

Orthopaedic Center of Education

Knee Pain & Problems

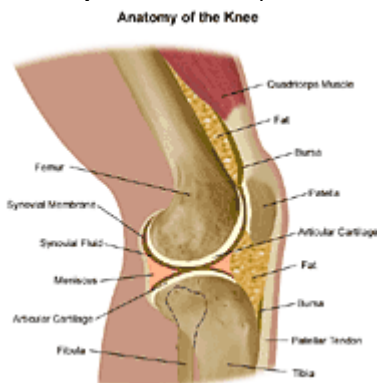
Knee Pain and Problems

Brief anatomy of the knee:

The knee is a vulnerable joint that bears a great deal of stress from everyday activities such as lifting and kneeling, and from high-impact activities such as jogging and aerobics.

The knee is formed by the following parts:

- **tibia** - shin bone or larger bone of the lower leg.
- **femur** - thighbone or upper leg bone.
- **patella** - kneecap.



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Each bone end is covered with a layer of cartilage that absorbs shock and protects the knee. Basically, the knee is two long leg bones held together by muscles, ligaments, and tendons.

There are two groups of muscles involved in the knee, including the quadriceps muscles (located on the front of the thighs), which straighten the legs, and the hamstring muscles (located on the back of the thighs), which bend the leg at the knee.

Tendons are tough cords of tissue that connect muscles to bones. Ligaments are elastic bands of tissue that connect bone to bone. Some ligaments on the knee provide stability and protection of the joints, while other ligaments limit forward and backward movement of the tibia (shin bone).

What are some common knee problems?

Many knee problems are a result of the aging process and continual wear and stress on the knee joint (i.e., arthritis). Other knee problems are a result of an injury or a sudden movement that strains the knee. Common knee problems include the following:

- **sprained or strained knee ligaments and/or muscles**
A sprained or strained knee ligament or muscle is usually caused by a blow to the knee or a sudden twist of the knee. Symptoms often include pain, swelling, and difficulty in walking.
- **torn cartilage**
Trauma to the knee can tear the menisci (pads of connective tissue that act as shock absorbers and also enhance stability). Cartilage tears can often occur with sprains. Treatment may involve wearing a brace during an activity to protect the knee from further injury. Surgery may be needed to repair the tear.
- **tendonitis**
Inflammation of the tendons may result from overuse of a tendon during certain activities such as running, jumping, or cycling. Tendonitis of the patellar tendon is called jumper's knee. This often occurs with sports such as basketball, where the force of hitting the ground after a jump strains the tendon.
- **arthritis**
Osteoarthritis is the most common type of arthritis that affects the knee. Osteoarthritis is a degenerative

process where the cartilage in the joint gradually wears away, and often affects middle-age and older people. Osteoarthritis may be caused by excess stress on the joint such as repeated injury or being overweight.

Rheumatoid arthritis can also affect the knees by causing the joint to become inflamed and by destroying the knee cartilage. Rheumatoid arthritis often affects persons at an earlier age than osteoarthritis.

How are knee problems diagnosed?

In addition to a complete medical history and physical examination, diagnostic procedures for knee problems may include the following:

- **x-ray** - a diagnostic test which uses invisible electromagnetic energy beams to produce images of internal tissues, bones, and organs onto film.
- **magnetic resonance imaging (MRI)** - a diagnostic procedure that uses a combination of large magnets, radiofrequencies, and a computer to produce detailed images of organs and structures within the body; can often determine damage or disease in a surrounding ligament or muscle.
- **computed tomography scan (Also called a CT or CAT scan.)** - a diagnostic imaging procedure that uses a combination of x-rays and computer technology to produce cross-sectional images (often called slices), both horizontally and vertically, of the body. A CT scan shows detailed images of any part of the body, including the bones, muscles, fat, and organs. CT scans are more detailed than general x-rays.
- **arthroscopy** - a minimally-invasive diagnostic and treatment procedure used for conditions of a joint. This procedure uses a small, lighted, optic tube (arthroscope) which is inserted into the joint through a small incision in the joint. Images of the inside of the joint are projected onto a screen; used to evaluate any degenerative and/or arthritic changes in the joint; to detect bone diseases and tumors; to determine the cause of bone pain and inflammation.
- **radionuclide bone scan** - a nuclear imaging technique that uses a very small amount of radioactive material, which is injected into the patient's bloodstream to be detected by a scanner. This test shows blood flow to the bone and cell activity within the bone.

