Combined Subcoracoid and Subacromial Impingement in Association With Anterosuperior Rotator Cuff Tears: An Arthroscopic Approach

Ian K. Y. Lo, M.D., F.R.C.S.C., Peter M. Parten, M.D., and Stephen S. Burkhart, M.D.

Purpose: The purpose of this study was to evaluate the surgical outcome of patients with combined subcoracoid and subacromial impingement with associated rotator cuff tears. Type of Study: Case series.

Methods: Eight patients with a mean age of 63.6 (± 8.9) years were reviewed. All patients had combined subscapularis, supraspinatus, and infraspinatus tears of the rotator cuff with associated subacromial and subcoracoid impingement. All patients were treated with arthroscopic subacromial decompression, subcoracoid decompression, and rotator cuff repair. Results: At a mean follow-up of 8.8 months (range, 6-12 months), all patients were satisfied with the procedure. The mean University of California Los Angeles (UCLA) score increased from 11.0 (± 2.6) preoperatively to 30.9 (± 2.9) postoperatively (P < .00001). Preoperatively, all patients were in the poor category by UCLA criteria. Postoperatively, 2 patients had excellent results, 5 patients had good results, and 1 patient had a fair result. All patients had significant reduction in pain postoperatively, with 4 patients showing complete elimination of pain during all activities. No patient complained of pain anteriorly over the coracoid or had positive impingement signs postoperatively. Active forward elevation increased from a mean of 103.1° ± 46.5° preoperatively to a mean of 155° ± 18.5° (P < .02). Preoperatively, 4 patients had no active overhead function with positive Napoleon tests. Postoperatively, all showed improvement of the Napoleon test and regained active overhead function. Conclusions: Arthroscopic treatment of combined subcoracoid and subacromial impingement can lead to good results in this patient population. A high index of suspicion for these combined lesions, along with adequate surgical decompression and rotator cuff repair, is essential in providing pain relief and improved function. Key Words: Subcoracoid impingement—Coracoplasty—Acromioplasty—Subacromial impingement—Arthroscopy—Rotator cuff tear.

Subacromial impingement with associated supraspinatus outlet stenosis has long been recognized as a common cause of shoulder pain. More than 70 years ago, Meyer proposed that mechanical attrition of the rotator cuff (supraspinatus, infraspinatus, teres minor) under the acromion was involved in the pathogenesis of rotator cuff degeneration. More recently, Neer and Bigliani et al. suggested that certain changes in the coracoacromial arch were associated with rotator cuff tears. In shoulders with a type III or hooked acromion, an increased incidence of full-thickness rotator cuff tears was seen. Since these initial reports, surgical treatment for rotator cuff tears has primarily consisted of subacromial decompression (acromioplasty) and rotator cuff repair.

Subcoracoid impingement (defined in this study as mechanical contact between the coracoid and lesser tuberosity) with associated subcoracoid stenosis (defined in this study as narrowing of the coracohumeral space) has been increasingly recognized as a possible cause of persistent shoulder pain (Fig 1). Most patients complain of pain and tenderness in the anterior aspect of the shoulder, which is exacerbated by...
various degrees of flexion, adduction, and rotation. Presumably, the origin of this pain is secondary to impingement of the subscapularis tendon between the lesser tuberosity and coracoid process. Thus, any factor that decreases the coracohumeral space may be implicated in subcoracoid impingement.

Major causes of subcoracoid impingement are idiopathic (anatomic abnormality of the coracoid process), iatrogenic (following coracoid transfer for anterior instability), traumatic (such as fracture of the coracoid), or secondary to a space-occupying lesion (such as ganglion). Recently, however, a strong association between rotator cuff tears and a decrease in the coracohumeral space has been reported. Nove-Josserand et al. studied the coracohumeral space on 206 computed tomography (CT) arthrograms of shoulders treated for full-thickness rotator cuff tears. In patients with combined subscapularis, supraspinatus, and infraspinatus tears, a significant decrease in the coracohumeral space was seen, with 26% of patients showing a coracohumeral space < 6 mm. This is in contrast to the mean coracohumeral space in asymptomatic shoulders, which was previously reported to be between 8.7 to 11.0 mm. Similarly, in our patient population, we found a mean coracohumeral space of 10.4 mm in patients without subcoracoid impingement (Parten PM, Burkhart SS, unpublished data).

