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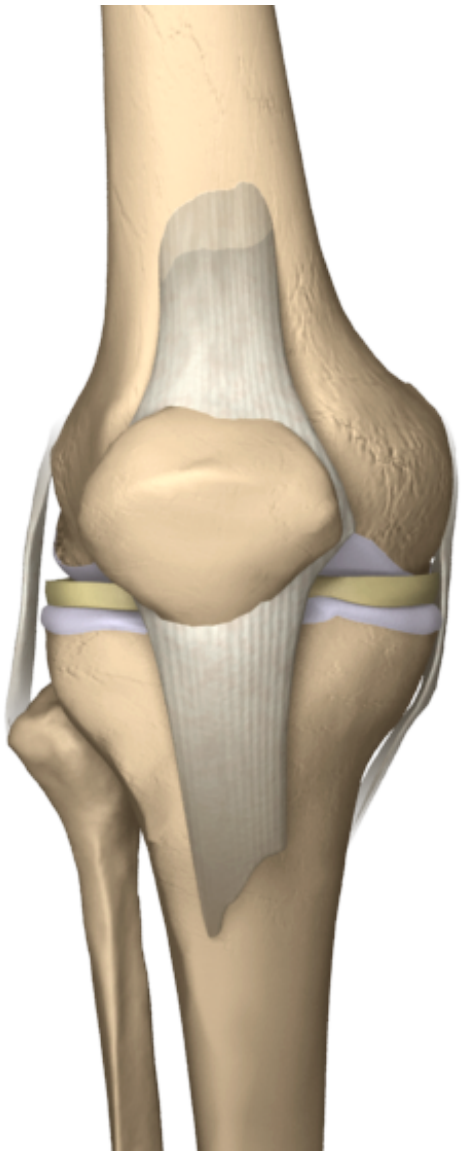
Partial Knee Replacement

A partial knee replacement removes damaged cartilage from the knee and replaces it with prosthetic implants. Unlike a total knee replacement, which removes all of the cartilage, a partial knee replacement typically removes and replaces cartilage from one particular region. The procedure is also known as a unicompartmental knee replacement, a uni, or partial knee resurfacing. A variation called a bicompartmental replacement can also be done to repair two regions, but is less common. This animation focuses on a unicompartmental partial knee replacement.



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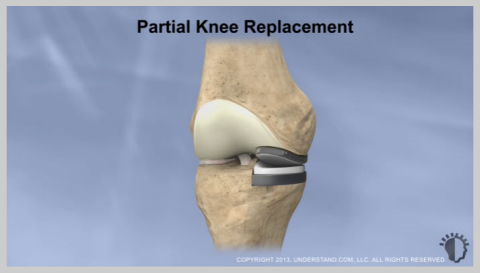

Introduction

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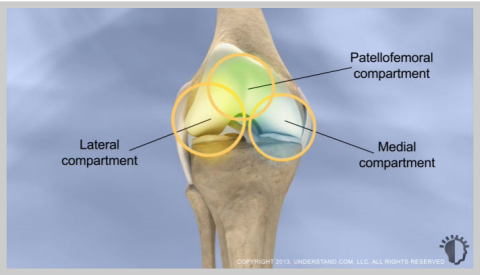

Knee Anatomy

Three bones comprise the knee joint: the patella (knee cap), the femur (thigh bone), and the tibia (shin bone). The patella is a rounded triangle-shaped bone embedded within the quadriceps tendon above it and the patellar tendon below. The two large, knob-like protuberances at the base of the femur, called the femoral condyles, form the top of the knee. The back surface of the patella, weight bearing portions of the femoral condyles, and the top of the tibia (tibial plateau) are lined with articular cartilage, which minimizes friction and helps prevent damage to the bones during movement. The knee's side-to-side motion is stabilized by the collateral ligaments (medial and lateral), and the cruciate ligaments (anterior and posterior) prevent excessive back and forth motion while allowing the knee to flex and extend.

The knee can be divided into three compartments: the medial compartment is between the femoral condyle on the inside of your knee and the tibial plateau; the lateral compartment exists between the outer condyle and the tibial plateau; and the patellofemoral compartment is the region between the patella and femoral condyles. A partial knee replacement can be done in any of these compartments, but is most common in the medial compartment where degenerative arthritis (osteoarthritis) tends to occur more frequently.

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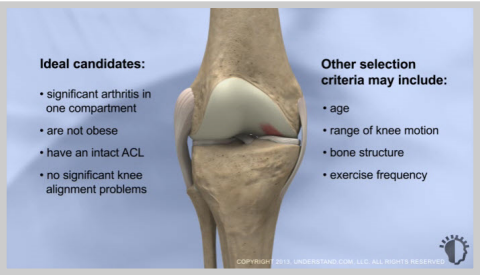

Patient Criteria

Partial knee replacements are reported to feel more natural than total knee replacements, but ideal candidates must fit selection criteria. For optimal results, unicompartmental knee replacement candidates should have significant arthritic damage confined to one knee compartment; if arthritis is widespread, a total knee replacement may be recommended. Partial knee replacements are restricted to patients who are not obese and who have healthy knee ligaments, particularly an intact ACL. Also, the cartilage damage should not be the result of anatomic knee alignment problems that may be better treated with different procedures. Other criteria used to determine whether a partial replacement procedure is appropriate include age, range of knee motion, bone structure, and the amount of exercise a person gets. These selection criteria help reduce the number of patients needing revision surgery or a total knee replacement at a later date.

