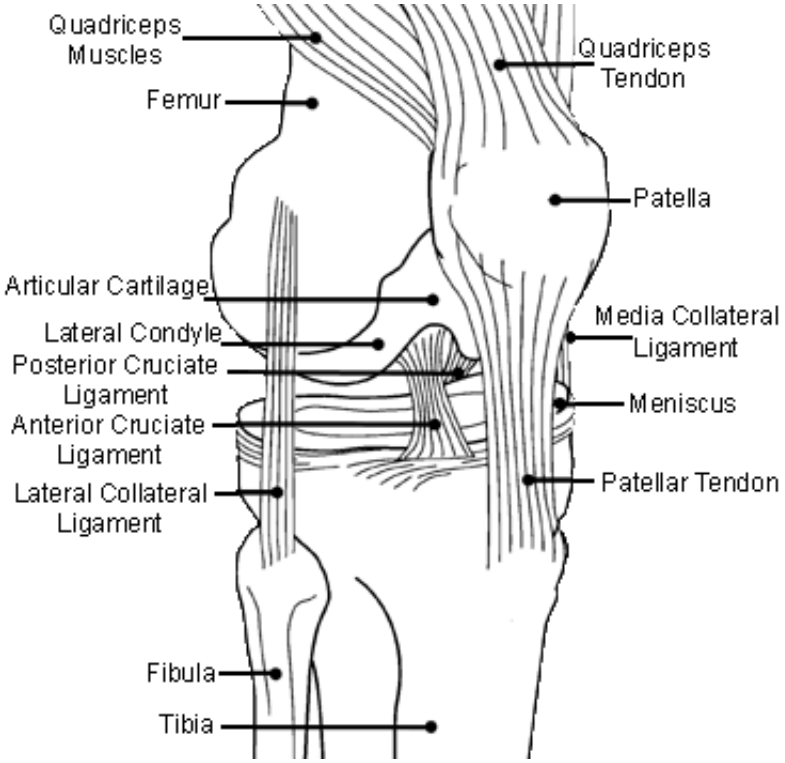
Degnerative Osteoarthritis

Introduction Osteoarthritis is a common problem for many people after middle age. Osteoarthritis is sometimes referred to as degenerative, or wear and tear arthritis.

Anatomy The main problem in osteoarthritis is degeneration of the articular cartilage that covers the joint. This results in areas of the joint where bone rubs against bone. Bone spurs may form around the joint as the body's response.



Causes Osteoarthritis may result from an injury to the knee earlier in life. Fractures involving the joint surfaces, instability from ligament tears, and meniscal injuries can all cause abnormal wear and tear of the knee joint. Not all cases of osteoarthritis are related to prior injury, however. Research has shown that some people are prone to develop osteoarthritis, and this tendency may be genetic.

Symptoms Osteoarthritis develops slowly over several years. The symptoms of osteoarthritis are mainly pain, swelling, and stiffening of the knee. The pain of osteoarthritis is usually worse after activity. Early in the course of the disease, you may notice that your knee does fairly well while walking, then after sitting for several minutes the knee becomes stiff and painful. As the condition progresses, pain can interfere with even simple daily activities. In the late stages, the pain can be continuous and even affect sleep patterns.

This pain probably does not come from the covering of the joint, the articular cartilage, because this tissue does not have a nerve supply. There is still some confusion about where the pain in osteoarthritis actually comes from. Sources of pain may be due to:

- inflammation in the lining of the joint, called the synovium.
- small fractures in the bone under the cartilage, the subchondral bone.
- pressure from blood in the area.
- stretching of nerve endings over a bone spur (osteophyte).

Diagnosis

The diagnosis of osteoarthritis can usually be made on the basis of the initial history and examination. X-Rays are very helpful in the diagnosis and may be the only special test required in the majority of cases. In some cases of early osteoarthritis, the X-rays may not show changes typical of osteoarthritis. It is not always clear where the pain is coming from. Knee pain from osteoarthritis may be confused with other common causes of knee pain such as a torn meniscus or kneecap problems. Sometimes, a MRI scan may be ordered to look at the knee more closely. A MRI scan is a special radiological test where magnetic waves are used to create pictures that look like slices of the knee. The MRI scan shows more than the bones of the knee. It can show the ligaments, articular cartilage, and menisci as well. The MRI scan is painless, and requires no needles or dye to be injected.

If the diagnosis is still unclear, arthroscopy may be necessary to actually look inside the knee and see if the joint surfaces are beginning to develop changes from wear and tear. Arthroscopy is a surgical procedure where a small fiberoptic television camera is inserted into the knee joint through a very small incision, about a 1/4 inch. The surgeon can then move the camera around inside the joint while watching the pictures on a TV screen. The structures inside the joint can be poked and pulled with small surgical instruments to see if there is any damage.

