

Osteoarthritis of the Knee

Brett Sanders, MD

Center For Sports Medicine and Orthopaedic
2415 McCallie Ave.
Chattanooga, TN
(423) 624-2696

Osteoarthritis is a common problem for many people. Osteoarthritis is sometimes referred to as "degenerative disease", or wear-and-tear arthritis. The main problem in osteoarthritis is degeneration of the articular cartilage that the joint. This results in areas of the joint where bone against bone. Bone spurs may form around the joint as body's response. Osteoarthritis may result from an injury knee earlier in life. Fractures involving the joint surfaces, instability from ligament tears, and meniscal injuries *can* 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 develop osteoarthritis, and this tendency may be genetic. Osteoarthritis develops slowly over several years. The symptoms of osteoarthritis are mainly pain, swelling, and stiffening of the knee. The pain of osteoarthritis is worse after activity. Early in the course of the disease, may notice that your knee does fairly well while walking, after sitting for several minutes the knee becomes stiff painful.

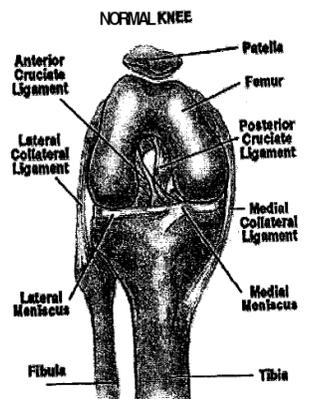
As the condition progresses, pain *can* interfere with even daily activities, In the late stages, the pain can be continuous and even affect sleep patterns.

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:

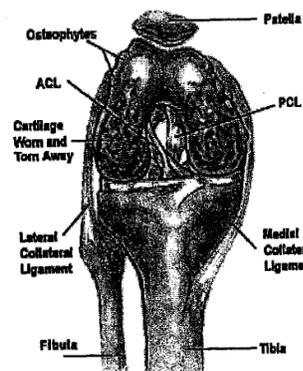
1. Inflammation in the lining of the joint, called the synovium.
2. Small fractures in the bone under the cartilage, the subchondral bone.
3. Pressure from blood in the area.
4. Stretching of nerve endings over a bone spur (osteophyte).
5. Degenerative tears in the meniscus cartilage.
6. Loose bone chips in the joint.

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



NORMAL KNEE



ARTHROTIC KNEE

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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.

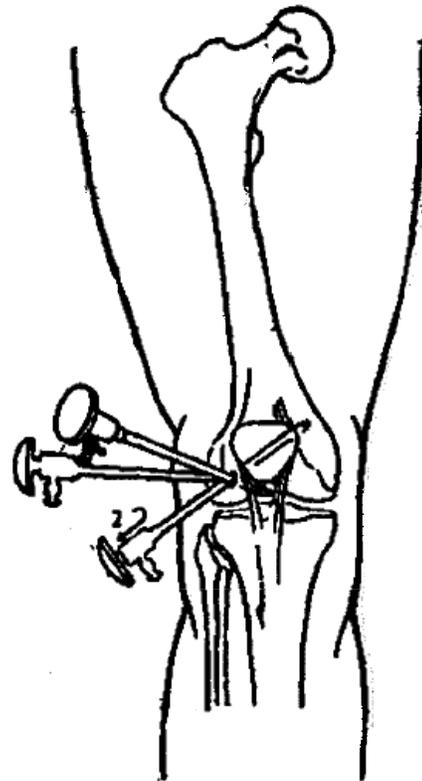
SURGICAL TREATMENT

Arthroscopic Surgery

If the diagnosis is still unclear, or the patient does not respond to non-operative treatment, arthroscopy can sometimes be helpful. Arthroscopy is a surgical procedure where a small fiberoptic television camera is inserted into the knee joint through a very small incision, about 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.

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 debridement any loose fragments of cartilage are removed and the knee is washed with a saline (salt) solution. At times, it may be possible to stimulate new areas of cartilage growth with a fibrocartilage material that is similar scar tissue. This technique, referred to as microfracture, may not always be possible and is not 100% successful.

Arthroscopy and debridement of the knee has variable success rates. Its best results are seen when there is a sudden change in the status of the knee or there is locking or catching of the knee. This type of treatment is not a cure for arthritis. For the right patient, however, it may offer a temporary solution that can last for days to months or years.



