

## Shoulder Joint Replacement

Page (1)

Although shoulder joint replacement is less common than knee or hip replacement, it is just as successful in relieving joint pain.

Shoulder replacement surgery was first performed in the United States in the 1950s to treat severe shoulder fractures. Over the years, shoulder joint replacement has come to be used for many other painful conditions of the shoulder, such as different forms of arthritis.

Today, about 53,000 people in the U.S. have shoulder replacement surgery each year, according to the Agency for Healthcare Research and Quality. This compares to more than 900,000 Americans a year who have knee and hip replacement surgery.

If nonsurgical treatments like medications and activity changes are no longer helpful for relieving pain, you may want to consider shoulder joint replacement surgery. Joint replacement surgery is a safe and effective procedure to relieve pain and help you resume everyday activities.

Whether you have just begun exploring treatment options or have already decided to have shoulder joint replacement surgery, this article will help you understand more about this valuable procedure.

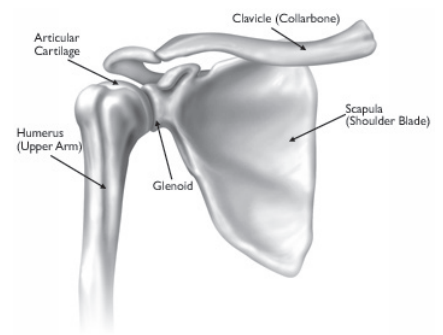
### Anatomy

Your shoulder is made up of three bones: your upper arm bone (humerus), your shoulder blade (scapula), and your collarbone (clavicle). The shoulder is a ball-and-socket joint: The ball, or head, of your upper arm bone fits into a shallow socket in your shoulder blade. This socket is called the glenoid.

The surfaces of the bones where they touch are covered with articular cartilage, a smooth substance that protects the bones and enables them to move easily. A thin, smooth tissue called synovial membrane covers all remaining surfaces inside the shoulder joint. In a healthy shoulder, this membrane makes a small amount of fluid that lubricates the cartilage and eliminates almost any friction in your shoulder.

The muscles and tendons that surround the shoulder provide stability and support.

All of these structures allow the shoulder to rotate through a greater range of motion than any other joint in the body.



The bones of a healthy shoulder joint.

## Description

In shoulder replacement surgery, the damaged parts of the shoulder are removed and replaced with artificial components, called a prosthesis. The treatment options are either replacement of just the head of the humerus bone (ball), or replacement of both the ball and the socket (glenoid).

## Cause

Several conditions can cause shoulder pain and disability, and lead patients to consider shoulder joint replacement surgery.

### Osteoarthritis (Degenerative Joint Disease)

This is an age-related “wear and tear” type of arthritis. It usually occurs in people 50 years of age and older, but may occur in younger people, too. The cartilage that cushions the bones of the shoulder softens and wears away. The bones then rub against one another. Over time, the shoulder joint slowly becomes stiff and painful.

Unfortunately, there is no way to prevent the development of osteoarthritis. It is a common reason people have shoulder replacement surgery.

### Rheumatoid Arthritis

This is a disease in which the synovial membrane that surrounds the joint becomes inflamed and thickened. This chronic inflammation can damage the cartilage and eventually cause cartilage loss, pain, and stiffness. Rheumatoid arthritis is the most common form of a group of disorders termed “inflammatory arthritis.”

### Post-traumatic Arthritis

This can follow a serious shoulder injury. Fractures of the bones that make up the shoulder or tears of the shoulder tendons or ligaments may damage the articular cartilage over time. This causes shoulder pain and limits shoulder function.

### Rotator Cuff Tear Arthropathy

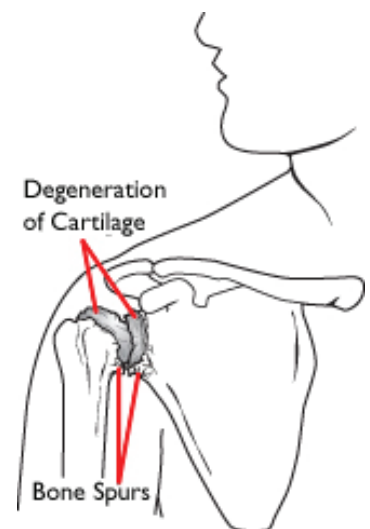
A patient with a very large, long-standing rotator cuff tear may develop cuff tear arthropathy. In this condition, the changes in the shoulder joint due to the rotator cuff tear may lead to arthritis and destruction of the joint cartilage.