The purpose of our study was to evaluate the outcomes of patients with combined subscapularis, supraspinatus, and infraspinatus tears with evidence of both subacromial and subcoracoid impingement who underwent arthroscopic modified acromioplasty, coracoplasty, and rotator cuff repair.

**METHODS**

**Patient Population**

From June 2000 to April 2001, the senior author (S.S.B.) performed 133 arthroscopic rotator cuff repairs. Of those repairs, 85 were isolated to the posterosuperior rotator cuff (supraspinatus, infraspinatus), and 6 involved only the subscapularis tendon. Forty-two patients had combined tears involving the subscapularis, supraspinatus, and infraspinatus tendons. Of these patients, 8 showed evidence of both subcoracoid impingement and subacromial impingement. Those 8 are the subject of this report (Figs 1 and 2).

The mean age of the patients was 63.6 ± 8.9 years. Patients included 3 women and 5 men. Five patients had symptoms in the dominant shoulder, and 3 patients had pain in the nondominant shoulder. Five patients described a traumatic onset of symptoms 7.4 ± 5.9 months before surgery. Two patients previously had an open rotator cuff repair on the same shoulder.
shoulder but developed new onset of symptoms 3 and 24 months after initial surgery.

All patients complained of pain and tenderness in the anterior and anterolateral aspect of the shoulder. In addition, all patients showed positive impingement signs and a positive impingement test, confirming the diagnosis of subacromial impingement.

Subcoracoid stenosis and subcoracoid impingement were diagnosed on clinical findings, preoperative imaging, and intraoperative examination. All patients complained of pain and tenderness anteriorly over the coracoid. All patients had a negative Speed’s test. One patient had a positive lift-off test. The other 7 patients were unable to complete the lift-off test because of pain or limited internal rotation.

The Napoleon test was performed on each patient by asking the patient to push against the stomach while keeping the wrist straight. To perform this maneuver, the patient must have adequate subscapularis function to internally rotate the arm enough to allow the wrist to become straight (negative Napoleon test). If no subscapularis function is present, the wrist remains flexed 90° as the patient substitutes the posterior deltoid to provide the force to push against the stomach (positive Napoleon test). The ability to perform this maneuver with the wrist flexed 30° to 60° is considered an intermediate Napoleon test.

Four patients had a positive Napoleon test, 2 had an intermediate Napoleon test, and 2 had a negative Napoleon test. All had subscapularis tears confirmed arthroscopically. As previously reported, a correlation of the grade of Napoleon test to the extent of subscapularis tearing was found. Patients with positive Napoleon tests had tears of the entire subscapularis tendon; patients with tears involving more than 50% of the tendon but not the entire tendon showed intermediate Napoleon tests; and those with tears less than 50% had a negative Napoleon test.

The coracohumeral space was measured as the shortest distance between the coracoid process and proximal humerus (typically the lesser tuberosity) on axial magnetic resonance imaging (MRI) scans. A coracohumeral space of less than 6 mm was considered diagnostic of subcoracoid stenosis. The mean coracohumeral space in our patients was 3.9 ± 1.1 mm (range, 2.4-5.6 mm) on axial MRI scans. Subcoracoid stenosis was confirmed arthroscopically by estimating the coracohumeral space during arthroscopic examination (surgical technique discussed later). In every case, MRI evidence of subcoracoid stenosis was confirmed arthroscopically, attesting to the accuracy of MRI in estimating the coracohumeral interval.

Subcoracoid impingement was confirmed intraoperatively by contact of the coracoid process against the subscapularis tendon and lesser tuberosity during manipulation of the arm. No diagnostic injection was performed to confirm subcoracoid impingement syndrome. All patients underwent a minimum of 3 months of failed conservative management before surgery. MRI scans confirmed large anterosuperior rotator cuff tears (involving subscapularis, supraspinatus, and infraspinatus tendons) in all 8 patients (Figs 1 and 2).

All patients were evaluated preoperatively and postoperatively using a standardized format including subjective and objective outcome measures. Clinical results were evaluated according to the modified University of California Los Angeles (UCLA) score. Using the UCLA score, a cumulative score of 34 to 35 was considered excellent, 28 to 33 was considered good, 21 to 27 considered fair, and 20 or less considered poor. Paired, 2-tailed student t tests were used to determine statistically significant differences between preoperative and postoperative scores. A P value < 0.05 was considered statistically significant.

