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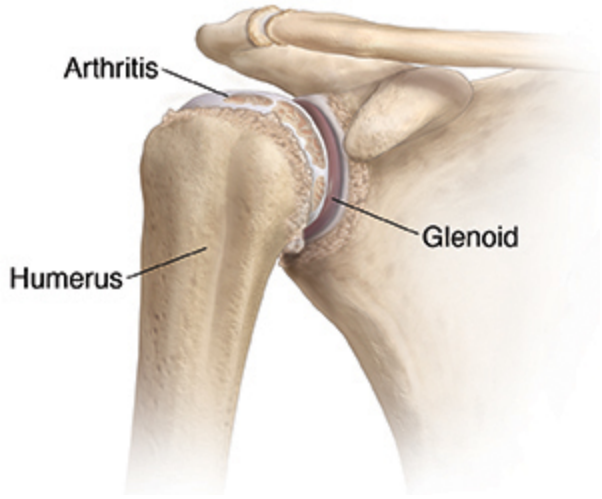
OSTEOARTHRITIS OF THE SHOULDER

Glenohumeral (shoulder) arthritis is a common source of pain and disability that affects up to 20% of the older population. **Damage to the cartilage surfaces of the glenohumeral joint (the shoulder's "ball-and-socket" structure) is the primary cause of shoulder arthritis.**



There are many treatment options for shoulder arthritis, ranging from anti-inflammatory medications and exercises for mild cases, to surgical procedures for severe cases. Treatment decisions are based upon the cause, the symptoms and the severity of the patient's disease. Each year, over 120,000 shoulder replacement surgeries are performed in the United States to relieve pain and improve function for shoulders that are severely damaged by glenohumeral arthritis.

The shoulder is the most mobile joint in the human body with a complex arrangement of structures working together to provide the movement necessary for daily life. Unfortunately, this great mobility comes at the expense of stability. Several bones and a network of soft tissues (ligaments, tendons, muscles, and joint capsule), work together to produce shoulder movement. They interact to keep the joint in place while it moves through extreme ranges of motion. Each of these structures makes an important contribution to shoulder movement and stability. Certain work or sports activities can put great demands upon the shoulder, and injury can occur when the limits of movement are exceeded and/or the individual structures are overloaded.

What is the labrum and what does it do?

The labrum is a disk of cartilage on the glenoid, or "socket" side of the shoulder joint. The labrum helps stabilize the joint and acts as a "bumper" to limit excessive motion of the humerus, the "ball" side of the shoulder joint, against the glenoid. More importantly, it holds the humerus securely to the glenoid, almost as if suction were involved. Although the glenoid itself is a relatively flat surface, the labrum's cuff-like contour gives the glenoid a more concave shape. The secure but flexible fit of the humerus within the glenoid permits the great range of motion of the healthy shoulder.

What is glenohumeral joint arthritis?

Glenohumeral joint arthritis is caused by the destruction of the cartilage layer covering the bones in the glenohumeral joint. This creates a "bone-on-bone" environment, which encourages the body to produce osteophytes (bone spurs). Friction between the humerus and the glenoid increases, so the shoulder no longer moves smoothly or comfortably. As osteophytes develop, motion is gradually lost.

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A number of conditions can lead to the breakdown of cartilage surfaces:

Wear and tear over time
Trauma (such as a fracture or dislocation)
Infection
A chronic (long-standing) inflammatory condition (such as rheumatoid arthritis or psoriatic arthritis)
Osteonecrosis (bone death caused by loss of blood supply)
Chronic rotator cuff tears in which the head of the humerus (the upper bone in the arm) loses its proper position in the middle of the glenoid (socket)
Rare congenital and metabolic conditions
Post-surgical changes that can be a result of over-tightening during instability surgery

What are the signs and symptoms of glenohumeral arthritis?

Pain from bone-on-bone rubbing within the joint is the most common symptom of glenohumeral arthritis
At first the pain may come and go, but it tends to increase with time, usually over several years.
Movement usually adds to the discomfort.
The pain is commonly present at night, and interferes with sleep.
There may or may not be pain at rest.
Loss of motion is another common symptom.

