# ARTHROSCOPY OF THE SCAPULOTHORACIC JOINT: CASE REPORTS

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## ABSTRACT

Scapulothoracic arthroscopy is a procedure presenting restricted indications, for resecting free bodies, benign tumors, bursitis, and snaping scapula. The authors report four cases of scapulothoracic joint arthroscopy; in the first case, only a benign tumor (osteochondroma) could be visualized; in the second case, arthroscopic resection of an osteochondroma was found; in the third case, arthroscopic bursectomy due to scapulothoracic bursitis, and; in the fourth case, bursectomy and partial superomedial arthroscopic scapulectomy due to snaping scapula.

**Keywords** – *Scapula; Arthroscopy; Human*

## INTRODUCTION

Arthroscopy of the shoulder girdle has evolved in the last two decades, for both diagnostic and therapeutic purposes. The glenohumeral joint, the subacromial space, the acromioclavicular joint, and, less frequently, the scapulothoracic joint, can all be reached by arthroscopy[1].

The scapulothoracic joint arthroscopy was described by Ciulla and Jones in 1992, who performed arthroscopic debridement of the scapula[2]. In 1999, Harper *et al*.[3] reported a series of arthroscopic bone resections of the superior medial angle using multiple medial portals. Chan *et al*.[4], Lehtinen *et al*.[5], and Van Riet *et al*.[6] described alternative techniques and portals for scapulothoracic arthroscopy.

Scapulothoracic arthroscopy is a procedure with restricted indications. The articles in the literature refer to case reports and series with small numbers of patients, and recommend it in cases of snapping scapula syndrome, decompression of scapulothoracic bursitis caused by impact against the superior medial angle of the scapula, resection of a foreign body, resection of benign tumors, and treatment of chronic pain that is refractory to conservative treatment[1-16].

Arthroscopic anatomy was described in the work of Ruland *et al*.[7] through cadaver studies, relating the important neurovascular structures, proposing safe passages, and avoiding injury to important structures. The scapulothoracic joint has two triangular spaces, the serratus anterior space and the subscapularis space, which are divided obliquely by the serratus anterior muscle. The boundaries of the serratus anterior space

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include the serratus anterior muscle posteriorly, the rhomboid muscle medially, and the chest wall anteriorly. Within the subscapularis space is the serratus anterior muscle anteriorly, the subscapularis muscle posteriorly, and then axilla laterally.

During arthroscopy, the patient is placed in a prone position, the arm in full internal rotation and shoulder in extension (chicken wing position), in which the scapulothoracic space is increased[1,7]. The initial entry portal is located medial to the angle of the scapula at the scapulothoracic spine, a second portal is positioned about 4 cm below the first portal[2]. Access to the upper angle of the scapula can be difficult to achieve with the portals described; in some cases, safe alternative portals are located superior to the scapula[4,6].

The objective of this study is to present four clinical cases of surgical treatment of diseases of the scapula with the use of scapulothoracic joint arthroscopy.

## CASE REPORTS

### Case 1 – Arthroscopic inspection

Female patient, 22 years old, college student, active gym member, complaining of pain and swelling in the right dorsal region medial to the medial border of the scapula for one year. The pain increased with exercise and the dorsal region showed a massive bulge on the scapula upon movement.

Physical examination showed no change in the range of motion, however, we noted deformity in the right dorsal region with the presence of a winged scapula.

Radiography of the scapular region showed the presence of a solid mass in the medial border of the scapula. The radiographic study was complemented by computed tomography (CT). The image was considered compatible with osteochondroma (Figure 1).

The indication for surgery for the patient was due to the presence of pain, a winged scapula, and the size of the benign tumor. The scapulothoracic arthroscopy aimed to see the benign tumor (osteochondroma), because, due to the size of the tumor, arthroscopic resection would be difficult.

The patient underwent scapulothoracic joint arthroscopy to remove the tumor. Under general anesthesia, she was placed prone with the affected limb in internal rotation. The arthroscopic procedure allowed for the direct visualization of the osteochondroma, but open resection with complete excision was performed due to the size of the tumor (Figures 2 and 3). The procedure took 25 minutes.

