

Knee Osteoarthritis: Risk Factors, Diagnosis and Treatment Options by Dr. Meridel I. Gatterman

According to the American Academy of Orthopedic Surgeons, osteoarthritis of the knee is one of five leading causes of disability among elderly men and women, and the risk for disability from [osteoarthritis](#) of the knee is as great as that from cardiovascular disease.¹ Currently, 21 million Americans are affected by osteoarthritis² and an estimated 10 million suffer from knee osteoarthritis, making it one of the most common causes of disability in the U.S.³ It is estimated by the year 2030, 72 million Americans will be at high risk for osteoarthritis.⁴ Patients with chronic joint pain often think nothing can be done to help them, with 23 million Americans reporting chronic joint symptoms that have not been diagnosed with arthritis.⁵ One in five American adults with doctor-diagnosed arthritis underscores the magnitude of this chronic condition.⁶

Factors That Increase the Risk of Developing Knee Osteoarthritis¹

- Heredity: There is evidence that genetic factors may make individuals more likely to develop osteoarthritis of the knee.
- Weight: Being overweight increases the load on joints, especially the knee.
- Age: The ability of cartilage to heal itself decreases as people age.
- Gender: Women older than 50 years of age are more likely than men to develop osteoarthritis of the knee.
- Trauma: Previous injuries to the knee, including sports injuries, can lead to osteoarthritis of the knee.
- Repetitive stress injuries: Activities associated with certain occupations, particularly those that involve kneeling or squatting, walking more than 2 miles a day, or lifting at least 55 pounds regularly, increase the risk of knee OA. Occupations such as assembly line workers, computer keyboard operators, performing artists, shipyard or dock workers, miners, and carpet or floor layers have demonstrated a higher incidence of osteoarthritis of the knee.
- High-impact sports: Elite players in soccer, football, long-distance running and tennis have an increased risk of developing osteoarthritis of the knee.
- Associated illnesses: Repeated episodes of gout or septic arthritis, metabolic disorders and some congenital conditions can also increase the risk of developing osteoarthritis.
- Associated risk factors: Other risk factors being investigated include deficiencies of [vitamins C and D](#), poor posture or bone alignment, poor aerobic fitness, and muscle weakness.

Etiology and Diagnosis

Osteoarthritis of the knee is characterized by a degeneration of the knee cartilage. Cartilage is a smooth, slippery, fibrous connective tissue that acts as a protective cushion between the bones. The joint space between the bones narrows as the articular cartilage in the knee is lost. As the disease progresses the cartilage thins, becoming grooved and fragmented. The surrounding bones react by becoming thicker. They start to grow outward and form spurs as the body attempts to stabilize the joint. The synovium becomes inflamed and thickened, often with acute episodes of debilitating

pain. The joint slowly changes over a period of years and in severe cases, when the cartilage is gone bone erosion occurs with deformity of the joint. When the bone ends rub against each other, normal activity becomes painful and difficult.¹

Diagnosis is based on patient-reported symptoms such as pain and disability, and physical signs such as changes in the joints (decreased joint space) seen on radiographs. Symptoms of osteoarthritis of the knee include pain (mild, moderate and severe); stiffness; limited range of motion in the knee; and localized inflammation.

Pain from osteoarthritis of the knee is usually worse following activity, especially overuse of the affected knee. Stiffness can worsen after sitting for prolonged periods of time. Symptoms generally become more severe as osteoarthritis progresses. Pain can become continuous rather than only when weight-bearing. More detailed imaging including MRI can provide more detailed information. Arthroscopic knee surgery provides an invasive method of viewing the condition of the [knee joint](#).¹

Lifestyle Modifications to Reduce Disability

While there is no cure for osteoarthritis of the knee, a combination of strategies can reduce the risk of disability.

