Osteoarthritis of the Hip

Cause
You are more likely to get it if you have a family history of the disease.

You are also at risk if you are elderly, obese, or have an injury that puts stress on your hip cartilage.

You can develop osteoarthritis if you do not have any risk factors.

See your doctor as soon as possible if you think you may have it.

Symptoms
Your first sign may be a bit of discomfort and stiffness in your groin, buttock, or thigh when you wake up in the morning. The pain flares when you are active and gets better when you rest.

If you do not get treatment for osteoarthritis of the hip, the condition keeps getting worse until resting no longer relieves your pain. The hip joint gets stiff and inflamed. Bone spurs might build up at the edges of the joint.

When the cartilage wears away completely, bones rub directly against each other. This makes it very painful for you to move. You may lose the ability to rotate, flex or extend your hip. If you become less active to avoid the pain the muscles controlling your joint get weak, and you may start to limp.

Diagnosis
You doctor will determine how much the disease has progressed. Describe your symptoms and when they began.

Your doctor may rotate, flex, and extend your hips to check for pain.
He or she may want you to walk or stand on one leg to see how your hips line up.

Both hips will probably be X-rayed to check if hip joint space has changed, and if you have developed bone spurs or other abnormalities.

**Treatment**

While you cannot reverse the effects of osteoarthritis, early nonsurgical treatment may help you avoid a lot of pain and disability and slow progression of the disease. Surgery can help you if your condition is already severe.

**Nonsurgical Treatment**

If you have early stages of osteoarthritis of the hip, the first treatment may be:

- Rest your hip from overuse
- Follow a physical therapy program of gentle, regular exercise like swimming, water aerobics or cycling to keep your joint functioning and improve its strength and range of motion
- Use nonsteroidal anti-inflammatory medications like ibuprofen for pain
- Get enough sleep each night
- You may need to lose weight if you are overweight. As the disease progresses, you may need to use a cane.

**Surgical Treatment**

If you have later stages of osteoarthritis, your hip joint hurts when you rest at night, and/or your hip is severely deformed, your doctor may recommend total hip replacement surgery (arthroplasty).

You will get a two-piece ball and socket replacement for your hip joint. This will cure your pain and improve your ability to walk. You may need crutches or a walker for a while after surgery. Rehabilitation is important to restore the flexibility in the hip and work your muscles back into shape.
Osteonecrosis of the Hip

Anatomy

The hip is a ball-and-socket joint. The socket is formed by the acetabulum, which is part of the large pelvis bone. The ball is the femoral head, which is the upper end of the femur (thighbone).

A slippery tissue called articular cartilage covers the surface of the ball and the socket. It creates a smooth, low friction surface that helps the bones glide easily across each other.

Cause

Osteonecrosis of the hip develops when the blood supply to the femoral head is disrupted. Without adequate nourishment, the bone in the head of the femur dies and gradually collapses. As a result, the articular cartilage covering the hip bones also collapses, leading to disabling arthritis.
With osteonecrosis, the bone in the head of the femur slowly dies.

**Risk Factors**

Although it is not always known what causes the lack of blood supply, there are a number of risk factors that can make it more likely for someone to develop the disease:

- **Injury** — Hip dislocations, hip fractures, and other injuries can damage the blood vessels and impair circulation to the femoral head
- **Alcoholism**
- **Corticosteroid medicines** — Many diseases, such as asthma, rheumatoid arthritis, and systemic lupus erythematosus, are treated with steroid medications. Although it is not known exactly why these medications can lead to osteonecrosis, research shows that there is a connection between the disease and long-term steroid use.
- **Other medical conditions** — Osteonecrosis is associated with other diseases, including Caisson disease (diver’s disease or “the bends”), sickle cell disease, myeloproliferative disorders, Gaucher’s disease, systemic lupus erythematosus, Crohn's disease, arterial embolism, thrombosis, and vasculitis

**Incidence**

Although osteonecrosis affects people of all ages, it most commonly occurs between the ages of 40 and 65. Men develop osteonecrosis more often than women.

**Symptoms**

Osteonecrosis develops in stages. Hip pain is typically the first symptom. This may lead to a dull ache or throbbing pain in the groin or buttock area. As the disease progresses, it will become more difficult to stand and put weight on the affected hip, and moving the hip joint will be painful.

How long it takes for the disease to progress through these stages varies from several months to over a year. It is important to diagnose this disease early, because some studies show that early treatment is associated with better outcomes.
Osteonecrosis can progress from a normal, healthy hip (Stage I) to the collapse of the femoral head (Stage IV).


**Doctor Examination**

After discussing your symptoms and medical history, your doctor will examine your hip to discover what specific motions cause you pain.

Increased pain during certain movements may be a sign of osteonecrosis.


**Imaging Tests**

Imaging tests that may help your doctor confirm a diagnosis include:

**X-rays.** These scans create pictures of dense structures, like bone. X-rays are used to determine whether the bone in the femoral head has collapsed and to what degree.

**Magnetic resonance imaging (MRI) scans.** Early changes in the bone that may not show up in an x-ray can be detected with an MRI scan. These scans are used to evaluate how much of the bone is has been affected by the disease. An MRI may show early osteonecrosis that has yet to cause symptoms (for example, whether osteonecrosis is developing in the opposite hip joint).
Treatment

Although nonsurgical treatment options like medications or using crutches can relieve pain and slow the progression of the disease, the most successful treatment options are surgical. Patients with osteonecrosis that is caught in the very early stages (prior to femoral head collapse) are good candidates for hip preserving procedures.

Core Decompression

This procedure involves drilling one larger hole or several smaller holes into the femoral head to relieve pressure in the bone and create channels for new blood vessels to nourish the affected areas of the hip.

When osteonecrosis of the hip is diagnosed early, core decompression is often successful in preventing collapse of the femoral head and the development of arthritis.

Core decompression is often combined with bone grafting to help regenerate healthy bone and support cartilage at the hip joint. A bone graft is healthy bone tissue that is transplanted to an area of the body where it is needed.

Many bone graft options are available today. The standard technique is to take extra bone from one part of your body (harvest) and move (graft) it to another part of your body. This type of graft is called an autograft.

Many surgeons use bone that is harvested from a donor or cadaver. This type of graft is typically acquired through a bone bank. Like other organs, bone can be donated upon death.

There are also several synthetic bone grafts available today.
Vascularized Fibula Graft

Another surgical option is a vascularized fibula graft. This is a more involved procedure in which a segment of bone is taken from the small bone in your leg (fibula) along with its blood supply (an artery and vein). This graft is transplanted into a hole created in the femoral neck and head, and the artery and vein are reattached to help heal the area of osteonecrosis.

Total Hip Replacement

If osteonecrosis has advanced to femoral head collapse, the most successful treatment is total hip replacement. This procedure involves replacing the damaged cartilage and bone with artificial implants.

Total hip replacement is successful in relieving pain and restoring function in 90 to 95 percent of patients. It is considered one of the most successful operations in all of medicine.
Outcomes

Core decompression prevents osteonecrosis from progressing to severe arthritis and the need for hip replacement in 25% to 85% of cases. This depends upon the stage and size of the osteonecrosis at the time of the procedure.

Core decompression achieves the best results when osteonecrosis is diagnosed in its early stages, before the bone collapses. In many of these cases, the bone heals and regains its blood supply after core decompression. It takes a few months for the bone to heal, and during this time, a walker or crutches will be needed to prevent putting stress on the damaged bone.

Patients with successful core decompression procedures typically return to walking unassisted in about 3 months and have complete pain relief.

When osteonecrosis is diagnosed after collapse of the bone, core decompression is not usually successful in preventing further collapse. In this situation, the patient is best treated with a total hip replacement, which relieves pain and restores function in 90% to 95% of patients.
Anesthesia for Hip and Knee Surgery

Types of Anesthesia

Pain Relief After Surgery

At some point before your joint replacement surgery, your doctor will raise the issue of anesthesia. Many people will jokingly say, "Just put me out, Doc, and wake me when it's over." But the selection of anesthesia is a major decision that could have a significant impact on your recovery. It deserves careful consideration and discussion with your surgeon and your anesthesiologist.

Several factors must be considered when selecting anesthesia, including:

- Your past experiences and preferences. Have you ever had anesthesia before? What kind? Did you have a reaction to the anesthesia? What happened? How do other members of your family react to anesthesia?
- Your current health and physical condition. Do you smoke? Are you overweight? Do you drink or use recreational drugs? Are you being treated for any condition other than your joint replacement?
- Your reactions to medications. Do you have any allergies? Have you ever experienced bad side effects from a drug? Which drug? What were the side effects? What medications, nutritional supplements, vitamins, or herbal remedies are you currently taking?
- The risks involved. Risks vary, depending on your health and selection of anesthesia, but may include breathing difficulties, blood loss, and allergic reactions. Your surgeon and anesthesiologist will discuss specific risks with you.
- The skill and preferences of your surgical team

Types of Anesthesia

There are three broad categories of anesthesia: general, regional, and local.

