ARTHROSCOPY OF THE SHOULDER CURRENT CONCEPTS REVIEW

K. DE MULDER[1], D. PETRÉ[2], G. DECLERCQ[1]

Arthroscopy of the shoulder has become much more common in the past decade as surgeons have developed proficiency with the arthroscope in the knee and appropriate instrumentation has been developed. In recent years arthroscopic techniques adapted to the shoulder have continued to evolve from a diagnostic to a treatment-oriented modality. It is now recognized and accepted as both a diagnostic and therapeutic technique in orthopedic surgery. A thorough knowledge of the anatomy, disorders, arthroscopic variations and pathological findings is essential to successfully perform the procedure. This paper discusses the operating room set-up, the portal placement and the indications for arthroscopy of the shoulder.

Keywords : shoulder ; arthroscopy ; diagnosis ; treatment.
Mots-clés : épaule ; arthroscopie ; diagnostic ; traitement.

INTRODUCTION

Michael Burman of the Hospital for Joint Diseases in New York performed the first arthroscopic examination of the shoulder in 1931 (5). No further publications on arthroscopy of the shoulder appeared until 1958. In that year Watanabe released the 'Watanabe # 21', which proved to be the first truly successful arthroscope. Since then interest in arthroscopy rapidly spread. Many orthopedic surgeons created techniques and instruments to improve arthroscopic procedures. In those years it was the knee joint that interested orthopedic surgeons the most.

The techniques in knee surgery were subsequently applied to other joints such as the shoulder. Arthroscopy of the shoulder evolved at a much slower pace than that of the knee, because of factors making routine shoulder arthroscopy potentially more hazardous than arthroscopy of the knee (26).

First, the shoulder has more muscle coverage than the knee. Therefore, the bony anatomy of the shoulder is not readily palpable, which makes portal placement less easy. Second, routine diagnostic and instrument portals in the shoulder lie close to important nerves and vessels (44).

However, in the last 15 years an increasing number of techniques and surgical procedures have been performed in the shoulder under arthroscopic control. A thorough knowledge of the anatomy and disorders is essential to successfully perform the procedures and to minimize complications. This paper will focus on the operating room set-up, the location of the portals, the indications and complications.

OPERATING ROOM SET-UP

Two basic positions for shoulder arthroscopy have been described : the lateral decubitus and the beach-chair position. Both positions have their benefits and disadvantages.

For the lateral decubitus position with the arm held in balanced traction, no assistant is required. In the beach chair position an assistant is always

[1] Department of Orthopaedic Surgery, OLV Middelares Ziekenhuis, Deurne, Belgium.
[2] Department of Orthopaedic Surgery, Sint-Jozef Kliniek, Izegem, Belgium.
Correspondence and reprints : K. De Mulder, Dienst Orthopedie, OLV Middelares Ziekenhuis, Florent Pauwelslei 1, 2100 Deurne, Belgium.

needed for positioning and traction of the arm. Surgical equipment companies have recently released special traction devices to overcome this problem. Whatever position for traction is used, it should not exceed 5 to 7 kg to avoid neurapraxia of the brachial plexus (61). Even if no traction is used in the beach chair position, there is still a risk, and a safe head position should be used. Rotation and lateral flexion on the same side should be avoided (8). Hypoglossal nerve palsy has been reported owing to compression of the contralateral nerve by a head support (37).

Some surgeons use both positions : the lateral decubitus for subacromial decompression, rotator cuff assessment and AC-joint debridement ; the beach-chair position is used for evaluation of instability. If the patient is in this position and the decision is made to proceed to open surgery, no repositioning or redraping of the patient is required. The latter position places the arthroscope in a dependent position during most of the procedures, especially subacromial decompression. This can cause fogging of the lens because fluid runs down into the camera (57).

PORTAL PLACEMENT

Many portals have already been described, but the posterior portal remains the primary entry portal. It allows vizualisation of most of the joint and assists in the placement of subsequent portals.

Intra-articular procedures, such as stabilization, require one or two anterior portals. These portals are usually created by an inside-out technique, because direct portal placement may be hazardous owing to the proximity of the musculocutaneous nerve. The key here is to stay lateral to the coracoid process.