Weight control: According to Brigham and Women's Hospital, Americans over the age of 50 will lose the equivalent of 86 million healthy years of life due to obesity and symptomatic knee osteoarthritis. Maintaining an optimal weight reduces the stress on the knees. Each pound lost helps. A force three to six times a person's body weight is exerted across the knee while walking.

In other words, being obese increases the force on the knee by 30 to 60 pounds with each step taken while walking. Painful joints, especially when weight-bearing, often lead to inactivity, which makes weight loss more difficult and further compromises joints that are designed to move in order to be healthy.

Exercise: Encouraging the patient to stay active is an essential part of management of osteoarthritis of the knee.⁸ If walking is too painful, cycling, swimming and water aerobics are good choices. Keeping the leg and thigh muscles strong improves knee function, and exercise also can help increase range of motion and [flexibility](#).⁹ Being active and staying active can reduce pain and make movement easier.⁸

Diet: Dietary supplements that promote healthy cartilage are important factors in the management of osteoarthritis. Vitamin C is essential in the development of normal cartilage. A deficiency of vitamin C can lead to the development of weak cartilage. Dietary vitamin C is most widely available in citrus fruits. Supplementation with a vitamin C tablet is advised if sufficient dietary vitamin C is not consumed.¹⁰

Vitamin D deficiency has been shown to increase the risk of joint space narrowing and progression of disease in osteoarthritis. Supplementation of 400 IU daily is recommended by many doctors. Fifteen minutes of daily exposure to the sun is a natural way to increase vitamin D levels. Deficiency of calcium can be caused by vitamin D deficiency. Adequate calcium is necessary to maintain sufficient bone density.¹⁰

Glucosamine and chondroitin are controversial nutritional supplements⁸ that have been studied in Europe and more recently in the United States.¹⁰ While 50 percent of patients get relief from the symptoms of osteoarthritis attributable to glucosamine and chondroitin supplementation, the AHRQ questions their efficacy, stating that these supplements are not regulated as drugs in the United States and therefore their quality may vary.⁸ Glucosamine and chondroitin can help reduce swelling and tenderness, as well as improve mobility and function. At least two months of continuous use is necessary before the full effect is realized.⁹

Other Potential Treatment Options

Supportive devices: A variety of supportive devices are available to patients limited by osteoarthritis. A cane, energy-absorbing shoes or inserts, and a brace can be helpful. A brace can help support the entire knee load, or if the arthritis is centered on one side of the knee, an "unloader" brace can shift the load away from the affected portion of the knee.

Topical applications: Other measures may include topical applications including heat and ice. When the [knee is inflamed](#), ice can reduce the inflammation and relieve pain. When the joint pain is not acute, heat can be soothing and help to relax surrounding soft tissue. Topical analgesics and liniments can offer temporary relief. Elastic bandages can offer limited support and remind the patient to be cautious when moving the knee.⁹ The patient must be taught to unweight the knee before moving to avoid aggravating the damaged joint.

Acupuncture and magnetic pulse therapy have also been helpful in treating osteoarthritis of the knee. Employed nontraditionally, acupuncture uses fine needles to stimulate specific body areas to relieve pain or numb the area. Magnetic pulse therapy is painless and works by applying a pulsed signal to the knee, which is placed in an electromagnetic field.⁹

Less Conservative Methods

Corticosteroid injections: Corticosteroids are powerful anti-inflammatory agents that can be injected into the joint. They are given for moderate to severe pain. They can be useful if there is significant swelling, but are not very helpful if the arthritis affects the joint mechanics. Corticosteroids are hormones produced by the adrenal glands. They can provide pain relief and reduce inflammation; however, the effects are not long-lasting, and no more than four injections a year are recommended. With repeated injections or over an extended period of time, joint damage can actually *increase* rather than decrease.⁹

Viscosupplementation with [hyaluronic acid](#): The exact mechanism of action of viscosupplementation is unclear. Prospective, randomized, controlled trials have demonstrated mixed results. Some studies have found minimal or no benefit, while others suggest beneficial effects over placebo. In a meta-analysis of eight hyaluronan trials involving 971 patients, outcomes in patients treated with hyaluronan were superior to outcomes in patients treated with placebo at the end of treatment cycles and after six months.¹¹