### Avascular Necrosis (Osteonecrosis)

Avascular necrosis is a painful condition that occurs when the blood supply to the bone is disrupted. Because bone cells die without a blood supply, osteonecrosis can ultimately cause destruction of the shoulder joint and lead to arthritis. Chronic steroid use, deep sea diving, severe fracture of the shoulder, sickle cell disease, and heavy alcohol use are risk factors for avascular necrosis.



Shoulder joint replacement.  
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Osteoarthritis of the shoulder.

### Severe Fractures

A severe fracture of the shoulder is another common reason people have shoulder replacements. When the head of the upper arm bone is shattered, it may be very difficult for a doctor to put the pieces of bone back in place. In addition, the blood supply to the bone pieces can be interrupted. In this case, a surgeon may recommend a shoulder replacement. Older patients with osteoporosis are most at risk for severe shoulder fractures.

### Failed Previous Shoulder Replacement Surgery

Although uncommon, some shoulder replacements fail, most often because of implant loosening, wear, infection, and dislocation. When this occurs, a second joint replacement surgery – called a revision surgery – may be necessary.

### Is Shoulder Joint Replacement for You?

The decision to have shoulder replacement surgery should be a cooperative one between you, your family, your family physician, and your orthopaedic surgeon.

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

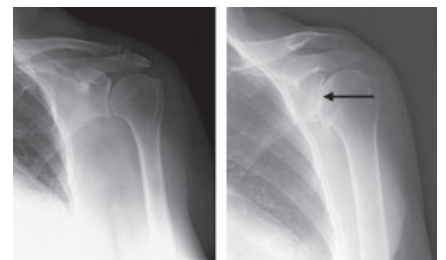
- Severe shoulder pain that interferes with everyday activities, such as reaching into a cabinet, dressing, toileting, and washing.
- Moderate to severe pain while resting. This pain may be severe enough to prevent a good night's sleep.
- Loss of motion and/or weakness in the shoulder.
- Failure to substantially improve with other treatments such as anti-inflammatory medications, cortisone injections, or physical therapy.

### Orthopaedic Evaluation

Your family physician may refer you to an orthopaedic surgeon for a thorough evaluation to determine if you can benefit from this surgery.

An evaluation with an orthopaedic surgeon consists of several components:

- **A medical history.** Your orthopaedic surgeon will gather information about your general health and ask you about the extent of your shoulder pain and your ability to function.
- **A physical examination.** This will assess shoulder motion, stability, and strength.
- **X-rays.** These images help to determine the extent of damage in your shoulder.



**(Left)** An x-ray of a healthy shoulder joint. **(Right)** Osteoarthritis of the shoulder. Note the the decreased joint space in the x-ray (arrow).

## Shoulder Joint Replacement cont.

Page ( 4 )

They can show loss of the normal joint space between bones, flattening or irregularity in the shape of the bone, bone spurs, and loose pieces of cartilage or bone that may be floating inside the joint.

- **Other tests.** Occasionally blood tests, a magnetic resonance imaging (MRI) scan, or a bone scan may be needed to determine the condition of the bone and soft tissues of your shoulder.

Your orthopaedic surgeon will review the results of your evaluation with you and discuss whether shoulder joint replacement is the best method to relieve your pain and improve your function. Other treatment options – including medications, injections, physical therapy, or other types of surgery – will also be discussed and considered.

### Shoulder Replacement Options

Shoulder replacement surgery is highly technical. It should be performed by a surgical team with experience in this procedure.

There are different types of shoulder replacements. Your surgeon will evaluate your situation carefully before making any decisions. He or she will discuss with you which type of replacement would best meet your health needs. Do not hesitate to ask what type of implant will be used in your situation, and why that choice is right for you.

#### Total Shoulder Replacement

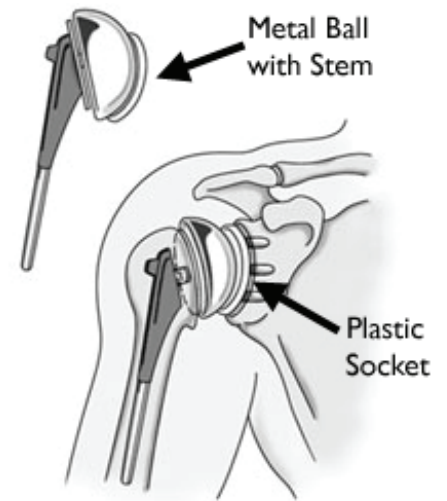
The typical total shoulder replacement involves replacing the arthritic joint surfaces with a highly polished metal ball attached to a stem, and a plastic socket.

