

# Scapulothoracic bursectomy

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## Overview

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- Snapping scapula syndrome is caused by either osseous lesions or scapulothoracic bursitis [1].
- Snapping scapula syndrome can be difficult to recognize and treat [1].
- The best initial approach to scapulothoracic bursitis and crepitus is a nonoperative treatment plan that combines scapular strengthening, postural reeducation, and core strength endurance [6].
- Nonoperative management is advised for 3 to 6 months before operative treatment [2].
- Nonoperative management is as effective as surgical management in pain relief [2].
- Open surgical treatment for snapping scapula provides durable pain relief [5].
- Nonsurgical treatment for snapping scapula provides durable pain relief [5].
- Surgically treated patients improved faster than nonsurgically treated patients [5].
- It cannot be concluded that surgery is better than nonsurgical treatment for snapping scapula [5].
- Arthroscopic scapulothoracic treatment provides good pain relief for scapulothoracic syndrome in patients who have failed to respond to nonoperative treatment modalities [3].
- Arthroscopic scapulothoracic treatment provides functional improvement for scapulothoracic syndrome in patients who have failed to respond to nonoperative treatment modalities [3].
- Arthroscopic bursoscopy and bursectomy is an effective surgical procedure in recalcitrant scapulothoracic bursitis with failed conservative management [4].
- Extracorporeal shock wave therapy (ESWT) is a beneficial and trustable method of treatment for painful cases of scapulothoracic bursitis [7].

## Anatomy & Pathophysiology

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### SCAPULOTHORACIC ARTICULATION & BIOMECHANICS

- The scapula is separated from the chest wall by thin gliding fibro-fatty tissue, allowing its smooth excursion over the chest wall [12].
- Normal shoulder motion is approximately two-thirds glenohumeral and one-third scapulothoracic [13].

- The scapulothoracic articulation is one of four articulations that work together to allow smooth shoulder function [23].
- The scapula is suspended by muscles alone and has shifted caudally from the cervical position in lower animals [20].
- Broadening of the infraspinatus fossa has resulted in a change in the vector of muscle pull from the axillary border of the scapula to the glenoid fossa [20].
- This adaptation allows the infraspinatus and teres minor muscles to be more effective in their roles as depressors and external rotators of the humeral head [20].
- The scapula is anteverted on the chest wall approximately 30 degrees relative to the body [24].

## BONY ANATOMY

- The scapula is triangular when viewed anteroposteriorly, with its base situated superiorly and its apex inferiorly [12].
- The glenoid is connected with the flat body of the scapula by the scapular neck [12].
- The hook-shaped coracoid process curves forwards from the superior surface of the scapular neck [12].
- The scapular spine ends in a flattened bony process, the acromion, which curves forwards [12].
- The highest concentration of bony mass in the scapula is located in the glenoid, the scapular neck (including the base of the coracoid process), and the lateral border of the scapular body [12].
- The lateral pillar connects the inferior border of the glenoid with the inferior angle [12].
- The spinal pillar arises from the central part of the glenoid and continues medially to become part of the base of the scapular spine [12].
- The weakest bone in the scapula is located primarily in the central part of the biomechanical body, i.e., in the infraspinous fossa [12].
- The weakest area of the circumference of the biomechanical body of the scapula is the spinomedial angle [12].
- The glenoid is a convex structure of shallow depth shaped like an inverted pear [10].
- The glenoid averages 5° of retroversion in relation to the axis of the scapular body [13].
- The subchondral bone of the glenoid is relatively flat, and the articular concavity is augmented by cartilage and a circumferential labrum [13].
- The acromion has three ossification centers: the metacromion (base), the mesoacromion (middle), and the preacromion (tip) [13].
- Failure of fusion of the acromial ossification centers results in os acromiale [13].
- The scapular spine is an osseous ridge that separates the supraspinatus and infraspinatus fossae [13].

## SOFT TISSUE & BURSAE

- The subscapular bursa lies between the subscapularis tendon and the neck of the scapula [14].

- The subscapular bursa communicates with the joint cavity between the superior and middle glenohumeral ligaments [14].
- The subscapular bursa protects the tendon of the subscapularis at the point where it passes under the base of the coracoid process and over the neck of the scapula [14].
- The subscapular bursa is linked to the coracoid process by a suspensory ligament [14].
- In 28% of specimens dissected by Colas and colleagues, the subscapular bursae merged with the subcoracoid bursae, forming a unique wide bursa in this region [14].
- The subscapular bursa often houses loose bodies in the shoulder [14].
- The subscapular bursa is a region in which synovitis of the shoulder may be most intense [14].
- Small fringes, or villi, can project into the joint cavity from the subscapular bursa [14].
- The rotator cuff is a sheet of conjoined tendons closely applied over the shoulder capsule and inserting mainly into the greater tuberosity of the humerus [18].
- The subscapularis is inserted into the lesser tuberosity [18].
- The coracoacromial arch is formed by the acromion process posterosuperiorly, the coracoid process anteriorly, and the coracoacromial ligament joining them [18].
- The subacromial bursa separates the rotator cuff tendons from the coracoacromial arch, allowing them to glide [18].

