J Shoulder Elbow Surg (2016) 25, e256–e264

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

ORIGINAL ARTICLE

Short-term outcomes after arthroscopic capsular release for adhesive capsulitis

Callum P. Barnes, Patrick H. Lam, PhD, George A.C. Murrell, MD, DPhil*

Orthopaedic Research Institute, St George Hospital Campus, University of New South Wales, Sydney, NSW, Australia

Background: Little is known about the short-term temporal outcomes of an arthroscopic capsular release for adhesive capsulitis (frozen shoulder). Specifically, it is not known how immediate the improvements are and how quickly patients return to normal function after an arthroscopic release.

Methods: The study included 140 shoulders in 133 patients with idiopathic adhesive capsulitis who underwent a complete arthroscopic release of the shoulder capsule, performed by a single surgeon in a day surgery setting. Patient-reported pain and shoulder function were evaluated with the use of Likert scales, and an independent examiner assessed shoulder strength and range of motion preoperatively and at 1 week, 6 weeks, 12 weeks, and 24 weeks postoperatively.

Results: Arthroscopic capsular release resulted in immediate improvements in pain, functional outcomes, and range of motion ($P < .0001$). External rotation increased from 21° ± 17° (mean ± standard deviation) to 76° ± 17° at 1 week. Passive range of shoulder motion improved at 1 week, deteriorated slightly at 6 weeks, and then continued to improve at 12 and 24 weeks. Before surgery, 38% of patients reported that they "always" experienced extreme pain. This proportion reduced to 30% ($P < .0001$) at 1 week postoperatively and 2% ($P < .0001$) at 24 weeks postoperatively. There were no complications.

Conclusions: Patients who underwent an arthroscopic capsular release for idiopathic adhesive capsulitis experienced significant reductions in pain, improvements in range of motion, and improvements in overall shoulder function in the first postoperative week. These immediate improvements in pain and function continue to improve at 6, 12, and 24 weeks postoperatively.

Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Adhesive capsulitis; arthroscopic release; shoulder; arthroscopy; pain measurement; recovery of function

Adhesive capsulitis of the shoulder, also referred to as frozen shoulder, is a condition characterized by the spontaneous onset of worsening shoulder pain and the global limitation of both active and passive ranges of shoulder motion.[10,21] Adhesive capsulitis has a prevalence ranging from 2% to 5% in orthopedic clinics.[11] The etiology of the condition is unknown. Women are affected more than men, and the peak age at onset is about 55 years (although this may range anywhere from 35 to 70 years).

The Human Ethics Research Committee, NSW Health South Eastern Sydney Local Health District, approved this study: HREC 14/013 (LNR/14/POWH/023).

*Reprint requests: George A.C. Murrell, MD, DPhil, Orthopaedic Research Institute, St George Hospital, Level 2, 4-10 South Street, Kogarah, NSW 2217, Australia.

E-mail address: murrell.g@ori.org.au (G.A.C. Murrell).

1058-2746/$ - see front matter
http://dx.doi.org/10.1016/j.jse.2015.12.025

Adhesive capsulitis tends to occur in 3 consecutive clinical stages.[16] The first stage is characterized by pain and stiffness in and around the shoulder, which is generally worse at night. During the second stage, patients experience a gross reduction in all glenohumeral movements, most significantly in external rotation.[16] The final recovery stage involves spontaneous improvement in range of movement. The entire process will often resolve after approximately 2 years; however, pain and a limitation in range of motion may persist indefinitely.[16,20]

Nonoperative treatments of adhesive capsulitis include benign neglect, physical therapy, and intra-articular steroid injections.[14] Although these treatments may reduce pain, they have not been shown to accelerate recovery.[8] Surgical options include an open release, manipulation under anesthesia, or an arthroscopic capsular release. Some authors have speculated that an arthroscopic release is safer than a manipulation because of the controlled nature of the release.[5,9,20]

We have previously shown that an arthroscopic release for idiopathic frozen shoulder resulted in a persistent reduction in pain severity and frequency as well as in improvements in shoulder range of motion as many as 7 years after arthroscopic release (range, 5-13 years).[14] Several other studies have shown good outcomes more than 1 year after capsular release for adhesive capsulitis.[14,19] Capsular release can, however, result in iatrogenic instability.[8]

It is not known how quickly shoulder range of motion improves after surgery. Hence, the aim of this study was to determine the short-term outcomes of arthroscopic capsular release for idiopathic adhesive capsulitis and specifically to determine the rate and extent of restoration of shoulder function after this surgery. We elected to evaluate short-term recovery because there was little information available concerning how quickly patients recover after an arthroscopic release.