Surgical Technique

After induction of general anesthesia, the patient was placed in the lateral decubitus position. Five to 10 lb of balanced suspension was used with the arm in 20° to 30° of abduction and 20° of forward flexion (Star Sleeve Traction System, Arthrex, Naples, FL). Diagnostic glenohumeral arthroscopy was performed using a 30° arthroscope through a standard posterior portal and an arthroscopic pump maintaining pressure at 60 mm Hg.

Visualization of the subscapularis and its footprint on the lesser tuberosity was performed through a posterior viewing portal. With appropriate manipulation of the arm in abduction and internal rotation, the subscapularis insertion could be easily visualized. These maneuvers lift the fibers of the intact portion of the subscapularis away from the humerus at an oblique angle, allowing excellent visualization of its insertion. Occasionally a 70° arthroscope was necessary to satisfactorily visualize the subscapularis insertion.

Because the anterior working space is extremely tight and because arthroscopic subscapularis repair is technically challenging, arthroscopic repair of the subscapularis tendon was performed immediately after...
identification of the tear (Fig 3). Shoulder swelling can limit visualization and compromise the ability to perform an effective repair. Therefore, subscapularis repair was performed before repair of any other tendons or decompressions. However, the subcoracoid space was so tight that in 6 of 8 cases subcoracoid decompression and coracoplasty had to be performed before subscapularis repair to create enough room for the repair. In these cases, the plane and depth of coracoid resection were refined after the repair.

Four portals were routinely used for subscapularis repair (Fig 4). A standard posterior portal was used for viewing, and an anterior portal was used for anchor placement and suture passage. An anterolateral portal was placed just anterior to the biceps tendon and was used for subscapularis mobilization and preparation of the bone bed. An accessory anterolateral portal was placed just posterior to the biceps tendon and was used for traction sutures. The subscapularis tendon was then repaired arthroscopically as previously described if space allowed.\textsuperscript{32} If the coracohumeral space was too tight, we proceeded with arthroscopic coracoplasty before subscapularis repair.

**FIGURE 3.** Arthroscopic views from a posterior portal of a right shoulder show a complete subscapularis tendon tear retracted to the glenoid margin. (A) A traction stitch has been placed in the superolateral corner of the subscapularis tendon. One must not confuse the soft tissues superior to the superolateral corner of the subscapularis tendon with the edge of the subscapularis tendon. This area represents the “comma sign,” a structure formed by the conjoined medial coracohumeral ligament and superior glenohumeral ligament, which avulse with the subscapularis tendon from the humerus where their combined footprint is located adjacent and directly superior to the subscapularis footprint. (B) Traction on the subscapularis tendon reveals the true borders of the subscapularis showing that the subscapularis tendon had been significantly retracted medially and inferiorly. G, glenoid; H, humeral head; SSc, subscapularis tendon; C, comma sign; dashed line, upper border of the subscapularis tendon; solid line, outlines the comma sign. (Note: All arthroscopic views are oriented in the beach chair position with the patient’s head toward the top of the figure.)

**FIGURE 4.** Portals for arthroscopic subscapularis repair. (A) The anterior portal is used for anchor placement and suture passage. (B) The anterolateral portal is used for subscapularis mobilization and preparation of the bone bed. (C) The accessory anterolateral portal is used for the traction sutures. (D) The posterior portal is used as the arthroscopic viewing portal.
During arthroscopic coracoplasty, a 70° arthroscope is commonly used. The goal of surgery is to restore the coracohumeral space and prevent impingement of the coracoid against the subscapularis tendon. The 70° arthroscope provides an essential "aerial" view of the coracoid and the subscapularis tendon.

To confirm subcoracoid stenosis and subcoracoid impingement, the coracoid tip was located by placing a shaver or Wissinger rod through the anterolateral portal while viewing through the posterior portal. The coracoid tip was clearly felt as a hard, bony protuberance just anterior to the subscapularis tendon (Fig 5). At this point, an initial gross estimate of the coracohumeral space was made using an instrument of known size (5.0-mm Resector, Stryker Endoscopy, Santa Clara, CA). The coracohumeral space was estimated to be less than 6 mm, the decision was made to proceed with coracoplasty to create enough space for the subscapularis to be repaired without impinging against the coracoid.