Total or Partial Knee Replacement

Once non-operative measures have failed, discussion about knee replacement is appropriate. While there are risks to a knee replacement, results are generally excellent and the knee can routinely last for many years. The longevity of the knee replacement is related to the activity level a patient. For this reason, running or hard labor on a knee replacement is not advised.

There are several types of knee replacements. If only one part of the knee (usually the inner or medial compartment) is severely involved with arthritis and the other compartment (especially the lateral compartment) is normal, a partial knee replacement (unicondylar knee replacement or 'uni') may be the best answer. If the whole knee is worn down to bare bone surfaces and there is significant pain, a total knee replacement (total knee arthroplasty) may be indicated.

Newer minimally invasive knee replacements may offer an advantage to older more invasive approaches. Knee replacement, however, is an elective procedure — patients usually know when this level of treatment is necessary.



Non-Surgical Treatment

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

- Control pain and inflammation. Aspirin, Advil and Eleve are available over-the-counter. Prescription strength anti-inflammatory medicine is also available.
- Glucosamine and chondroitin are over-the-counter products that may provide pain relief in osteoarthritis.
- Reduce shock by using a walking aid (cane), 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.
- Take precautions with daily activities to avoid stressing the knee.
- Avoid activities in your fitness and recreational pursuits that cause high impact loads to the knee such as walking, jogging, hiking, stair-stepper machines.
- Substitute impact activities with low impact activities such as stationary cycle, swimming, cross-country ski machine, rowing machine, elliptical machine.
- Follow a regular exercise program 2 to 3 times a week to stretch and strengthen the muscles around the knee.
- Certain injections into the knee (corticosteroid or ‘synvisc’ may be appropriate and will be discussed

Exercise Program

The following exercise program should be followed as instructed by the doctor or his physical therapist. For the straight leg lift and short arc lift, hamstring curl and hip abduction exercises, ankle weights can be added to increase resistance and strength of the target muscles. Generally, after 1 to 2 weeks, ankle weights can be added (starting at 1 pound) and increased by 1 pound per week until you build to 5 pounds. The exercises should be done daily until ankle weights are added. At this time, the straight-leg lift, short-arc lift, wall slides, hamstring curl, hip abduction and toe raises should be done every other day and the stretches should continue daily. When you have built up to 5 pounds on the straight-leg and short-arc lifts, continue the exercises 2 times per week for maintenance. Avoid using stair-stepper machines, leg extension machines and doing deep knee bends and squats or any exercise that causes crunching, clicking or pain at the kneecap.

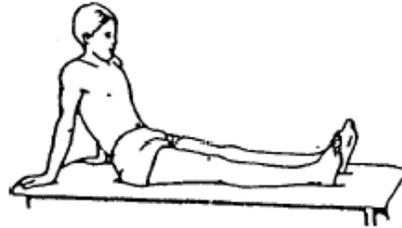
The arthritic knee is especially prone to episodes of inflammation. This may be a sign that you are doing too much exercise and need to cut back.

STATIONARY BICYCLE

Utilize a stationary bicycle to move the knee joint and improve flexibility of the joint. If you cannot pedal all the way around, then keep the foot of your involved knee on the pedal, and pedal back and forth, in a rocking motion, until your knee will bend far enough to allow a full cycle. Most people are able to achieve a full cycle revolution backwards first, followed by forward. You may ride the cycle with mild resistance for 10 to 20 minutes a day. Set the seat height so that when you are sitting on the bicycle seat, your knee is fully extended with the H resting on the pedal in the fully bottom position. You should then ride the bicycle with your forefoot resting on the pedal.



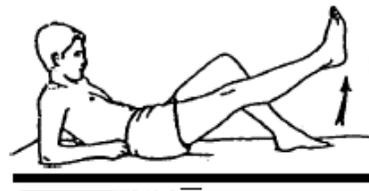
QUADRICEPS SETTING - to maintain muscle tone in the thigh (quadriceps) muscles and straighten the knee. Lie on your back with the knee extended fully straight as in the figure. Contract and hold the front thigh muscles (quadriceps) making the knee flat and straight. If done correctly, the kneecap will slide slightly upward toward the thigh muscles. The tightening action of the quadriceps muscles should make your knee straighten and be pushed flat against the bed or floor. Hold five seconds for each contraction. Do at least 20 repetitions three or four times a day. Try to fully straighten your knee equal to the uninvolved side.



