Evaluation of two procedures in the Treatment of Snyder Type 2 Superior Labrum Anterior to Posterior Lesion

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the tenodesis group as more time was required to locate the biceps tendon in the subacromial space. This is due to the technical proficiency of the surgeon. While the tenodesis group showed a notable advantage than the SLAP repair group in terms of short-term outcomes and no symptom of shoulder instability appeared in the present study, the two groups provided comparable functional restorations after 1 or 2 years. Although the SLAP repair group had inferior shoulder function as compared to the tenodesis group in the early phase, it helped to regain shoulder anatomy and stability; both groups could contribute to functional restoration in the long-term.

**Conclusion:** Biceps tenodesis has better therapeutic outcome than the SLAP repair in the short term; however, the long-term outcomes are equivalent. Both procedures could be chosen for treating SLAP lesions, but other pathological changes with biceps tendon should be excluded when SLAP repair is used.
Preoperative evaluation of spinoglenoid ganglion cyst with MRI, EMG and isokinetic muscle test
- Does size matter? -

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Background: There are few studies correlating the size of ganglion cyst at the spinoglenoid notch with electrophysiological alterations, muscle power or pain severity.

Materials and Methods: Between June 2010 and November 2014, 30 patients (24 males and 6 females) who diagnosed with a ganglion cyst at the spinoglenoid notch on MRI were evaluated by EMG/NCV test and isokinetic muscle test. Maximum cyst diameter was measured on MRI and used for comparison. Pain severity was estimated by visual analogue scale (VAS). And, pooled sensitivity and specificity analysis was conducted, with an assessment of the summary receiver operating characteristic (ROC) curve.

Results: EMG/NCV test were examined in 27 out of 30 patients. Eight out of 27 patients were diagnosed with suprascapular neuropathy. The overall mean cyst size was 2.1cm. The cyst size of EMG positive group was 2.7cm, and size of EMG negative group was 1.8cm. When the size of ganglion cysts was increased 1cm, probability of an abnormal EMG/NCV test were increased 4.32 times (odds ratio: 4.32, p = 0.023). Area under the ROC curve (AUC) was 0.822, and set point 2.2cm had most sensitivity (87.5%), specificity (73.7%), positive likelihood ratio (3.3). However, there was no significant difference in the peak torque deficit on external rotation (mean: 30.2 (> 2.2 cm) vs. 20.7 (< 2.2 cm); p = 0.156) and abduction (mean: 28.6 (> 2.2 cm) vs. 18.4 (< 2.2 cm), respectively; p = 0.28) according to the size of ganglion cyst. The mean pain VAS of all 30 patients was 6.22 (range: 3~9), and there was no statistical difference in pain VAS according to the cyst size (mean: 6.06 (> 2.2 cm) vs. 6.50 (< 2.2 cm), respectively; p = 0.841). Twenty eight out of 30 patients had a labral lesion associated with spinoglenoid notch cyst on MRI. We performed SLAP repair in 19 cases, biceps tenodesis in 6 cases, biceps tenotomy in 3 cases, and cyst decompression only in 2 cases.

Discussion: Large spinoglenoid notch cysts may compress the suprascapular nerve. Tung¹ el al. reported that average maximum diameter of cysts associated with muscle denervation was 3.1cm. However, this study diagnosed muscle denervation on MRI, not the EMG/NCV study. The strengths of this study were as follows; 1) The current study used needle EMG for the diagnosis of suprascapular neuropathy. 2) This is the first study regarding the correlation with cyst size and suprascapular neuropathy. 3) All patients in the present study have taken EMG/NCV test, isokinetic muscle performance test and MRI evaluation. The limitation of study was 1) small number for subgroup analysis, 2) postoperative external rotation power and EMG follow up were not analyzed.

Conclusion: The current data suggested that cyst size reflect the compressive suprascapular neuropathy. Therefore, the decompression surgery would be justified in patients with cyst size greater than 2.2 cm.
Paralabral Spinoglenoid Cysts With Suprascapular Nerve Palsy – A Comparison of Two Arthroscopic Approaches

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BACKGROUND: Focal spinoglenoid cysts are often excised through a translabral approach. This may be inadequate when treating extensile cysts that progress from spinoglenoid to suprascapular region. Posterosuperior capsulotomy (paralabral approach) allowing better visualization, dissection, and excision of the cyst with suprascapular nerve decompression may be warranted in such cases. This study compares the results of the two arthroscopic approaches in suprascapular neuropathy secondary to spinoglenoid ganglion cysts.

METHODS: 27 consecutive patients underwent arthroscopic decompression of spinoglenoid cysts with labral repair. Two cyst types were identified: focal and extensile; and three treatment groups based on approach. Group A included 17 focal cysts excised through translabral approach. Group B included 3 extensile cysts that underwent translabral approach. Group C included 7 extensile cysts excised through paralabral approach. Patients were evaluated preoperatively and 12 months postoperatively by clinical examination, MRI, and ASES scores. 13 patients underwent postoperative EMG. The mean follow-up was 31 months (range=12 to 83 months).

RESULTS: 17 group A (100%), 1 group B (33%), 7 group C (100%) patients had an excellent result with complete clinical recovery and no recurrence. 24 of these 25 revealed complete cyst excision on postoperative MRI. All postoperative EMG in this group confirmed infraspinatus recovery. In two group B patients (66%), a residual cyst was noted on MRI, with persistent EMG findings in one. The mean ASES scores showed significant improvement (P<0.001)(A - 62 to 95 points, B - 58 to 76 points, C - 57 to 92 points). This was significantly better in groups A and C (P<0.05). No complications were encountered in any group.

DISCUSSION: A translabral approach is adequate for focal spinoglenoid cyst excision, but is inadequate for extensile cysts. A paralabral approach to the spinoglenoid notch via a posterosuperior capsulotomy is necessary for extensile cysts. This allows better visualization of the cyst and facilitates thorough dissection and excision of the cyst walls. Moreover, the inferior branch of the suprascapular nerve is decompressed and traced under visualisation.