Local Anesthesia

You are probably familiar with local anesthesia. This is the kind of anesthesia your dentist uses when repairing your teeth. Local anesthesia numbs only the specific area being treated.

General Anesthesia

Effects

Most joint replacement surgeries use either general or regional anesthesia. General anesthesia affects your entire body. It acts on the brain and nervous system, leaving you in a deep sleep. Usually, it is given by injection or inhalation.

Administration

When general anesthesia is used, the anesthesiologist will also place a breathing tube down your throat and administer oxygen to assist your breathing. General anesthesia is commonly used if you are having an extensive surgical procedure that takes a long time.

There are several types of general anesthetics. Your anesthesiologist will discuss specific selections with you.
Risks
As with any anesthesia, there are risks, which may be increased if you already have heart disease or a chronic lung condition.

- General anesthesia slows both your heart and breathing rates; therefore, doctors will constantly monitor your heart, blood pressure, breathing, and body temperature during the surgery.
- General anesthesia also causes your blood vessels to open wider (dilate), which can result in a heavier loss of blood during the surgery. You may want to consider donating blood in advance of your surgery.
- The tube inserted down your throat may give you a sore throat and hoarse voice for a few days.
- Headache, nausea, and drowsiness are also common.

Regional Anesthesia

Regional anesthesia involves numbing a specific area of the body, without affecting your brain or breathing. Because you remain conscious, you will be given sedatives to relax you and put you in a light sleep.

The two types of regional anesthesia used most frequently in joint replacement surgery are spinal blocks and epidural blocks. For surgery below the hip, a combination block that targets the lumbar plexus and the sciatic nerve can numb only one leg.

Spinal Block

In a spinal block, the anesthesia is injected into the fluid surrounding the spinal cord in the lower part of your back. This produces a rapid numbing effect that can last for hours, depending on the drug used.

Epidural Block

An epidural block uses a small tube (catheter) inserted in your lower back to deliver large quantities of local anesthetics over a longer time period. The epidural block and the spinal block are administered in a very similar location; however, the epidural catheter is placed slightly closer to the skin and farther from the spinal cord.

There are several advantages to using a regional anesthesia during hip or knee replacement surgery. Studies have shown that there is less blood loss during the surgery, and fewer complications from blood clotting afterwards.

Side effects from regional anesthesia include headaches, trouble urinating, and allergic reactions, which could be quite serious.

Pain Relief After Surgery

The goals of postoperative pain management are to enable you to do the required physical therapy and to minimize pain and stress. If a general or spinal anesthesia was used during your surgery, postoperative pain relief may be delivered intravenously. You will be able to control the flow of medication, within preset limits, as you feel the need for additional relief. This process is often referred to as patient-controlled anesthesia, or PCA.

If an epidural block was used during your surgery, the epidural catheter can be left in place and anesthesia continued afterwards to help control pain. You will also have control over the amount of pain medication you receive, within preset limits.
You will be closely monitored to ensure that no complications, such as excessive sedation or compartment syndrome (an excessive build-up of pressure within the muscles), develop. Your doctor may also prescribe other pain relievers, such as aspirin or ibuprofen, to help control pain after surgery. However, if you are also taking drugs to help prevent blood clots, your use of these pain relievers or any other medications that could further thin the blood will need to be monitored closely.

The proper use of pain relievers before, during, and after your surgery is an extremely important aspect of your treatment. Proper use of pain medication can encourage healing and make your joint replacement a more satisfying experience. Take time to discuss the options with your doctor, and be sure to ask questions about things you don't understand.
**Hip Implants**

Implant Design
Implant Construction
Implant Insertion
Cemented Total Hip Replacement
Cementless Total Hip Replacement
Hybrid Total Hip Replacement
Partial Hip Replacements
Hip Resurfacing
Longevity and Outcomes

Total hip joint replacement is an orthopaedic success story, enabling hundreds of thousands of people to live fuller, more active lives.

Using metal alloys, high-grade plastics, and polymeric materials, orthopaedic surgeons can replace a painful, dysfunctional joint with a highly functional, long-lasting prosthesis.

Over the past half-century, there have been many advances in the design, construction, and implantation of artificial hip joints, resulting in a high percentage of successful long-term outcomes.

**Implant Design**

The hip joint is called a ball-and-socket joint because the spherical head of the thighbone (femur) moves inside the cup-shaped hollow socket (acetabulum) of the pelvis.

To duplicate this action, a total hip replacement implant has three parts: the stem, which fits into the femur; the ball, which replaces the spherical head of the femur; and the cup, which replaces the worn out hip socket. Each part comes in various sizes to accommodate various body sizes and types.

In some designs, the stem and ball are one piece; other designs are modular, allowing for additional customization in fit.

Several manufacturers make hip implants. The brand used by your doctor or hospital depends on many factors, including your needs (based on your age, weight, bone quality, activity level, and health), the doctor's experience and familiarity with the device, and the cost and performance record of the implant. These are issues you may wish to discuss with your doctor.

**Implant Construction**

Many people credit Sir John Charnley, a British orthopaedist, with performing the first modern total hip replacement. His innovations included combining a metal stem and ball with a plastic shell and using a methacrylate cement to hold the devices in place.

Today, the stem portions of most hip implants are made of titanium- or cobalt/chromium-based alloys. They come in different shapes and some have porous surfaces to allow for bone ingrowth.
Cobalt/chromium-based alloys or ceramic materials (aluminum oxide or zirconium oxide) are used in making the ball portions, which are polished smooth to allow easy rotation within the prosthetic socket.

The acetabular socket can be made of metal, ultra-high molecular-weight polyethylene, or a combination of polyethylene backed by metal.

All together, these components weigh between 14 and 18 ounces, depending on the size needed.

All the materials used in a total hip replacement have four characteristics in common:

- **They are biocompatible.** They can function in the body without creating either a local or a systemic rejection response.
- **They are resistant to corrosion, degradation, and wear.** Therefore, they will retain their strength and shape for a long time. Resistance to wear is particularly significant in maintaining proper joint function and preventing the further destruction of bone caused by particulate debris generated as the implant parts move against each other.
- **They have mechanical properties that duplicate the structures they are intended to replace.** For example, they are strong enough to withstand weight-bearing loads, flexible enough to bear stress without breaking, and able to move smoothly against each other as required.
- **They meet the highest standards.** These high standards extend to fabrication and quality control at a reasonable cost.

**Implant Insertion**

During a total hip replacement surgery, the orthopaedic surgeon will take a number of measurements to ensure proper prosthesis selection, limb length, and hip rotation. After making the incision, the surgeon works between the large hip muscles to gain access to the joint.

The femur is pushed out of the socket, exposing the joint cavity. The deteriorated femoral head is removed.

The acetabulum is prepared by cleaning and enlarging it with circular reamers of gradually increasing size. The new acetabular shell is implanted securely within the prepared hemispherical socket. The plastic inner portion of the implant is placed within the metal shell and fixed into place.

Next, the femur is prepared to receive the stem. The hollow center portion of the bone is cleaned and enlarged, creating a cavity that matches the shape of the implant stem. The top end of the femur is planed and smoothed so the stem can be inserted flush with the bone surface. If the ball is a separate piece, the proper size is selected and attached. Finally, the ball is seated within the cup so the joint is properly aligned and the incision is closed.

Hip replacements may be cemented, cementless, or hybrid (a combination of cemented and cementless components), depending on the type of fixation used to hold the implant in place. Although there are certain general guidelines, your surgeon will evaluate your particular situation carefully before making any decisions. Do not hesitate to ask which type of implant will be used in your situation and why that choice is appropriate for you.

**Cemented Total Hip Replacement**

Over the past 40 years, there have been many improvements in both the materials and the methods used to hold the femoral and acetabular components in place. Today, the most commonly used bone cement is an acrylic polymer called polymethylmethacrylate (PMMA).
A patient with a cemented total hip replacement can put full weight on the limb and walk without support almost immediately after surgery, resulting in a faster rehabilitation. Although cemented implants have a long and distinguished track record of success, they are not ideal for everyone.

Cemented fixation relies on a stable interface between the prosthesis and the cement and a solid mechanical bond between the cement and the bone. Today’s metal alloy stems rarely break, but they can occasionally loosen. Two processes, one mechanical and one biological, can contribute to loosening.