Recently anteroinferior portals have been described for arthroscopic repair of the Bankart lesion (51, 10) in order to find a direct approach to the anteroinferior third of the glenoid rim. Besides the musculocutaneous nerve, the axillary nerve is also at risk in this technique. The authors describe the safety and utility of the 5 o'clock portal using an anatomic and clinical study. Yet, more publications and studies must be completed before this technique can be extensively used.

Another portal that can be used to gain access to the glenohumeral joint is the superior or supraclavicular portal (40). The use of instruments is restricted by the surrounding bony anatomy. Except for its rare use for irrigation of the joint, this portal is rarely required.

The subacromial space can be entered using anterior, lateral, posterior and superior portals. There is almost no risk for neurovascular structures. Most surgeons use a posterior viewing and a lateral working portal for subacromial decompression.

A posteromedial working portal for subacromial decompression was recently described (11). This portal was developed because its use provided easier triangulation. Furthermore there were no problems with grooving deeply with a mechanized burr on the undersurface of the acromion, as was the case, although infrequently, with the lateral portal. Therefore it is relatively easy to convert a type II or III acromion into a type I acromion, without the danger of resecting too much bone. After the subacromial decompression the same portals can be used for arthroscopic excision arthroplasty of the acromioclavicular joint. Resection of the distal end of the clavicle can be done nicely through the posteromedial portal because it is in line with the AC-joint. To finish it is usually necessary to make an additional anterior portal just inferior to the AC-joint. If the arthroscopic excision arthroplasty of the AC-joint is performed without subacromial decompression, we use a direct superior approach, described by Johnson (25). The arthroscope and instruments are inserted directly into the AC-joint. This has the advantage of leaving the subacromial bursa unviolated. A posterosuperior and anterosuperior portal is made, and initially a 2.7-mm wrist arthroscope and shaver are used until the joint space is widened. The instruments are then changed for the standard 4-mm arthroscope and burr. Decompression is completed when 8 to 10 mm of the distal clavicle is removed. Moving the shaver sideways in the space between clavicle and acromion checks this distance.

DIAGNOSTIC ARTHROSCOPY

There is no substitute for taking a good history and detailed clinical examination, which will give the diagnosis in the vast majority of shoulder disorders. The arthroscope may be used to confirm the diagnosis, or establish it in the minority of cases where the diagnosis remains unclear.

Major indications are : assessment of the unstable shoulder, evaluation of the glenohumeral joint prior to arthroscopic subacromial decompression to rule out concurrent intra-articular or rotator cuff pathology, shoulder pain in an athlete with a confusing history and examination and inconclusive radiographic studies.

There is no real indication for diagnostic shoulder arthroscopy in a patient allergic to contrast material with a suspected rotator cuff tear. MRI or even sonography, performed by an experienced radiologist, can give a decisive answer on the integrity of the rotator cuff.

IMPINGEMENT

Neer originally described open acromioplasty for the treatment of the chronic impingement syndrome (stage 2 rotator cuff disease) in 1972 (38), and its efficacy has been well-documented (39, 64). Ellman described arthroscopic subacromial decompression in 1985 (14). It appears to have certain advantages over conventional surgery. The cosmetic result is better because of the smaller incision. Due to the decreased postoperative pain, the procedure can be performed in an outpatient setting. Since the deltoid muscle is not detached from the acromion, active range of motion exercises can be started immediately after the operation. This allows the patient to return more rapidly to a job that requires heavy labor. Even more important is the fact that the glenohumeral joint can be inspected.

Therefore, the arthroscopic procedure starts with an inspection of the glenohumeral joint. Clinically important coexisting intra-articular lesions are not common, but underlying glenohumeral instability, biceps tendon lesions, partial thickness rotator cuff tears and arthritic changes of the joint can be identified.

After glenohumeral inspection, the arthroscope is placed in the subacromial space. The diagnosis of impingement is confirmed arthroscopically by inflammation of bursal tissue, fraying of the rotator cuff and erosion at the undersurface of the leading edge of the acromion.