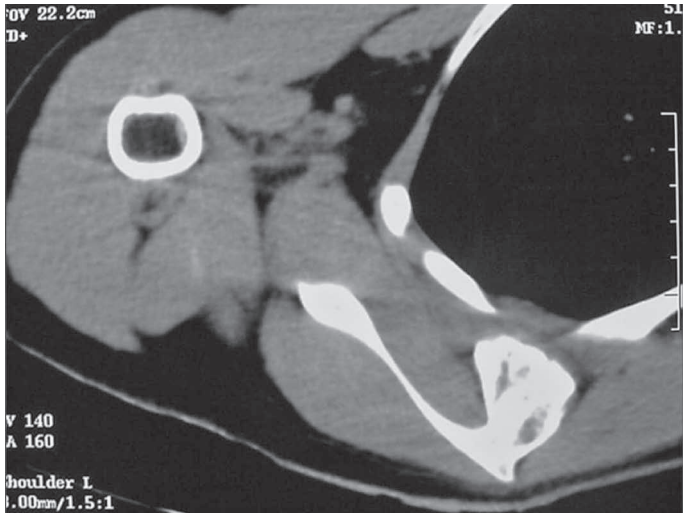

**Figure 1** – Computed tomography of the scapula showing the presence of an osteochondroma in the medial region

The postoperative radiographs showed the total removal of the tumor. Clinically, the patient evolved without pain and with improvement in the deformity, and remains asymptomatic after three years of follow-up. The evolution of the case was satisfactory. This was the group's first case, for which the visualization of the tumor was obtained, however, resection was performed through open access.

### Case 2 – Arthroscopic resection of a scapular osteochondroma

Female patient, 17 years old, student, complained of pain and crepitation in the region of the left scapula for eight months. Crepitation was progressive with the appearance of pain during movement.

Physical examination of the left scapula showed no change in the range of motion, crepitation on palpation and scapular dyskinesia with the presence of a winged scapula.

The lateral radiograph of the scapula demonstrated a small solid mass in the anterior region of the medial third of the scapula. Computed tomography (CT) complemented the diagnosis, showing a solid mass in the anterior region of the medial third of the scapula. The image was considered compatible with osteochondroma (Figure 4). The patient was

indicated for surgery due to the presence of pain, a winged scapula, and the location and size of benign tumor (osteochondroma). The goal of scapulothoracic arthroscopy was to resect the benign tumor (osteochondroma) by arthroscopy.