CONCLUSION: Both arthroscopic approaches are safe and effective, results in excellent clinical outcomes, and avoid cyst recurrence when applied for the specific type of cyst location.
Long Head of Biceps Tenotomy and Tenodesis Don’t Affect Elbow Flexion and Forearm Supination Strength

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a) Background; Lesions of long head of biceps tendon (LHBT) are often seen in patients with rotator cuff tears, for which tenotomy and tenodesis of the LHBT are frequently performed. Although the good clinical results of tenotomy and tenodesis in simultaneous arthroscopic rotator cuff repair (ARCR) were reported, weakness of elbow flexion and forearm supination strength are also predictable. The purpose of this study is to compare the postoperative outcome and the muscle strength of elbow flexion and forearm supination after ARCR between cases with LHBT tenotomy, tenodesis and preserved.

b) Material: Sixty-one patients who underwent ARCR with a minimum 1 year of follow-up are included in this study (mean age 64.6 ± 10.6; 27 women and 34 men). We checked contralateral shoulders of these patients with MRI or ultrasonography and the patients who had rotator cuff tear or underwent previous ARCR in the opposite shoulders were excluded. Cases who had re-rupture of repaired rotator cuff were also excluded. For all supra- and/or infraspinatus tendon tears we performed ARCR using suture-bridge technique, and if the subscapularis tendon lesions were included, the tendon repair was also performed by simple suture or suture-bridge ARCR. When the LHBT lesions such as subluxation or dislocation, partial tear more than half of it or hourglass deformity were identified during the operation, we performed LHBT tenotomy or tenodesis procedures. We added tenodesis for cases who were under 65 years old or had high activities in life even if they were over 65 years old (tenodesis group; 8 cases). For the other cases with LHBT lesions we performed LHB tenotomy (tenotomy group; 15 patients) and for the other cases who had no LHBT lesions we preserved LHBT (control group; 39 patients). The tenodesis procedure was performed in 45 degrees of elbow flexion and forearm neutral position, LHBT was pulled proximally with manual max strength and was immobilized using a tenodesis anchor (PEEK SwiveLock Tenodesis®, Arthrex, Japan) on the bicipital groove at the supraperatorial position. Tenotomy was performed by resecting the intraarticular lesion of the LHBT. After these procedure, the rotator cuff repair was performed. The almost same shoulder rehabilitation protocols were performed for each group but we prohibited the elbow motion for three weeks to the patient with the tenotomy and the tenodesis group. We measured the quantitative muscle strength of elbow flexion and forearm supination pre- and postoperatively. Strength index which were defined as ratio of affected side divided by contralateral side were compared statistically among these groups. For clinical evaluation we used the Japanese Orthopaedic Association (JOA) score which was also compared among these groups. We used one-way ANOVA and Scheffe’s method for the statistically evaluations. A p value of <.05 was defined as statistically significance.
d) Results: The average age in each group was 71.6 ± 4.94 in the tenotomy group, 65.5 ± 5.78 in the tenodesis group and 61.9 ± 11.9 in the control group, respectively. The age of the tenotomy group was significantly higher than the control group (p = 0.012). The mean muscle strength of elbow flexion in each group was 165 ± 34.7 N in the tenodesis group, 113 ± 34.4 N in the tenotomy group and 157 ± 48.5 N in the control group, respectively. The mean muscle strength of forearm supination in each group was 47.4 ± 12.1 N in the tenodesis group, 35.6 ± 14.1 N in the tenotomy group and 45.9 ± 13.4 N in the control group, respectively. The muscle strength index of elbow flexion in each group was 0.89 ± 0.17 in the tenodesis group, 0.92 ± 0.25 in the tenotomy group, and 1.00 ± 0.16 in the control group. The muscle strength index of forearm supination in each group was 0.77 ± 0.09 in the tenodesis group, 0.80 ± 0.17 in the tenotomy group, and 0.90 ± 0.23 in the control group. There were no significant differences of muscle strength index of elbow flexion and forearm supination among these groups (elbow flexion; p = 0.264, forearm supination; p = 0.313). JOA score was 92.6 ± 6.0 points in the tenodesis group, 86.1 ± 14.8 points in tenotomy group, and 95.4 ± 6.3 points in the control group. The JOA score of the tenotomy group was significantly lower than that of control group (p = 0.007). In detail there was no differences of the pain score among these groups but the function and range of motion scores of tenotomy group were significantly lower than those of control group (pain; p = 0.304, function; p = 0.021, range of motion; p = 0.003).

e) Discussion; the tenotomy group was significantly older than the control group because we performed tenotomy for the over 65 years old cases. And the reason may be that rotator cuff tears of younger patients didn’t have so severe LHBT lesions and consequently they didn’t need the LHBT procedures. There were no significant differences about the strength index of elbow flexion and forearm supination among these groups. In the tenotomy group, it is possible the stump of biceps tendon may adhere somewhere and functioned. We made 3 weeks’ prohibition of elbow flexion after LHB procedure so this situation may occur in our study. We must also consider the other elbow flexion muscle such as short head of biceps tendon, brachialis and brachioradialis had worked compensatorily. It also could be said to the supination strength such as supinator muscle. JOA score, especially function and range of motion scores in the tenotomy group were significantly lower than that in the control group but there was no difference of pain score. Because of the higher age, tenotomy group may had severer degenerative changes of the rotator cuff and/or the other muscles, or the bad posture due to back deformity that induced lower scores. We can also say the both procedures were effective for the pain as well as the control group.

f) Conclusion; LHBT tenotomy and tenodesis with ARCR don’t affect the muscle strength of elbow flexion and forearm supination comparing with the LHBT-preservation.
Accuracy of Backward Traction Test for the Diagnosis of Bicipital Sheath Lesions and Bicipital Tendonitis: Comparison with Arthroscopic Examination

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Abstract

Background: To explore and describe the reasons for variation in diagnostic accuracy of clinical examination using Yergason’s and Speed’s tests in predicting the pathological changes of biceps tendon, shoulder arthroscopy is still used as the gold standard. Clinical tests are key elements in diagnosing bicipital sheath lesions and bicipital tendonitis. The purpose of this study is To evaluate clinical application of a new diagnostic method named as the backward traction test for the diagnosis of bicipital sheath lesions and bicipital tendonitis with the comparison with arthroscopic examination.

