



THE UNIVERSITY OF TOLEDO  
**MEDICAL CENTER**

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THE UNIVERSITY OF TOLEDO MEDICAL CENTER

# ORTHOPAEDIC MONTHLY

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## Shoulder Impingement Syndrome

Shoulder impingement syndrome is a common source of pain in the shoulder. It is found in about 50% of patients who come to the doctor with a complaint of shoulder problems. Shoulder impingement is often referred to as rotator cuff tendonitis or shoulder bursitis. It is really an irritation of the rotator cuff and could lead to break down and tear of the tendon. It could be considered an overuse syndrome.

The subacromial bursa is located above the tendon of the supraspinatus rotator cuff muscle. The acromion process of the scapula is above the subacromial bursa. As you lift the arm up, the tendons may become easily irritated, because there is bone above and below these tendons. When the tendons become squeezed and irritated, it causes pain.

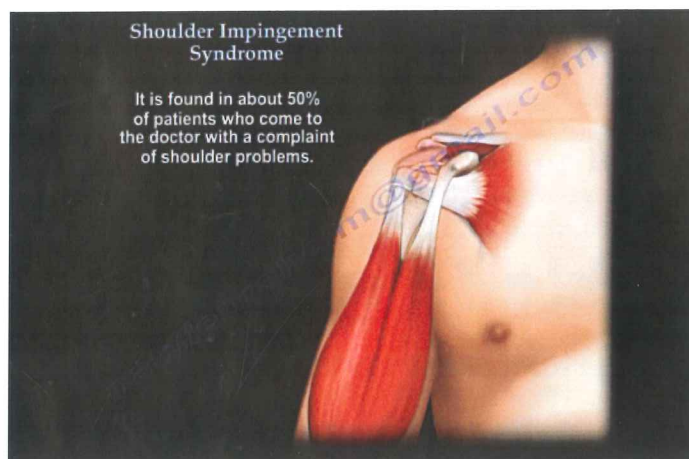
How do you diagnose it? The patient has a history of pain in the shoulder that is increased with overhead activity. If the patient has night pain, it is probably a rotator cuff tear and nonoperative treatment will not work.

**Examination:** When testing the shoulder for possible impingement, be sure to warn the patient before beginning the examination because this may cause pain in the shoulder. The idea of this impingement test is that the humeral head will squeeze the rotator cuff tendons and possibly cause pain. The presence of this continued irritation could lead to a full thickness tear of the rotator cuff tendon.

**Neer Impingement Sign:** Pinching of the rotator cuff tendon by the underside of the acromion. The examiner stabilizes the scapula with one hand and then moves the arm up in forward flexion attempting to pinch the rotator cuff against the acromion. A pain response due to the impingement is considered to be a positive sign.

The diagnosis is confirmed when the pain symptoms are relieved by injection of numbing medicine in the subacromial space (10 mL of 1% Xylocaine). The doctor may add 2 cc of corticosteroids to the numbing medicine.

**Hawkin's Sign:** Flex the shoulder to 90° and flex the elbow to 90° as well. Internally rotate the shoulder, which brings the greater tuberosity of the humerus underneath the acromion, which could



cause impingement and pain. Pain caused by this impingement is considered to be a positive Hawkin's Sign.

**Imaging:** X-rays can show the bone spur of the acromion which is a prominence on the under surface of the acromion. The bony acromial spur digs into the tendon of the rotator cuff. A true anteroposterior view x-ray should be obtained; the patient can be standing, sitting or lying down. This view will show the acromiohumeral interval, which is normally about 7-14 mm. A scapular Y view lateral x-ray will show the bony acromial spur and what type of acromion is present. The supraspinatus outlet view x-ray will show the acromion morphology. Type III Hooked acromion is most often associated with rotator cuff pathology. An MRI study is helpful in displaying the associated rotator cuff pathology.