In patients with complete subscapularis tears, which were retracted medially towards the glenoid, the coracoid was approached anterior to the subscapularis tendon tear. A 90° radiofrequency wand (3.5 mm × 90° right angle Arthrowand, Arthrocare, Sunnyvale, CA) was introduced through an anterolateral portal, and the soft tissues were resected on the posterior aspect of the coracoid tip (Fig 6). However, in patients with full-thickness subscapularis tears involving only a portion of the subscapularis footprint, the rotator interval tissue obstructs the proper angle of approach. In these cases, a shaver (5.0-mm Resector) was introduced through an anterolateral portal, and the portion of the rotator interval directly over the coracoid was resected (Fig 7A). This creates a small window through the rotator interval, exposing the coracoid and allowing an appropriate angle of approach for coracoplasty (Fig 7B).

The space between the coracoid, subscapularis tendon, and lesser tuberosity was then assessed. Subcoracoid impingement was confirmed by visualizing direct contact of the coracoid against the subscapularis tendon and lesser tuberosity during manipulation of the arm in a combination of forward elevation, adduction, and internal rotation (Fig 8). All patients showed subcoracoid impingement with manipulation of the arm. In addition, in some patients the coracohumeral space was so tight that the subscapularis tendon appeared to bowstring across the prominent coracoid process even with the arm at the side in external...
rotation. In these cases, the coracoid could be seen compressing the free span of the tendon, thereby increasing tensile and shear forces at the insertion. We should note that when the size of the coracohumeral space was estimated, traction was applied by an assistant or by balanced suspension to minimize any effect that might be caused by proximal humeral migration.

After subcoracoid impingement was confirmed, the coracohumeral space was increased by resecting the posterolateral aspect of the coracoid. A 4.0-mm burr (Barrel Burr 6 Flute, Stryker Endoscopy) was introduced through the anterolateral portal, and the coracoid was resected in line with the subscapularis tendon (Fig 9A). Correct orientation of the resection was provided by the “aerial” view using the 70° arthroscope. The end-point of resection was determined by using the diameter of the 4.0-mm burr as a reference to estimate a 7-mm clearance between the coracoid and the subscapularis tendon (Barrel Burr 6 Flute, Stryker Endoscopy) (Fig 9B). Manipulating the arm into the subcoracoid impingement position and assessing the coracohumeral space confirmed the adequacy of decompression.

After subcoracoid decompression, the subscapularis tear was repaired if repair was not previously
performed (Fig 10). Other concomitant pathologies were then treated. Our technique for arthroscopic rotator cuff repair has previously been described. Three patients had residual crescent-shaped rotator cuff tears of the supraspinatus and infraspinatus (after subscapularis repair) that were repaired directly to bone, and 3 patients had massive U-shaped rotator cuff tears that were treated with a margin convergence technique. Two patients had massive contracted rotator cuff tears, which were treated by partial rotator cuff repair. Standard suture anchor fixation to bone was obtained using BioCorkscrew (Arthrex, Naples, FL) anchors double-loaded with No. 2 Ethibond (Fig 11). Subacromial smoothing (rather than classic acromioplasty) was routinely performed in all patients with preservation of the coracoacromial arch.

Postoperative Protocol

All patients were treated on an outpatient basis. After the procedure, the treated arm was placed at the side in a sling with a small pillow. The sling was worn continuously for 6 weeks except during bathing and exercises.

Active elbow flexion and extension was encouraged, but terminal extension was restricted if a biceps tenodesis was performed. Patients performed passive external rotation exercises immediately, restricting maximal external rotation for the first 6 weeks to 0° (straight ahead). In addition, overhead stretching was avoided until 6 weeks postoperatively to avoid stressing the repair.

At 6 weeks, the sling was discontinued and over-
head stretching with a rope and pulley and internal rotation stretching were begun. Isotonic strengthening was not begun until 10 to 12 weeks after surgery, at which point rehabilitation of the rotator cuff, deltoid, and scapular stabilizers was begun. Progressive activities were incorporated as strength allowed, and unrestricted activities were resumed 6 to 12 months after surgery.

RESULTS

Three patients had complete tears of the subscapularis tendon, and 5 patients had full-thickness partial tears of the subscapularis tendon (1 patient with a tear involving 25% of the tendon, 3 patients with a tear involving 50% of the tendon, 1 patient with a tear involving 66% of the tendon). In addition, all 8 patients had complete tears of the supraspinatus tendon in addition to tears of the infraspinatus tendon (3 patients had tears involving 50% of the infraspinatus tendon, and 5 patients had complete infraspinatus tendon tears). Tear size ranged from 3 × 3 cm to 6 × 8 cm with a median tear size of 5 × 7 cm. Seven tears were considered massive (> 5 cm) and one was considered large (3 to 5 cm). All patients had a complete repair of the subscapularis tear. Six patients had complete repairs and 2 patients had partial repairs of the remaining rotator cuff.38,39

In addition to the described procedures, 1 patient required a distal clavicle excision for acromioclavicular joint derangement. Four patients had evidence of biceps tendon subluxation or dislocation during arthroscopic examination. Three of these patients underwent arthroscopic biceps tenodesis, and 1 patient had a biceps tenotomy.