Material and Methods:
Between February 2012 and February 2015, a consecutive cohort including 280 patients (131 women and 149 men) with the age range of 18-79 years old (mean age, 46 years old) was conducted to examine shoulder pain through Speed’s test and a new test named as backward traction test. Patients who fulfilled the following criteria underwent surgery: persistent pain and functional disability for more than 6 months, no responsiveness to adequate conservative treatment, positive impingement test confirmed by local anesthesia, or clinical or investigative signs of rotator cuff tears, labrum, biceps lesions or bicipital sheath lesions and bicipital tendonitis. The results of these tests were also confirmed through arthroscopic examination. Backward traction test is conducted during the patient was in the stand position coupled with the arm with natural fall. The examiner sits adjacent to the patient on the same side as the shoulder, grasps the patient’s wrist gently, fixes at the scapula and backward traction for the examined arm at 120° external rotated position and 120° internal rotated position (Fig. 1). The test is considered as positive if the patient has the complaint of pain or clicking joint at the front of the shoulder during the test. The test is considered as negative if pain is not elicited during the test. Surgical findings were recorded for true and false positives and true and false negatives for the pathology of biceps. Sensitivity, specificity, accuracy, and positive and negative predictive values were calculated for backward traction and Speed’s tests (Tables 1 and 2).

Results: The arthroscopic findings associated with the pathological changes of biceps were observed in 58 patients with bicipital tendonitis, 78 patients with bicipital sheath lesions (Figs.
2 and 3), 54 patients with SLAP lesions, and 90 patients with rotator cuff tears. In addition, 56 patients had the compound pathological characteristics of rotator cuff tears, labrum, biceps lesions or bicipital sheath lesions and bicipital tendonitis.

Among these patients with bicipital tendonitis and bicipital sheath lesions, the sensitivity, specificity, and positive and negative predictive values were 91%, 89.8%, 89%, and 91.7% for backward traction test and 26.5%, 54.9%, 35.6%, and 44.1% for Speed’s test, respectively. The likelihood ratios were 8.9 and 0.1 for backward traction test and 0.59 and 1.3 for Speed’s test (Tables 1 and 2). In addition, among the 136 patients, 85 patients at 120° external rotated position and 51 patients at 120° internal rotated position were positive for backward traction test, respectively.

Discussion

The pathology of the shoulder pain may involve lesions within the long head of the biceps tendon (LHBT). Along its course in bicipital tendonitis, bicipital sheath lesions and or labrum lesions, the pathological changes of LHBT were classified into 3 categories: 1) the degeneration of biceps tendon (bicipital tendonitis); 2) the instability of tendon (bicipital sheath lesions); and 3) original disorders (SLAP lesions). Biceps tendonitis may be a secondary phenomenon caused by impingement. Decreased space in the coracoacromial arch may lead to the irritation and mechanical symptoms of biceps. Others pathological changes included rotator cuff tears and labral lesions (SLAP). Yergason’s and Speed’s tests are not sensitivity for bicipital sheath lesions and bicipital tendonitis. An accurate clinical diagnosis of bicipital sheath lesions and bicipital tendonitis is difficult.

The backward traction test in the present study reveals the sensitivity of 91%, the specificity of 89.8%, and the accuracy of 90.4% for bicipital sheath lesions and bicipital tendonitis although the arthroscopic examination is used as a gold standard. The likelihood ratios are 8.9 and 0.1 for backward traction test and 0.59 and 1.3 for Speed’s test. Therefore, the backward traction test is much better than Speed’s test. It is not clear if the surgeon in that study is blinded to the clinical examination at the time of surgery. The backward traction test is evaluated in a tertiary clinic, and patients have surgery for various pathologic conditions, indicating an appropriate spectrum of patients. The arthroscopic findings associated with the pathological changes of biceps include bicipital tendonitis, bicipital sheath lesions and SLAP lesions. Among these patients with bicipital tendonitis and bicipital sheath lesions, 85 patients at 120° external rotated position including the tears of the supraspinatus are positive, suggesting the medial walls of bicipital sheath lesions; 51 patients with 120° internal rotated position including the tears of the subscapularis are positive, suggesting the lateral walls of bicipital sheath lesions. Among patients with SLAP lesion, the positive rates are 92.9% for backward traction test and 91.7% for Speed’s test, respectively. The correlation between Speed’s test and anatomic location of type II SLAP lesions has also explored. The sensitivity is reported as 29% for posterior lesions, 100% for anterior lesions, and 78% for combinatorial lesions.

Conclusion: The backward traction test is an effective diagnostic strategy for bicipital sheath lesions and bicipital tendonitis.
THE COMPARATIVE STUDY OF ARTHROSCOPICALLY AND OPEN SUBPECTORAL TENODESIS FOR THE TREATMENT OF BICEP TENDONITIS

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BACKGROUND:
The long head of the biceps tendonitis is a common pathological situation which causes shoulder pain for patients. Normally it can be treated with tenotomy or tenodesis when nonoperative measures are not effective. The tenodesis of bicep tendon can be achieved arthroscopically or open surgery. It is not clear whether arthroscopic or open biceps tenodesis has a clinical advantage.

MATERIAL AND METHOD:
A prospective comparative study was designed for patients undergoing an all-arthroscopic in joint or open subpectoral biceps tenodesis. Patients undergoing a concomitant rotator cuff or labral repair were excluded. The groups were matched to age within 5 years, sex, and time to follow-up within 1 months. Time length of tenodesis surgery, amount of blood loss, early pain improvement (day 1-7 after surgery, late pain improvement (day 7-1 month), postoperative American Shoulder and Elbow Surgeons scores, and complications were evaluated.