**Treatment:** The initial treatment is nonoperative and includes NSAIDs (nonsteroidal anti-inflammatory drugs), like Motrin. This medication may have side effects. Always ask the doctor about any potential side effects. Physical therapy will also be utilized for the front and back shoulder muscles. This will give the shoulder more room to move. Physical therapy will be an aggressive cuff strengthening and periscapular muscle stabilization exercises. The aim is to coordinate the muscles and to regain full range of motion of the shoulder.

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Treatment can also commonly be a subacromial injection of numbing medicine and steroids. The injection is used in hopes of decreasing the level of inflammation. If the patient improves, then we have the correct diagnosis. Some physicians use blind injection technique (use the blind technique initially). With additional injections, the ultrasound guided injection technique will be used. The injection is into the subacromial bursa and not the tendon. Then the patient will be asked to return in six weeks.

During this follow-up appointment, repeat injections may be used. At this point, if the patient is not improving, an MRI will be ordered and we will dig deeper. The MRI will give us a better idea of any other pathology that may exist. We need to rule out the possibility of a rotator cuff tear. If the result is that the patient has impingement of the shoulder that is not improving and there is significant pain despite conservative treatment, then we will need to perform surgery. The surgery will be performed after conservative treatment has failed for about 4-6 months. The surgical outcome is usually not as good in patients with workers' compensation claims.

**Subacromial Decompression:** We will shave the under surface of the acromion in order to create more room for the rotator cuff tendon. Removal of the subacromial bursa and bone on the underside of the acromion is performed. If there is pain from the AC joint associated

with impingement, then the surgeon will probably need to excise the outer portion of the clavicle. The biceps tendon is connected to the rotator cuff associated tendonitis. The physician may need to perform a biceps tendon tenotomy or biceps tenodesis.

The result of surgery is usually very good if the doctor has the proper patient, proper clinical situation, proper diagnosis and a positive injection test. After surgery, the patient will be given a sling for a few days. The patient will return to normal daily activity within a couple weeks. At two weeks, the patient will be able to lift the arm above the head. At two months, the patient's will have a near normal condition.

**Complications:** Complications after surgery may occur and usually involve deltoid muscle disruption. The doctor will do either an acromionectomy (excise a large portion of the acromion) or excision of the Os Acromial, which will lead to deltoid muscle dysfunction. They may need the Os Acromiale to heal first and then later do the acromioplasty. The Os Acromiale is seen in an axillary view.

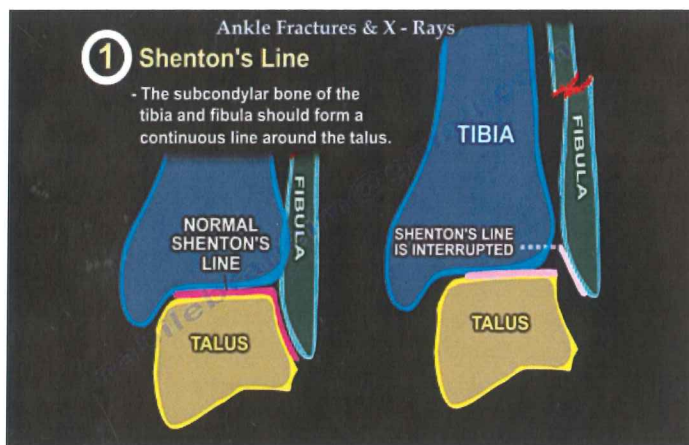
An excision of the CA ligament in a patient with a massive rotator cuff tear is another complication after surgery. In these types of patients, the doctor should try to avoid a coracoacromial ligament release to prevent the coracoacromial ligament.

## Ankle Fractures and X-rays

The mortise view is about 15° of internal rotation. The medial clear space should be 4-5 mm or less and it should be equal to the superior clear space which is between the talus and the distal tibia on the mortise view. If the medial clear space appears widened before surgery, then there is a deltoid injury. If the medial clear space does not appear widened, then make sure that you do not have a supination – external rotation Type 4 injury. You may need to do stress view x-rays before surgery in order to prove that the deltoid ligament is or is not injured.