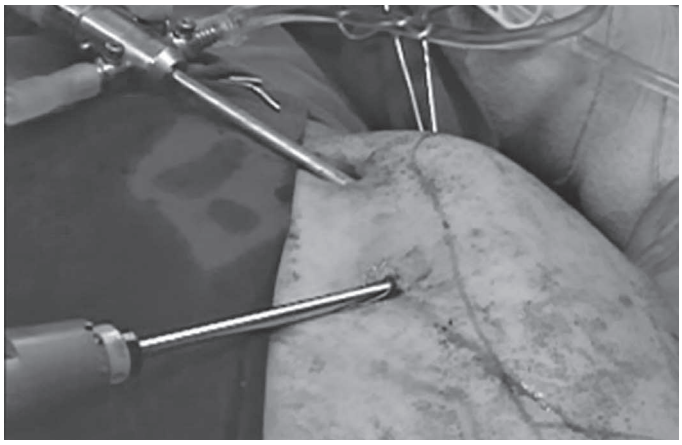

**Figure 2** – Medial arthroscopic portals for arthroscopic inspection of the scapulothoracic joint

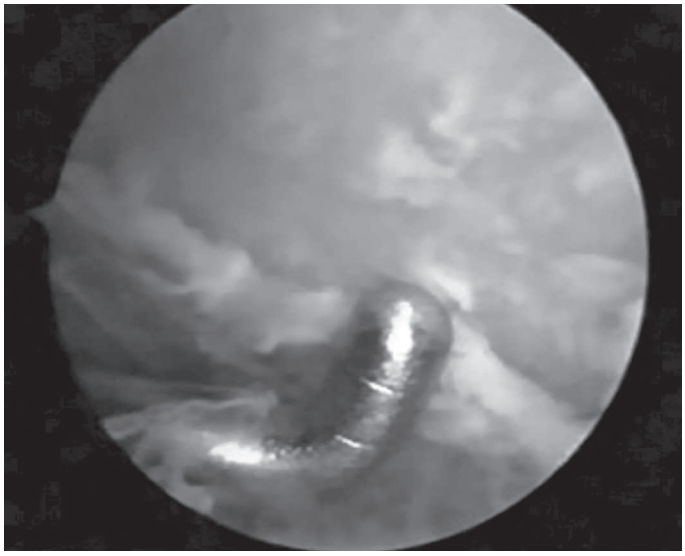

**Figure 3** – Arthroscopic view of the osteochondroma

The patient underwent general anesthesia and was positioned prone with the affected limb in internal rotation, the affected shoulder supported with a cushion (Figure 5). The arthroscopic procedure allowed the direct visualization and complete resection of the osteochondroma (Figures 6a, b, c). The procedure took 40 minutes, the patient had marked edema in the region of the scapula (Figure 7).

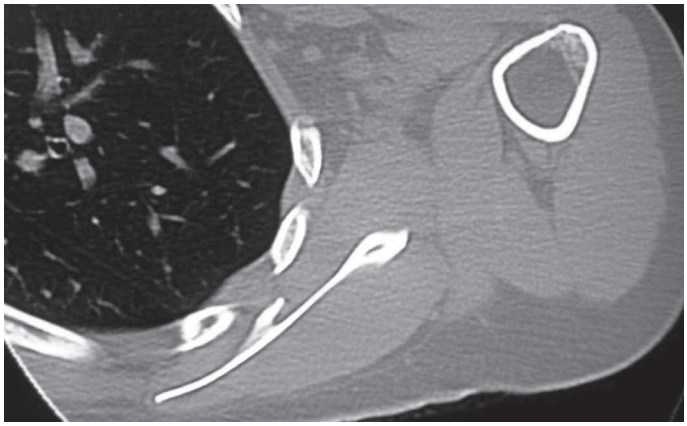

**Figure 4** – Computed tomography showing the presence of scapular osteochondroma in the central region of the medial third

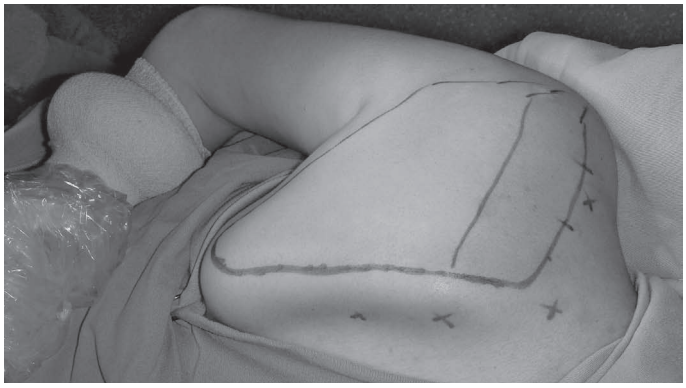

**Figure 5** – Positioning the patient prone with the arm in internal rotation and demarcation of the portals for arthroscopy of the scapulothoracic joint