- In the femoral component, cracks (fatigue fractures) in the cement that occur over time can cause the prosthetic stem to loosen and become unstable. This occurs more often with patients who are very active or very heavy. The action of the metal ball against the polyethylene cup of the acetabular component creates polyethylene wear debris. The cement or polyethylene debris particles generated can then trigger a biologic response that further contributes to loosening of the implant and sometime to loss of bone around the implant.
- The microscopic debris particles are absorbed by cells around the joint and initiate an inflammatory response from the body, which tries to remove them. This inflammatory response can also cause cells to remove bits of bone around the implant, a condition called osteolysis. As the bone weakens, the instability increases. Bone loss can occur around both the acetabulum and the femur, progressing from the edges of the implant.

Despite these recognized failure mechanisms, the bond between cement and bone is generally very durable and reliable. Cemented total hip replacement is more commonly recommended for older patients, for patients with conditions such as rheumatoid arthritis, and for younger patients with compromised health or poor bone quality and density. These patients are less likely to put stresses on the cement that could lead to fatigue fractures.

**Cementless Total Hip Replacement**

In the 1980s, new implant designs were introduced to attach directly to bone without the use of cement. In general, these designs are larger and longer than those used with cement.

They also have a surface topography that is conducive to attracting new bone growth. Most are textured or have a surface coating around much of the implant so that the new bone actually grows into the surface of the implant. Because they depend on new bone growth for stability, cementless implants require a longer healing time than cemented replacements.

The orthopaedic surgeon must be very precise in preparing the femur for a cementless impact. The implant channel must match the shape of the implant itself very closely. New bone growth cannot bridge gaps larger than 1 mm to 2 mm.

Your surgeon may recommend a period of protected weight-bearing (using crutches or a walker) to give the bone time to attach itself to the implant. This protected weight bearing helps to ensure there is no movement between the implant and bone so a durable connection can be established.

Cementless femoral components tend to be much larger at the top, with more of a wedge shape. This design enables the strong surface (cortex) of the bone and the dense, hard spongy (cancellous) bone just below it to provide support.

The acetabular component of a cementless total hip replacement also has a coated or textured surface to encourage bone growth into the surface. Depending on the design, these components may also use screws through the cup or spikes, pegs, or fins around the rim to help hold the implant in place until the new bone forms. Usually these components have a metal outer shell and a polyethylene liner.
The pelvis is prepared for a cementless acetabular component using a process similar to that used in a cemented total hip replacement procedure. The intimate contact between the component and bone is crucial to permit bone ingrowth.

Initially, it was hoped that cementless total hip replacement would eliminate the problem of bone resorption or stem loosening caused by cement failure. Although certain cementless stem designs have excellent long-term outcomes, cementless stems can loosen if a strong bond between bone and stem is not achieved.

Patients with large cementless stems may also experience a higher incidence of mild thigh pain. Likewise, polyethylene wear, particulate debris, and the resulting osteolysis (dissolution of bone) remain problems in both cemented and uncemented designs. Improvements in the wear characteristics of newer polyethylene, and research into newer bearing surfaces may help resolve some of these problems in the future.

Although some orthopaedic surgeons are now using cementless devices for all patients, cementless total hip replacement is most often recommended for younger, more active patients and patients with good bone quality where bone ingrowth into the components can be predictably achieved. Individuals with juvenile inflammatory arthritis may also be candidates, even though the disease may restrict their activities.

**Hybrid Total Hip Replacement**

A hybrid total hip replacement has one component, usually the acetabular socket, inserted without cement, and the other component, usually the femoral stem, inserted with cement. This technique was introduced in the early 1980s, so long-term results are just now being measured. A hybrid hip takes advantage of the excellent track records of cementless hip sockets and cemented stems.

**Partial Hip Replacements**

If only one part of the joint is damaged or diseased, a partial hip replacement may be recommended. In most instances, the acetabulum is left intact and the head of the femur is replaced, using components similar to those used in a total hip replacement. The most common form of partial hip replacement is called a bipolar prosthesis.

**Hip Resurfacing**

A newer technique for hip replacement that has recently emerged is called hip resurfacing. In this procedure, the socket is replaced similar to a total hip replacement. The femur, however, is covered or "resurfaced" with a hemispherical component. This fits over the head of the femur and spares the bone of the femoral head and the femoral neck. It is fixed to the femur with cement around the femoral head and has a short stem that passes into the femoral neck.

Hip resurfacing is an emerging procedure, most commonly performed in younger patients. It is too early to assess the long-term success of this procedure.

**Longevity and Outcomes**

Hip replacement operations are highly successful in relieving pain and restoring movement. However, the ongoing problems with wear and particulate debris may eventually necessitate further surgery, including replacing the prosthesis (revision surgery). Men and patients who weigh more than 165 lb have higher rates of failure. The chance of a hip replacement lasting 20 years is approximately 80%
Total Hip Replacement

Anatomy
Common Causes of Hip Pain
Description
Is Hip Replacement Surgery for You?
The Orthopaedic Evaluation
Deciding to Have Hip Replacement Surgery
Preparing for Surgery
Your Surgery
Your Stay in the Hospital
Possible Complications of Surgery
Avoiding Problems After Surgery
Outcomes

Whether you have just begun exploring treatment options or have already decided to undergo hip replacement surgery, this information will help you understand the benefits and limitations of total hip replacement. This article describes how a normal hip works, the causes of hip pain, what to expect from hip replacement surgery, and what exercises and activities will help restore your mobility and strength, and enable you to return to everyday activities.

If your hip has been damaged by arthritis, a fracture, or other conditions, common activities such as walking or getting in and out of a chair may be painful and difficult. Your hip may be stiff, and it may be hard to put on your shoes and socks. You may even feel uncomfortable while resting.

If medications, changes in your everyday activities, and the use of walking supports do not adequately help your symptoms, you may consider hip replacement surgery. Hip replacement surgery is a safe and effective procedure that can relieve your pain, increase motion, and help you get back to enjoying normal, everyday activities.

First performed in 1960, hip replacement surgery is one of the most successful operations in all of medicine. Since 1960, improvements in joint replacement surgical techniques and technology have greatly increased the effectiveness of total hip replacement. According to the Agency for Healthcare Research and Quality, more than 285,000 total hip replacements are performed each year in the United States.

Anatomy

The hip is one of the body's largest joints. It is a ball-and-socket joint. The socket is formed by the acetabulum, which is part of the large pelvis bone. The ball is the femoral head, which is the upper end of the femur (thighbone).

The bone surfaces of the ball and socket are covered with articular cartilage, a smooth tissue that cushions the ends of the bones and enables them to move easily.

A thin tissue called synovial membrane surrounds the hip joint. In a healthy hip, this membrane makes a small amount of fluid that lubricates the cartilage and eliminates almost all friction during hip movement.
Bands of tissue called ligaments (the hip capsule) connect the ball to the socket and provide stability to the joint.

Normal hip anatomy.

**Common Causes of Hip Pain**

The most common cause of chronic hip pain and disability is arthritis. Osteoarthritis, rheumatoid arthritis, and traumatic arthritis are the most common forms of this disease.

- **Osteoarthritis.** This is an age-related "wear and tear" type of arthritis. It usually occurs in people 50 years of age and older and often in individuals with a family history of arthritis. The cartilage cushioning the bones of the hip wears away. The bones then rub against each other, causing hip pain and stiffness. Osteoarthritis may also be caused or accelerated by subtle irregularities in how the hip developed in childhood.
- **Rheumatoid arthritis.** This is an autoimmune disease in which the synovial membrane becomes inflamed and thickened. This chronic inflammation can damage the cartilage, leading to pain and stiffness. Rheumatoid arthritis is the most common type of a group of disorders termed "inflammatory arthritis."
- **Post-traumatic arthritis.** This can follow a serious hip injury or fracture. The cartilage may become damaged and lead to hip pain and stiffness over time.
- **Avascular necrosis.** An injury to the hip, such as a dislocation or fracture, may limit the blood supply to the femoral head. This is called avascular necrosis. The lack of blood may cause the surface of the bone to collapse, and arthritis will result. Some diseases can also cause avascular necrosis.
- **Childhood hip disease.** Some infants and children have hip problems. Even though the problems are successfully treated during childhood, they may still cause arthritis later on in life. This happens because the hip may not grow normally, and the joint surfaces are affected.
A hip with osteoarthritis.

**Description**

In a total hip replacement (also called total hip arthroplasty), the damaged bone and cartilage is removed and replaced with prosthetic components.

