

**MADE FOR NEW YORK.**



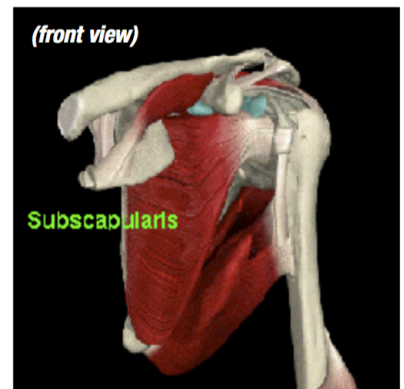
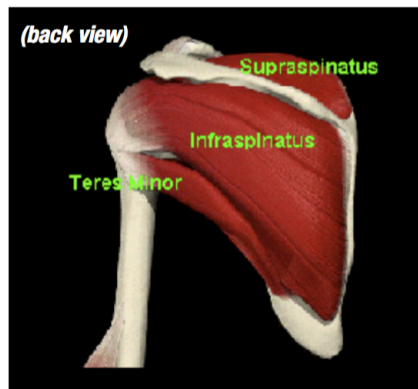
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# Rehabilitation After Shoulder Arthroplasty

The anatomic configuration of the shoulder joint (glenohumeral joint) is often compared to that of a golf ball on a tee. This is because the articular surface of the round humeral head is approximately four times greater than that of the relatively flat shoulder blade face (glenoid fossa). This configuration provides less boney stability than a truer ball and socket joint, like the hip. The stability and movement of the shoulder is controlled primarily by the rotator cuff muscles, with assistance from the ligaments, glenoid labrum and capsule of the shoulder. The rotator cuff is a group of four muscles: subscapularis, supraspinatus, infraspinatus and teres minor (Figure 1).

The articular surface of the humerus (upper arm bone) and glenoid fossa (shoulder blade) is normally covered with a layer of hyaline cartilage called articular cartilage. The articular cartilage has a frictional coefficient approximately 1/5 of ice on ice – i.e. rubbing articular cartilage on articular cartilage would be five times smoother than rubbing ice on ice. This allows for a very smooth gliding surface. A large portion of articular cartilage is fluid, which also provides significant resistance to compressive forces.<sup>1</sup>

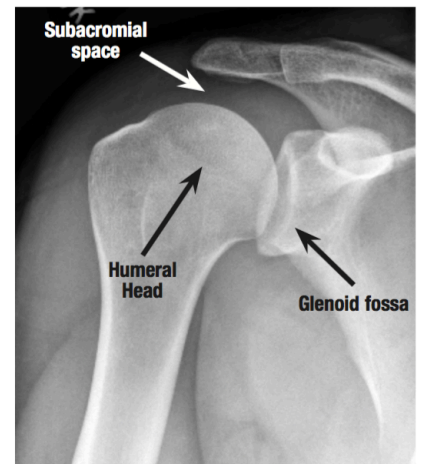


**Figure 1** Rotator cuff anatomy

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Degenerative joint disease or arthritis causes a slow progressive breakdown of this cartilage to occur. This often results from very large, long standing rotator cuff tears, in which case you have lost the ability to stabilize your shoulder and more shear stress is imparted to the articular cartilage. This is referred to as rotator cuff tear arthropathy.

Arthritis can also result from repeated stress and loads to the shoulder and previous dislocations. Regardless of the cause, when this happens you lose the normal smooth gliding articulation and the ability to resist compressive forces at the joint. These changes can cause pain, swelling, loss of motion, weakness and reduced function or performance.



**Figure 2** Normal shoulder radiograph

Surgical repair of widespread articular cartilage injury and breakdown is not yet a viable option because of

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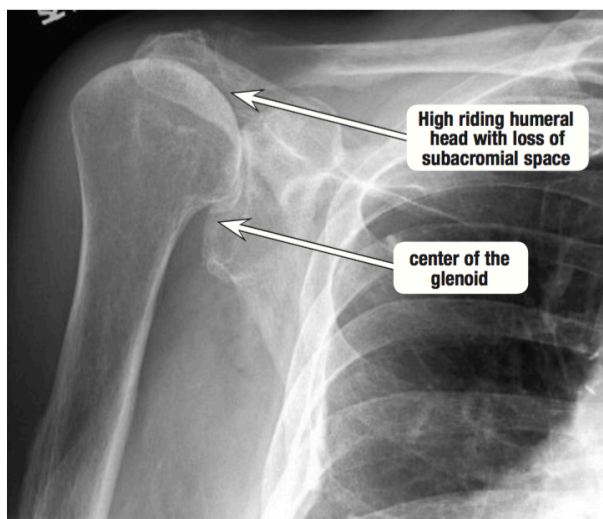
limitations in articular cartilage healing and fixation. What is a potential option is replacing the articular cartilage surface with a prosthetic component that replicates the properties of the articular cartilage. “Shoulder Arthroplasty” and “Reverse Ball and Socket Arthroplasty” are two surgical options for replacing the articular surfaces of the humeral head and glenoid. In shoulder arthroplasty the humeral head (ball) is replaced with metal and the glenoid (tee) is replaced with a plastic liner. In the reverse ball and socket arthroplasty the joint is actually flipped upside down such that the ball is now attached to the shoulder blade and the tee is attached to the top of the arm. This procedure is used when the

rotator cuff function is permanently and severely limited. By reversing the joint the deltoid can have a greater impact on improving active shoulder range of motion and function.