The tibiofibular clear space should be less than 6 mm on the mortise view and it is the distance between the medial border of the fibula and the tibial incisura notch. You want to make sure that the tibiofibular clear space is not widened. If the tibiofibular clear space is widened and the ankle mortise is unstable, this allows the talus to shift because of the syndesmosis is unstable. 1 mm of talar shift will give a 43% decrease in tibiotalar contact area. This will cause future accelerated arthritis. The tibiofibular overlap is about 10 mm in the AP view and you measure the tibiofibular overlap from the medial border of the fibula. In the mortise view, the tibiofibular overlap should be more than 1 mm. the lateral malleolus is longer than the medial malleolus.

If the fibula is short, two other x-ray measurements may help. 1. Shenton's Line – the subcondylar bone of the tibia and fibula should form a continuous line around the talus. If the fibula is short then the spike of the fibula will be too proximal. If the fibula is long then the spike of the fibula will be too distal. Always look for a broken line from the lateral part of the articular surface of the talus to the distal fibula. 2. Dime Test.



### Summary:

- look for the sprung mortise.
- look for the spike of the fibula to proximal.
- look for the broken Shenton's line
- look for the Dime Test
- look for medial clear space widening.
- get a lateral x-ray to see if there is a posterior malleolus fracture.
- see if there is any talar subluxation.
- see if there are any other associated injuries from the talus and the calcaneus.

The most important thing you will see on the lateral view x-ray of the ankle is the type of fracture:

- Pronation – External rotation injury
- Supination – External rotation injury (these types are seen from the direction of the fracture.
- Pronation – Abduction injury; is the fracture comminuted?



# Hill-Sachs Lesion

Hill-Sachs lesion is a dent in the back of the humeral head which occurs during anterior shoulder dislocation as the humeral head impacts against the front of the glenoid cavity of the scapula. Indentation of the posterior aspect of the humeral head occurs in up to 80% of recurrent anterior shoulder dislocations.

When a Hill-Sachs lesion is identified, it is important to do careful assessment of the anterior glenoid rim and labrum to identify a potential Bankart Lesion. The labrum is a rim of cartilage that attaches around the edge of the glenoid. The glenoid labrum contributes to shoulder stability.

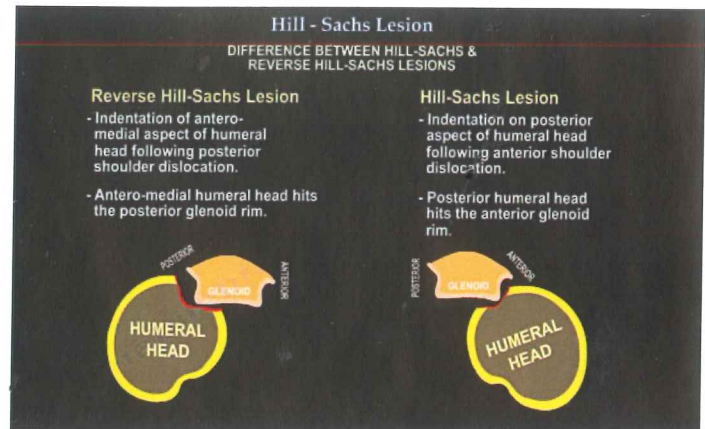
As the shoulder dislocates, the humeral head may tear part of the labrum away from the glenoid. Injury of the anterior inferior glenoid labrum due to anterior shoulder dislocation is called a Bankart Lesion. Bankart lesions cause chronic instability of the shoulder and usually require surgery.

How big is the Hill-Sachs lesion? The Hill-Sachs lesion can range from a small to large indentation and the size of the lesion affects the treatment given to the patient. The larger the Hill-Sachs lesions, the more likely the shoulder will be unstable and the more likely to dislocate again (recurrent dislocations). The larger the Hill-Sachs lesion is, the more likely that the glenoid labrum and joint capsule will have a significant tear.