At a mean follow-up time of 8.8 months (range, 6 to 12 months), all patients showed a significant improvement in symptoms and were satisfied with the procedure. The mean UCLA score increased from 11.0 ± 2.6 preoperatively to 30.9 ± 2.9 postoperatively (P < .00001). Preoperatively, all patients were in the poor category by UCLA criteria. Postoperatively, 2 patients had excellent results, 5 patients had good results, and 1 patient had a fair result. All patients had significant reduction in pain postoperatively, with 4 patients experiencing complete elimination of pain during all activities. No patient complained of pain anteriorly over the coracoid. No patient showed positive impingement signs.

Active forward elevation increased from a mean of 103.1° ± 46.5° preoperatively to a mean of 155° ± 18.5° postoperatively (P < .02). All 4 patients with preoperative forward flexion less than 90° gained overhead function postoperatively. Active external rotation did not significantly change (preoperative, 54.3° ± 19.7°; postoperative, 48.8° ± 10.6°).

Seven patients showed an improvement in strength by one grade. No patient showed decreased strength postoperatively. Of the 4 patients with positive Napoleon tests preoperatively, 2 converted to a negative Napoleon test and 2 converted to an intermediate Napoleon test postoperatively. None of these patients had active overhead function preoperatively. However, all had active overhead function postoperatively.

DISCUSSION

Subacromial impingement with associated subacromial stenosis has long been recognized as a common cause of pain and as a potential etiologic factor in rotator cuff disease.1-14 Thus, the standard surgical treatment for rotator cuff tears predominantly consists of subacromial decompression (acromioplasty) and rotator cuff repair.15-21 As reported by several authors,1,2,4,7,12,13,15,17-21 surgical treatment has yielded excellent results. In contrast, the diagnosis and treatment of subcoracoid impingement and subcoracoid stenosis have been relatively ignored,22-27 and some authors have doubted their existence.42

Warner et al.43 defined anterosuperior rotator cuff tears as those involving the subscapularis, supraspinat-
tus, and infraspinatus tendons. Although anterosuperior tears\textsuperscript{43} and subcoracoid impingement\textsuperscript{22-27} have been previously described, the primary treatment of combined subacromial and subcoracoid impingement in association with anterosuperior rotator tears has not.

In our study, patients with subcoracoid stenosis and subcoracoid impingement represented 19\% of patients with combined subscapularis, supraspinatus, and infraspinatus tears. This incidence correlates very closely to that found by Nove-Josserand et al.\textsuperscript{28} and confirms that radiographically documented subcoracoid stenosis is a common finding in patients with anterosuperior rotator cuff tears.

Some authors have suggested that subcoracoid impingement in association with massive rotator cuff tears may be a secondary finding. This is caused by anterior or superior translation of the humeral head toward the coracoid and thus an obligatory decrease in the coracohumeral space. Although anterosuperior translation is arguably an exacerbating factor in subcoracoid impingement, it is quite clear that despite adequate treatment of the rotator cuff, subcoracoid impingement may still exist.\textsuperscript{44} Furthermore, in our patients the diagnosis of subcoracoid impingement with objective measurement of the coracohumeral space was made during arthroscopy with the arm in traction, thereby reducing any proximal humeral translation.

Suenaga et al.\textsuperscript{44} recently reported on subcoracoid impingement syndrome in 11 of 216 cases (5.1\%) after rotator cuff surgery. All patients had previously undergone anterior acromioplasty and rotator cuff surgery. However, they were considered failures because of ongoing pain and tenderness over the coracoid. Bilateral CT scans showed a decrease in the coracohumeral space, and subcoracoid impingement syndrome was confirmed by diagnostic injection. Eventually, 9 of 11 patients required open coracoplasty and experienced improvement in all cases. Thus, despite previous treatment of the rotator cuff, subcoracoid impingement persisted. Interestingly, all 9 patients who underwent surgical exploration also showed evidence of thinning or partial tearing of the subscapularis tendon.