Possible causes of motion loss include:

Osteophytes that block joint motion
Constriction of the joint capsule due to chronic inflammation, pain, and disuse
Fractures or previous surgeries that may have changed joint structure and interfere with motion
Weakness of the supporting muscles following a rotator cuff tear

Other symptoms may be:

Atrophy (wasting away) of shoulder muscles due to disuse
Swelling in the shoulder due to inflammation
Crepitus (clicking or crunching sound) during shoulder motion
Tenderness with palpation (touch) affecting the entire shoulder region or specific areas

How is glenohumeral arthritis diagnosed?

The doctor will first obtain a history of the patient's symptoms and health over the past several years. Those who suffer from shoulder arthritis typically report an increase in pain over several years. The doctor will ask if the patient has any conditions that may be the underlying cause of osteoarthritis such as:

Previous trauma or surgery to the shoulder
An infection in the shoulder

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A previous rotator cuff tear: sometime a 'reverse' total shoulder replacement is needed.
Osteoarthritis or rheumatoid arthritis in other joints
Work and sports which may lead to accelerated arthritis

Next, the doctor will do a physical examination of the shoulder to evaluate the symptoms and reveal other conditions that may exist.

X-ray imaging of the shoulder can confirm a diagnosis of glenohumeral arthritis. With x-ray, the doctor can see structural changes that indicate arthritis, such as:

- Irregularity of the joint surface
- Osteophytes, typically located on the lower part of the joint
- Bone erosion on the humeral head, glenoid, or both. Glenoid bone loss is often visible on the backside of the joint.

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Other Imaging techniques used to make the diagnosis include:

- CT-Scan (Computer Tomography) – This test is the best way for your surgeon to measure the extent of glenoid bone loss and any anatomic abnormalities that may affect treatment. It is also very helpful for taking accurate measurements for surgical planning purposes.
- MRI (Magnetic Resonance Image) Although not as commonly used to diagnose arthritis as other imaging studies, an MRI can provide detailed information about the soft tissue structures of the joint.

How is glenohumeral arthritis treated?

Non-Operative Treatment

Mild glenohumeral arthritis is often manageable with a regimen of:

- Rest
- NSAIDS (non-steroidal anti-inflammatory medicines) – such as ibuprofen or naproxen
- Exercises to increase range of motion and strength

Mild to moderate glenohumeral arthritis pain is often effectively controlled by using any one or a combination of the follow treatments:

- Corticosteroid injections (cortisone shots) may be recommended for select cases that do not respond to NSAIDS. A concentrated dose of anti-inflammatory medicine is injected directly into the joint and can be used to manage pain. However, injections do not generally provide longterm relief for advanced cases of arthritis of the shoulder joint. It does not cure the disease.
- Glucosamine and chondroitin are non-prescription supplements that may help neutralize the destructive enzymes associated with osteoarthritis. Some patients may feel relief as a result of

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using these agents, but they are unable to 'regrow' new cartilage. More research is needed to evaluate the full extent of their effectiveness.

- Viscosupplementation therapy improves the cushioning of the joint surfaces and has gained popularity in the last few years. Hyaluronic acid is injected directly into the joint in order to improve joint lubrication and reduce friction during movement. Hyaluronic compounds are generally safe although there have been reports of inflammatory reactions in patients treated with some preparations. Most of the studies on viscosupplementation have been done on the knee, so it is less clear what effects this type of treatment will have on the arthritic shoulder.
- PRP (Platelet-rich-plasma) or Stem-Cell Injections have not been shown to reverse or consistently treat the symptoms of shoulder arthritis.

When severe shoulder arthritis pain is unmanageable with non-operative measures, surgical treatment may be recommended.

What types of complications may occur?

Even with the closest attention to detail, surgical complications may occur. Arthroscopic debridement surgery is typically less complex than arthroplasty (joint replacement). However, as with arthroplasty, the potential complications of bleeding, nerve injury, and infection are present.