Materials and methods

Study design

Our hypothesis was that capsular release would provide a rapid reduction in pain and improvement in shoulder range of motion in patients with idiopathic adhesive capsulitis.

A retrospective study was conducted of patients who had had an arthroscopic capsular release for adhesive capsulitis by the senior author (G.A.C.M.). The aim of this study was to assess the functional recovery of the shoulder joint in the short term (up to 6 months). The primary outcome measured was passive external rotation of the shoulder at 6 months after arthroscopic release. Secondary outcomes included examiner-determined range of motion (forward flexion, abduction, and internal rotation) and strength (internal rotation, external rotation, supraspinatus, subscapularis, and adduction). Patient-reported outcomes included changes in frequency of activity pain, resting pain, and extreme pain; magnitude of rest pain, overhead pain, and sleep pain; difficulty with activities behind the back or above the head; shoulder stiffness; overall shoulder satisfaction; and level of activity at work and level of sport played at 1 week, 6 weeks, 12 weeks, and 24 weeks after surgery.

Inclusion and exclusion criteria

The criteria used for a clinical diagnosis of idiopathic adhesive capsulitis were a painful, stiff shoulder for a duration of at least 4 weeks; restriction of passive range of motion with a loss of function; and pain that disturbed sleep or made it difficult to lie on the affected side in the absence of other causes for the pain and restricted motion of the shoulder.[4,6,9,20]

Patients included in this study must have been admitted to surgery for an arthroscopic capsular release performed by the senior author and they must have attended a minimum of 1 follow-up clinic. Patients were excluded if the affected shoulder had had a previous fracture, a previous or concurrent rotator cuff tear or repair, calcific tendinitis, prior surgery to the shoulder, evidence of moderate or grade II or more glenohumeral joint arthritis, or previous sepsis.

Outcome assessment

Before each consultation (preoperative evaluation and 1 week, 6 weeks, 12 weeks, and 24 weeks of follow-up), each patient was required to complete a standardized questionnaire evaluating shoulder pain and function (based on the Shoulder Rating Questionnaire).[15] Specifically, patients used a Likert scale to answer questions about frequency of activity pain, sleep pain, and extreme pain (never, monthly, weekly, daily, always) and magnitude of resting pain, activity pain, and sleep pain (none, mild, moderate, severe, very severe). Patients also used this scale to rank difficulty with overhead activities and activities behind the back. Further Likert scales were used to rank shoulder stiffness (not at all, a little, moderately, quite, very), overall shoulder satisfaction (good, fair, poor, bad, very bad), and current levels of work (none, light activity, moderate activity, strenuous labor) and sport (none, hobby sport, club sport, national sport).

Trained assessors used a previously validated protocol to measure strength and passive range of motion at each consultation (except 1 week postoperatively).[12,13] Passive range of motion (abduction, forward flexion, external rotation, internal rotation) was assessed visually. Strength (internal rotation, external rotation, supraspinatus, subscapularis, adduction) was assessed using a hand-held force gauge (HFG-110; Transducer Techniques, Temecula, CA, USA).

Operative procedures and rehabilitation

Arthroscopic release was performed in a day surgery setting, using a previously described protocol.[1] Patients undergoing the procedure received interscalene regional anesthesia before being positioned in the beach chair position (the routine position for shoulder arthroscopy). Passive shoulder range of motion was assessed and recorded, the patient was prepared and draped, and a posterior glenohumeral arthroscopy portal was established. The arthroscope was then introduced through the posterior portal and the glenohumeral joint was examined. After this, an anterior portal was established under direct vision using a spinal needle just lateral to the coracoid process. The spinal needle ensured that the instruments could