
<http://www.amazon.com/exec/obidos/ASIN/85070094X/iconegroupinterna>
- **Stedman's Electronic Medical Dictionary Version 5.0 (CD-ROM for Windows and Macintosh, Individual)** by Stedmans, CD-ROM edition (2000), Lippincott Williams & Wilkins Publishers, ISBN: 0781726328,  
<http://www.amazon.com/exec/obidos/ASIN/0781726328/iconegroupinterna>
- **Stedman's Medical Dictionary** by Thomas Lathrop Stedman, Hardcover - 2098 pages, 27th edition (2000), Lippincott, Williams & Wilkins, ISBN: 068340007X,  
<http://www.amazon.com/exec/obidos/ASIN/068340007X/iconegroupinterna>

- **Tabers Cyclopedic Medical Dictionary (Thumb Index)** by Donald Venes (Editor), et al, Hardcover - 2439 pages, 19th edition (2001), F A Davis Co, ISBN: 0803606540, <http://www.amazon.com/exec/obidos/ASIN/0803606540/icongroupinterna>



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