**X-ray Views:** The defect may be missed on a routine AP view. The axillary view is helpful for the subluxation or dislocation. Combination of AP view in internal rotation and Stryker Notch view allow evaluation of the Hill-Sachs lesion in the posterolateral aspect of the humeral head. The Stryker Notch View will see the Hill-Sachs lesion that is present in the posterolateral aspect of the humeral head. The patient is lying supine with the hand placed over the head. The beam is tilted 10° cephalad and directed towards the coracoid. CT scans can be very helpful. MRI is the procedure of choice for labral pathology.

## Treatment:

- Small sized Hill-Sachs lesion (less than 20%) – usually treated nonoperatively.



- Medium sized Hill-Sachs lesion (defect is usually more than 25%) – arthroscopic or open remplissage procedure (may be performed in combination with Bankart repair). The defect is “filled in” with the posterior capsule and rotator cuff.

- Larger sized Hill-Sachs lesion (greater than 40% - rare) – usually filled with bone or metal.

It should be noted that the normal humeral head has a bare area on the posterior aspect of the humeral head and it should not be confused with a Hill-Sachs lesion. Hill-Sachs lesion is not clinically significant unless the defect engages the glenoid.

When the lesion is large enough and the arm is in abduction and external rotation, the shoulder will dislocate and the anterior glenoid will engage the posterior part of the humeral head. Some surgeons consider doing open procedure with engaging Hill-Sachs lesion.

What is the difference between a Hill-Sachs and a Reverse Hill-Sachs Lesion? A Reverse Hill-Sachs lesion is an indentation of the anteromedial aspect of the humeral head following a posterior shoulder dislocation. The anteromedial humeral head hits the posterior glenoid rim. A Hill-Sachs lesion is an indentation on the posterior aspect of the humeral head following an anterior shoulder dislocation. The posterior humeral head hits the anterior glenoid rim.

## Shoulder Examination

When you have a patient with a shoulder problem, you need to look at the shoulder. Inspection of the shoulder is not as easy as an inspection of the lower extremity.

Look at the shoulder muscles: Are the muscles small, atrophied, wasted or big? If there is infraspinatus muscle wasting present, then you need to check the condition of the suprascapular nerve.

If you have an older patient with a rotator cuff tear; inspect the deltoid muscle size in comparison to the deltoid of the other shoulder.

Flex the elbow to check the biceps function and rule out the presence

of a biceps tear. Tear of the biceps tendon may be associated with a rotator cuff tear. Check the pectoralis major muscle and look at the axillary fold. Make sure that the axillary fold is the same on both sides of the shoulders.

What else do we look at? Are the shoulders at the same level? Does the patient have AC joint separation? Does the patient have winging of the scapula? Medial scapular winging is different than lateral winging of the scapula. Medial scapular winging is due to dysfunction of the serratus anterior muscle. Lateral scapular winging is due to dysfunction of the trapezius muscle.

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*Shoulder Examination continued*

Look at the scars from previous surgeries and where they are located! We may incorporate these scars into any future surgery. Look for swelling; it may be difficult to see. Look at the skin; is there redness around the shoulder?

Palpate all of the bony prominences around the shoulder and also palpate all the important muscles. The AC joint could be a source of pain and tenderness. Tenderness over the leading edge of the acromion could be an impingement syndrome or rotator cuff problem. Palpate for trigger points (levator scapulae) and then decide if it is a neck problem or a shoulder problem. Do not miss the cervical spine! Palpate the posterior cervical spine and examine the movement of the spine.

Check the spurling maneuver. The patient is seated with the head turned towards the affected side. The examiner then applies downward compressive force to the top of the patient's head. The spurling maneuver is considered to be positive when the compressive force being applied to the cervical spine causes radiating pain down the patient's arm.

A slap lesion (labral tear) may cause pain in the posterior edge of the acromion in the soft spot.

360° palpation: do not miss the cervical spine. You may begin the examination by examining the neck first, then move to the trapezius, the clavicle and state the 360° examination (it does not matter how you start the exam, just be consistent). Check for any crepitus or swelling. Go after the known area of anatomy which could elicit tenderness and lead you to the diagnosis. Do not forget to check the biceps or the AC joint!

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