



# Subacromial Decompression

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## Introduction/Background

Nearly 20% of the adult population reports pain in the shoulder during a calendar year, and a large proportion of these patients are diagnosed with subacromial impingement syndrome. A thorough search for the underlying pathology is always indicated followed by an initial course of nonoperative treatment as first-line treatment and generally results in favorable outcomes. Surgery may be indicated for patients suffering from impingement due to a mechanical obstruction that fail physical therapy and injections. While subacromial decompression (SAD) with partial acromioplasty has long been recognized as an accepted surgical management option to help reduce mechanical impingement and optimize shoulder function, more recent literature has questioned its utility, particularly when done in isolation. Recent studies out of Finland and the United Kingdom have reported no significant difference in outcome scores between patients who have undergone subacromial decompression versus placebo surgery or a diagnostic arthroscopy underlining the critical need for a thorough preoperative examination. Subacromial decompression has historically helped reduce patient pain and symptoms from a variety of pain generators within the subacromial space including but not limited to subacromial bursitis, synovitis, adhesions, and subacromial impingement lesions. Additionally, large acromial spurs (e.g., ossifications of the coracoacromial

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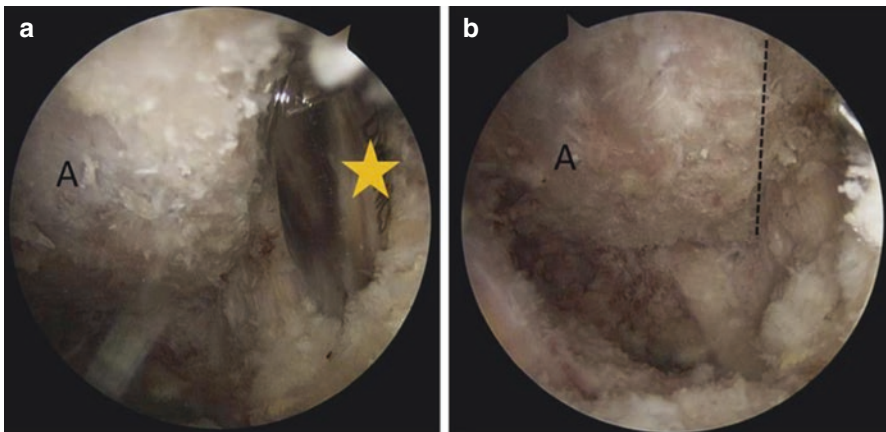
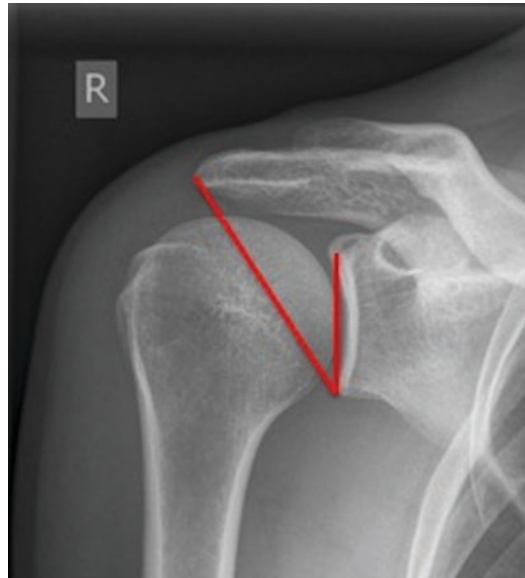
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ligament) have been shown to cause significant impingement and even bursal-sided tears of the underlying rotator cuff and thus need to be removed. Recent work by Gerber et al. and Katthagen et al. have also shown that a lateral acromioplasty can help to reduce large critical shoulder angles (CSA) which may be particularly helpful in cases of rotator cuff repair. Critical shoulder angles greater than  $35^\circ$  have been shown to be an independent risk factor for rotator cuff tears, repair failure, and abduction strength weakness. Recent studies, both biomechanical and clinical, have demonstrated that lateral acromioplasty can effectively improve CSA and shoulder mechanics without compromising the deltoid insertion and its function (Figs. 2.1 and 2.2).