These components come in various sizes. They may be either cemented or “press fit” into the bone. If the bone is of good quality, your surgeon may choose to use a non-cemented (press-fit) humeral component. If the bone is soft, the humeral component may be implanted with bone cement. In most cases, an all-plastic glenoid (socket) component is implanted with bone cement.

Implantation of a glenoid component is not advised if:

- The glenoid has good cartilage
- The glenoid bone is severely deficient
- The rotator cuff tendons are irreparably torn

Patients with bone-on-bone osteoarthritis and intact rotator cuff tendons are generally good candidates for conventional total shoulder replacement.



A total shoulder joint replacement.



These x-rays were taken before and after total shoulder replacement surgery for osteoarthritis.

### Stemmed Hemiarthroplasty

Depending on the condition of your shoulder, your surgeon may replace only the ball. This procedure is called a hemiarthroplasty. In a traditional hemiarthroplasty, the head of the humerus is replaced with a metal ball and stem, similar to the component used in a total shoulder replacement. This is called a stemmed hemiarthroplasty.

Some surgeons recommend hemiarthroplasty when the humeral head is severely fractured but the socket is normal. Other indications for a hemiarthroplasty include:

- Arthritis that only involves the head of the humerus with a glenoid that has a healthy and intact cartilage surface
- Shoulders with severely weakened bone in the glenoid
- Some shoulders with severely torn rotator cuff tendons and arthritis

Sometimes, surgeons make the decision between a total shoulder replacement and a hemiarthroplasty in the operating room at the time of the surgery.

Studies show that patients with osteoarthritis get better pain relief from total shoulder arthroplasty than from hemiarthroplasty.

### Resurfacing Hemiarthroplasty

Resurfacing hemiarthroplasty involves replacing just the joint surface of the humeral head with a cap-like prosthesis without a stem. With its bone preserving advantage, it offers those with arthritis of the shoulder an alternative to the standard stemmed shoulder replacement.

Resurfacing hemiarthroplasty may be an option for you if:

- The glenoid still has an intact cartilage surface
- There has been no fresh fracture of the humeral neck or head
- There is a desire to preserve humeral bone

For patients who are young or very active, resurfacing hemiarthroplasty avoids the risks of component wear and loosening that may occur with conventional total shoulder replacements in this patient population. Due to its more conservative nature, resurfacing hemiarthroplasty may be easier to convert to total shoulder replacement, if necessary at a later time.

### Reverse Total Shoulder Replacement

Another type of shoulder replacement is called reverse total shoulder replacement. Reverse total shoulder replacement is used for people who have:



This x-ray shows the cap-like prosthesis used in resurfacing hemiarthroplasty.

## Shoulder Joint Replacement cont.

Page ( 6 )

- Completely torn rotator cuffs with severe arm weakness
- The effects of severe arthritis and rotator cuff tearing (cuff tear arthropathy)
- Had a previous shoulder replacement that failed

For these individuals, a conventional total shoulder replacement can still leave them with pain. They may also be unable to lift their arm up past a 90-degree angle. Not being able to lift one's arm away from the side can be severely debilitating.

In reverse total shoulder replacement, the socket and metal ball are switched. That means a metal ball is attached to the shoulder bone and a plastic socket is attached to the upper arm bone. This allows the patient to use the deltoid muscle instead of the torn rotator cuff to lift the arm.

### Complications

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

When complications occur, most are successfully treatable. Possible complications include the following.

#### Infection

Infection is a complication of any surgery. In shoulder joint replacement, infection may occur 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 in the wound area 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.

#### Prosthesis Problems

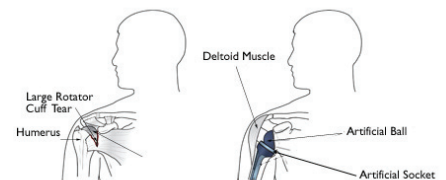
Although prosthesis designs and materials, as well as surgical techniques, continue to advance, the prosthesis may wear down and the components may loosen. The components of a shoulder replacement may also dislocate. Excessive wear, loosening, or dislocation may require additional surgery (revision procedure).

#### Nerve Injury

Nerves in the vicinity of the joint replacement may be damaged during surgery, although this type of injury is infrequent. Over time, these nerve injuries often improve and may completely recover.



An x-ray of a reverse total shoulder replacement.



**(Left)** Rotator cuff arthropathy.  
**(Right)** The reverse total shoulder replacement allows other muscles – such as the deltoid – to do the work of the damaged rotator cuff tendons.

## Preparing for Surgery

### Medical Evaluation

If you decide to have shoulder replacement surgery, your orthopaedic surgeon may ask you to schedule a complete physical examination with your family physician several weeks before surgery. 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, must also be evaluated by a specialist, such a cardiologist, before the surgery.