Treatment for knee problems:

Specific treatment for knee problems will be determined by your physician based on:

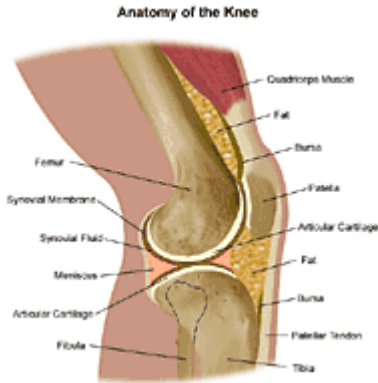
- your age, overall health, and medical history
- extent of the disease, injury, or condition
- your tolerance for specific medications, procedures, or therapies
- expectations for the course of the disease, injury, or condition
- your opinion or preference

If initial treatment methods do not provide relief, and x-rays show destruction of the joint, the orthopaedist may recommend total joint replacement for the knee.

Knee Replacement Surgery

When a knee is so severely damaged by disease or injury, an artificial knee replacement may be considered. Approximately 500,000 knee replacement surgeries are performed annually in the US. The most common age for knee replacement is between ages 60 to 80 years old.

Who might be a candidate for knee replacement?



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The most common condition that results in the need for knee replacement surgery is osteoarthritis, a degenerative, joint disease that affects mostly middle-aged and older adults. Osteoarthritis is characterized by the breakdown of joint cartilage and adjacent bone in the knees. Other forms of arthritis, such as rheumatoid arthritis and arthritis that results from a knee injury can also lead to degeneration of the knee joint. In addition, fractures, torn cartilage, and/or torn ligaments also can lead to irreversible damage to the knee joint over the years.

The decision to replace the painful knee with an artificial one is a joint decision between you and your physician. Other alternative treatments may first be used, including assistive walking devices and anti-inflammatory medications.

What happens before the surgery?

In addition to a complete medical history, your physician may perform a complete physical examination, including x-rays, to ensure you are in good health before undergoing surgery. In addition, you may also meet with a physical therapist to discuss rehabilitation after the surgery and undergo blood tests (or other tests).

How is a knee replaced with an artificial knee?

Although each procedure varies, generally, surgery to replace a knee usually lasts about two hours. After the damaged bone and cartilage of the knee is removed, the orthopedic surgeon will place the new artificial knee in its place.

The two most common types of knee prostheses used in replacement surgeries are cemented prosthesis and uncemented prosthesis. Sometime, a combination of the two types is used to replace a knee. A knee prosthesis is made up of metal and plastic. A cemented prosthesis is attached to the bone with a type of epoxy. An uncemented prosthesis attaches to the bone with a fine mesh of holes on the surface, in order for the bone to grow into the mesh and attach naturally to the prosthesis.

The prosthesis (artificial knee) is comprised of the following three components:

- tibial component (to replace the top of the tibia, or shin bone)
- femoral component (to replace the two femoral [thighbone] condyles and the patella groove)
- patellar component (to replace the bottom surface of the kneecap that rubs against the thighbone)

While undergoing surgery, the patient may be under general anesthesia or awake with spinal or epidural anesthesia.

After surgery:

Knee replacement surgeries usually require an in-hospital stay of several days. Even while in the hospital, the patient usually begins physical therapy exercises to begin regaining range of motion in the knee. Physical therapy will continue at home. Pain medication also will be administered to keep the patient comfortable.

The incision will have stitches or staples that will be removed after a few weeks.