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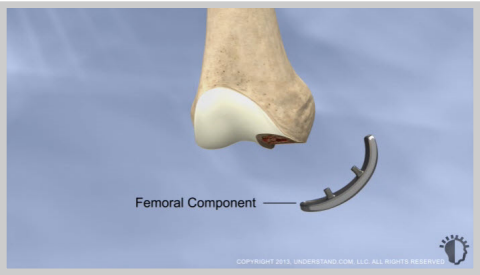
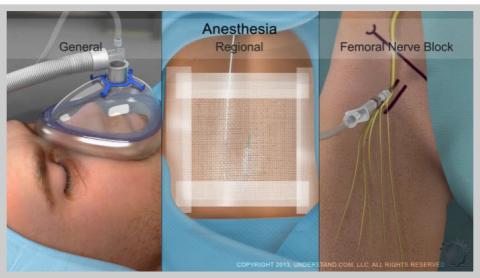


Implant Materials & Design

A variety of partial knee replacement implant designs exist. In general they are made out of metal alloys and synthetics, such as dense polyethylene plastics or ceramics, that are well tolerated inside the body. The metal components typically move against the synthetic components to minimize wear from abrasion. For medial or lateral compartment replacements, prosthetics will be cemented to bone to create a new moving surface between a femoral condyle and the tibial plateau. The femoral component is usually a curved metal cap that emulates the shape of the condyle. The tibial component is usually a metal plate topped with a synthetic bearing that may be either fixed or mobile. Fixed bearing implants are secured to the tibial platform, whereas mobile bearing implants move on the base, allowing for a limited amount of joint rotation. If the partial knee replacement is performed in the patellofemoral compartment, the cartilage surface of the patella is removed and replaced with polyethylene that articulates with a metal femoral component.



Preparation

Detailed X-rays will indicate the extent of knee damage and will help with preoperative measurements. You will be positioned on your back for the procedure and may undergo general anesthesia, which may be administered by intravenous injection or as a gas that puts you to sleep; regional anesthesia, in which a small tube called an epidural catheter delivers medication to the spinal column, numbing you from the waist down; or a femoral nerve block that numbs the surgical region. A tourniquet may be applied to control bleeding, and your knee will be free to be placed in a bent position to enable access to the joint surfaces. Once prepped, a partial knee replacement procedure generally takes one to two hours to complete.

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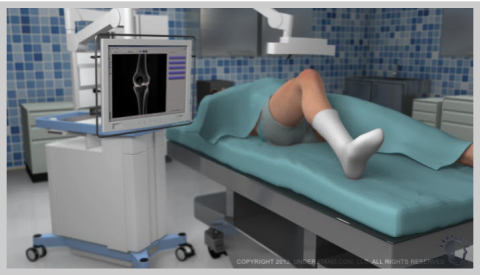
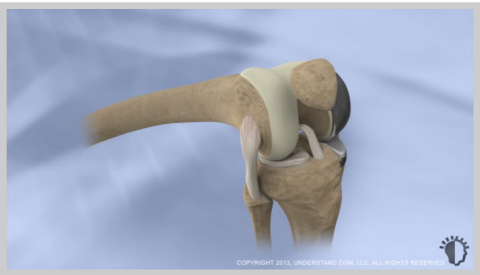


Procedure – Preparing the Joint Surfaces

Surgical details vary by procedure and component design. Generally, a three to five inch incision is made above the damaged compartment at the front of your knee. Muscle and fatty tissue are carefully moved aside, and the patella is shifted to one side to provide access to the femur and tibia in the affected compartment. The degenerative cartilage is removed, and some underlying bone is usually cut and sculpted to allow the implants to be cemented in place. Some procedures involve computer-assisted 3D imaging and micro-robotic instruments to aid in removing damaged parts and cutting bone, while other procedures use manual instruments with precision guides.

If the patella needs resurfacing, a series of similar steps are used to remove the damaged cartilage and prepare for the implant.



Procedure – Fitting the Implants

Once implant sites are prepared and tested, the prostheses are positioned and cemented in place. Any excess cement is removed. For a medial or lateral compartment resurfacing, the bearing surface is usually affixed to the tibial plate by press-locking or impacting it into place to complete the repair. After proper motion and function are confirmed, the various layers of tissue that had been separated are joined with resorbable (absorbable/dissolving) sutures and the skin incision is sealed with sutures or surgical staples. A bandage will be wrapped around your knee and you will be taken to recovery

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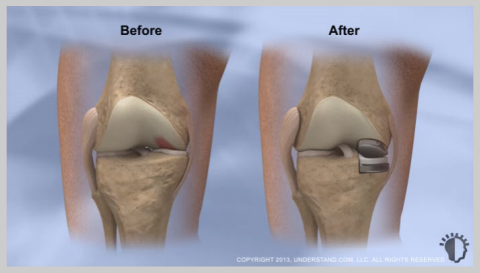

Recovery and Results

The smaller incision used for a partial knee replacement makes for a quicker recovery than a total knee replacement. Some partial knee replacements are done as outpatient procedures, but typically you will spend a night or two in the hospital. Range of motion exercises and bearing weight on the repaired knee are usually recommended immediately after surgery with physical therapy starting as soon as possible. Pain that can be managed with medication and some discoloration following the procedure are normal and will subside with time. Non-absorbable sutures or staples are typically removed within two weeks, and most people can walk unassisted within a month after surgery. It generally takes about six weeks for you to feel that your knee has recovered and you can resume most normal activities. When performed on properly selected patients, partial knee replacements exhibit good long-term results with a high degree of patient satisfaction.