RESULTS:
25 patients (14 all-arthroscopic, 11 open) with an average age of 50 years (range, 45-55years) were evaluated. There is a significant difference between two groups regarding the time length of surgery. The mean time length of arthroscopically tenodesis in joint is 25 mins (range, 20-35 mins) and that of open tenodesis is 10 mins (range, 5-18 mins). There is a significant difference between two groups regarding the blood loss. The mean amount of blood loss is 5ml (range 3-10 ml) for arthroscopically and 30ml (range, 20-50ml) for open tenodesis. There is significant difference regarding the early pain improvement between two groups. Open tenodesis shows more early pain improvement than arthroscopically. There was no significant difference in mean American Shoulder and Elbow Surgeons scores as well as the late pain improvement between the open and arthroscopic groups (90.4 vs 85.6; P=.36); There were no complications in both all-arthroscopic group and open group.

DISCUSSION
The long head of biceps tendon starts at the top of glenoid labrum and run through the tendon sheath around the intertubercular groove. Once it gets inflammation, the arthroscopically fixation in joint still leave certain length of inflammatory tendon in the tendon sheath which might cause symptoms for the patient. Also if the tendon sheath gets inflammation, the tenodesis of bioceps tendon in the joint might not have effect on the symptoms relieve because there is still a part of
tendon in the tendon sheath is in motion while arm moves. However, open subpectoral tenodesis has the tendon fixed below the inferior end of tendon sheath which leave nothing in the inflammatory tendon sheath. It might be a better method to treat the biceps tendonitis with inflammation of tendon sheath.

CONCLUSION:

Biceps tenodesis remains a reliable treatment for the long head of the biceps tenodesis. Open subpectoral biceps tenodesis takes less time than arthroscopically surgery, but with more blood loss. Patients undergoing open subpectoral tenodesis showed more early pain improvement as compared with patients undergoing an arthroscopically tenodesis. There is no significant difference regarding the late pain improvement, shoulder score and complications between two groups.
RETURN TO SPORT AND PATIENT SATISFACTION AFTER ARTHROSCOPIC BANKART REPAIR. A SINGLE-INSTITUTION EXPERIENCE.
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Background
Arthroscopic Bankart repair produces good results, however not all patients return to playing sports after seemingly successful surgery. Revision surgery is a crude measure of failure as not all dissatisfied patients return for repeat surgery. The aim of this study is to study the functional outcomes of arthroscopic Bankart repair at our institution including return to sports and patient satisfaction and its associated factors.

Material
Institutional Board Review approval was obtained for this study. The operative records of 107 consecutive patients undergoing arthroscopic Bankart repair at our institution from 2008 to 2013 were reviewed. Patients who underwent arthroscopic Bankart repair were recurrent dislocators without large Hill-Sachs or bony Bankart lesions seen on MRI of the affected shoulder.

Method
Patients were contacted by an independent observer at least 2 years after surgery. 85 patients consented for an interview which consisted of self-reported scoring of patient satisfaction with surgery, willingness to undergo surgery again if given the chance and return to sports after surgery. 63 patients completed the interview and scoring, including the Oxford Instability Score (OIS) and Simple Shoulder Test. Analysis was performed with SPSS for Windows using the Chi-squared test for categorical values and the t-test for continuous variables.

Results
The mean age at first dislocation was 19.5 ± 3.3 (13.0 to 28.0) years. Duration of follow-up was 3.6±1.4 (2.3 to 8.1) years. 2.2±2.7 (0.1 to 15.2) years elapsed from first dislocation to surgery. 34/63 (54.0%) played overhead or contact sports before injury. 35/63 (55.6%) played competitive sports before injury.

7/63 (11.1%) reported recurrence of dislocation after surgery. 4/63 (6.4%) underwent revision surgery. 19/63 (30.2%) report mild instability after surgery. 35/63 (55.6%) returned to playing sports after surgery. 57/63 (90.5%) are satisfied with their surgery. 61/63 (96.8%) will undergo the same surgery again if given a chance. 44/63 (69.8%) reported completing physiotherapy.

Recurrence of dislocation is not associated with atraumatic dislocation (p<1.00), Hill-Sachs lesion (p<0.67), ligamentous laxity (p<0.41), playing contact or overhead sports prior to injury (p<0.44), bony Bankart lesion seen on arthroscopy (p<0.89), SLAP lesion (p<0.21), number of dislocations before surgery (5.0±2.44 vs. 5.6±13.5, p<0.90), age of dislocation (17.9±3.9 vs. 19.7±3.2 years, p<0.16), completion of physiotherapy (p<1.00), return to sports (p<0.45), patient satisfaction (p<1.07). Recurrence of dislocation is associated with playing competitive sports prior to injury (p<0.038).
56/63 (88.9%) have a 2 year OIS score which is Good or Excellent. A Good or Excellent OIS Score is not significantly associated with number of dislocations before surgery (5.7±13.5 vs. 4.6±4.9, p<0.83), return to sports (p<0.23), age of dislocation (19.6±3.4 vs. 19.1±2.5 years, p<0.75), ligamentous laxity (p<0.41), operative time (65.9±32.2 vs. 55.7±15.1 mins, p<0.42), absence of recurrence (p<1.23), completing physiotherapy (p<1.00), wanting to do surgery again if given a chance (p<0.31).

A Good or Excellent OIS Score is significantly associated with self-reported stability after surgery (p<0.022), satisfaction with surgery (p<0.024) and playing competitive sports before surgery (p<0.014).

**Discussion**

Despite the low revision rate in our series of patients and Good or Excellent functional scores at 2 years after surgery, 30% of patients report mild instability in the operated shoulder. Even with this self-reported instability, patient satisfaction remains high as seen by the willingness to undergo the same surgery again. More than half of our patients returned to playing sports after surgery.

Although recurrence of dislocation was associated with a history of playing competitive sports prior to injury, a Good or Excellent functional score was also associated with a history of competitive sports. A more sensitive indicator of outcome from surgery could be self-reported instability and return to playing sports.

**Conclusion**

Good functional scores after arthroscopic Bankart repair do not necessarily translate to a return to sports for most patients. Even with perceived instability in the operated shoulder after surgery, patients’ satisfaction remains high.
Clinical results after all arthroscopic reduction and fixation with suture anchor of fresh bony Bankart lesion

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Background: Restoration of glenoid bony integrity and repair of labrum and capsule lesion is critical to minimizing the risk of recurrence of subluxation and re-creating normal kinematics in the setting of anterior glenohumeral instability. We present an arthroscopic suture anchor-based technique for treating fresh bony Bankart fractures in which the fragment is secured to the glenoid using suture placed through the proximal and distal poles of the bony fragment and augmented with adjacent soft-tissue repair.