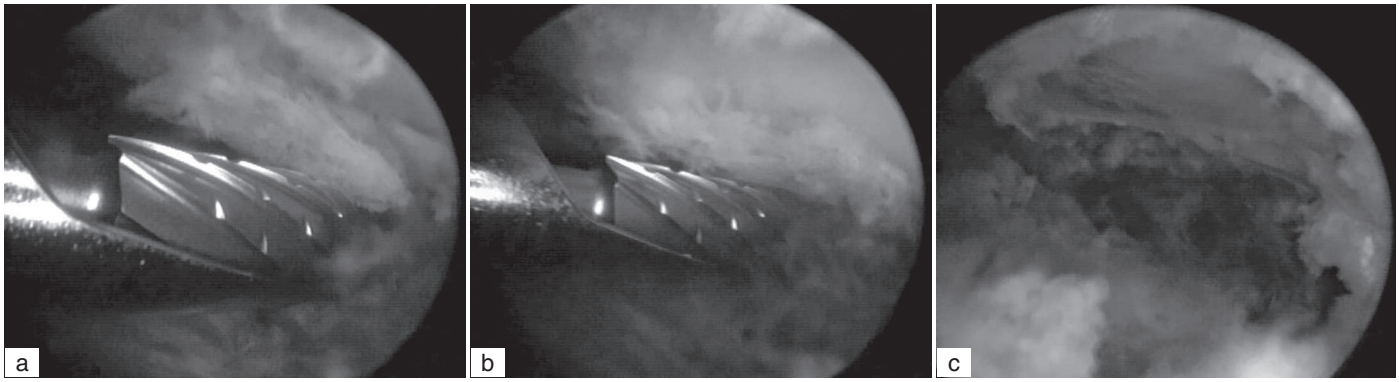


**Figure 6** – a) Location of the osteochondroma and positioning for arthroscopic resection; b) beginning resection with a shaver blade for bone; c) arthroscopic view of the complete resection of the osteochondroma

**Figure 7** – Presence of marked edema in the scapula post-scapulothoracic joint arthroscopy

**Figure 8** – Lateral radiograph of the scapula showing total resection of the osteochondroma

Postoperative radiographs showed the total removal of the tumor (Figure 8). Clinically, the patient evolved without pain and with improvement of the deformity and crepitation, returning to the gym after four months. The evolution of the case was satisfactory.

## Clinical case 3 – Scapular bursectomy

Male patient, 36 years old, menial laborer, amateur soccer player, complaining of pain in the superior medial region of the left scapula for three years, which worsened with weight training exercises. There was progressive worsening of pain, becoming continuous and incapacitating for work, even with the use of analgesics, anti-inflammatories, and physical therapy (65 sessions) and three injections.

After two years of unsuccessful clinical therapy, he took leave from work, and two injections were performed in three months without any improvements in pain. Physical examination revealed pain on palpation in the superior medial region of the left scapula, with no change in range of motion or the presence of deformities.

Radiographs of the scapular region showed no changes in bony structures. Magnetic resonance imaging of the scapula showed an inflammatory process and fibrous tissue in the superior medial border of the left scapula, images considered compatible with scapular bursitis. The indication for scapulothoracic joint arthroscopy was due to the persistence of pain.

The patient underwent general anesthesia, was positioned prone with the affected limb in internal rotation. We obtained total resection of the bursa in the superior medial angle of the scapula. A needle was used to find the angle by means of two medial portals, no local bone resection was performed (Figures 9, 10 and 11). The procedure took 26 minutes.

Postoperatively, radiography and MRI confirmed the total removal of scapular bursitis. Clinically,