Treatment

Non-Surgical

Osteoarthritis (OA) is a condition which progresses slowly over a period of many years. Osteoarthritis cannot be cured. Treatment is directed at decreasing the symptoms of the condition, and slowing the progress of the condition. First, realize you are not alone. OA of the knee is a condition many people face. But thanks to continued advances in medicine, there are now many treatment options available. Recent information now shows that your condition may be maintained, and in some cases it may even

improve. So let's look at some ways to get your knee feeling better, to get it in tiptop shape, and to keep it that way!

Our first goal, then, will be to help reduce pain in the knee. Your physician may prescribe acetaminophen (Tylenol), a mild analgesic, as an excellent first-line pain reliever in this problem. Some people may also get relief of pain with anti-inflammatory medication, such as ibuprofen and aspirin. In either case, medications should be used in combination with physical therapy.

If the symptoms continue, a cortisone injection may be used to bring the inflammation under better control and ease your pain. Cortisone is a very powerful anti-inflammatory medication, but does have secondary effects that limit its usefulness in the treatment of osteoarthritis. The major drawback in the use of multiple injections of cortisone is the fact that it may actually speed up the process of degeneration when used repeatedly. Repeated injections also increase the risk of developing a knee joint infection, called a septic arthritis. Any time a joint is entered with a needle, there is the possibility of an infection. Most physicians use cortisone sparingly, and avoid multiple injections unless the joint is already in the end stages of degeneration where the next step is an artificial knee replacement.

Recently, a new type of injectable medication has become available in the US. Hyaluronic acid preparations have been used in Europe and Canada for several years and seem to be beneficial in decreasing the symptoms in knees that have mild to moderate osteoarthritis changes. The medication requires 3 to 5 injections given over a one month period. The medication seems to reduce symptoms in many patients for 6-8 months.

In the Beginning...

Limit pain: Your physical therapist has several tools, or modalities, to help control the acute symptoms caused by osteoarthritis of the knee. Sources of heat, like a moist hot pack, ultrasound, or diathermy, can help reduce discomfort by stimulating blood flow and overriding pain sensation. Joint mobilization may be chosen for its ability to provide nutrition and lubrication to the joint surfaces. It is also helpful for overriding the transmission of pain to the brain. Another helpful treatment to reduce pain is transcutaneous nerve stimulation (TENS for short), which uses a mild electrical impulse to block pain. Certain topical ointments (such as Capsaicin) can also help limit pain.

Increase range of motion: By improving knee movement, you may

find that pain symptoms ease. Another benefit of gaining more motion is that it keeps the joint surfaces healthy. And finally, it helps prepare your knee for higher levels of activity. Range of motion can be gained with a pool exercise program, gentle stretching by your therapist, or with the use of a stationary bike.

Increase strength: In the early stages, strengthening may be done using isometric exercise. These are exercises in which the muscles contract, but the joint stays in one position. Isometrics help restore strength while protecting you from further pain and irritation. As your muscles gain strength, you may notice less pain in the knee while feeling a sense of ease with walking and doing general activities.

Practice Joint Protection...

Muscular control: Sometimes the knee gets an extra jolt when you accidentally miss a stair or when you stub your toe. Untrained leg muscles are slow to respond in protecting the knee joint, and these jolting forces do more damage to the softer bone under the cartilage. A trained muscle will generate force quickly. Conditioning exercises help knee muscles generate forces more quickly, acting as shock absorbers in protecting the knee joint.

Walking aids: A cane or walker may be suggested by your physical therapist. Using a walking aid can take some of the stress off the joint, protecting it from undue stress and strain.

Shock absorption: A good pair of shoes will help reduce shock. Also, if you choose walking as your primary exercise, choose a walking surface like cinder or grass. Avoid cemented or other hard surfaces. If you find that increasing your walking speed irritates your knee, limit your speed. Other exercises that prevent high impact shock include stationary biking and swimming.

Alignment: When the knee is not properly aligned, extra pressure may develop on one side of the knee joint. In these cases, a special shoe insert, or orthotic, with a heel wedge can help relieve pressure and pain. Sometimes an osteoarthritis knee brace may be chosen. These braces are designed to unload the pressure, whether on the inside or outside of the knee joint.

Daily activities: Here are some helpful hints to use during the day to limit strain on your knee.

Avoid standing for greater than 10 minutes; instead use a high stool or take frequent rests.
Limit stair climbing; take the elevator, escalator, or ramp.

Avoid bending and squatting; keep items at waist level, or use a reached.
Park close to your destination.
Avoid low beds, chairs, and toilets; elevate them when possible.

As Your Treatment Progresses...

