

# Knee Anatomy and Function

## Understanding How the Knee Works

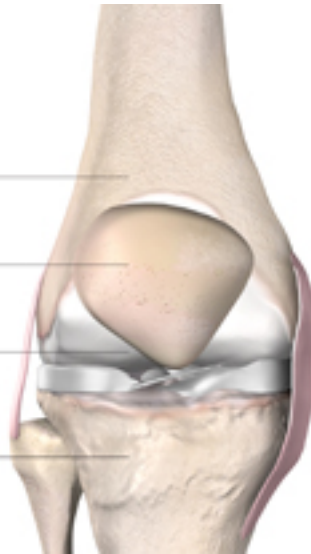
### A Normal Knee

Femur (thigh bone)

Patella

Healthy Cartilage

Tibia (shin bone)



### An Arthritic Knee

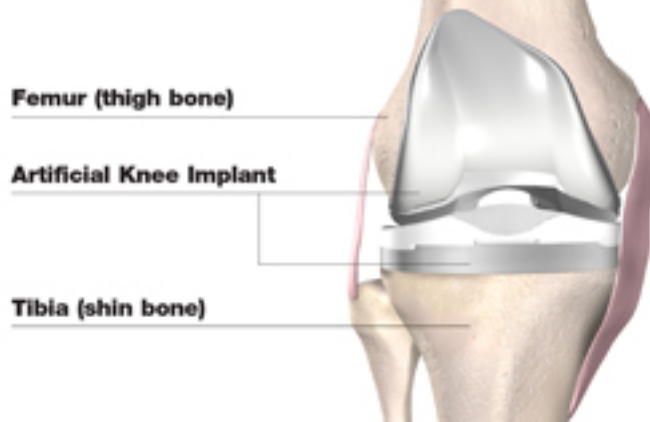
Femur (thigh bone)

Diseased Cartilage

Tibia (shin bone)



## A Replaced Knee



A joint is formed by two or more bones that are connected by thick bands of tissue called ligaments. The knee is the largest joint in the body and is made up of three main parts:

- The lower end of the thigh bone, or **femur**.
- The upper end of the shin bone, or **tibia**.
- The kneecap, or **patella**.

The thigh bone (femur) turns on the upper end of the shin bone (tibia), and the kneecap (patella) slides in a groove on the end of the thigh bone. **Ligaments**, which are bands of tissue, connect the thigh bone and the shin bone to help keep the knee joint steady. The **quadriceps**, the long muscles on the front of the thigh, help strengthen the knee.

A smooth substance called **articular cartilage** covers the surface of the bones where they touch each other within the joint. This articular cartilage acts as a cushion between the bones. The rest of the surfaces of the knee joint are covered by a thin, smooth tissue liner called **synovial membrane**, which makes a small amount of fluid that acts as a lubricant so that the joint bones will not rub against each other.

## What Causes Knee Pain?

One of the most common causes of knee pain and loss of mobility is the wearing away of the joint's cartilage lining. When this happens, the bones rub against each other, causing significant pain and swelling. The most common cause is a condition known as osteoarthritis. Trauma or direct injury to the knee can also cause osteoarthritis. Without cartilage there is no shock absorption between the bones in the joint, which allows stress to build up in the bones and contributes to pain.

## **Your Treatment Options for Knee Pain**

You may be able to get pain relief from treatments like steroidal and nonsteroidal anti-inflammatory drugs, physical therapy, bracing, cortisone or Visco Supplementation injections (e.g. Euflexxa, Synvisc, Supartz, etc.). However, if you've tried these methods and haven't experienced adequate relief, you don't have to live with severe knee pain and the limitations it puts on your activities. Knee replacement surgery may provide the pain relief you long for and enable you to return to the things you enjoy doing. Remember, even if Dr. Elkus recommends knee replacement for you, it is still up to you to make the final decision. The ultimate goal is for you to be as comfortable as possible with your choice — and that always means making the best decision based on your own individual needs.

If you do choose surgery, you'll be in good company: More than a quarter-million Americans have knee replacement surgery every year.<sup>1</sup> First performed in 1968, the procedure typically relieves pain and restores joint function.

## **Total Knee Joint Replacement**

### **Are You Considering Knee Replacement Surgery?**

Each patient is unique, but generally candidates for knee replacement surgery have:

- Pain severe enough to restrict not only work and recreation, but also the routine activities of daily living
- Pain that is not relieved by more conservative methods of treatment, such as reduced activity, medication or physical therapy
- Significant joint stiffness and loss of mobility
- X-rays that show advanced arthritis or other degenerative problems

## **Knee Replacement Frequently Asked Questions**

### **What is knee replacement?**

Knee joint replacement is a surgical procedure in which certain parts of an arthritic or damaged knee joint are removed and replaced with a prosthesis, or artificial joint. The artificial joint is designed to move just like a normal, healthy joint and allows you to get back to enjoying normal, everyday activities without pain.