Treatment of impingement includes resection of the bursa, the coracoacromial ligament and the anteroinferior border of the acromion. This will enlarge the subacromial outlet, allowing for easier passage of the rotator cuff. The resection of the soft tissue is accomplished with a synovial shaver placed in the lateral or posteromedial portal. The acromioplasty itself is performed with a power burr. The aim of the acromioplasty is to convert a type II or type III acromion into a type I acromion (48).

The presence of osteophytes on the undersurface of the acromioclavicular joint may contribute to the impingement syndrome. They project downward into the rotator cuff tendon and cause impingement. If present, these osteophytes need to be removed in a similar manner as the anteroinferior border of the acromion.

In contrast to the open approach, deltoid detachment is avoided and postoperative management progresses more rapidly after arthroscopic surgery (28, 43, 67). However, the arthroscopic technique also has the potential for deltoid injury as the deltoid fascial origin can be disrupted if an overly aggressive acromioplasty is performed (27). Deltoid dehiscence is a very rare, but debilitating complication.

CALCIFIC TENDINITIS

The pathogenesis of calcifying tendinitis of the rotator cuff is still under debate.

It is probably a primary degenerative process in a hypovascular area of the tendon. The fibers become necrotic, and dystrophic calcification follows (4). Others suggest that the process of calcification is actively mediated by cells in a viable environment. Tissue hypoxia is considered to be the primary etiologic factor (46, 50, 53, 65, 66).

During the formative phase, the patient may be free of pain or may suffer a moderate degree of discomfort. The condition becomes acutely

painful when the calcium undergoes resorption (resorptive phase). If conservative therapy fails during the formative phase, surgery may become necessary. In the resorptive phase, when natural mechanisms normally succeed in removing the deposit, surgery is rarely indicated. During this hyperalgic phase, the disease usually heals with the use of supportive measures (13). Absence of improvement of symptoms after conservative therapy, progression of symptoms and constant pain interfering with activities of daily life are the major indications for surgery (23).

As with the surgical treatment of impingement syndrome, an arthroscopic procedure has several advantages in treating calcifying tendinitis. These include a shorter rehabilitation time, the possibility of a better functional result and a better cosmetic appearance than after open surgery (2). After a routine glenohumeral inspection, the arthroscope is introduced into the subacromial space. Through the working portal, the bursa is resected with a synovial shaver, and the surface of the rotator cuff is inspected for calcific deposits. If these deposits are not clearly visible, the preoperative radiographs of the shoulder can help to localize them. Once the deposit has been identified, it can be opened with a needle. The calcific material is then forced out of the cuff with a small curette or with the blunt side of a synovial shaver. Irrigation of the subacromial space is performed, as the calcific debris can act as an irritating agent. Subacromial decompression is only performed if there are signs of impingement. It may happen that one is left with a full thickness cuff defect after debriding a large calcific deposit. This will delay the return to full activity. Normally, the tendon will reconstitute itself, but if the pain does not subside, a mini open cuff repair should be considered.

INFLAMMATORY DISEASES

An inflammatory disease such as rheumatoid arthritis does not uncommonly cause synovitis of the glenohumeral joint. Synovectomy has been described (40) and is technically similar to that of other joints (knee, elbow). An almost complete synovectomy is possible without disrupting the deltoid muscle or rotator cuff. In addition, the arthroscope can be used for selective biopsy of the synovium. Other indications for synovectomy may include pigmented villonodular synovitis, gout and synovial chondromatosis.

LOOSE BODIES

Loose bodies can occasionally be encountered during arthroscopy, and they are usually found in the axillary recess inferiorly or in the subscapularis recess anteriorly. Usually they can be easily removed with a grasper through a second, working portal. If they are big, they need to be crushed and broken into smaller fragments before removal. Several underlying shoulder conditions can exist in the presence of loose bodies : osteochondral fractures, avascular necrosis, and synovial chondromatosis and shoulder instability. If a loose body is found, the glenohumeral joint should be carefully evaluated in view of these conditions. When present, these conditions need to be addressed properly.