- The damaged femoral head is removed and replaced with a metal stem that is placed into the hollow center of the femur. The femoral stem may be either cemented or "press fit" into the bone.
- A metal or ceramic ball is placed on the upper part of the stem. This ball replaces the damaged femoral head that was removed.
- The damaged cartilage surface of the socket (acetabulum) is removed and replaced with a metal socket. Screws or cement are sometimes used to hold the socket in place.
- A plastic, ceramic, or metal spacer is inserted between the new ball and the socket to allow for a smooth gliding surface.
Is Hip Replacement Surgery for You?

The decision to have hip replacement surgery should be a cooperative one made by you, your family, your primary care doctor, and your orthopaedic surgeon. The process of making this decision typically begins with a referral by your doctor to an orthopaedic surgeon for an initial evaluation.

Candidates for Surgery

There are no absolute age or weight restrictions for total hip replacements.

Recommendations for surgery are based on a patient's pain and disability, not age. Most patients who undergo total hip replacement are age 50 to 80, but orthopaedic surgeons evaluate patients individually. Total hip replacements have been performed successfully at all ages, from the young teenager with juvenile arthritis to the elderly patient with degenerative arthritis.

When Surgery Is Recommended

There are several reasons why your doctor may recommend hip replacement surgery. People who benefit from hip replacement surgery often have:

- Hip pain that limits everyday activities, such as walking or bending
- Hip pain that continues while resting, either day or night
- Stiffness in a hip that limits the ability to move or lift the leg
- Inadequate pain relief from anti-inflammatory drugs, physical therapy, or walking supports

The Orthopedic Evaluation

An evaluation with an orthopaedic surgeon consists of several components.

- **Medical history.** Your orthopaedic surgeon will gather information about your general health and ask questions about the extent of your hip pain and how it affects your ability to perform everyday activities.
- **Physical examination.** This will assess hip mobility, strength, and alignment.
- **X-rays.** These images help to determine the extent of damage or deformity in your hip.
- **Other tests.** Occasionally other tests, such as a magnetic resonance imaging (MRI) scan, may be needed to determine the condition of the bone and soft tissues of your hip.
Deciding to Have Hip Replacement Surgery

Talk With Your Doctor

Your orthopaedic surgeon will review the results of your evaluation with you and discuss whether hip replacement surgery is the best method to relieve your pain and improve your mobility. Other treatment options — such as medications, physical therapy, or other types of surgery — also may be considered.

In addition, your orthopaedic surgeon will explain the potential risks and complications of hip replacement surgery, including those related to the surgery itself and those that can occur over time after your surgery.

Never hesitate to ask your doctor questions when you do not understand. The more you know, the better you will be able to manage the changes that hip replacement surgery will make in your life.

Realistic Expectations

An important factor in deciding whether to have hip replacement surgery is understanding what the procedure can and cannot do. Most people who undergo hip replacement surgery experience a dramatic reduction of hip pain and a significant improvement in their ability to perform the common activities of daily living.

With normal use and activity, the material between the head and the socket of every hip replacement implant begins to wear. Excessive activity or being overweight may speed up this normal wear and cause the hip replacement to loosen and become painful. Therefore, most surgeons advise against high-impact activities such as running, jogging, jumping, or other high-impact sports.

Realistic activities following total hip replacement include unlimited walking, swimming, golf, driving, hiking, biking, dancing, and other low-impact sports.

With appropriate activity modification, hip replacements can last for many years.
Preparing for Surgery

Medical Evaluation

If you decide to have hip replacement surgery, your orthopaedic surgeon may ask you to have a complete physical examination by your primary care doctor before your surgical procedure. This is needed to make sure you are healthy enough to have the surgery and complete the recovery process. Many patients with chronic medical conditions, like heart disease, may also be evaluated by a specialist, such a cardiologist, before the surgery.

Tests

Several tests, such as blood and urine samples, an electrocardiogram (EKG), and chest x-rays, may be needed to help plan your surgery.

Preparing Your Skin

Your skin should not have any infections or irritations before surgery. If either is present, contact your orthopaedic surgeon for treatment to improve your skin before surgery.

Blood Donations

You may be advised to donate your own blood prior to surgery. It will be stored in the event you need blood after surgery.

Medications

Tell your orthopaedic surgeon about the medications you are taking. He or she or your primary care doctor will advise you which medications you should stop taking and which you can continue to take before surgery.

Weight Loss

If you are overweight, your doctor may ask you to lose some weight before surgery to minimize the stress on your new hip and possibly decrease the risks of surgery.

Dental Evaluation

Although infections after hip replacement are not common, an infection can occur if bacteria enter your bloodstream. Because bacteria can enter the bloodstream during dental procedures, major dental procedures (such as tooth extractions and periodontal work) should be completed before your hip replacement surgery. Routine cleaning of your teeth should be delayed for several weeks after surgery.

Urinary Evaluation

Individuals with a history of recent or frequent urinary infections should have a urological evaluation before surgery. Older men with prostate disease should consider completing required treatment before having surgery.
Social Planning

Although you will be able to walk with crutches or a walker soon after surgery, you will need some help for several weeks with such tasks as cooking, shopping, bathing, and laundry.

Home Planning

Several modifications can make your home easier to navigate during your recovery. The following items may help with daily activities:

- Securely fastened safety bars or handrails in your shower or bath
- Secure handrails along all stairways
- A stable chair for your early recovery with a firm seat cushion (that allows your knees to remain lower than your hips), a firm back, and two arms
- A raised toilet seat
- A stable shower bench or chair for bathing
- A long-handled sponge and shower hose
- A dressing stick, a sock aid, and a long-handled shoe horn for putting on and taking off shoes and socks without excessively bending your new hip
- A reacher that will allow you to grab objects without excessive bending of your hips
- Firm pillows for your chairs, sofas, and car that enable you to sit with your knees lower than your hips
- Removal of all loose carpets and electrical cords from the areas where you walk in your home

Set up a "recovery center" where you will spend most of your time. Things like the phone, television remote control, reading materials, and medications should all be within reach.
Your Surgery

You will most likely be admitted to the hospital on the day of your surgery.

Anesthesia

After admission, you will be evaluated by a member of the anesthesia team. The most common types of anesthesia are general anesthesia (you are put to sleep) or spinal, epidural, or regional nerve block anesthesia (you are awake but your body is numb from the waist down). The anesthesia team, with your input, will determine which type of anesthesia will be best for you.

Implant Components

Many different types of designs and materials are currently used in artificial hip joints. All of them consist of two basic components: the ball component (made of highly polished strong metal or ceramic material) and the socket component (a durable cup of plastic, ceramic or metal, which may have an outer metal shell).

The prosthetic components may be "press fit" into the bone to allow your bone to grow onto the components or they may be cemented into place. The decision to press fit or to cement the components is based on a number of factors, such as the quality and strength of your bone. A combination of a cemented stem and a non-cemented socket may also be used.

Your orthopaedic surgeon will choose the type of prosthesis that best meets your needs.

(Left) A standard non-cemented femoral component. (Center) A close-up of this component showing the porous surface for bone ingrowth. (Right) The femoral component and the acetabular component working together.
The acetabular component shows the plastic (polyethylene) liner inside the metal shell. The porous surface of this acetabular component allows for bone ingrowth.

Procedure

The surgical procedure takes a few hours. Your orthopaedic surgeon will remove the damaged cartilage and bone and then position new metal, plastic, or ceramic implants to restore the alignment and function of your hip.

X-rays before and after total hip replacement. In this case, non-cemented components were used.

After surgery, you will be moved to the recovery room where you will remain for several hours while your recovery from anesthesia is monitored. After you wake up, you will be taken to your hospital room.

Your Stay in the Hospital

You will most likely stay in the hospital for a few days. To protect your hip during early recovery, a positioning splint, such as a foam pillow placed between your legs, may be used.

Pain Management

After surgery, you will feel some pain, but your surgeon and nurses will provide medication to make you feel as comfortable as possible. Pain management is an important part of your recovery. Movement will begin soon after surgery, and when you feel less pain, you can start moving sooner and get your strength back more quickly. Talk with your surgeon if postoperative pain becomes a problem.

Physical Therapy

Walking and light activity are important to your recovery and will begin the day of or the day after your surgery. Most patients who undergo total hip replacement begin standing and walking with the help of a walking support and a physical therapist the day after surgery. The physical therapist will teach you specific exercises to strengthen your hip and restore movement for walking and other normal daily activities.
Recovery

The success of your surgery will depend in large measure on how well you follow your orthopaedic surgeon's instructions regarding home care during the first few weeks after surgery.

Wound Care

You may have stitches or staples running along your wound or a suture beneath your skin. The stitches or staples will be removed approximately 2 weeks after surgery.

Avoid getting the wound wet until it has thoroughly sealed and dried. You may continue to bandage the wound to prevent irritation from clothing or support stockings.