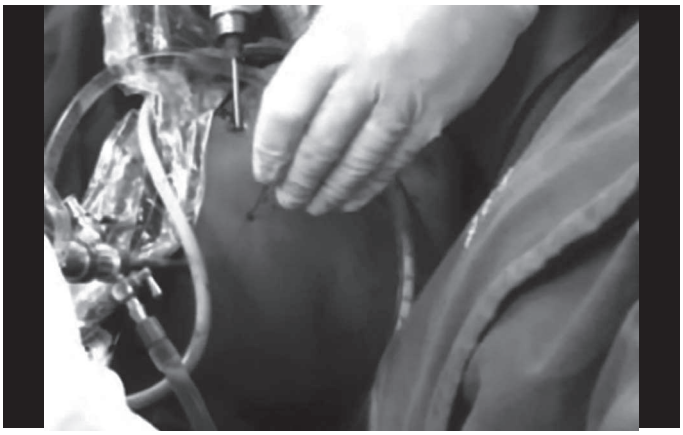

**Figure 9** – Using a needle to mark the superior medial angle of the scapula during scapulothoracic joint arthroscopy

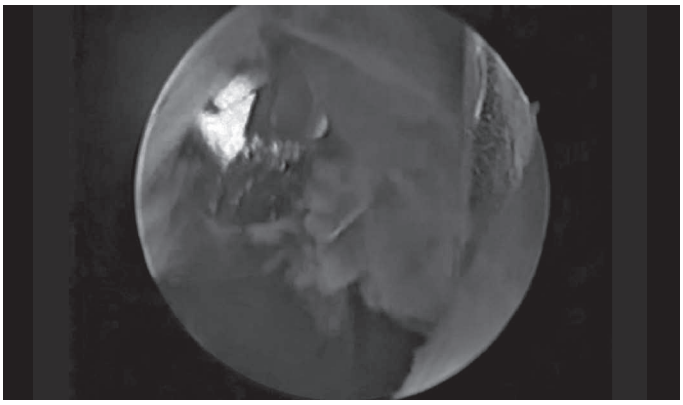

**Figure 10** – Arthroscopic image of the bursectomy

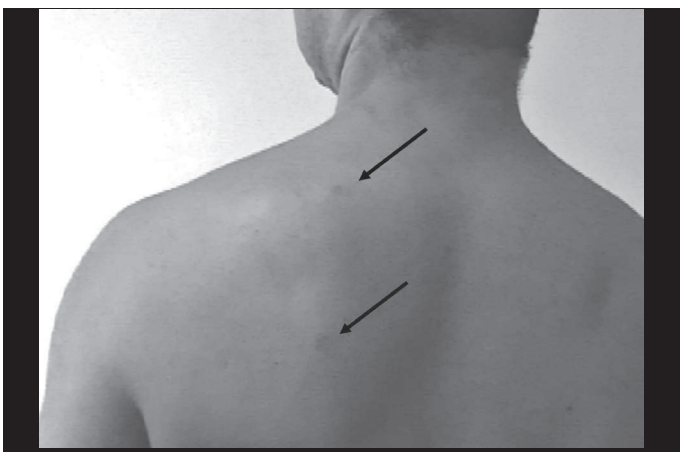

**Figure 11** – Portals used for bursectomy

the patient was asymptomatic after six weeks. The evolution of the case was satisfactory, with the patient returning to work after three months.

### Clinical case 4 – Bursectomy and partial scapulectomy

Male patient, 42 years old, entrepreneur, tennis player and runner, complaining of pain and increased volume in the left dorsal region for four years. The pain increased while serving and using the forehand stroke in tennis.

Physical examination showed no change in range of motion, however, we noted pain on palpation of the superior medial region of the left scapula (Figure 12). Radiographs of the left scapular region showed the presence of a bony protrusion at the superior medial border of the left scapula. Radiographic study was complemented by computed tomography (CT), showing calcification of the superior medial border of the left scapula (Figure 13). The MRI also showed the presence of a local inflammatory process (bursitis). The indication for scapulothoracic joint arthroscopy was due to the persistence of pain and the presence of a bony protrusion at the superior medial border of the left scapula consistent with snapping scapula.

**Figure 12** – Inspection of the location of pain and crepitation in the scapulothoracic joint (arrow)

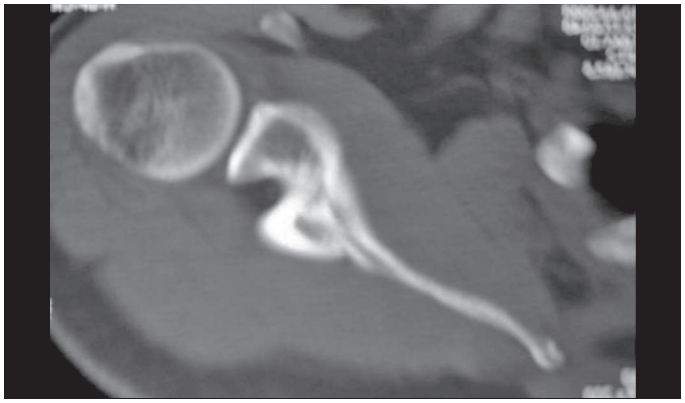

**Figure 13** – Computed tomography of the scapula showing the presence of calcification in the superior medial angle

The patient underwent general anesthesia and was positioned prone with the affected limb in internal rotation for scapulothoracic joint arthroscopy. Bursectomy and superior medial scapulectomy were performed using two portals, one medial to the scapular spine and the other through the Bell portal (Figures 14a, b, c). The procedure took 39 minutes.