INSTABILITY

It is usually no problem to diagnose recurrent unidirectional traumatic instability. The difficult case is the patient with subtle instability, without history of trauma. Diagnostic arthroscopy and evaluation under anesthesia can help in making the diagnosis. Examination of both shoulders under anesthesia should be done before the arthroscopy is started. Translation and load and shift (6, 7) tests are performed in all directions to establish the pattern of possible instability. The arthroscopic evaluation of the glenohumeral joint is done with the patient in beach chair or lateral decubitus position. In our department we prefer the lateral decubitus position with a double traction system. The arm is placed in longitudinal skin traction with a weight of 2-4 kg to keep the arm slightly abducted and flexed forward. At the upper arm a second sling pulls at an angle of 90° to the chest of the patient, with 3-6 kg traction. Classic posterior and anterior portals are made for evaluation. It is necessary to view the glenohumeral joint from both anterior and posterior portals to complete the examination.

Several types of lesions can be noted : a Bankart lesion, an attenuated inferior glenohumeral ligament (IGHL), a humeral avulsion of the glenohumeral ligaments (HAGL), a cartilaginous or a bony Hill Sachs defect and an associated SLAP-lesion or rotator cuff tear. According to Wolf's classification the Bankart lesion occurs in 73%, attenuation of the IGHL in 17% and the HAGL in 9% of recurrent traumatic dislocations (71). The percentage of HAGL lesions is especially important in this context, because they are frequently overlooked. Some variations are possible when we look at the Bankart lesions.

In the Perthes' lesion there is stripping of the periosteum from the scapular neck, but no complete separation of the labrum. The real Bankart lesion shows both the labrum and the periosteum torn and separated from the glenoid. In the bony Bankart lesion there is a flake avulsion, pulled off the anteroinferior scapular neck. Finally, we can find a variation in which both the labrum and periosteum are separated and have slipped down the scapular neck to heal in a more inferior and medial position.

It is called an anterior labral ligamentous periosteal sleeve avulsion (ALPSA), as described by Neviaser (41). In patients with atraumatic instability of the shoulder the presence of a Bankart or a Hill-Sachs lesion is rare. In most cases, arthroscopy reveals glenohumeral ligaments that are attenuated or grossly lax. The bands of the ligaments are not separately visible and are flattened.

In traumatic posterior instability one should look for a mirror image of the patterns seen in anterior instability. There are no exact data on the incidence of complete avulsion of the posterior capsulolabral complex at the glenoid attachment site, but it seems that capsular laxity due to tearing or stretching is far more frequent than in anterior instability.

All techniques of arthroscopic stabilization focus on reattaching the avulsed capsulolabral structures. The technique for staple fixation of the capsule has been modified for arthroscopy with use of smaller staples and cannulated systems. The clinical results of staple capsulorrhaphy have been disappointing : because of its unpredictable results, this procedure has largely been abandoned. In 1987, Morgan and Bodenstab described the use of transglenoid sutures for reattachment of the anterior structures. The authors reported a 100% success rate in a cohort study of 25 patients with an average follow-up period of 17 months (36). After impressive initial results, the enthusiasm was somewhat tempered by other authors who reported higher rates of recurrence (68, 35, 12).

In the beginning of the Nineties suture anchors were introduced, and they allowed the avulsed structures to be repaired without the need to pass instruments across the glenoid. This technique avoids the potential complication of injuring the suprascapular nerve when drilling through the glenoid. Wolf reported a recurrence rate of only 2 % at short-term follow-up in more than 50 patients treated with this technique (71).

Recently bioabsorbable tacks have been developed. Speer *et al.* reported on 52 patients with a follow-up of 42 months. The recurrence rate was 21%, and there were no complications related to the use of the tacks (60). Bioabsorbable tacks may become more important in the future if engineers succeed in creating the same pullout strength as that for the nonabsorbable anchors.

Despite early promising results, recent data suggest that the rate of recurrence remains unacceptably high in the arthroscopic stabilization procedures. They do not have the success rate that open procedures have provided. The main difference with open procedures is the damaged and attenuated capsule not being addressed in arthroscopic procedures. To overcome this problem, new instruments have been released (lasers, radiofrequency generators). The capsule is heated up to a temperature between 60° and 70°C, and the collagen structure is altered. The redundant capsule is shortened, and this significant shrinkage helps stabilize the joint. Although short-term results of this shrinking procedure are promising, we need longer follow-up studies to confirm its liability (24, 47).