Material: Between May 2014 and February 2015, 4 patients with fresh bony Bankart lesion who underwent transient shoulder joint dislocation and showed remained instability as subluxation of shoulder, among them 3 were male and 1 patient was female, the age of the patients was 27, 38, 44 and 59 years old respectively.

Objective:

Method: All the 4 patients were treated with all arthroscopic labrum and fracture fragment reduction and internal fixation with suture anchors, 1 of the patients combined with Hill-Sachs lesion was proceeded with remplissage technique, and 1 patient’s combining supraspinatus tear was repaired arthroscopically. Constant-Murley score, Rowe score and the VAS score for instability were used to evaluate the effect.

Results: The average duration of follow-up was 10.2 months (7-14 months). The Constant-Murley were 98.3 ±2.2, the Rowe score were 84.5 ±22.0 and two of the patients showed 1 for the VAS score for instability and the other two showed 0.

Discussion: Indication of surgical intervention is the most crucial for success of fresh bony Bankart lesion treatment, it should be restricted in instability as subluxation of shoulder after reduction. Suturing technique and instrument is also important in the repair.

Conclusion: Arthroscopic reduction and fixation for fresh bony Bankart lesion in unstable shoulder can achieve a good result and the combined injuries also could be addressed effectively.
[Abstract] **Objective**: to evaluate the early functional outcome of arthroscopic-assisted treatment of glenoid Fractures. **Method**: We treated 15 cases suffering glenoid fractures with arthroscopic-assisted approach from September 2011 to April 2014. 11 patients were male and 4 patients were female. The average age is 34.6y (18-46y). The etiology included 9 falls and 6 traffic accidents. The interval from injury to surgery is 9.2 days (6-17d). According to the Ideberg classification: 7 cases were Type Ia; 1 case was Type Ib; 2 cases were type II; 3 cases type III and 2 case was type IV, 3 cases type Ia and all type Ib to type III fractures were treated with arthroscopic reduction and percutaneous cannulated screw fixation, 4 cases type Ia fractures were treated with arthroscopic reduction and double pulley technique fixation, 2 case type IV fractures were first openly managed with posterior glenoid rim and neck fracture via posterior approach and then treated with arthroscopic reduction and double pulley technique or cannulated screw fixation. Constant—Murley shoulder score was used to assess the joint function. **Result**: The average operation time was 95 minutes (80-135min) and average follow-up time was 10.6 months (9-18m). The step of articular surface was less than 1-2mm in the view of arthroscopy and postoperative CT scan. 3 months postoperatively CT scan showed the fractures had healed. The mean Constant-Murley score was 87.2 points (range, 74 to 100 points). There were 10 excellent cases, 4 good cases and 1 moderate case. The average forward flexion of the shoulder was 162° (range, 130° to 180°); The average external rotation was 42.5° (range, 30° to 80°); The average internal rotation were lost 2.8 vertebra segments (range, 0 to 6 vertebra segments). **Conclusion** It is the new and effective method to treat the intraarticular glenoid fracture, It provides precise reduction and stable fixation through the arthroscopic-assisted approach and have the advantage of rapid recovery and less complication. But the technique is demanding and the surgeons need long learning curve. **Key word**: Arthroscopic-Assisted Treatment Glenoid Fractures
Arthroscopy assisted reduction and fixation to treat the Ideberg IA type glenoid cavity fracture recent clinical curative effect

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Background

Objective To investigate the recent clinical effect of arthroscopy assisted reduction and fixation to treat the Ideberg IA type glenoid cavity fracture.

Material

From February 2010 to February 2014, 25 patients with Ideberg IA type glenoid cavity fracture were selected in the our department.

Methods

10 patients combine with humerus greater tuberosity fracture, including 16 male and 9 female. Their age varied from 22 to 70, and the average age was 53.4 years old. All patients had a clear history of trauma. The time from injury to operation was 3-18 days, 9 days in average. All of them were treat by arthroscopy assisted reduction and fixation by headless compression screw associate with suture anchor internal fixation, the patients humerus greater tuberosity fracture at the same time with reduction and fixation under arthroscopy. After operation, adjustable shoulder abduction brace was given and then regularly followed up. American Shoulder and Elbow Society (ASES) score was used to evaluate the shoulder function.

Results

All of the 23 patients' incision were I grade unioned, two old patients occurred partial fixation loosening. All of the 25 patients were successfully followed up for 12 to 40 months, at an average of (29.7 ±9.2) months. The ASES score was 69 to 90, at an average of (88.0 ±13.2); 9 cases got excellent clinical effect, 12 cases got good clinical effect, and 4 case got bad clinical effect.

Discussion

Arthroscopic shoulder under the fixed type Ideberg IA glenoid cavity fractures, small trauma, simple operation, exact fixed tightly.

Conclusion

Arthroscopy assisted reduction and fixation to treat the Ideberg IA type glenoid cavity fracture has satisfying recent clinical effect, especially adapted to the good bone patient.

【Key words】Glenoid Fractures, Ideberg IA, Cannulated sreew, Suture anchor, Arthroscopy
Clinical outcome of arthroscopic fixation for glenoid fracture using a double threaded screw

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Background: The glenoid rim fractures with a small bony fragment are generally treated by suture anchor technique. However, when the bony fragment is large, osteosynthesis would be performed using screws. The purpose of this study is to evaluate clinical outcome of arthroscopic fixation for glenoid fractures using double threaded screws.

Material and Methods: Ten patients who underwent arthroscopic fixation of glenoid fracture were included in this study. Nine patients had glenoid rim fractures (Ideberg type Ia), and one patient had a glenoid transverse fracture associated with body fracture (Ideberg type IVa). The surgeries were performed in all arthroscopic procedure. After reduction of the bony fragment, labrum around the fragment was repaired by suture anchors. Then, the bony fragment was fixed by a double threaded screw. Mean follow-up duration was 25 months. Japanese Orthopaedic Association (JOA) score, Constant score, Japanese Shoulder Society (JSS) shoulder instability score, and Rowe score were assessed.