## PATHOPHYSIOLOGY

# Investigations

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## IMAGING PRINCIPLES AND GENERAL APPROACH

- The purpose of shoulder imaging is to help establish the diagnosis, determine the severity of the pathoanatomy, assist in surgical planning, and enable the surgeon to illustrate the condition of the shoulder to the patient [8].
- Unless a specific research protocol is in place, the temptation to “overimage” should be resisted, obtaining only the scans or reconstructions that are necessary for the care of the patient [8].
- Standardized plain films are almost always sufficient to garner the information needed for shoulder evaluation [8].
- Proper radiographic technique is as important as proper surgical technique to achieve the desired outcome [8].
- The shoulder is a three-dimensional structure that cannot be represented by a single planar view [30].
- Critical relationships, such as the degree of centering of the humeral head, change with the position of the arm [30].
- Shoulder pathology may be found in a large number of different bones and soft tissues [30].

- Overlying and superimposed structures as well as metallic implants may complicate imaging the structures of interest [30].
- Surgeons need to develop a judicious approach to imaging that yields the information necessary to treat the patient while avoiding the tendency to “over-image” [30].

## PLAIN RADIOGRAPHY

- At least two X-ray views should be obtained for shoulder evaluation: an anteroposterior in the plane of the glenoid and an axillary projection with the arm in abduction to show the relationship of the humeral head to the glenoid [27].
- The first key view is the anteroposterior (AP) in the plane of the scapula taken so that the x-ray beam passes through the glenohumeral joint [8].
- The AP view in the plane of the scapula shows the superoinferior position of the humeral head relative to the glenoid, the presence of osteophytes on the humeral head and glenoid, narrowing of the joint space, and the degree of medial displacement of the humerus in relation to the lateral acromial line [8].
- The AP view in the plane of the scapula also shows the quality of the humeral and glenoid bone, the presence of loose bodies, and whether there is humeral head collapse or deformity [8].
- The second key view is the axillary view taken with the arm in the functional position of elevation in the plane of the scapula and oriented so that both the spinoglenoid notch and the scapular neck are visible [8].
- The axillary view shows a different perspective of the humeral anatomy, the amount of glenoid bone, the shape of the glenoid, its version in relation to the plane of the scapula, and the relationship of the humeral head to the glenoid fossa [8].
- The standardized axillary view is referred to as the “truth view” because it demonstrates the glenohumeral relationships in the functional position of elevation [8].
- CT scans have the disadvantage of being taken with the arm in the adducted position, whereas the axillary truth view is taken with the arm in elevation [8].
- When taken properly, standardized anteroposterior and axillary views indicate the thickness of the cartilage space between the humerus and the glenoid, relative positions of the humeral head and the glenoid, presence of osteophytes, degree of osteopenia, and extent of bony deformity and erosion [8].
- Joint space narrowing is most evident on the axillary truth view as opposed to images made with the arm at the side [8].
- The axillary truth view can show posterior subluxation or “functional decentering” that is not evident in images taken with the arm at the side [8].
- The degree of posterior subluxation can be measured as the position of the center of the humeral head in relation to the plane of the scapula, the position of the center of the humeral head in relation to the glenoid face, or the point of contact of the humeral articular surface on the glenoid articular surface [8].
- The point of contact of the humeral articular surface on the glenoid articular surface reflects the degree of centering of the net humeral joint reaction force on the glenoid [8].
- Malcentering of the joint reaction force leads to posterior instability, posterior glenoid wear, and “rocking horse” loosening of prosthetic glenoid components [8].