We believe the ideal candidate for arthroscopic stabilization is one with a traumatic unidirectional dislocation with a Bankart lesion, whose glenoid labral and capsular tissues are of good quality.

ADHESIVE CAPSULITIS

Although most patients with primary adhesive capsulitis respond to physical therapy, some will require closed manipulation to achieve and maintain sufficient improvement in motion. A small percentage of those patients will continue to have loss of motion that is refractory even to manipulation of the shoulder under anesthesia. In those cases, as in those of postsurgical or posttraumatic shoulder stiffness in which closed manipulation fails, arthroscopic release can be attempted (69).

Arthroscopic release has the advantage of allowing the detection and treatment of concomitant intra-articular and subacromial disorders. It also permits a controlled and precise capsular release (49, 69, 70). Furthermore, in cases of both idiopathic and postsurgical loss of motion, the force of manual manipulation required to regain motion is greatly reduced by releasing the capsule before manipulating the shoulder. If loss of motion remains unchanged intraoperatively after attempted arthroscopic release and manipulation, conversion to an open release is possible (69).

SEPTIC ARTHRITIS

Although polyarticular septic arthritis may occur, most patients with bacterial arthritis present with arthritis in just one joint. The knee is most commonly involved, and septic arthritis of the shoulder is relatively rare, accounting for approximately 10 to 15% of all joint infections (54, 55).

Arthroscopic treatment of infected joints is evolving. Little information exists with regard to its role in the septic shoulder.

Arthroscopic treatment allows accurate evaluation of the extent of the disease process. Direct visualization allows harvesting of synovial tissue for culture and pathologic analysis, as well as debridement of synovitis, capsular debris and involved bone of the glenohumeral joint. The subacromial and subdeltoid spaces can be similarly managed. Arthroscopic large-volume irrigation is able to remove the bacteria and the immunologic mediators of cartilage destruction (54, 62).

SLAP LESIONS

Progress in shoulder arthroscopy has led to the identification of previously undiagnosed lesions involving the superior labrum and the biceps tendon anchor. These superior labrum anterior to posterior (SLAP) lesions are very difficult to diagnose clinically. Although NMR and NMR arthrography may provide useful information in evaluating the glenohumeral joint as well as the superior labrum-biceps tendon complex, the diagnosis must ultimately be made with diagnostic arthroscopy (34, 56, 58).

Because of the association of SLAP lesions and glenohumeral instability, a thorough examination under anesthesia must be performed before beginning arthroscopy (34, 22).

In 1990 Snyder described the four basic types of SLAP lesions (58). In type I, there is fraying and degeneration of the edge of the superior labrum, but with a firmly attached labrum and biceps anchor. In type II, the labrum and the biceps anchor are detached from the insertion on the superior glenoid, and the complex arches away from the glenoid neck. In type III, there is a bucket-handle tear of the superior labrum, although the remaining portions of the labrum and biceps anchor are still well attached to their insertion. In type IV, there is a bucket-handle-type tear of the superior labrum with extension of the tear into the biceps tendon. Portions of the labral flap and biceps tendon are displaceable into the glenohumeral joint. The remaining labrum and biceps anchor are still attached to the glenoid. Complex lesions involve a combination of two types of SLAP lesions, usually a combination of type II and III or a combination of type II and IV (22, 58).

Other investigators have described three variations on those four basic types of SLAP lesions. These are an anteroinferior Bankart-type labral lesion in continuity with the SLAP lesion, biceps tendon separation with an unstable flap tear of the labrum and extension of the superior labrum-biceps tendon separation to beneath the middle glenohumeral ligament (33).