Diet

Some loss of appetite is common for several weeks after surgery. A balanced diet, often with an iron supplement, is important to promote proper tissue healing and restore muscle strength. Be sure to drink plenty of fluids.

Activity

Your activity program should include:

- A graduated walking program to slowly increase your mobility, initially in your home and later outside
- Resuming other normal household activities, such as sitting, standing, and climbing stairs
- Specific exercises several times a day to restore movement and strengthen your hip. You probably will be able to perform the exercises without help, but you may have a physical therapist help you at home or in a therapy center the first few weeks after surgery
Possible Complications of Surgery

The complication rate following hip replacement surgery is low. Serious complications, such as joint infection, occur in less than 2% of patients. Major medical complications, such as heart attack or stroke, occur even less frequently. However, chronic illnesses may increase the potential for complications. Although uncommon, when these complications occur they can prolong or limit full recovery.

Infection

Infection may occur superficially in the wound or deep around the prosthesis. It may happen while in the hospital or after you go home. It may even occur years later.

Minor infections of the wound are generally treated with antibiotics. Major or deep infections may require more surgery and removal of the prosthesis. Any infection in your body can spread to your joint replacement.

Blood Clots

Blood clots may form in the leg veins or pelvis.

Blood clots in the leg veins or pelvis are the most common complication of hip replacement surgery. These clots can be life-threatening if they break free and travel to your lungs. Your orthopaedic surgeon will outline a prevention program which may include blood thinning medications, support hose, inflatable leg coverings, ankle pump exercises, and early mobilization.

Leg-length Inequality

Sometimes after a hip replacement, one leg may feel longer or shorter than the other. Your orthopaedic surgeon will make every effort to make your leg lengths even, but may lengthen or shorten your leg slightly in order to maximize the stability and biomechanics of the hip. Some patients may feel more comfortable with a shoe lift after surgery.

Dislocation

This occurs when the ball comes out of the socket. The risk for dislocation is greatest in the first few months after surgery while the tissues are healing. Dislocation is uncommon. If the ball does come out of
the socket, a closed reduction usually can put it back into place without the need for more surgery. In situations in which the hip continues to dislocate, further surgery may be necessary.

![Hip implant dislocation.](image)

**Loosening and Implant Wear**

Over years, the hip prosthesis may wear out or loosen. This is most often due to everyday activity. It can also result from a biologic thinning of the bone called osteolysis. If loosening is painful, a second surgery called a revision may be necessary.

**Other Complications**

Nerve and blood vessel injury, bleeding, fracture, and stiffness can occur. In a small number of patients, some pain can continue or new pain can occur after surgery.

**Avoiding Problems After Surgery**

**Recognizing the Signs of a Blood Clot**

Follow your orthopaedic surgeon's instructions carefully to reduce the risk of blood clots developing during the first several weeks of your recovery. He or she may recommend that you continue taking the blood thinning medication you started in the hospital. Notify your doctor immediately if you develop any of the following warning signs.

**Warning signs of blood clots.** The warning signs of possible blood clot in your leg include:

- Pain in your calf and leg that is unrelated to your incision
- Tenderness or redness of your calf
- Swelling of your thigh, calf, ankle, or foot

**Warning signs of pulmonary embolism.** The warning signs that a blood clot has traveled to your lung include:

- Sudden shortness of breath
• Sudden onset of chest pain
• Localized chest pain with coughing

Preventing Infection

A common cause of infection following hip replacement surgery is from bacteria that enter the bloodstream during dental procedures, urinary tract infections, or skin infections.

Following your surgery, you may need to take antibiotics prior to dental work, including dental cleanings, or any surgical procedure that could allow bacteria to enter your bloodstream. For many people with joint replacements and normal immune systems, the American Academy of Orthopaedic Surgeons (AAOS) recommends taking preventative antibiotics before dental work.

Warning signs of infection. Notify your doctor immediately if you develop any of the following signs of a possible hip replacement infection:

• Persistent fever (higher than 100°F orally)
• Shaking chills
• Increasing redness, tenderness, or swelling of the hip wound
• Drainage from the hip wound
• Increasing hip pain with both activity and rest

Avoiding Falls

A fall during the first few weeks after surgery can damage your new hip and may result in a need for more surgery. Stairs are a particular hazard until your hip is strong and mobile. You should use a cane, crutches, a walker, or handrails or have someone help you until you improve your balance, flexibility, and strength.

Your orthopaedic surgeon and physical therapist will help you decide which assistive aides will be required following surgery, and when those aides can safely be discontinued.

Other Precautions

To assure proper recovery and prevent dislocation of the prosthesis, you may be asked to take special precautions — usually for the first 6 weeks after the surgery:

• Do not cross your legs
• Do not bend your hips more than a right angle (90°)
• Do not turn your feet excessively inward or outward
• Use a pillow between your legs at night when sleeping until you are advised by your orthopaedic surgeon that you can remove it
Your surgeon and physical therapist will give you more instructions prior to your discharge from the hospital.

Outcomes

How Your New Hip Is Different

You may feel some numbness in the skin around your incision. You also may feel some stiffness, particularly with excessive bending. These differences often diminish with time, and most patients find these are minor compared with the pain and limited function they experienced prior to surgery.

Your new hip may activate metal detectors required for security in airports and some buildings. Tell the security agent about your hip replacement if the alarm is activated. You may ask your orthopaedic surgeon for a card confirming that you have an artificial hip.

Protecting Your Hip Replacement

There are many things you can do to protect your hip replacement and extend the life of your hip implant.

- Participate in a regular light exercise program to maintain proper strength and mobility of your new hip.
- Take special precautions to avoid falls and injuries. If you break a bone in your leg, you may require more surgery.
- Make sure your dentist knows that you have a hip replacement. You will need to take antibiotics before any dental procedure.
- See your orthopaedic surgeon periodically for routine follow-up examinations and x-rays, even if your hip replacement seems to be doing fine.

Activities After Hip Replacement

Activities in the Hospital

Discharge

Activities at Home

Dos and Don'ts

After undergoing hip replacement, you may expect your lifestyle after the surgery to be a lot like the way it was before, but without the pain. In many ways, you are right, but it will take time. You need to be a partner in the healing process to ensure a successful outcome.

You will be able to resume most activities; however, you may have to change how you do them. For example, you will have to learn new ways of bending down that keep your new hip safe. The suggestions you find here will help you enjoy your new hip while you safely resume your daily routines.

Activities in the Hospital

Hip replacement is major surgery and, for the first few days, you will want to take it easy. However, it is important that you start some activities immediately to offset the effects of the anesthetic, help the healing, and keep blood clots from forming in your leg veins. Your doctor and physical and occupational
therapists can give you specific instructions on wound care, pain control, diet, and exercise. They should also indicate how much weight you can put on your affected leg.

Pain management is important in your early recovery. Although pain after surgery is quite variable and not entirely predictable, it does need to be controlled with medication. Initially, you may get pain medication through an IV (intravenous) tube that you can control to get the amount of medication you need. It is easier to prevent pain than to control it and you do not have to worry about becoming addicted to the medication; after a day or two, injections or pills will replace the IV tube.

Besides the pain medication, you will also need antibiotics and blood-thinners to help prevent blood clots from forming in the veins of your thigh and calf.

You may lose your appetite and feel nauseous or constipated for a couple of days. These are ordinary reactions. You may have a urinary catheter inserted during surgery and be given stool softeners or laxatives to ease the constipation caused by the pain medication after surgery. You will be taught to do breathing exercises to keep your chest and lungs clear.

A physical therapist will visit you, usually on the day after your surgery, and teach you how to use your new joint. It is important that you get up and about as soon as possible after hip replacement surgery. Even in bed, you can pedal your feet and pump your ankles regularly to keep blood flowing in your legs. You may have to wear elastic stockings and/or a pneumatic sleeve to help keep blood flowing freely.

**Discharge**

Your hospital stay may last from 3 to 10 days, until you can perform certain skills you will need to use at home. If you go straight home, you will need help at home for several weeks. If going straight home is too difficult, you may need to spend some time at a rehabilitation center.

The following tips can make your homecoming easier.

- In the kitchen (and in other rooms as well), place items you use frequently within reach so you do not have to reach up or bend down.
- Rearrange furniture so you can get about on a walker or crutches. You may want to change rooms (make the living room your bedroom, for example) to stay off the stairs.
- Get a good chair—one that is firm and has a higher-than-average seat. This type of chair is safer and more comfortable than a low, soft-cushioned chair.
• Remove any throw rugs or area rugs that could cause you to slip. Securely fasten electrical cords around the perimeter of the room.
• Install a shower chair, grab bar, and raised toilet in the bathroom.
• Use assistive devices such as a long-handled shoe horn, a long-handled sponge, and a grabbing tool or reacher to avoid bending too far over. Wear a big-pocket shirt or soft shoulder bag for carrying things.
• Set up a "recovery center" in your home, with a phone, television remote control, radio, facial tissues, wastebasket, pitcher and glass, reading materials, and medications within easy reach.