### Medications

Be sure to talk to your orthopaedic surgeon about the medications you take. Some medications may need to be stopped before surgery. For example, the following over-the-counter medicines may cause excessive bleeding and should be stopped 2 weeks before surgery:

- Non-steroidal anti-inflammatory medications, such as aspirin, ibuprofen, and naproxen sodium
- Most arthritis medications

If you take blood thinners, either your primary care doctor or cardiologist will advise you about stopping these medications before surgery.

### Home Planning

Making simple changes in your home before surgery can make your recovery period easier.

For the first several weeks after your surgery, it will be hard to reach high shelves and cupboards. Before your surgery, be sure to go through your home and place any items you may need afterwards on low shelves.

When you come home from the hospital, you will need help for a few weeks with some daily tasks like dressing, bathing, cooking, and laundry. If you will not have any support at home immediately after surgery, you may need a short stay in a rehabilitation facility until you become more independent.

## Your Surgery

### Before Your Operation

Wear loose-fitting clothes and a button-front shirt when you go to the hospital for your surgery. After surgery, you will be wearing a sling and will have limited use of your arm.

## Shoulder Joint Replacement cont.

Page ( 8 )

You will most likely be admitted to the hospital on the day of your surgery. After admission, you will be taken to the preoperative preparation area and will meet a doctor from the anesthesia department.

You, your anesthesiologist, and your surgeon will discuss the type of anesthesia to be used. You may be provided a general anesthetic (you are asleep for the entire operation), a regional anesthetic (you may be awake but have no feeling around the surgical area), or a combination of both types.

### Surgical Procedure

The procedure to replace your shoulder joint with an artificial device usually takes about 2 hours.

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.

### Recovery

Your medical team will give you several doses of antibiotics to prevent infection. Most patients are able to eat solid food and get out of bed the day after surgery. You will most likely be able to go home on the first, second or third day after surgery.

### 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. Physical therapy 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.

### Rehabilitation

A careful, well-planned rehabilitation program is critical to the success of a shoulder replacement. You usually start gentle physical therapy soon after the operation. Your surgeon or physical therapist will provide you with a home exercise program to strengthen your shoulder and improve flexibility.

### Your Recovery At Home

When you leave the hospital, your arm will be in a sling. You will need the sling to support and protect your shoulder for the first 2 to 4 weeks after surgery.



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Wearing a sling will protect your shoulder after surgery.



## Shoulder Joint Replacement cont.

Page ( 9 )

**Wound care.** You will have staples running along your wound or a suture beneath your skin. The staples will be removed several weeks after surgery. A suture beneath your skin will not require removal.

Avoid soaking the wound in water until it has thoroughly sealed and dried. You may continue to bandage the wound to prevent irritation from clothing.

**Activity.** Exercise is a critical component of home care, particularly during the first few weeks after surgery. Follow your surgeon's home exercise plan to help you regain strength. Most patients are able to perform simple activities such as eating, dressing and grooming within 2 weeks after surgery. Some pain with activity and at night is common for several weeks after surgery.

Driving a car is not allowed for 2 to 4 weeks after surgery.

### Do's and Don'ts

The success of your surgery will depend largely on how well you follow your orthopaedic surgeon's instructions at home during the first few weeks after surgery. Here are some common do's and don'ts for when you return home:

- Don't use the arm to push yourself up in bed or from a chair because this requires forceful contraction of muscles.
- Do follow the program of home exercises prescribed for you. You may need to do the exercises 2 to 3 times a day for a month or more.
- Don't overdo it! If your shoulder pain was severe before the surgery, the experience of pain-free motion may lull you into thinking that you can do more than is prescribed. Early overuse of the shoulder may result in severe limitations in motion.
- Don't lift anything heavier than a glass of water for the first 2 to 4 weeks after surgery.
- Do ask for assistance. Your physician may be able to recommend an agency or facility if you do not have home support.
- Don't participate in contact sports or do any repetitive heavy lifting after your shoulder replacement.
- Do avoid placing your arm in any extreme position, such as straight out to the side or behind your body for the first 6 weeks after surgery.

Many thousands of patients have experienced an improved quality of life after shoulder joint replacement surgery. They experience less pain, improved motion and strength, and better function.

## Research

Work is being done to design and develop newer and better shoulder replacements that can be done with less invasive surgical techniques. Researchers are collecting data to determine which patients are the best candidates for which type of shoulder replacement surgery. This information will allow your surgeon to offer you the best recommendation for the treatment of your arthritic shoulder.

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