Some of the more common complications are:

- Infection – Perioperative antibiotics (given before and after surgery) and current intraoperative procedures have reduced infection rates in arthroplasty to less than 1%. If the infection is caught early, aggressive antibiotic treatment may save the components. A chronic infection that has been present for more than 6-12 weeks generally requires removal of the infected implant.
- Blood loss – Although not usually considered a complication, blood loss can occur during shoulder replacement surgery and a transfusion may be required. This is very rare. Even though there are legitimate concerns about banked blood, the current blood available is extremely safe with very low incidences of disease transmission.
- Nerve injury – Nerve injuries that occur during shoulder replacement surgery are usually temporary, with near normal function returning over time.
- Component failure – This problem is more common with the glenoid component of a total shoulder arthroplasty. Usually, but not always, the loose glenoid component requires surgical removal or revision.

What Can I Expect If I Have Surgery?

Rehabilitation following shoulder arthroplasty or debridement requires teamwork between the patient, physician, and physical therapist. Good communication will optimize the patient's results and allow the earliest possible return to full activity.

- During the first 4-6 weeks after surgery, the shoulder is usually immobilized with a sling.

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- During this time, the therapist will move the shoulder through passive range of motion exercises to prevent stiffness. This will allow the patient to maintain functional motion in the shoulder while protecting the soft tissue repair.
- After soft tissues are adequately healed (about 6 weeks) an active range of motion exercise program can begin.
- Soon after adequate active range of motion is achieved, a strengthening program begins, concentrating on the rotator cuff muscles, and those that stabilize the scapula.

Once appropriate levels of motion and strength are reached, a maintenance program of shoulder exercises, as part of a whole-body fitness regimen, is recommended. The patient who commits to a lifetime physical therapy program will maximize the success of the surgical procedure.
Return to full activity is highly variable among patients. Generally, complete recovery takes 4-6 months.

How painful is shoulder replacement surgery?

Shoulder arthroplasty is a complex procedure, which requires a great amount of cutting of deep tissues and bone. The surgeon takes great care to eliminate pain with appropriate analgesia both immediately after surgery and during the rehabilitation process. A long acting local anesthetic infused around the nerves of the joint is often used with general anesthesia during surgery. This is placed by anesthesiologists prior to surgery, either as an injection or as an indwelling catheter. These regional "interscalene" blocks will provide several hours of pain relief even after a patient has emerged from general anesthesia. By the first day after surgery, oral pain relief medication is usually adequate for pain control and may be used through the early rehabilitation period (4-6 weeks). With many of these advancements, the level of pain following shoulder surgery has been dramatically reduced compared to even 10 years ago. Most patients are able to return home the day after surgery.

How long before I can return to my normal activities after shoulder arthroplasty?

The time it takes to return to normal activity varies greatly from patient to patient. Most individuals have less pain at night or at rest in the first 2-4 weeks after surgery. Pain with activity persists longer, but generally decreases as the strength and function of the shoulder muscles improve. Full recovery usually takes 4-6 months.

What activities can I safely do after shoulder replacement?

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The goal of shoulder arthroplasty is to relieve the pain from glenohumeral arthritis. It is unrealistic to expect to return to repetitive, heavy, or overhead activities, which would put the replacement components at risk. Shoulder function after arthroplasty is also unlikely to allow the motions required by these activities.

According to the American Shoulder and Elbow Society, the acceptable activities after a shoulder arthroplasty are:

- Bowling, doubles tennis, cross-country skiing, swimming, canoeing, and shuffleboard
- For those with previous experience in the activity: golf, ice skating, shooting, and downhill skiing

Unacceptable activities are:

- Football, gymnastics, hockey, rock climbing
- Throwing sports, except for gentle underhand tossing
- Bench press, pushups, contact sports
- Yoga positions (downward dog) where excessive weight is placed through the shoulders.

I've heard that joint replacement sometimes "wear out" and need to be redone. What are the chances I may require a second shoulder arthroplasty?

Long-term studies show that 90% of total shoulder replacements are functioning well ten years after implantation, and 85% are doing well fifteen years after surgery. Over time, current advances in materials and techniques should improve these percentages even more.

For more information, please refer to Dr. Costouros' website: www.stanfordshoulder.com