Results: The average of JOA score, Constant score, JSS shoulder instability score, and Rowe score at final follow-up were 95.2 points, 83.4 points, 90.9 points, and 96.5 points, respectively. Bony union was acquired in all cases at three months after the surgeries without any pain. Postoperative CT scan revealed protrusion of the screw head in eight cases without symptom. The removals of the screws were performed in six cases. In two cases, the patients refused removal of the screws because they were asymptomatic.

Discussion: Fixation of the bony fragment of the glenoid fractures using the double threaded screw was rigid, and early bony union was successfully achieved. Although the screws were arthroscopically inserted underneath the articular cartilage, follow-up CT scan showed protrusion of the screw head inside the joint. To avoid the unnecessary complication, the position and insertion angle of the screw should be carefully planned.

Conclusion: The clinical results of arthroscopic fixation for glenoid fracture using a double threaded screw were satisfactory.
Surgical Management of Chronic and irreducible Anterior Shoulder Dislocation

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Purpose: The unreduced shoulder dislocation that lasts more than 3 weeks is called the chronic and irreducible shoulder dislocation. The purpose of our study was to evaluate the methods of surgical treatment of chronic and irreducible anterior shoulder dislocation, by use of open reduction, Lartajet procedure and repaired proximal humeral bone defect.

Methods: From January 2013 to June 2015, three chronic and irreducible anterior shoulder dislocation had underwent surgical treatment. The patients comprised 5 men and 2 woman (minimum age 16, maximum age 58) in whom shoulder dislocation were all caused by fall damage. Average dislocation time was 7.3 weeks (range, 5 to 9 weeks). Patients were treated by releasing adhesion of shoulder joint and open reduction, Lartajet procedure which needed coracoid osteotomy was used to repair Bankart lesion, and proximal humeral bone defect was repaired with fracture bone reduction and fixation or autogenous iliac bone.

Results: At a mean follow-up of 6.6 months (range, 4 to 10 months), all the shoulders reminded stable without redislocation. Pain relieved obviously. Shoulder joint activity obviously improved, abduction more than 90 degrees and external rotation more than 70 degrees in every patients. Nerve symptoms of the patients who had brachial plexus injury performance improved significantly after 4 months. The mean American Shoulder and Elbow Surgeons score increased 59 (±14.5) points postoperatively. Mean satisfaction with outcome was 8 of 10 points (range, 1 to 10).

Conclusions: Our surgical management, including open reduction, Lartajet procedure and repaired proximal humeral bone defect, can effectively restore the stability of the shoulder joint. The shoulder functions can be regained well because of the realization early rehabilitation training.
Arthroscopic Treatment of Multidirectional Shoulder Instability with Capsular Narrowing and Shortening of the Anterior, Inferior and Posterior ligaments: Minimum 2-Year Follow-up

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Background: Shoulder stabilization for symptomatic multi-directional instability can be performed with open or arthroscopic surgery, but arthroscopy has become the preferred method. There are differences in different arthroscopic capsule narrowing techniques. The aim of this study was to present the clinical outcomes of arthroscopic all round capsular narrowing applied along the axes of the glenohumeral ligaments (GHL) in 2-4-year follow-up period.

Materials: The study included 75 patients who underwent surgery because of symptomatic multi-directional shoulder instability. The diagnosis was made on the basis of patient history, physical examination and arthroscopic findings. Functional outcomes of the all patients were evaluated with the American Shoulder and Elbow Surgeons (ASES) score, Rowe instability score and visual analog pain scale. Stability, strength, degree of pain and range of motion were also evaluated with patient-reported scales.

Methods: The technique applied was arthroscopic shortening of the inferior capsule then the inferior GHL anterior and posterior sections, the medial GHL, and superior GHL. In each case, 3 absorbable screws were used. An arm sling was applied for 3 weeks postoperatively. After 3 weeks, ROM exercises were started without forcing internal and external rotation. At the end of one week, all ROM exercises and strengthening exercises were started. Sporting activities were permitted after 16 weeks.

Results: In the follow-up period of 2-4 years, all postoperative functional scores were rated good to excellent except three cases. There were 2 (2.66%) cases of recurrent dislocation and 1(1.33%) case of symptomatic instability. In the cases of recurrent dislocation, revision was applied with the Latarjet procedure. There were no differences in range of motion compared with the opposite extremity in 72 (96%) cases.

Discussion and Conclusion: The good results obtained with open capsule narrowing have been obtained in recent years with arthroscopic techniques in multi-directional shoulder instability. The results of this study demonstrated that in multi-directional instability, capsular narrowing applied with the arthroscopic technique in the form of all round shortening along the axes of the glenohumeral ligaments is an effective technique which is compatible with the biomechanics of the glenohumeral joint and provides good results in terms of pain relief and clinical stability at a minimum 2-year follow-up.
Effects of Arthroscopic versus Open Surgical Treatment on Multidirectional Instability of the Shoulder – A Meta-analysis

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Background

Surgical treatment of shoulder multidirectional instability (MDI), which can be defined as pathological capsular laxity, has evolved since Neer (1) recommended an open inferior capsular shift technique to treat the condition after failure in a prolonged physiotherapy program. The successful outcomes of this technique specified the surgical strategy for MDI. Biomechanical studies supported the capsular volume reduction and the capsuloligamentous tightening concept. Several arthroscopic surgical variations, such as arthroscopic capsular plication and thermal capsular shrinkage have subsequently evolved.

The controversy remains regarding which of the surgical options is a preferred method of treatment in individual circumstances. Few properly designed randomized controlled trials have been completed. However, this evolving technology demands further understanding to guide practice. It has been demonstrated that case series can be incorporated in meta-analysis to increase the strength, especially when higher levels of evidence are lacking. Therefore, we included case series data in this meta-analysis, to synthesize reported results concerning MDI for the first time.

The purpose of this study was to assess the effectiveness of arthroscopic and open surgical techniques on the treatment of shoulder multidirectional instability.