HEEL SLIDES - to regain the bend (flexion) of the knee. While lying on your back (figure), actively slide your heel backward to bend the knee. Keep bending the knee until you feel a stretch in the front of the knee. Hold this bent position for five seconds and then slowly relieve the stretch and straighten the knee. While the knee is straight, you may repeat the quadriceps setting exercise. Repeat 20 times, three times a day.

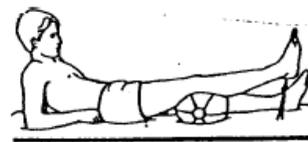
STRAIGHT LEG LIFT

Tighten the quadriceps muscles so that the knee is flat, straight and fully extended. Try to raise the entire involved limb up off of the floor or bed. If you are able to keep the knee straight raise the limb to about 45 degrees, pause one second and then lower slowly to the bed. Relax and repeat. If the knee bends when you attempt to lift the limb off of the bed, do not do this exercise. Keep trying to do the quadriceps setting exercise until you can lift the limb without letting the knee bend. Repeat 20 times.



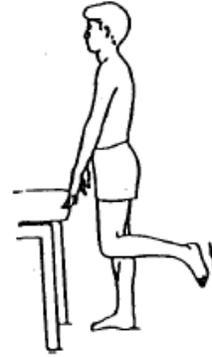
SHORT ARC LIFT

With the knee bent over a rolled up towel or blanket, lift the foot so that the knee fully straightens. Hold the knee locked in extension for five seconds, then slowly lower. Repeat 20 times.



STANDING HAMSTRING CURL

Stand facing a table, using the table for balance and support. While standing on the unoperated limb bend the knee of the operated side and raise the heel toward the buttock. Hold this flexed position for one second. Slowly lower the foot back to the floor. Keep the thighs aligned as illustrated. Repeat 20 times.

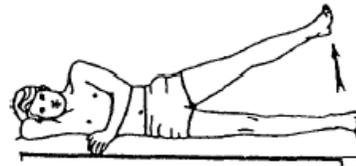


STANDING TOE RAISE

Stand facing a table, hands on the table for support and balance. Keep the knees extended fully. Tighten the quadriceps to hold the knee fully straight. Raise up on 'tip-toes' while maintaining the knees in full extension. Hold for one second, then lower slowly to the starting position. Repeat 20 times.

HIP ABDUCTION

Lie on your uninvolved side. Keep the knees fully extended. Raise the operated limb upward to a 45 degree angle as illustrated. Hold one second, then lower slowly. Repeat 20 times



WALL SLIDES

Stand upright with your back and buttocks touching a wall. Place the feet about 12 inches apart and about 6 inches from the wall. Slowly lower your hips by bending the knees and slide down the wall until the knees are flexed about 45 degrees (illustration). Pause five seconds and then slowly slide back up to the upright starting position. Doing this exercise too fast or too deep can aggravate your pain. Do not do this exercise if there is crunching or cracking at the kneecap or if it is painful. Do 3 sets of 10 to 15 repetitions.

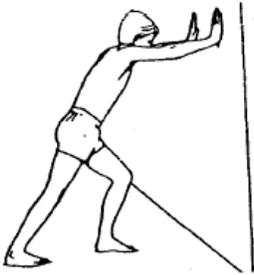
HAMSTRING STRETCH

Perform this stretch in the position illustrated at the right. Bend slowly forward at the hips, keeping the knee fully extended until you feel gentle stretch in the back of your thigh and knee. Hold the stretch for 15 to 20 seconds and repeat 3 to 5 times.



QUADRICEPS STRETCH

This stretch is performed in the position illustrated at the right. Lean gently backward as if bringing your heel toward the buttock. When a stretch is felt in the front of the thigh and knee, hold 15 to 20 seconds for 3 to 5 repetitions.



CALF STRETCH

In the position illustrated, keep the heel flat on the floor and the knee fully extended. Lean forward at the hips with the arms supporting your weight. When you feel a gentle stretch in the back of your calf and knee, hold for 15 to 20 seconds, 3 to 5 repetitions.

LATERAL HIP AND THIGH STRETCH

Cross your left (right) leg over in front of the other. Lean to the left (right), bending at the waist and letting your right (left) hip jut out. When you feel a gentle stretch in the out side of hip, hold 15 to 20 seconds, 3 to 5 repetitions.