**Fig. 2.1** Preoperative true anteroposterior fluoroscopic image showing the critical shoulder angle



**Fig. 2.2** Lateral acromion resection. Shoulder arthroscopy of the subacromial space through a posterior viewing portal (right shoulder): (a) lateral acromion resection with 5 mm burr (star) and (b) after lateral resection (in which the dotted line indicates the resection line)

In addition to improving shoulder mechanics, acromioplasty done in the setting of rotator cuff repair also offers several other benefits including improved visualization, removal of extrinsic compression, as well as the potential for an improved biologic environment for a healing response due to the release of marrow elements from bleeding bone.

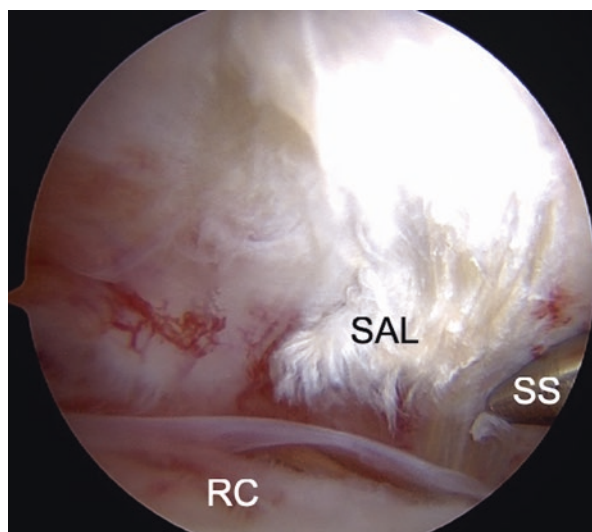
## Operative Principle

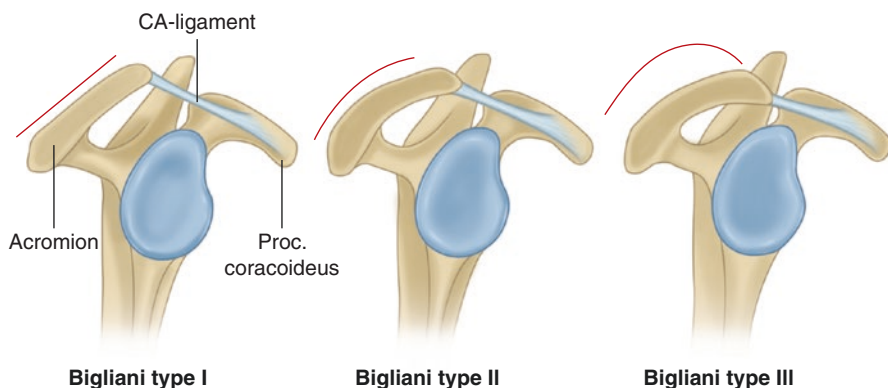
A subacromial decompression is generally performed arthroscopically using a posterior standard viewing and anterior standard working portal. A burr or shaver is inserted into the subacromial space and a bursectomy performed. Additionally, all mechanical obstacles such as spurs or scarred bursitis which might potentially damage the rotator cuff and thus cause pain are also removed.

## Indication

SAD is indicated in patients with subacromial impingement and persistent shoulder pain despite a thorough course of nonoperative management including but not limited to physical therapy, anti-inflammatory medications, and/or subacromial injections. It is mainly used in combination with other reconstructive procedures such as rotator cuff repair surgeries. Subacromial decompression in isolation should be utilized with caution and only in cases of an outlet impingement with mechanical obstructions (Fig. 2.3) as results from recent European studies have questioned the benefits and results of this widely employed procedure. Acromial morphology is a known risk factor for an outlet impingement and typically classified using the classification scheme developed by Bigliani et al. with type 1 being normal and flat, type 2 as curved, and type 3 as hooked. In general, subacromial decompression with partial acromioplasty is considered in patients with type 2 and type 3 acromial morphology (Fig. 2.4).

**Fig. 2.3** Arthroscopic view of a right shoulder demonstrating a subacromial “impingement lesion” due to mechanical conflict such as a hook-shaped acromion with its pathognomonic fraying of the coracoacromial ligament insertion on the undersurface of the acromion. SAL, subacromial impingement lesion; SS, switching stick; RC, rotator cuff





**Fig. 2.4** Illustration demonstrating Bigliani classification for acromial morphology. Type 1 flat, type 2 curved, type 3 hooked

## Contraindications

In general, significant general medical comorbidities including cardiac disease, pulmonary disease, and active infection are contraindications to any surgery including an SAD. Care should be taken when performing a partial acromioplasty on patients with a history of previous SAD or a history of an os acromiale as this could lead to a higher risk of possible iatrogenic fracture of the acromion. Similarly patients with large, massive irreparable rotator cuff tears are not ideal candidates for subacromial decompression particularly when the coracoacromial (CA) ligament is released. In these patients, the CA arch should be preserved to help prevent or reduce the incidence of anterosuperior escape of the humerus.