- The standard shoulder series should include orthogonal views of the shoulder, including a true AP view in the scapular plane, an AP view, an axillary view, and a scapular Y view [35].
- The true AP view in the scapular plane visualizes the anterior greater tuberosity in profile and can reveal proximal humeral migration [35].
- The AP view with the arm in internal rotation visualizes the posterior aspect of the greater tuberosity and the lesser tuberosity in profile [35].
- The axillary view is necessary for evaluation of glenohumeral joint instability and enables determination of the humeral head position in the glenoid fossa [35].
- The axillary view may detect occult, locked posterior shoulder dislocation in a patient who exhibits a lack of passive external rotation [35].
- The axillary view is helpful in evaluation of glenoid morphology in glenohumeral osteoarthritis and provides good visualization of the coracoid process, acromion, and distal clavicle [35].
- The scapular Y view provides visualization of the coracoacromial arch and can reveal coracoacromial spurs [35].
- The scapular Y view is a reliable alternative for evaluation of glenohumeral subluxation and dislocation [35].
- The scapular Y view can show scapular body abnormalities, such as osteochondroma or fracture, and acromial shape [35].
- The acromiohumeral distance is normally 7 to 14 mm [35].
- The width of the glenohumeral joint space should be symmetric superiorly and inferiorly [35].
- The coracoclavicular distance is normally 1.1 to 1.3 cm [35].
- Neer classified acromial morphology as type I (flat), type II (curved), and type III (hooked) [35].
- Type III acromial morphology has been shown to have a correlation with the presence of rotator cuff disease, although no direct causal relationship has been demonstrated [35].
- The Neer classification of acromial morphology has shown relatively poor interobserver reliability [35].
- Arthritis, calcific tendinitis, and osteolysis of the distal clavicle can be observed on plain radiograph [34].

## COMPUTED TOMOGRAPHY (CT)

- CT scans may offer a few degrees of increased precision in the measurement of glenoid version [8].
- There is no conviction that increased precision in glenoid version measurement via CT improves the quality of the surgery or the clinical outcome [8].
- There is information that can be gathered from properly taken plain films that cannot be obtained from CT scans [8].
- Three-dimensional reconstructions can reveal fine details of the shoulder anatomy, but this additional information rarely changes the planning or conduct of the arthroplasty [8].
- CT imaging is frequently used to evaluate fractures of the shoulder, to assess for bony lesions in recurrent instability cases, or for preoperative templating for shoulder arthritis [34].

- CT with three-dimensional reconstructions is the advanced imaging study of choice for determining the extent of glenoid bone loss in the setting of shoulder instability [35].
- CT is helpful for planning fracture surgery and shoulder joint replacement [27].

## MAGNETIC RESONANCE IMAGING (MRI)

- MRI is useful to identify osteonecrosis of the humeral head, or a bone tumour [27].
- MRI can identify labral tears and rotator cuff tears, although the accuracy for these is enhanced by combining the scan with arthrography [27].
- MRI is the modality of choice for evaluating the rotator cuff, biceps, and subacromial/subdeltoid bursa [34].
- T1-weighted MRI can reveal Hill-Sachs lesions and is often used with magnetic resonance (MR) arthrograms to provide a more detailed picture of the joint surfaces [34].
- T2-weighted MRI provides better visualization of full thickness rotator cuff tears [34].
- Traditional magnetic resonance imaging (MRI) is a diagnostic tool to complement both physical examination and standard radiographs in the management of patients with anterior shoulder instability [32].
- MRI is utilized for evaluation of soft tissues, which can be performed with high contrast and spatial resolution [32].
- MR accuracy in identifying labral and rotator cuff tears in the literature ranges from 70% to 100% [32].
- The acquired multi-planar imaging allows for the detailed evaluation of the glenoid, labrum, joint capsule, and rotator cuff in different planes [32].
- Abduction and external rotation (ABER) of the arm is an alternative position utilized to increase the sensitivity and specificity for detecting anteroinferior labroligamentous injury [32].
- Limited range of motion or pain may prohibit patients from performing the ABER provocative maneuver [32].
- Full routine MRI or MRA examination had similar accuracy as the ABER sequence in evaluating the anteroinferior labral–ligamentous complex [32].
- The sensitivity of MRA with the ABER position for detecting anteroinferior labral lesions was significantly higher than that of the MRA in neutral position [32].
- MRA with the ABER position is more effective in identifying Perthes lesions than MRA in neutral position [32].
- MRAs can demonstrate a patulous capsule on the coronal, sagittal, and axial imaging in patients with multidirectional instability [32].
- MRAs can be helpful in evaluating lesions of the rotator interval and other associated findings that may affect the eventual surgical plan [32].
- The presence of glenoid dysplasia, increased capsular cross-sectional area, and increased glenoid retroversion have all been found to be associated with increased posterior labral tears and symptomatic instability [32].
- Glenoid retroversion was significantly increased in patients with symptomatic posterior labral tears [32].

- There was no significant association between instability and increased humeral head subluxation in patients with symptomatic posterior labral tears [32].
- The diagnosis of multidirectional instability is a clinical one, and the need for expensive and/or invasive imaging should be weighed against the information that will be gained from these studies [32].