Postoperatively, the patient presented clinically with pain relief and rehabilitation for two months, at which point he was referred to weight training, and returned to tennis after three months of surgery.

## DISCUSSION

Studies of scapulothoracic joint arthroscopy are increasingly present in the orthopedic literature. Clinical indications are limited, making this procedure uncommon in our midst. But with the improvement and definition of the arthroscopic technique, specific cases, such as snapping scapula, decompression of scapulothoracic bursitis caused


Figure 14 – a) Arthroscopic image of bursectomy; b) resection of the superior medial angle of the scapula with shaver blade; c) complete resection of the superior medial angle of the scapula

by impact against the superior medial angle of the scapula, foreign body resection, resection of benign tumors and treatment of chronic pain refractory to conservative treatment may be treated using this method[1-16].

The diagnosis of scapulothoracic disorders remains a challenge, in cases of benign tumors (osteochondroma), the presence of pain and crepitation symptoms, and a mass in the X-ray or CT scan leads to diagnosis. Total resection was performed arthroscopically in one case, following previous studies by Kumar *et al*.[15] and Fukunaga *et al*.[16], due to the location and size of the tumor. In the first case, resection was not possible through arthroscopy because the tumor was larger than 4 cm, we were only able to view it.

In cases of bursitis and impact against the superior medial angle of the scapula, arthroscopy is indicated with the failure of conservative treatment consisting of anti-inflammatory medication, rehabilitation for muscle balance, and injections. In the literature, as reported by Chan *et al*.[4], Lehtinen *et al*.[5], Nicholson *et al*.[9], and Sisto and Jobe[12], the surgical procedure is indicated by the persistence of pain. In cases of snapping scapula, the superior and medial partial scapulectomy is performed with or without bursectomy, as reported by Millet *et al*.[1], Harper *et al*.[3], Carlson *et al*.[8], Pavlik *et al*.[10], and Richards and McKee[11].

In the third case presented (scapulothoracic bursitis), bursectomy was performed only in the absence of bone changes in complementary tests, due to the persistence of symptoms for more than two years. In the fourth case (snapping scapula), bursectomy was performed in combination with partial resection of the scapula due to the persistence of pain and the presence of a bony protrusion at the superior medial border of the left scapula, consistent with snapping scapula.

We are currently conducting a study of arthroscopic resection of the scapula in corpses, with the goal of developing it and applying it in clinical cases, similar to what has occurred in other joints such as the hip, elbow, wrist, and ankle.

The prone position with the affected limb in internal rotation (chicken wing position) during arthroscopy is the consensus in the literature[1-10], and was used in all of our cases. We also decided to place a cushion under the operated shoulder, further increasing the scapulothoracic space, a conduct not performed in the articles studied.

Ruland *et al*.[7] described arthroscopic portals in their findings. The portals recommended for arthroscopic surgery should be inferior to the scapular spine and three to four finger widths from the vertebral border of the scapula in order to protect neurovascular structures in the superior medial angle of the scapula, the dorsal scapular nerve and artery, the spinal accessory nerve, and to orient the arthroscope perpendicularly to the chest wall. The portals made depend on the scapulothoracic condition being treated. In the case of scapulothoracic bursitis, the Bell portals above the scapula and medial to the scapular spine are used for triangulation[6]. In the treatment of benign tumors (osteochondromas), the diversity of localization and size in the region of the scapula make it necessary to use a sequence of varying portals.

Saline infusion was used in two cases using tubing through four routes, and in two cases using the infusion pump, there was no difference in the degree of swelling of the joint. Currently, however, we choose tubing using four routes; operating time should not be extended for more than 45 minutes. In surgeries, excessive swelling should be a constant concern, and there were no complications.

Scapulothoracic arthroscopy is a procedure that is in development. Indications are limited, however, the mastery of the technique will enhance its use and procedures such as bone resections and large muscular releases.

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