## Technique

### Preoperative Preparation

After the induction of general anesthesia and placement of a regional interscalene block, the patient is placed in the beach chair position. The operative extremity is then situated in a pneumatic arm holder, and the operative shoulder and axilla are prepared and draped using standard sterile techniques.

### Diagnostic Arthroscopy

A standard posterior viewing portal and an additional anterior working portal are created. A 5 mm × 7 cm cannula is inserted in the anterior working portal and a probe inserted. A standard diagnostic arthroscopy is performed, and any

intra-articular pathology such as debridement or biceps tendon management is addressed at this time. Careful evaluation of the articular sided portion of the rotator cuff is also performed at this time.

## Subacromial Decompression and Acromioplasty

Once all intra-articular work is completed, the arthroscope is then introduced into the subacromial space. If indicated, bursectomy, synovectomy, and subacromial spur removal can be performed. A standard anterolateral arthroscopic portal is made approximately two finger breadths lateral to the anterolateral border of the acromion. This portal should be made under direct visualization with the aid of a spinal needle to ensure the correct trajectory for accessing the undersurface of the acromion is achieved (Fig. 2.5).

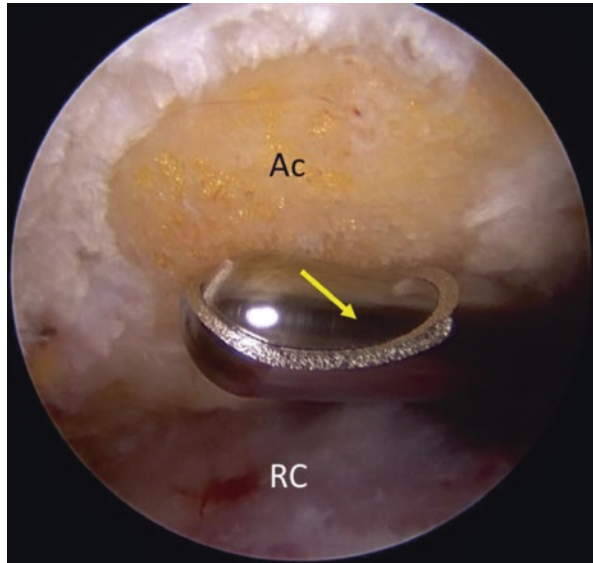
A 4.5 mm arthroscopic shaver is used to complete a bursectomy in the subacromial space (Fig. 2.6).

A radiofrequency device is then introduced to help outline the border of the acromion and to peel back the coracoacromial ligament from the anterior edge of the acromion. Care should be taken during resection at the anterior edge of the acromion to avoid injury to the anterior acromial branch of the thoracoacromial artery as this could lead to bleeding and limit visualization during the remainder of the procedure. The acromial morphology as viewed arthroscopically should be compared to preoperative imaging, and any subacromial spurs or impingement lesions should be carefully resected. A 5.5 mm burr is used to perform a partial acromioplasty, using a standard cutting block technique. The width of the burr is a useful reference

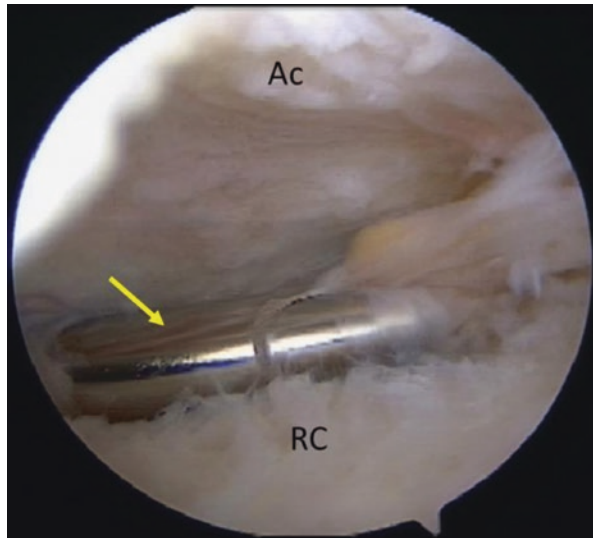
**Fig. 2.5** Arthroscopic view of a left shoulder subacromial space as viewed from the posterior viewing portal. A spinal needle is being introduced through the proposed anterolateral portal and is in the correct trajectory to aid in easy access to the anterolateral acromion