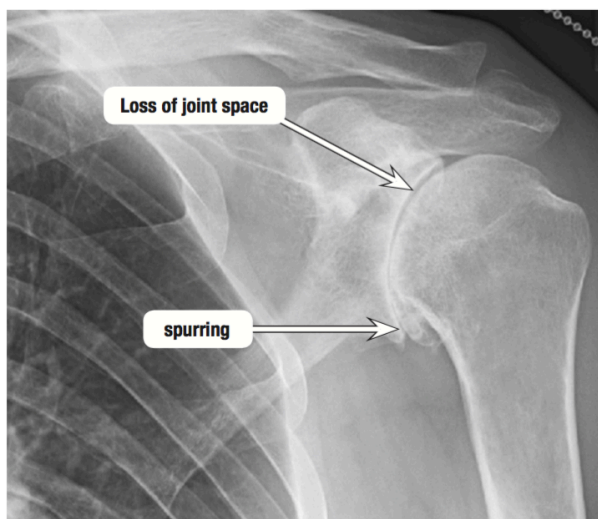
Rehabilitation is vital to regaining motion, strength and function of the shoulder after surgery. In these procedures the subscapularis is detached for exposure of the glenohumeral joint and then reattached after the repair is complete. This reattachment must be protected for 6 weeks. During this time, strengthening activities involving internal rotation must be avoided. Initially patients will use a sling to protect the implants and allow for proper healing. The rehabilitation program will

gradually progress to more strengthening and control type exercises. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehabilitation compliance and injury severity.

The goal of these procedures is to restore your daily function and allow you to return to an active healthy lifestyle. You will have some permanent restrictions to minimize chance of associated injury or implant failure. These include contact sports such as basketball, soccer, football, martial arts, heavy lifting, chopping wood, repetitive overhead throwing and heavy labor.



**Figure 3** This is a radiograph of a patient with a chronic rotator cuff tear and rotator cuff arthropathy. Note the “high riding humeral head”, you can notice the humeral head is significantly above the center of the glenoid fossa with loss of subacromial space.



**Figure 4** Shoulder (glenohumeral) degenerative joint disease. Note that although the humeral head is centered there is a significant loss of joint space. There is also presence of spurring and sclerosis.

## Rehabilitation After Shoulder Arthroplasty

### Phase I (Surgery to 6 weeks after surgery)

Precautions	<ul style="list-style-type: none"> <li>○ Sling immobilization for the first 6 weeks</li> </ul>
Range of Motion Exercises	<ul style="list-style-type: none"> <li>○ Out of sling to do home exercise program (pendulums) twice daily</li> </ul>
Therapeutic Exercises	<ul style="list-style-type: none"> <li>○ Grip strengthening</li> <li>○ Elbow/wrist/hand exercises</li> <li>○ Teach home exercises - pendulums</li> </ul>
Other	<ul style="list-style-type: none"> <li>○ Heat/ice before and after PT sessions</li> </ul>

### Phase II (6 weeks to 12 weeks following surgery)

Precautions	<ul style="list-style-type: none"> <li>○ Discontinue sling</li> </ul>
Range of Motion Exercises	<ul style="list-style-type: none"> <li>○ PROM -&gt; AAROM -&gt; AROM               <ul style="list-style-type: none"> <li>○ Increase as tolerated</li> </ul> </li> <li>○ Begin active internal rotation and backward extension as tolerated</li> <li>○ Goals – 90 degrees of forward flexion and 30 degrees of external rotation</li> </ul>
Therapeutic Exercises	<ul style="list-style-type: none"> <li>○ Begin light resisted exercises for forward flexion, external rotation, and abduction – isometrics and bands – concentric motions only</li> <li>○ <b>No resisted internal rotation, backward extension, or scapular retraction.</b></li> </ul>
Other	<ul style="list-style-type: none"> <li>○ Modalities per PT discretion</li> </ul>

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### Phase III (12 weeks to 1 year following surgery)

Range of Motion Exercises	<ul style="list-style-type: none"><li>○ Progress to full AROM without discomfort.</li><li>○ Gentle passive stretching at end range</li></ul>
Therapeutic Exercises	<ul style="list-style-type: none"><li>○ Begin resisted internal rotation and backward extension exercises</li><li>○ Advance strengthening as tolerated<ul style="list-style-type: none"><li>○ Rotator cuff</li><li>○ Deltoid</li><li>○ Scapular stabilizers</li></ul></li><li>○ Begin eccentric motions, plyometrics, and closed chain exercises</li></ul>

### References

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