The cost of hyaluronic acid is significant. Third-party reimbursement varies and Medicare pays for injections every six months. Most insurance companies now cover viscosupplementation.¹²

Drug treatment: Several types of drugs can be used in treating arthritis of the knee. Because every patient is different and because not all people respond the same to medications, a one-size-fits-all drug program should be avoided. Anti-inflammatory medications can include aspirin, acetaminophen, or ibuprofen to help reduce swelling in the joint. These over-the-counter drugs can be very effective in reducing pain. All drugs have potential side effects, however, and simple analgesics are no exception.⁹

Surgical treatment: If the patient's condition is not sufficiently relieved by conservative therapy, a number of surgical options are available. Arthroscopic surgery utilizes fiberoptic technology to enable the surgeon to see inside the joint, clean it of debris and/or repair torn cartilage. Arthroscopic knee surgery generally does not reduce the pain of osteoarthritis and is used more effectively for knee problems from trauma such as sports injuries.⁹

Knee replacement or total knee replacement is misleading and can scare some patients when they believe that the entire knee is to be replaced. A total or partial knee arthroplasty replaces severely damaged knee joint cartilage with metal and plastic.⁹ The replacement implants include a metal alloy on the end of the femur and polyethylene on the tibia and patella. Knee replacement is major surgery and is generally reserved for those patients who have tried all other treatments available for osteoarthritis of the knee. Knee replacement surgery is generally very successful, but success is dependent on active postsurgical rehabilitation.

Your Role in Managing Knee OA

The role of the doctor of chiropractic in treating patients with osteoarthritis of the knee is one of minimizing disability in mild to moderate cases and presenting options for those patients whose degenerative changes have reached a stage at which more invasive therapy is necessary to preserve optimum quality of life. As a first step, encouraging patients with osteoarthritis to stay active and lose weight where indicated is in their best interest.⁸

References

1. Frequently Asked Questions About Osteoarthritis of the Knee. American Academy of Orthopaedic Physicians. <http://orthoinfo.aaos.org/topic.cfm?topic=A00228>
2. Lawrence RC, Hemlick CG, et al. Estimates of the prevalence of arthritis and selected musculoskeletal disorders in the United States. *Arthritis and Rheumatism*, 1998;41(50):778-99.
3. "Obesity and Knee Osteoarthritis Shorten Healthy Years of Life." *Science News*, Feb. 15, 2011.
4. *Handout on Health: Osteoarthritis*. National Institutes of Health. NIH publication number 06-46-17, May 2006.
5. Bolen J, et al. Racial/ethnic differences in the prevalence and impact of doctor diagnosed arthritis – United States 2002. *Morbidity and Mortality Weekly Report*, 2005;54:119-23.
6. Hootman J, et al. Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation – United States, 2003-2005. *Morbidity and Mortality Weekly Report*, 2006:55:1089-1092.
7. Losina A. "Obesity and Knee Osteoarthritis Shorten Healthy Years of Life." Physorg.com, Feb. 15, 2011.
8. *Osteoarthritis of the Knee*. AHRQ Pub. No. 09-EHC001A, 2009.

9. Arthritis of the Knee. American Academy of Orthopaedic Physicians.
<http://orthoinfo.aaos.org/topic.cfm?topic=A00212>
10. Osteoarthritis and Your Diet. WebMD.com.
<http://webmd.com/osteoarthritis/guide/osteoarthritis-diet>
11. George E. Intra-articular hyaluronan treatment for osteoarthritis. *Ann Rheum Dis*, 1998;57:637-40.
12. Wen DY. Intra-articular hyaluronic acid injections for knee osteoarthritis. *American Family Physician*, Aug. 1, 2000;62:565-70,572.