Activities at Home

• Keep the skin clean and dry. The dressing applied in the hospital should be changed as necessary. Ask for instructions on how to change the dressing if you are not sure.
• If you have stitches that need to be removed, your surgeon will give you specific instructions about the incision and when you can bathe. X-rays will be taken later to ensure that the joint is healing properly.
• Notify your doctor if the wound appears red or begins to drain.
• Take your temperature twice daily and notify your doctor if it exceeds 100.5°F.
• Swelling is normal for the first 3 to 6 months after surgery. Elevate your leg slightly and apply an ice pack for 15 to 20 minutes at a time, a few times a day.
• Calf pain, chest pain, and shortness of breath are signs of a possible blood clot. Notify your doctor immediately if you notice any of these symptoms.

Medication

Take all medications as directed. You will probably be given a blood thinner to prevent life-threatening clots from forming in the veins of your calf and thigh. If a blood clot forms and then breaks free, it could travel to your lungs, resulting in a pulmonary embolism, a potentially fatal condition.

Because you have an artificial joint, it is especially important to prevent any bacterial infections from settling in your joint implant. You should get a medical alert card and take antibiotics whenever there is the possibility of a bacterial infection, such as when you have dental work. Be sure to notify your dentist that you have a joint implant and let your doctor know if your dentist schedules an extraction, periodontal work, dental implant, or root canal procedure. The American Academy of Orthopaedic Surgeons has
prepared recommendations about using antibiotics to prevent joint infection when you must have dental work.

**Diet**

By the time you leave the hospital, you should be eating your normal diet. Your physician may recommend that you take iron and vitamin supplements. Continue to drink plenty of fluids and avoid excessive intake of vitamin K while you are taking the blood-thinner medication. Foods rich in vitamin K include broccoli, cauliflower, Brussels sprouts, liver, green beans, garbanzo beans, lentils, soybeans, soybean oil, spinach, kale, lettuce, turnip greens, cabbage, and onions. Try to limit your intake of coffee and alcohol. You should watch your weight to avoid putting more stress on the joint.

**Resuming Normal Activities**

Once you get home, you should stay active. The key is not to overdo it! While you can expect some good days and some bad days, you should notice a gradual improvement over time. Generally, the following guidelines will apply:

**Weight Bearing**

Be sure to discuss weight bearing with your physician and physical therapist. Their recommendations will depend on the type of implant and other factors in your situation. Revision hip surgery (replacing an artificial joint that fails) may require that you wait longer until putting weight on the leg.

- If you have undergone uncemented hip replacement, your surgeon will give you specific instructions about the use of crutches or a walker and when you can put weight on the leg. By 8 weeks, you should be weight bearing with only a little support. This protects the joint and gives the bone time to grow into the porous coating of the implant.
- If you have undergone cemented or hybrid hip replacement, you can put some weight on the leg immediately using a can or walker, and you should continue to use some support for 4 to 6 weeks to help the muscles recover.

**Driving**

You can begin driving an automatic shift car in 4 to 8 weeks, provided you are no longer taking narcotic pain medication. If you have a stick-shift car and your right hip was replaced, do not begin driving until your doctor says you can. The physical therapist will show you how to slide in and out of the car safely. Placing a plastic bag on the seat can help.

**Sex**

Some form of sexual relations can be safely resumed 4 to 6 weeks after surgery. Ask your doctor if you need more information.

**Sleeping Positions**

Sleep on your back with your legs slightly apart or on your side with an abduction pillow, a regular pillow between your knees, or a knee immobilizer at night. Be sure to use the pillow for at least 6 weeks, or until your doctor says you can do without it. Sleeping on your stomach should be all right.
Sitting
For at least the first 3 months, sit only in chairs that have arms. Do not sit on low chairs, low stools, or reclining chairs. Do not cross your legs at the knees. The physical therapist will show you how to sit and stand from a chair, keeping your affected leg out in front of you. Get up and move around on a regular basis—at least once every hour.

Climbing Stairs
Stair climbing should be limited if possible until healing is far enough along. If you must go up stairs:

- The unaffected leg should step up first.
- Then bring the affected leg up to the same step.
- Then bring your crutches or canes up.

To go down stairs, reverse the process.

- Put your crutches or canes on the lower step.
- Next, bring the affected leg down to that step.
- Finally step down with the unaffected leg.

Return to Work
Depending on the type of activities you perform, it may be as long as 3 to 6 months before you can return to work.

Other Activities
Walk as much as you like once your doctor gives you the go-ahead, but remember that walking is no substitute for your prescribed exercises. Walking with a pair of trekking poles is helpful and adds as much as 40% to the exercise you get when you walk.

Swimming is also recommended; you can begin as soon as the sutures have been removed and the wound is healed, approximately 6 to 8 weeks after surgery. Using a pair of training fins may make swimming a more enjoyable and effective exercise.

Acceptable activities include dancing, golfing (with spikeless shoes and a cart), and bicycling (on level surfaces).

Avoid activities that involve impact stress on the joint (such as tennis and badminton), contact sports (such as football and baseball), squash or racquetball, jumping, or jogging.

Lifting weights is not a problem, but carrying heavy, awkward objects that cause you to stagger is not advised, especially if you must go up and down stairs or slopes. Plan ahead to have a cart, dolly, or hand-truck available.

Dos and Don’ts
Dos and don’ts (precautions) vary depending on the orthopaedic surgeon's approach. Your doctor and physical therapist will provide you with a list of dos and don’ts to remember with your new hip. These
precautions will help to prevent the new joint from dislocating and to ensure proper healing. Here are some of the most common precautions:

**The Don’ts**

- Don't cross your legs at the knees for at least 8 weeks.
- Don't bring your knee up higher than your hip.
- Don't lean forward while sitting or as you sit down.
- Don't try to pick up something on the floor while you are sitting.
- Don't turn your feet excessively inward or outward when you bend down.
- Don't reach down to pull up blankets when lying in bed.
- Don't bend at the waist beyond 90°.
- Don't stand pigeon-toed.
- Don't kneel on the knee on the unoperated leg (the good side).
- Don't use pain as a guide for what you may or may not do.

**The Dos**

- Do keep the leg facing forward.
- Do keep the affected leg in front as you sit or stand.
- Do use a high kitchen or barstool in the kitchen.
- Do kneel on the knee on the operated leg (the bad side).
- Do use ice to reduce pain and swelling, but remember that ice will diminish sensation. Don't apply ice directly to the skin; use an ice pack or wrap it in a damp towel.
- Do apply heat before exercising to assist with range of motion. Use a heating pad or hot, damp towel for 15 to 20 minutes.
- Do cut back on your exercises if your muscles begin to ache, but don't stop doing them!
Total Hip Replacement Exercise Guide

Early Postoperative Exercises
Ankle Pumps
Ankle Rotations
Bed-Supported Knee Bends
Buttock Contractions
Abduction Exercise
Quadriceps Set
Straight Leg Raises
Standing Exercises
Standing Knee Raises
Standing Hip Abduction
Standing Hip Extensions
Walking and Early Activity
Walking with Walker, Full Weightbearing
Walking with Cane or Crutch
Stair Climbing and Descending
Advanced Exercises and Activities
Elastic Tube Exercises
Exercycling
Walking

Regular exercises to restore your normal hip motion and strength and a gradual return to everyday activities are important for your full recovery. Your orthopaedic surgeon and physical therapist may recommend that you exercise 20 to 30 minutes 2 or 3 times a day during your early recovery. They may suggest some of the following exercises.

Early Postoperative Exercises

These exercises are important for increasing circulation to your legs and feet to prevent blood clots. They also are important to strengthen muscles and to improve your hip movement. You may begin these exercises in the recovery room shortly after surgery. It may feel uncomfortable at first, but these exercises will speed your recovery and reduce your postoperative pain. These exercises should be done as you lie on your back with your legs spread slightly apart.

Ankle Pumps

Slowly push your foot up and down. Do this exercise several times as often as every 5 or 10 minutes. This exercise can begin immediately after surgery and continue until you are fully recovered.

Ankle Rotations
Move your ankle inward toward your other foot and then outward away from your other foot.

Repeat 5 times in each direction 3 or 4 times a day.

Bed-Supported Knee Bends

Slide your heel toward your buttocks, bending your knee and keeping your heel on the bed. Do not let your knee roll inward.