Daily exercise: Your joint surfaces can remain healthier by consistently working your leg through a full range of motion and using safe, load-bearing exercises. Use exercise to keep the hip, knee, and ankle muscles strong. Avoid pain by working in a pain-free arc of movement, limiting walking speeds, and overstressing the knee. In the presence of pain, use static, isometric exercise.

General fitness: The Surgeon General recommends that everyone get 30 minutes of moderate activity a day for as many as seven days a week. Along with reducing the risk of heart disease, lowering stress, managing body weight, and prolonging life, a general fitness program can also assist you in managing OA of the knee. Before undertaking such a program, consult your physician. Moderate activity can include walking, swimming, stationary biking, or low impact aerobics.

Exercise progression: Your exercise program will be advanced cautiously to include strengthening, balance, endurance, and functional activities. Your program will address key muscle groups of the buttock and hips, thigh, and calf. Several exercise choices can further stabilize and control the knee. Finally, a select group of exercises can be used to simulate day-to-day activities like raising up on your toes or standing from a raised stool. Specific exercises may then be chosen to simulate work or hobby demands.

Long Term Management...

Here are some long-term solutions to help manage OA of the knee:

Control pain and inflammation.
Reduce shock by using a walking aid, wearing good shoes, choosing soft surfaces, and keeping the leg muscles conditioned for unexpected stresses.
Exercise daily to maintain range of motion, strength, and cardiovascular fitness.
Use a shoe orthotic with a heel wedge for better alignment.
Take precautions with daily activities to avoid stressing the knee.
There are also braces on the market now that can reduce the pressure on the side of the knee that is most involved. These

braces have been designed mainly for the more common condition of early wear and tear in the medial compartment of the knee. A brace may help with your pain and is worth experimenting with.

Surgical Treatment

Arthroscopy

Arthroscopy is sometimes useful in the treatment of osteoarthritis of the knee. Looking directly at the articular cartilage surfaces of the knee is the most accurate way of determining how advanced the osteoarthritis is. Arthroscopy also allows the surgeon to debride the knee joint. Debridement essentially consists of cleaning out the joint of all debris and loose fragments. During the debridment any loose fragments of cartilage are removed and the knee is washed with a saline (salt) solution. (WASH.AVI) The areas of the knee joint which are badly worn may be roughened with a burr to promote the growth of new cartilage - a fibrocartilage material that is similar scar tissue. (BURR.AVI) Debridement of the knee using the arthroscope is not 100% successful. If successful, it usually affords temporary relief of symptoms for somewhere between 6 months - 2 years.

Proximal Tibial Osteotomy

Osteoarthritis usually affects the inside half (medial compartment) of the knee more often than the outside (lateral compartment). This can lead to the lower extremity becoming slightly bowlegged, or in medical terms, a genu varum deformity. The result is that the weight bearing line of the lower extremity moves more medially (towards the medial compartment of the knee). (It's really all in the physics of the situation!) The end result is that there is more pressure on the medial joint surfaces, which leads to more pain and faster degeneration.

In some cases, re-aligning the angles in the lower extremity can result in shifting the weight-bearing line to the lateral compartment of the knee. This, presumably, places the majority of the weight-bearing force into a healthier compartment. The result is to reduce the pain and delay the progression of the degeneration of the medial compartment.

The procedure to re-align the angles of the lower extremity is called a Proximal Tibial Osteotomy. In this procedure a wedge of bone is removed from the lateral side of the upper tibia. This converts the extremity from being bow-legged to knock-kneed. This procedure is not always successful, and generally will reduce

your pain, but not eliminate it altogether. The advantage to this approach is that very active people still have their own knee joint, and once the bone heals there are no restrictions to activity level.

The proximal tibial osteotomy in the best of circumstances is probably only temporary. It is thought that this operation buys some time before ultimately needing to perform a total knee replacement. The operation probably lasts for 5-7 years if successful.

Total Knee Replacement

The ultimate solution for osteoarthritis of the knee is to replace the joint surfaces with an artificial knee joint. The decision to proceed with a total knee replacement is usually only considered in people over the age of 60, (although younger patients sometimes require the surgery simply because no other acceptable solution is available to treat their condition). The main reason that orthopedic surgeons are reluctant to perform the surgery on younger individuals, is that the younger the patient, the more likely the artificial joint will fail during the patient's lifetime. Replacing the knee again, a process called a revision, is much harder, has more potential complications and is less likely to be successful.

Artificial knee joints last about 12 years in an elderly population but most knee replacements actually last a lifetime. Younger patients are more active and place more stress on the artificial joint. This can lead to loosening and failure of the artificial knee earlier after surgery. Obviously, younger patients are also more likely to outlive their artificial joint, and will almost surely require a revision at some point down the road. It is for these reasons that orthopedic surgeons are usually reluctant to recommend a total knee replacement in the younger patient until there are simply no other options.