Collectively, these studies and the current study suggest that subcoracoid stenosis and subcoracoid impingement are common findings in patients with combined subscapularis, supraspinatus, and infraspinatus tears. In addition, the diagnosis is commonly unrecognized, probably under-reported, and may be a cause of failure after rotator cuff repair.\textsuperscript{44}

In our study, subcoracoid stenosis and subcoracoid impingement were diagnosed based on clinical findings, radiographic criteria, and intraoperative evaluation. All patients exhibited pain and tenderness over the coracoid, all demonstrated $<6$ mm of coracohumeral space on axial MRI images, and all had gross evidence of a decreased coracohumeral space and direct subcoracoid impingement on arthroscopy. We did not perform a diagnostic subcoracoid block in any of these patients. Thus, arguably, subcoracoid impingement syndrome, as defined by Gerber,\textsuperscript{24} was not confirmed. However, we agree with Patte\textsuperscript{26} and others\textsuperscript{44} that subcoracoid impingement can only definitively be diagnosed during intraoperative examination. Therefore, in this patient population, we believe that subcoracoid stenosis with arthroscopically documented subcoracoid impingement at least in part contributed to the disease pattern and symptoms.

The etiology of tears of the subscapularis tendon is currently unknown. However, similar to subacromial impingement in posterosuperior rotator cuff tears, subcoracoid impingement may be an etiologic factor in subscapularis tears, particularly in those tears that also involve supraspinatus and infraspinatus tendons. Thus, similar to subacromial impingement, subcoracoid impingement may create stresses high enough in the subscapularis tendon to not only initiate tears but also to compromise the results of repair.\textsuperscript{16,17,45}

In addition to subcoracoid impingement, persistent instability of the biceps tendon can compromise subscapularis repair. In the senior author’s (S.S.B.) experience of repairing (both open and arthroscopic) subscapularis tears with associated biceps instability, attempts to preserve and relocate the biceps by stabilizing it within the bicipital groove commonly fail secondary to redislocation of the biceps. This can lead to persistent symptoms and can cause disruption of the subscapularis repair. Therefore, we now routinely perform arthroscopic biceps tenodesis during arthroscopic subscapularis repair when subluxation or dislocation is confirmed.\textsuperscript{41} Subluxation of the biceps is determined by dynamic arthroscopic examination of the tendon as the arm is sequentially internally and externally rotated. If the biceps is completely stable in the bicipital groove through the full range of rotation, we leave it alone. However, if any degree of subluxation is present in association with a subscapularis tear, we perform a biceps tenodesis. We have no strict age criteria for performing arthroscopic biceps tenodesis versus tenotomy. However, in sedentary patients physiologically older than 70 years of age we more commonly perform biceps tenotomy.
We have previously reported that improvement or reversal of a positive Napoleon test is correlated with return of overhead function. The current study included 4 patients with positive Napoleon signs and no overhead function preoperatively. All 4 of these patients regained overhead function postoperatively in addition to reversing the Napoleon tests from positive to negative or intermediate. This aspect of functional improvement (restoration of overhead function) underscores the importance of subscapularis repair.

Interestingly, 2 of the 8 patients in this study had undergone previous rotator cuff repair. We suggest that unrecognized subcoracoid impingement may have played a role in the development of recurrent symptomatic cuff tears in these 2 patients.

Recently, the use of arthroscopy for the treatment of subcoracoid impingement syndrome has been reported. In 2001, Karnaugh et al. reported on 4 patients who underwent arthroscopic treatment for subcoracoid impingement through a subacromial approach. Although this method is technically feasible, visualization of the coracoid is difficult because of the large amount of fibrofatty tissue surrounding the coracoid. We have found that if the subscapularis tendon is not completely torn and retracted medially, then an intra-articular transcapsular coracoplasty through the rotator interval is easier than a subacromial approach because it avoids the subacromial fibrofatty tissue and thereby provides better visualization of the coracoid. In addition, intra-articular transcapsular coracoplasty allows the appropriate orientation of the coracoplasty and permits a direct, accurate assessment of the adequacy of decompression intraoperatively.

In conclusion, subcoracoid and subacromial impingement may occur in patients with combined subscapularis, supraspinatus, and infraspinatus tendon tears. A high index of suspicion with careful preoperative and intraoperative evaluation is necessary when diagnosing these conditions. Arthroscopic surgery with adequate surgical decompression combined with rotator cuff repair is essential in providing pain relief and improved function.

REFERENCES

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