Repeat 10 times 3 or 4 times a day

Buttock Contractions

Tighten buttock muscles and hold to a count of 5.

Repeat 10 times 3 or 4 times a day

Abduction Exercise

Slide your leg out to the side as far as you can and then back.

Repeat 10 times 3 or 4 times a day

Quadriceps Set

Tighten your thigh muscle. Try to straighten your knee. Hold for 5 to 10 seconds.

Repeat this exercise 10 times during a 10-minute period.

Continue until your thigh feels fatigued.
**Straight Leg Raises**

Tighten your thigh muscle with your knee fully straightened on the bed. As your thigh muscle tightens, lift your leg several inches off the bed. Hold for 5 to 10 seconds. Slowly lower.

Repeat until your thigh feels fatigued.

**Standing Exercises**

Soon after your surgery, you will be out of bed and able to stand. You will require help since you may become dizzy the first several times you stand. As you regain your strength, you will be able to stand independently. While doing these standing exercises, make sure you are holding on to a firm surface such as a bar attached to your bed or a wall.

**Standing Knee Raises**

Lift your operated leg toward your chest. Do not lift your knee higher than your waist. Hold for 2 or 3 counts and put your leg down.

Repeat 10 times 3 or 4 times a day
Be sure your hip, knee and foot are pointing straight forward. Keep your body straight. With your knee straight, lift your leg out to the side. Slowly lower your leg so your foot is back on the floor.

Repeat 10 times 3 or 4 times a day

Standing Hip Extensions

Lift your operated leg backward slowly. Try to keep your back straight. Hold for 2 or 3 counts. Return your foot to the floor.

Repeat 10 times 3 or 4 times a day

Walking and Early Activity

Soon after surgery, you will begin to walk short distances in your hospital room and perform light everyday activities. This early activity helps your recovery by helping your hip muscles regain strength and movement.

Walking with Walker, Full Weightbearing

Stand comfortably and erect with your weight evenly balanced on your walker or crutches. Move your walker or crutches forward a short distance. Then move forward, lifting your operated leg so that the heel of your foot will touch the floor first. As you move, your knee and ankle will bend and your entire foot will rest evenly on the floor. As you complete the step allow your toe to lift off the floor. Move the walker again
and your knee and hip will again reach forward for your next step. Remember, touch your heel first, then flatten your foot, then lift your toes off the floor. Try to walk as smoothly as you can. Don't hurry. As your muscle strength and endurance improve, you may spend more time walking. Gradually, you will put more and more weight on your leg.

**Walking with Cane or Crutch**

A walker is often used for the first several weeks to help your balance and to avoid falls. A cane or a crutch is then used for several more weeks until your full strength and balance skills have returned. Use the cane or crutch in the hand opposite the operated hip. You are ready to use a cane or single crutch when you can stand and balance without your walker, when your weight is placed fully on both feet, and when you are no longer leaning on your hands while using your walker.

**Stair Climbing and Descending**

The ability to go up and down stairs requires both flexibility and strength. At first, you will need a handrail for support and you will only be able to go one step at a time. Always lead up the stairs with your good leg and down the stairs with your operated leg. Remember "up with the good" and "down with the bad." You may want to have someone help you until you have regained most of your strength and mobility. Stair climbing is an excellent strengthening and endurance activity. Do not try to climb steps higher than those of the standard height of seven inches and always use the handrail for balance.

**Advanced Exercises and Activities**

A full recovery will take many months. The pain from your problem hip before your surgery and the pain and swelling after surgery have weakened your hip muscles. The following exercises and activities will help your hip muscles recover fully.

These exercises should be done in 10 repetitions four times a day with one end of the tubing around the ankle of your operated leg and the opposite end of the tubing attached to a stationary object such as a locked door or heavy furniture. Hold on to a chair or bar for balance.

**Elastic Tube Exercises**

**Resistive Hip Flexion**
Stand with your feet slightly apart. Bring your operated leg forward keeping the knee straight. Allow your leg to return to its previous position.

**Resistive Hip Abduction**

Stand sideways from the door and extend your operated leg out to the side. Allow your leg to return to its previous position.

**Resistive Hip Extensions**

Face the door or heavy object to which the tubing is attached and pull your leg straight back. Allow your leg to return to its previous position.
**Exercycling**

Exercycling is an excellent activity to help you regain muscle strength and hip mobility. Adjust the seat height so that the bottom of your foot just touches the pedal with your knee almost straight. Pedal backwards at first. Pedal forward only after comfortable cycling motion is possible backwards. As you become stronger (at about 4 to 6 weeks) slowly increase the tension on the exercycle. Exercycle forward 10 to 15 minutes twice a day, gradually building up to 20 to 30 minutes 3 to 4 times a week.

**Walking**

Take a cane with you until you have regained your balance skills. In the beginning, walk 5 or 10 minutes 3 or 4 times a day. As your strength and endurance improves, you can walk for 20 or 30 minutes 2 or 3 times a day. Once you have fully recovered, regular walks, 20 or 30 minutes 3 or 4 times a week, will help maintain your strength.
**Total Hip Replacement**

- What is arthritis?
- What are the symptoms of a painful hip?
- What can I do to get rid of my hip pain?
- When should I consider having a hip replacement?
- What hip replacement is best for me?
- What is soft tissue balancing of the hip?
- What types of bearings are there?
- “Hard on polyethylene bearing”.
- Metal on metal bearing.
- Ceramic on ceramic bearing
- What are the possible complications of a total hip replacement?
- Will the operation be painful?
- How quickly will I recover postoperative?
- What can I do with my hip replacement?

**What is arthritis?**

Arthritis is a degenerative condition of joints which results in damage to the articular cartilage. Large joints such as the knee and hip joints are often affected.

Primary osteoarthritis (arthritis without a cause) of the hip is actually very rare. Most patients with osteoarthritis have an underlying cause.

The most common causes for hip arthritis are trauma, avascular necrosis, hip dysplasia (abnormally developed hip), slipped upper femoral epiphysis (growth plate injury around puberty), Perthe’s disease (avascular necrosis of the femoral head), and infection.

Sometimes hip arthritis can be secondary to inflammatory conditions such as rheumatoid arthritis, ankylosing spondylitis, Reiter’s disease, psoriasis and other inflammatory joint diseases.

Ultimately the articular cartilage of the joint will be severely damaged which may lead to symptoms of pain, stiffness and loss of function.

![X-Ray showing a osteoarthritic hip](image)
What are the symptoms of a painful hip?

- Groin pain is the most common presentation of a hip problem.
- This is often associated with pain going down the thigh and can be associated with referred pain to the front of the knee.
- The pain is often activity related but can also appear at rest and typically at night.
- Buttock pain is much less common and may indicate problems with the lower back.
- The difference between hip pain and back pain can be very difficult to tell apart.
- Sometimes special tests are required to make certain where the pain is coming from.

What can I do to get rid of my hip pain?

There are a variety of non-operative treatments that can relieve your symptoms of hip arthritis.

It is good to keep as active as possible however you may be required to limit certain activities that exacerbate the pain.

Some patients are overweight and some weight loss is very helpful in relieving symptoms.

Arthritis is often causes cyclical discomfort due to inflammation of the synovial lining of the joint. Regular painkillers may be helpful during that period of worsening of symptoms.

Anti-inflammatory medication and pain killers of different strengths may be helpful.

Some patients find other ways of obtaining pain relief such as acupuncture, aromatherapy, reflexology or the use of a chiropractor or osteopath.

Dietary supplements such as glucosamine and chondroitin sulphate as well as omega-3-fatty acids now have scientific evidence that they provide symptomatic relief, especially in knee arthritis.

Soft shoe inserts may reduce the forces travelling to the hip. This may make walking more comfortable.

A walking stick held in the opposite hand to the painful hip may also reduce pain in an arthritic hip.

In certain rare cases the use of hip arthroscopy may provide pain relief and delay the requirement for more major surgery.

Eventually, at a time often difficult to determine, conservative treatment measures may not provide adequate symptomatic relief and a surgical solution may have to be considered.

When should I consider having a hip replacement?

Arthritis of the hip joint has affected mankind ever since we assumed an upright posture. The body’s natural way to deal with a joint that is arthritic is to restrict its movement and make it stiff. After all it is the movement that causes the pain most of the time!
Damage to the cartilage is seen as narrowing of the joint on the X-Ray. Extra bone known as osteophytes develop, which is the body’s attempt to increase the surface area and so reduce the pressure per surface area of the joint. Ultimately when the destruction of the joint is so extensive the joint fuses. Fusion of the joint, also known as “ankylosis”, will stop it from moving and will therefore stop the pain!