It is important to recognize variations in normal glenohumeral anatomy to appropriately diagnose

SLAP lesions. This includes appreciation of the frequently normal sublabral hole at approximately the 2-o'clock position, as well as the commonly seen meniscoid appearance of the superior labrum. Another normal variant is the termed the "Buford complex". This includes a cordlike middle glenohumeral ligament that attaches at the base of the biceps tendon anchor and the absence of labral tissue on the anterior superior glenoid (3, 34).

Because of the uncertain healing with conservative treatment or with simple arthroscopic debridement, and the association of SLAP lesions and instability, the treatment of SLAP lesions continues to evolve. Type I SLAP lesions are currently treated with debridement of the superior labrum. Type II SLAP lesions are treated with arthroscopic fixation of the biceps anchor to the glenoid rim, typically with suture anchors. Type III SLAP lesions are treated with debridement of the superior labrum and excision of the bucket-handle portion of the labral tear. Treatment of type IV SLAP lesions depends on the extent of tearing of the biceps tendon. If the torn fragment represents less than 30% of the tendon, then the detached labral and biceps tissue can be simply resected. However, when more than 30% of the tendon is involved, the treatment considerations differ. In older patients with symptoms of biceps tendon irritation, labral debridement and biceps tenodesis is performed. In younger patients with extensive tears, arthroscopic suture repair of the biceps tendon and torn labrum and secure anchor fixation is recommended (22, 34).

Complex type II-III or complex type II-IV SLAP lesions occasionally occur, and should be treated according to the previously described principles : torn segments of labrum and biceps tendon should be debrided, and if the remainder of the biceps anchor is detached and is substantial, it should be sutured to the glenoid with suture anchors (34).

ROTATOR CUFF REPAIR

Rotator cuff disease is still only partially understood, and the role of arthroscopy in its treatment is still under debate. A clear advantage is that one can include an examination of the glenohumeral joint to look for any unsuspected lesion and to determine the status of the intra-articular structures (19).

Arthroscopy is particularly valuable in the diagnosis and management of partial-thickness tears of the rotator cuff. The vast majority of partial-thickness rotator cuff tears is on the articular surface and is not visible during inspection of the bursal side, as is the case during open surgery (21). Some surgeons will incise the rotator cuff longitudinally if no defect is found, but a tear is suspected on clinical or radiological examination. Even then there is limited exposure, and the articular side of the cuff is not well visualized. Inspection of the cuff is better performed with an arthroscopic technique, as the entire cuff can be visualized and the size and localization of any tear can be fully appreciated (19).

Although not a common practice, arthroscopy can also be used to diagnose the presence of a full-thickness rotator cuff tear. Arthroscopy is most useful in diagnosing complete tears in patients who have false-negative imaging studies (19).

Three options are available for the treatment of partial-thickness rotator cuff tears : debridement of the partial-thickness tear alone (1, 59), debridement of the tear with arthroscopic decompression (15, 18) and open or arthroscopic repair of the partial-thickness tear combined with subacromial decompression. Three factors determine the type of treatment : depth of the tear, bone structure and patient activity level. There is some agreement on how the depth of the tear influences the treatment. Most authors recommend repair if 50% or more of the tendon substance is involved. Patients with structural bone abnormalities (e.g., hooked acromion, inferior acromioclavicular joint osteophytes, anterior acromial spurs) are more likely to benefit from decompression. Sedentary patients tend to do well with decompression, while active patients are more likely to benefit from tendon repair (19).

There are three options for the treatment of complete rotator cuff tears : One might elect to perform an arthroscopic subacromial decompression, debridement of tendon flap tears and synovectomy without any attempt to repair the torn cuff (15, 18, 30). The second option is to perform

the arthroscopic decompression first and then make a small lateral incision and repair the cuff tear with a conventional open technique (3, 32, 45). The advantage of this "mini-open" repair is that the incision is smaller and deltoid detachment is not necessary, as the acromioplasty is performed arthroscopically. The third option is to perform the decompression and tendon repair entirely arthroscopically (20, 63). Reduced postoperative pain, improved cosmesis from smaller incisions, the ability to perform the procedure on an outpatient basis and easier, but not shorter, postoperative rehabilitation are some of the advantages (63). Whenever one has to deal with an irreparable cuff tear, the technique of subacromial decompression is altered. Removal of the coracoacromial arch in patients without a functioning rotator cuff can result in the devastating complication of superomedial humeral head dislocation. The goal is to sculpt the acromion, rather than flatten its inferior surface, and the coracoacromial ligament is not resected (19, 42).