Materials and methods

The review and analysis were performed in accordance with the Cochrane Handbook for Systematic Reviews and the PRISMA statement. The databases used in the search were Medline, EMBase, ClinicalTrials.gov, The Cochrane Library, and The Cochrane Central Register of Controlled Trials. Other sources included the reference lists.

Level IV or higher original articles were selected. The searched studies were screened against the selection criteria. The selected studies were pooled into three surgical technique groups: open capsular shift (OCS), arthroscopic capsular plication (ACP), and arthroscopic thermal capsular shrinkage (TCS).

The risk of bias in individual studies and the risk of bias in cross-studies was examined using Funnel plots with Egger tests and heterogeneity $I^2$. Follow-up data at 2 years were used for determining outcome measures. Recurrent instability was the primary outcome. Secondary outcomes included range of motion, and other complications.

Subgroup analysis was performed to examine the effects of the rotator interval closure technique and rehabilitation methods.

Results
The literature search yielded 631 papers. After screening, 36 papers were selected, including a total of 1,117 shoulder cases in 1,053 patients, with a mean age of 24.2 years and an average follow-up of 40.7 months.

The OCS and ACP groups exhibited recurrent instability rates of 9.9% (95% CI, 7.3%-12.9%) and 6.08% (95% CI, 3.7%-8.9%), respectively, with no significant difference observed. The TCS group experienced a significantly higher recurrent instability rate, 23.9% (95% CI, 16.6%-32.2%). I² was 63.3% in the TCS group, representing a substantial discrepancy among the studies in the group. The funnel plots for the TCS group also showed publication bias.

The analysis of the OCS and ACP groups revealed low reoperation rates of approximately 5.2% (95% CI, 2.7%-8.5%) and 4.8% (95% CI, 2.3%-8.0%), respectively. The TCS group had the highest reoperation rate, approximately 16.9% (95% CI, 12.4%-21.8%).

On average, OCS caused a loss of range of motion in 33.8% (95% CI, 27.7-40.1%) of patients, compared to 5.5% (95% CI, 3.6-9.8%) in the ACP group. An external rotation deficit contributed to the most loss of range of motion in these studies. The mean losses of external rotation was 7.0 (95% CI, 3.3-10.6) degrees in OCS group, significantly higher than that in the ACP group.

Three of the disabling pain patients were from the studies using arthroscopic transglenoid capsular suturing technique in the ACP group, two of which necessitated removal procedures.

Postoperative neurological deficits developed in 2.2% of the patients. Most of them are partial axillary nerve palsy. All recovered in 3 weeks to 12 months.

Only 3 cases of infection were reported, all from the open procedure group, accounting for 2% in the group.

In subgroup analysis, the results of rotator interval closure technique was partially reported in 16 studies in OCS and ACP groups. No difference was observed between with and without performing the technique.

The analysis concerning rehabilitation methods demonstrated no difference. Overall, the first phase of immobilization lasted for 2 to 6 weeks, the second phase of passive or active assisted range of motion for 2 to 10 weeks, and the third phase of active range of motion for 1 to 6 months. Participation in sports was generally delayed for 6 months.

**Discussion**

The success of the classic OCS technique profoundly influenced our understanding of MDI. More recently, the minimally invasive ACP has become a popular surgical technique. The advantages of the two techniques continue to be debated. The results of our meta-analysis suggested that these two techniques are nearly equally effective in achieving shoulder stability, with high success rates of more than 90%.

Functional recovery comparisons, however, yielded different results. The OCS surgery caused more patients to lose range of motion, particularly with respect to external rotation. This demonstrates that the open procedure with more traumatic dissection and tight suturing of anterior capsule causes more stiffness than the arthroscopic surgery.

Thermal capsular shrinkage under arthroscopy was once a popular surgical method. This technique became popular despite conflicting surgical results presented in initial publications, which was in
agreement with the high $I^2$ found in our analysis. The popularity of the procedure was lost in recent years, which could be explained by the high recurrent instability and reoperation rates in the analysis. The history of this technique presents a good example of how a meta-analysis can provide timely informed reference for emerging techniques.

Whether rotator interval closure should be performed has been a debate in MDI treatment. Whether or not performing this procedure showed similar results in the subgroup analysis.

**Conclusions**

In summary, the classic OCS technique and the newer ACP technique demonstrated comparable results in general MDI populations. However, the latter had the advantage of avoiding postoperative stiffness. Thermal capsular shrinkage may need to be avoided in MDI treatment because of its higher failure rates.

Outcome of coracoid transfer (Latarjet procedure) using a congruent arc technique assessed using computerised tomography

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Modified Arthroscopic Latarjet procedure with paired-Endobutton: a safe, rigid, and reproducible technique with early results

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Abstract

PURPOSE:
To evaluate the stability, safety and reproducibility of a novel modified arthroscopic Latarjet technique, and to report the early clinical and radiologic results.

METHODS:
15 consecutive patients with glenoid bone loss and capsular deficiency were treated with this modified Latarjet technique; 3 patients had a failed arthroscopic capsulolabral repair. After coracoid fragment was osteotomized by a 25mm skin incision, the fragment was passed with the conjoined tendon through the subscapularis muscle, and fixed in the standing position with a paired Endobutton guided by a double barreled aimer on the abraded glenoid neck arthroscopically. The intraoperative and postoperative complications were recorded. All patients were reviewed and had postoperative computed tomography scans.

RESULTS:
The procedure was performed arthroscopically in all cases except the coracoid harvest, no patient was conversed to open surgery. The axillary nerve was identified in all cases, and no neurologic injuries were observed. No patient had any recurrence of instability at the most recent follow-up (3-6 months, mean, 3.5 months). The mean Rowe score was 90 ± 15.4. The bone block was subequatorial in all cases; All of the cases had no bone graft too lateral (>2mm) or too medial (>5 mm). No bone block fracture or migration.