## ARTHROGRAPHY

- Arthrography involves injection of contrast agent in conjunction with either an MRI or CT scan, enhancing imaging of the joint to enable better identification of normal structures and pathology involving the joint surfaces [34].
- MR arthrography is considered the benchmark for evaluation for labral tears and rarely is indicated for evaluation of rotator cuff pathology [34].
- When MRI or MR arthrography is contraindicated, such as in patients with a pacemaker or vascular clips, CT arthrography is indicated [34].
- Magnetic resonance (MR) arthrography refers to MRI of a joint that has been injected with an intra-articular contrast agent such as diluted gadolinium or saline solution [32].
- The contrast material is injected prior to MRI by fluoroscopic or ultrasound guidance under strict aseptic technique [32].
- By distending the joint capsule, the cartilage, ligaments, and labrum are outlined with contrast, increasing the sensitivity for detecting tears and other lesions [32].
- In the acute dislocation setting, a joint effusion with distension of the joint may outline structures similarly, making the arthrogram unnecessary [32].
- MR arthrography has proven utility by increasing both sensitivity and specificity in detecting injuries to the capsulolabral–ligamentous complex as compared to traditional MRI [32].
- In a meta-analysis of 6 studies including 4,667 shoulders, MRA had greater diagnostic test accuracy for the detection of glenoid labral lesions than MRI [32].
- MRA sensitivity for glenoid labral lesions was 88% and specificity was 93% [32].
- MRI sensitivity for glenoid labral lesions was 76% and specificity was 87% [32].

## ULTRASONOGRAPHY

- Ultrasonography is a simple and accurate test for identifying rotator cuff tears and calcific tendinitis [27].
- Ultrasonography can be useful in guiding injections or barbotage, such as aspirating calcific deposits in the rotator cuff [27].
- Ultrasonography is a low-cost alternative to MRI and arthrography for evaluating both skeletal and soft-tissue structures of the shoulder [34].
- Ultrasonography can provide immediate, real-time visualization of the rotator cuff, biceps tendon, and calcific deposits [34].
- Ultrasonography can be used to measure the subacromial space and detect atrophy of rotator cuff muscles [34].

- As a result of providing images in real-time, ultrasonography can evaluate impingement in various positions and motions [34].
- Ultrasonography is highly operator dependent [34].
- Ultrasonography is not as useful for evaluating labral tears or rotator cuff tears that are very small or larger than 3 cm [34].
- The most commonly performed joint examination using ultrasonography is the shoulder examination [25].
- Accuracy of shoulder ultrasonography depends on the skill of the scanner operator and an awareness of pitfalls that are encountered [25].

## Treatment

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### NON-OPERATIVE

- Extracorporeal shock wave therapy (ESWT) is a beneficial and trustable method of treatment that can be strongly recommended in painful cases of scapulothoracic bursitis [7].
- Patients treated nonsurgically for snapping scapula did so well, although surgically treated patients improved faster [5].

### OPERATIVE

- Arthroscopic scapulothoracic treatment provides good pain relief and functional improvement for scapulothoracic syndrome in patients who have failed to respond to nonoperative treatment modalities [3].

## Complications

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- The snapping scapula syndrome can be difficult to recognize and treat [1].

## Recovery

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### NON-OPERATIVE MANAGEMENT

- Patients treated nonsurgically did so well [5].

## Key Evidence

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- [L5] The snapping scapula syndrome is caused by either osseous lesions or scapulothoracic bursitis and can be difficult to recognize and treat. [1] ([10.1155/2013/635628](https://doi.org/10.1155/2013/635628))
- [L4] Nonoperative management is as effective as surgical management in pain relief and is advised for 3 to 6 months before operative treatment. [2] ([10.1177/19417381211029211](https://doi.org/10.1177/19417381211029211))
- [L4] Based on the results, the study concludes that arthroscopic scapulothoracic treatment provides good pain relief and functional improvement for scapulothoracic syndrome in patients who have failed to respond to nonoperative treatment modalities. [3] ([10.2174/1874325001711010785](https://doi.org/10.2174/1874325001711010785))
- [L4] Arthroscopic bursoscopy and bursectomy is an effective surgical procedure in recalcitrant scapulothoracic bursitis with failed conservative management. [4] ([10.13107/jocr.2025.v15.i02.5290](https://doi.org/10.13107/jocr.2025.v15.i02.5290))
- [L3] Since the decision to treat these patients surgically was somewhat subjective, and since patients treated nonsurgically did so well (although the surgically treated patients improved faster), we cannot conclude that surgery is better than nonsurgical treatment. [5] ([10.1007/s11999-015-4614-1](https://doi.org/10.1007/s11999-015-4614-1))
- [L5] The best initial approach to scapulothoracic bursitis and crepitus is a nonoperative treatment plan that combines scapular strengthening, postural reeducation, and core strength endurance. [6] ([10.1177/1941738109338359](https://doi.org/10.1177/1941738109338359))
- [L1] We believe that ESWT is a beneficial and trustable method of treatment and can be strongly recommended in painful cases of scapulothoracic bursitis. [7] ([10.1177/2309499016684723](https://doi.org/10.1177/2309499016684723))

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