ACROMIOCLAVICULAR JOINT

The acromioclavicular (AC) joint is a common site of painful shoulder disorders, and open resection arthroplasty has been a reliable treatment for cases not responding to conservative treatment. Symptomatic AC osteoarthritis, rotator cuff impingement secondary to osteophytosis of the AC joint and osteolysis of the distal clavicle not responding to conservative treatment are the major indications for AC-joint arthroplasty (9). Patients with AC-joint symptoms after a type II or type III dislocation are better treated with a modified Weaver-Dunn procedure. Arthroscopic excision arthroplasty is possible, but the results are less favorable. Although the symptoms from bony abutment are relieved, the symptoms of instability remain (29).

Traditionally via an open approach the outer part of the clavicle is removed and any osteophytes on the acromial side are also trimmed. However, this open approach violates the capsule of the AC joint. This ligamentous disruption allows posterior translation of the clavicle so that it abuts against the acromion (16, 52).

Arthroscopic arthroplasty of the AC joint is performed through a posterior portal and another portal anterior to the AC joint (9). A superior approach is described in which the instruments and the arthroscope are inserted directly into the AC joint. This latter approach leaves the subacromial bursa unviolated and the capsule almost completely intact (17). Excision arthroplasty of the AC joint can also be performed in conjunction with arthroscopic acromioplasty. After arthroscopic subacromial decompression the distal clavicle is visualized and resected. An additional anterosuperior portal is used to finish the resection and to check if the resection is adequate (29).

The arthroplasty involves removal of bone from both the clavicular and the acromial side. As long as the bone resection remains intracapsular the superior AC ligament remains intact. The most common complication is incomplete resection of bone, leaving a small bridge of bone anteriorly or posteriorly. Hence it is mandatory to see the whole circumference of the joint at the time of resection and to remove an equal amount of bone anteriorly and posteriorly. It has been shown that resection of as little as 5 mm is successful in relieving symptoms at the AC joint (17, 29).

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SAMENVATTING

K. DE MULDER, D. PETRÉ, G. DECLERCQ. Schouder arthroscopie.

De laatste jaren heeft arthroscopie van de schouder veel terrein gewonnen. Dit is te danken aan het feit dat

chirurgen ervaring en bekwaamheid hebben opgedaan met de arthroscoop in het kniegewricht en dat het instrumentarium aangepast werd aan het schoudergewricht. Recent evolueerde de arthroscopie van de schouder van een diagnostische naar een therapeutische ingreep. De procedure wordt nu erkend en aanvaard als een diagnostische én therapeutische ingreep in de orthopedische chirurgie. Een uitgebreide kennis van de anatomie, afwijkingen, arthroscopische variaties en letsels is essentieel om de ingreep succesvol uit te voeren. Dit artikel behandelt de opstelling in de operatiezaal, het plaatsen van de ingangspoorten en de indicaties voor arthroscopie van de schouder.

RÉSUMÉ

K. DE MULDER, D. PETRÉ, G. DECLERCQ. L'arthroscopie de l'épaule.

L'arthroscopie de l'épaule s'est beaucoup répandue au cours de la dernière décennie, du fait que les chirurgiens ont profité de l'expérience acquise avec l'arthroscopie du genou, et aussi grâce à la mise au point d'instrumentations appropriées. Au cours des dernières années, des techniques d'arthroscopie adaptées à l'épaule se sont développées de façon continue, permettant de passer d'une phase purement diagnostique à des applications thérapeutiques. L'arthroscopie de l'épaule s'est maintenant acquis une place reconnue au sein des techniques de diagnostic et de traitement en chirurgie orthopédique. Son application fructueuse implique une connaissance approfondie de la pathologie, des techniques arthroscopiques et des lésions anatomo-pathologiques. Les auteurs passent en revue l'installation opératoire, le choix des voies d'accès et les indications de l'arthroscopie de l'épaule.