## **How “bad” does my joint pain have to get before I should consider having joint replacement?**

This is a very personal decision that only you can make with the help of an Dr. Elkus’ evaluation of your pain and its effects on your daily life. For example, experiencing knee pain day after day without relief can lead to “staying off” the joint — which often weakens the muscles around it, so it becomes even more difficult to move.

When other more conservative treatment options — including medication and physical therapy — no longer provide pain relief, joint replacement may be recommended.

## **What will I need to know about postoperative recovery in the hospital?**

Following joint replacement surgery, hospital stays vary depending on insurance coverage and individual medical status. A total of three days (including the day of the surgery) is typical. Dr. Elkus’ patients typically begin mobilizing with physical therapy a couple hours after surgery. While in the hospital, you will continue to work with both physical and occupational therapy twice a day.

A case manager and an orthopedic navigator are assigned to work with you as you move through your rehabilitation routines. When you’re ready for discharge, the decision will be made concerning whether you can best continue to recover at home (the usual procedure) or in another facility where you may receive specialized rehabilitative help. If you do go to another facility, the goal will be to return you to your home, able to move about with a safe level of independence, within 5-7 days.

## **What can I expect in the first week or 2 after I’m discharged?**

You shouldn’t be surprised if you feel a little shaky and uncertain for the first week or two after you’re discharged. For this reason, Dr. Elkus requests that all patients have family, friends or sitters around the clock for at least the first week or two. Don’t worry, however, you will soon get a routine going and gain confidence in your new joint — the start of a new life with less pain. As with any surgery, you’ll probably take pain medication for a few weeks while you are healing. Be aware that you’ll probably need a walker and/or crutches for about six weeks, then use a cane for another six weeks or so. You’ll be in touch with your therapist, Dr. Elkus, ortho navigator as well as your case manager, so you’ll have plenty of opportunities to ask questions or discuss concerns as well as to report your progress.

## **When will I be able to go back to a normal daily routine, such as going to work or driving a car?**

This varies from patient to patient, but certainly not before your first follow up visit with Dr. Elkus at 10-14 days after surgery.

## **How long does a knee replacement last?**

As successful as most of these procedures are, over the years the artificial joint can become loose or wear out, requiring a revision (repeat) surgery. How long it will last depends not only on a person's age, but also on a patient's activity level and weight. These issues — together with the fact that increasing numbers of younger and more active people are receiving total joint replacement — have challenged the orthopaedic industry to try to extend the life cycle of total joint replacements.

## **What happens during knee replacement surgery?**

In surgery, the knee is flexed and the leg suspended. One muscle is separated to expose the femur (thighbone); later, the tibia (shinbone) is exposed. The damaged surfaces at the end of the thighbone are trimmed to shape it to fit inside the total knee prosthesis. The shinbone is cut flat across the top and a hole is created in the center to hold the stem of the tibial component. If needed, the knee cap is trimmed and the patellar component attached.

At various points during surgery, the alignment, function, and stability of the knee joint are evaluated and required adjustments are made. The prosthesis components are cemented into place, any contracted ligaments are released, the midvastus muscle is reconstructed, and the incision is closed.

## **Knee Home Exercise Program**

Here are some exercises that your doctor may recommend to help speed your recovery:

**Low Impact Aerobic Exercise** – Swimming and riding a stationary bike are great low impact exercises that help build strength in your knee. Stop any exercise that causes increasing pain.

**Short-Arc Knee Extensions** – Roll up several towels in a roll 6-8 inches thick. Lay in bed with the towels under one knee. Bend the other knee. Keeping your knee on the towels, lift your foot to straighten the knee. Hold for a few seconds and lower the foot.

**Ankle Pumps** – While lying in bed, point your toes downward and then bring your toes back up towards your head, tightening your calf.

**Heel Slides** – Slide your heel along the bed pulling your foot towards you as your knee bends.

**Straight Leg Raise** – Start by tightening your quadriceps, the muscles in the front of your thigh. Then with toes toward the ceiling, lift your leg 6-12 inches from the bed.

**Quadriceps Sets** – Lie on your back, legs straight. Tighten the muscle in the front of your thigh as you press the back of your knee toward the bed. Hold for a few seconds, then relax the leg.

**Standing Knee Bends** – Stand while holding onto a steady surface, such as a table. Bend your knee as far as it will go comfortably. Hold for a few seconds and lower the leg.

Increasing upper body strength is also important because of the need to use a walker or crutches after knee replacement.

**Bicep Curls** – In a sitting position, keep your elbow close to your body and your wrist straight. Bend your arm, moving your hand up to your shoulder, then lower slowly.

**Triceps Extensions** – Sit, leaning forward from the waist. Bend your elbow so that your forearm is parallel to the floor. Then straighten your elbow as you extend your arm behind you.

**Seated Press Ups** – Sit in a sturdy chair with armrests. With palms on the armrests, press down to lift yourself from the chair. Hold for 3-5 seconds. Bend your elbows slowly to ease back down.

Talk to Dr. Elkus before starting any exercise program and remember to call your doctor if you experience increased pain or swelling in your knee after exercise.