**Fig. 2.6** Arthroscopic view of a right shoulder subacromial space through the posterior portal. Via the anterolateral portal, a 4.5 mm arthroscopic (arrow) shaver is used to complete the bursectomy. Ac, acromion; RC, rotator cuff

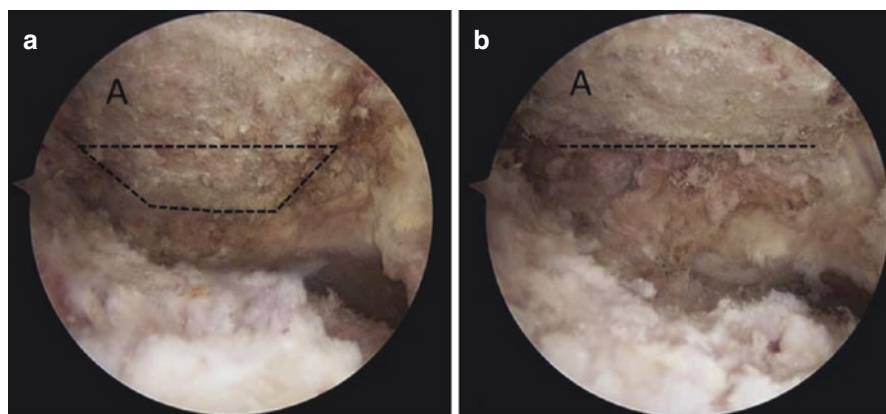


**Fig. 2.7** Arthroscopic view of a left shoulder subacromial space as viewed from the anterolateral portal. Via the posterior portal, a 5.5 mm arthroscopic (arrow) burr is used to complete the partial acromioplasty using a standard cutting block technique for measured resection. Ac, acromion; RC, rotator cuff



tool to measure the amount of acromion that is resected and can be helpful in avoiding over resection which can lead to an acromial fracture (Fig. 2.7).

Care should be taken to preserve the acromioclavicular joint capsule if possible, unless a concomitant distal clavicle excision is going to be performed. Once the majority of the partial acromioplasty is completed, it is beneficial to move the camera from the posterior portal to an anterolateral portal to better gauge both the degree and regularity of resection of the undersurface of the acromion (Fig. 2.8).



**Fig. 2.8** Standard anterolateral acromioplasty. Shoulder arthroscopy of the subacromial space through a posterior viewing portal (right shoulder) (a) before standard anterolateral acromioplasty (in which the dotted line indicates the area to be resected) and (b) after standard anterolateral acromioplasty (in which the dotted line indicates the resection line after acromioplasty)

## Postoperative Rehabilitation

The postoperative rehabilitation protocol following a subacromial decompression is largely dictated by any other concomitant procedures being performed at the time of partial acromioplasty. If a rotator cuff repair or biceps tenodesis is completed, the rehab protocols for those procedures should be followed. If, however, a subacromial decompression is performed in isolation, the postoperative rehabilitation protocol is initiated the following day, and both active and passive range of motion are unrestricted. A full recovery to all preoperative activities is typically achieved within 4–6 weeks.

## Pearls and Pitfalls

Surgical step	Pitfalls	Pearls
Diagnostic arthroscopy	Missing concomitant lesions	Performing a thorough and standardized examination allows for identification of concomitant lesions
Subacromial decompression	Appropriate resection	Correct placement of the anterolateral portal will ensure the correct trajectory for accessing the acromion Switch the camera from the posterior portal to the AL portal to ensure thorough, adequate, and even resection
Subacromial decompression	Excessive bleeding	Judicious use of the shaver during bursectomy near the scapula spine as this area is highly vascularized; consider radiofrequency ablation of bleeding vessels in this area Care should also be taken near the anterior border of the acromion to avoid injury to the anterior acromial branch of the thoracoacromial artery
Postoperative rehabilitation	Postoperative stiffness	Early passive and active range of motion is initiated immediately, depending on any concomitant procedures performed

## Recommended Literature

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