CONCLUSIONS:
The modified paired Endobutton arthroscopic Latarjet procedure is rigid, safe, and reproducible. This procedure allows restoration of shoulder stability in patients with glenoid bone loss and capsular deficiency, as well as in the case of failed capsulolabral repair. Arthroscopy offers the advantage of providing adequate visualization of both the glenohumeral joint and the anterior neck of the scapula, allowing accurate placement of the bone block and screw. The usage of a double barreled aimer, and portal shift techniques were the key part of this procedure.
Relationship between Humeral Torsion and Career of Pitcher in Elementary and Junior-high Schools

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Background: Repetitive throwing motion generates tremendous stress on the dominant shoulder in baseball players, resulting in osseous change in the shoulder joint, especially increased humeral retroversion. Here we hypothesized that the career of a pitcher in elementary and junior-high schools might increase humeral torsion on the dominant shoulder. The objective of this study was to assess the effect of baseball position in youth and adolescent athletes on humeral torsion.

Materials and Methods: We studied 153 high school baseball players who began to play baseball in elementary school at the age of 8.1±1.6 years old. All subjects completed questionnaires about their baseball experience, throwing activity, and past injuries; they then were physically examined. We divided them into four groups according to their baseball positions in elementary and junior-high schools: 35 players were pitchers in both elementary and junior-high school (group 1), 32 players were pitchers in elementary school but fielders in junior-high school (group 2), 17 players were fielders in elementary school but pitchers in junior-high school (group 3), and 69 players were fielders in both elementary and junior-high school (group 4). Humeral torsion was assessed bilaterally by using ultrasound. Humeral torsion was defined as the angle between the long axis of the forearm and a line parallel to the trunk, when the line tangential to the bicipital groove was parallel to the horizontal baseline in supine position with the shoulder at 90º abduction, the elbow at 90º flexion, and the forearm in the neutral position.

Results: Beginning age of baseball did not differ significantly among four groups. Among the 153 high school baseball players, 113 players (73.9%) had history of shoulder or elbow injuries. Humeral torsion was significantly greater (p < 0.01) on the dominant shoulder than on the non-dominant shoulder in all groups. Humeral torsion on the dominant shoulder was significantly greater (p=0.03) in group 1 than in group 4 (mean difference, 7.1º). A logistic regression analysis showed that humeral torsion on the dominant shoulder was not a predictive factor for shoulder and elbow injuries (odds ratio, 0.99; 95% confidence interval, 0.96 - 1.02; p value, 0.70).

Conclusions: In high school baseball players, humeral torsion was greater on the dominant shoulder than on the non-dominant shoulder. Players who played baseball as pitchers during both elementary and junior-high school had greater humeral torsion on the dominant side than did players who were fielders during both periods. Given that pitchers throws more frequently than do fielders, this study suggests that increased time pitching in youth and adolescent athletes increases the humeral torsion on the dominant shoulder. Increased humeral torsion on the dominant shoulder was not the predictive factor for shoulder and elbow injuries.
Elbow Valgus Laxity after Ulnar Collateral Ligament Reconstruction in Competitive Athletes

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Background: Ulnar collateral ligament reconstruction (UCLR) has afforded overhead athletes high rate of return to previous level of play. Although biomechanical study using cadaveric elbows showed UCLR restored valgus laxity to the native state, no clinical study investigated if the restored valgus stability has been kept at the time to play competitively. The objective of this study was to evaluate elbow valgus laxity using stress ultrasound before and after UCLR, and after return to play at the previous level.

Materials and Methods: Eleven competitive athletes (mean age of 18.3 years; range, 15–22) who had undergone UCLR using the modified Jobe technique (figure-of-8 graft with a muscle-splitting approach) participated in this study. Of the 11 patients, there were 8 baseball players, 2 cheerleaders, and one wrestler. Physical examination, MRI, and stress ultrasound were performed before surgery and at 2 and 12 months after surgery. Outcomes were classified using a Conway scale. For the assessment of elbow valgus laxity, the width of the medial joint space was measured using ultrasound. The degree of elbow valgus laxity was defined as the difference in width of the medial joint space with and without valgus stress. Graft healing was assessed using ultrasound and MRI.

Results: Valgus laxity in affected elbow (1.7±0.8mm) is significantly larger than that in unaffected elbow (0.4±0.2mm) before surgery (p<0.001). After UCLR, valgus laxity in affected elbow significantly decreased to 0.1±0.1mm and 0.2±0.1mm, at 2 (p<0.001) and 12 months (p<0.001), respectively. Ultrasound and MRI showed no graft tear at 12 months after UCLR in all patients. Seven baseball players returned to competition at 11 months (8-12 months) after UCLR, 2 cheerleaders at 5 months, and a wrestler at 4 months. Ten patients (91%) had excellent outcome in Conway scale. One patient did not return to baseball for family reasons.

Conclusions: Elbow valgus laxity restored to the intact level after UCLR. The restored elbow valgus stability after UCLR has been kept until return to sports.
The middle to long term results of reconstruction of stiff elbow under arthroscopy technique

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Abstract

Objective To evaluate the middle to long term results of reconstruction of stiff elbow under arthroscopy technique.

Methods To re-evaluate the clinical results of the 38 stiff elbows treated under arthroscopy technique previously, and to compare the clinical results between the early follow-up and the middle – long term follow up.

Results The were 36 patients completed the follow-up. There were 24 male and 12 female. The age was 47.8 years old on average(14-65 years old) and the average follow up time was 71.5 months(60-96 months). The preoperative average range of motion for the 36 patients was 80.1±24.4°, which increased to 121.4±24.8°at six months postoperatively and was 118.6±24.0°at the final follow up time; the averaged MEPS was 70.4±16.6 preoperatively, which increased to 89.4±16.5 at six months postoperatively and was 88.6±15.8 at the final follow up time; whereas the averaged VAS score was 2.8±2.2 preoperatively, which decreased to 0.5±0.5 at six months postoperatively and was 0.6±1.0 at the final follow up time. The middle-long term follow up showed superiorly results in terms of range of motion, MEPS(Mayo Elbow Performance Score), VAS for pain compared with preoperative results, whereas showed no significant difference compared with short term follow up results.

Conclusion The arthroscopy is an effective technique to reconstruct the function of the stiff elbow, and the clinical results did not decrease with time.

Keyword: Arthroscopy, elbow, osteoarthritis, joint contracture