The evolution of joint replacement has meant that whereas in the past a patient with an arthritic hip joint would be in pain and have restricted function until the joint fused; now we are able to replace a hip joint and relieve pain and maintain a level of function very similar to the native joint.

Hip replacement, is the most successful and cost effective medical intervention. 95% of patients who have a hip replacement will still have a functioning hip 10 years after surgery and about 85% of patients will still have their hip replacement at 20 years.

For patients older than 65 who have a hip replacement 93.5 % should not require any further surgical procedure on that hip.

It is worth remembering that having an arthritic hip is not a life threatening condition. The hip replacement operation is a quality of life procedure. The success rate is very high and the chance of a complication very low.

Before deciding on surgery, the patient should be aware that if a complication should occur it may cause him or her to be worse off. Fortunately the chances of that happening are quite rare.

In the majority of patients the best indication for proceeding to replacement surgery is when the symptoms fail to respond to conservative management and the patient is no longer willing to tolerate the symptoms associated with arthritis.

**What hip replacement is best for me?**

Like all things in life most people would like to have the best if possible. So what is the Rolls Royce of all hip replacements?

This is a difficult question to answer, as there are many variables involved.

As more studies are being published it appears that there are a great number of different hip systems that can provide good long term outcomes.

The largest data base which looks at how well hip replacements last is the

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Each type of hip replacement used today is experimental to some degree. The companies that produce the implants make some small modifications from time to time. After all, if the Volkswagen Golf was the same each year who would buy it after a while?

Your surgeon will discuss what type of hip replacement is best suited for you and he will also discuss the reasons why. Many options are available to each patient and the optimal solution is often reached after discussion with your surgeon.

There is however one certainty. The outcome of a hip replacement is directly related to the correct positioning of the implant and therefore related to the skill of the surgeon.

It is the aim during surgery to recreate the exact biomechanical environment that existed when the patient's original, well functioning, hip was still in place.

This process is called “soft tissue balancing” of the hip.

By doing this the hip joint will be as strong as possible, it will restore the leg length, if there is a discrepancy, and it will reduce the chance of hip dislocation.

It is becoming apparent that fixation of the socket and the femoral stem, whether cemented or uncemented, can last a long time.

The main weakness of a hip replacement, that most often causes it to fail, is the articulation between the ball and the socket also known as the bearing.

**What is soft tissue balancing of the hip?**

Your surgeon will try as best as possible to place the new replacement hip in the same “position” as the native hip before it got worn out. This process is know as “soft tissue balancing” of the hip.

This process will allow the replaced hip to function as best as possible by allowing the muscles around the hip to work optimally. It also will allow for deformities, such as leg length problems, to be corrected which in turn reduce the risk of post operative dislocation of the hip.

There are a number of ways by which the surgeon can optimise “soft tissue balancing”.

- At the time of the initial consultation the leg length discrepancy and other deformities are noted both on clinical and X-Ray examination.
- Prior to performing your operation your surgeon will “template” the X-Ray. This is the planning of the operation to determine what size of implants are required, where they need to be positioned and what intra-operative corrections need to be made.
- During the operation a number of tests are carried out to make sure that the pre-operative plan has been successfully executed. This may involve the use of a small jig which allows for the offset and leg length to be measured during the operation.
Templating of the X-Rays in order to plan restoration of leg length and offset during the operation. (Soft tissue balance of the hip)

A side arm jig is used to measure the restoration of leg length and offset during the operation. (Soft tissue balance of the hip)

This 71 year old lady has osteoarthritis of the hip with protrusio (the femoral head has migrated toward the pelvis). Using the patient's own femoral head as graft material the centre of rotation, leg length and offset have been restored.

**What types of bearings are there?**

The bearing of the hip replacement is the junction between the artificial femoral head and the socket. This is the area where “wear” will occur. Wear is the most common cause of long term failure of the artificial hip joint.

Every time the patient with a hip replacement takes a step some wear occurs between the ball and the socket. This produces wear particles which can, via a complex biological reaction in the body, ultimately lead to bone resorption and loosening of the joint replacement.

Over the last number of years newer types of bearing material have been introduced to see if they are an improvement over the traditional ones, in the hope that they will wear less and theoretically last longer.

The popular bearings at the moment are of three basic types. Each one has their own advantages and disadvantages. The jury is still out in deciding which one is the best.

**Hard on polyethylene bearing**

On the socket side a polyethylene bearing has been used almost since the popularisation of total hip replacement. The manner in which these bearing wear is fairly predictable, and unfortunately it is the
bearing that produces more wear particles than any other bearing. However, if revision of the replacement is required the techniques are well established.

A more modern type of polyethylene is called highly cross linked polyethylene. Most manufacturers of implants produce a slightly different type of “highly cross-linked” polyethylene. At least in the laboratory this type of polyethylene has shown improved wear characteristics over standard polyethylene. Some early publications using this material are now becoming available showing some promising results.

The “hard” part of the bearing relates to the femoral head. The most commonly used materials for making the artificial femoral head have been cobalt chrome and stainless steel. More recently harder material such as ceramics have been used.

A more recent material that is used to make the femoral head is Oxinium. This is a material used in the oil drilling and nuclear fuel industry which is very hard and scratch resistant. It has been shown in the laboratory and in clinical practice to have reduced wear of the bearing.

Metal on metal bearing.
This type of bearing is made of cobalt-chrome and have been around for many years. The size of the femoral head used in the metal on metal bearing can be either a regular size (28-36 mm head size) or a “large head bearing” (>36 mm head size). The metal on metal bearing can be used as a “resurfacing” hip replacement or it can be used with as a standard total hip replacement.

The improved engineering has meant that these components can now be manufactured with very high accuracy. This means that they wear very little. However, as part of the wear process cobalt and chromium particles are produced. Research is still ongoing to see if there are long term immunological consequences as a result of raised cobalt and chromium levels in the body.

**Ceramic on ceramic bearing**

Ceramic is the hardest bearing with the least wear. Unfortunately it is also brittle and may not be ideal for patient who intend to run or do impact sports. Fractures of this bearing have been reported although with the latest design of implants this is rare and occurs in only 0.004% of patients. A revision operation following a ceramic fracture however does not always have a good long term outcome.

**What are the possible complications of a total hip replacement?**

The chances of a major complication are between 1-3%. Anaesthetic complications are very rare.

For total hip replacement the five most common complications are:

1. Infection
2. Dislocation of the hip joint
3. Injury to the nerves and blood vessels
4. Deep vein thrombosis and possible pulmonary embolism
5. Problems with restoration of leg length

For uncemented total hip replacement there is a 0.3% chance of persistent thigh pain after the operation.

Hip resurfacing has a 1-2% incidence of femoral neck fracture.

**Other medical problems.** Major surgery can sometimes be followed by other unexpected medical problems including a heart attack, stroke, poor kidney function, the gut temporarily failing to function, constipation or poor bladder function.

**Will the operation be painful?**

Of course we expect some discomfort with every operation. However with modern modalities of pain control discomfort will be limited. Mr Busch has published on a method of injecting around the total hip or knee replacement during the time of surgery which makes the peri-operative time very comfortable and allows for early mobilisation.

**How quickly will I recover postoperative?**

Most patients will be out of hospital in 3-5 days. Some even sooner! The majority of patients have control of their car at six weeks and some leisurely sport can be started at 3 months. The function will continue to improve and will reach the maximum at 1 year to 14 months. Most people will be able to take part in normal walking, playing bowls, golf and tennis. Most patients have no problems with doing gardening. Certain patients will be able to ski and run.

**What can I do with my hip replacement?**

A replacement of any joint is never as good as your own original joint. It is however a very good second best! As the longevity of the joint replacement is almost completely dependant on the wear of the bearing surface it is logical to look after the replaced joint as much as possible. If we can compare a hip joint to a car engine we can speculate that if an engine has a million miles to run, a patient can drive all the miles available in just a few years, or by being a little more cautious, can have many years of trouble free motoring.

On the other hand we must not forget that the joint replacement is often performed in order to resume activities which the patient was unable to participate in, because of the arthritic joint.

Most activities can be performed by patients who have a joint replacement. Bearing in mind however that the longevity of a joint replacement depends on the rate of wear, the avoidance of dislocation and infection, any activity that the patient wishes to take part should be viewed within these confines.

Sports such as golf, tennis and skiing are possible with both hip and knee replacement. It is however worthwhile to take some simple actions to stop excessive wear of the replaced joint by perhaps taking a buggy whilst playing golf, to stay on the easier ski runs and to restrict the number of games of tennis played during the week!

Patients who have had surface replacements have notoriously been involved in contact sport, judo and running, sometimes long distance. Although these are activities are possible, very little is known as to what the long term.