

관절와 상완관절의 불안정증 (Instability in Glenohumeral Joint)

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1. 병태생리와 분류
2. 진단과 치료방침의 결정
3. 치료 방법 (Treatment of GHJ)

Treatment of Glenohumeral Joint Instability

- Anterior
- Posterior (Isolated)
- Multidirectional-excluded in session

Treatment of anterior instability

1. Acute traumatic anterior dislocation

1) Nonoperative treatment

- Closed reduction: Traction-countertraction, Stimpson method
- Immobilization: 3 weeks, in ER position (Itoi) afterwards same rehab protocol as recurrent dislocation
- Issues:
 - a. Length of immobilization?
 - b. Implementation of rehabilitation exercises, does it have some effect?
 - c. What kind of rehab?
 - d. Does rehab help to prevent recurrence?
 - e. ...

All these issues are still controversial.

- Goal of rehabilitation: Increase the endurance of scapula and cuff muscles (esp. the anterior subscapularis): discussed in recurrent instability below
- What can they go back to sports or over-the-head labor?
 - a. Normal rotator strength

- b. Comfortable and nearly full forward elevation
- c. Confidence in their shoulder with it in the necessary positions

2) Operative treatment

- Initial dislocator primary AS Bankart repair pro vs cons
- Rationale:
 - a. Hovelius 10 year f/u of primary anterior dislocation-only 50% had no recurrence, especially under 20 had high recurrence rate
 - b. Kirkley- conservative group 47-67% recurrence, Arthroscopic Bankart group 15%
 - c. Arciero 1994-Arthroscopic Bankart repair significantly reduced recurrence rate in young athletes who sustained an acute, initial anterior dislocation of the shoulder
 - d. Also although there were no recurrence and disease specific quality of life seem to be lower since they tend to avoid most of activities and sports involving overhead
 - e. ...

2. Recurrent anterior dislocation

1) Nonoperative treatment

- Background: Coordinated, strong muscle contraction is a key element in stabilization of the humeral head in the glenoid
- Aim of treatment: Optimal neuromuscular control of the rotator cuff muscles, deltoid, and pectoralis major, and the scapular musculature
- Principle of strengthening is basically same with other strengthening protocol.
 - a. Three parts of the deltoid muscles, the internal rotators, and the external rotators
Isometric → rubber tubing → free weights
 - b. Serratus anterior, and the rhomboids
Wall push-up → knee push-up → regular push-up
 - c. Trapezius and levator scapulae
Shoulder shrug with weights
 - d. Endurance and coordination -swimming 6 weeks - 8 weeks post trauma or op.
- Results
 - Yoneda- 17% recurrence
 - Aronen- 25% recurrence
 - Wheeler- 92% recurrence
 - Burkhead and Rockwood- only 16% had good result with just rehab

Mixed results - Probably age related (Age <20 at first dislocation is doomed to fail conservative treatment)

2) Operative treatment

- Arthroscopic vs Open Bankart repair (Always favorite topic, even hot potatoes) (Table 1)

Table 1. Pros and Cons

	Advantages	Disadvantages
Arthroscopic Bankart repair	Identify and treat concomitant disease	More recurrence rate
	Lower morbidity and pain	Maybe not suitable for contact sport athletes
	Short surgical time	Steep learning curve
	Improved cosmesis	Anchor related severe problem
	More chance to preserve good external rotation	Need many instruments
	Throwing athletes	
Open Bankart repair	Low recurrence rate	More surgical time
	Good firm repair of the labrum and capsule	More scar
	Shorter learning curve than arthroscopy	Possible more LROM esp ER
	Good suture tie without anchor	Damage to subscap
		More morbidity and pain

(1) Arthroscopic Bankart Repair

Indication (not absolute but best)

- Traumatic unidirectional anteroinferior dislocation
- Noncontact sports athletes
- Glenoid bone loss less than 25%
- No ligament laxity
- Not voluntary dislocators

Repair Method

- Capsular stapling, transglenoid suture, cannulated bio-absorbable anchor: *Presently not used*
- Suture anchor: Trend and now also switching from metal to bioabsorbable

Key technique

- Realistic patient goals and time frames
- Sufficient anterior and anteroinferior capsulolabral mobilization (1~7 o' clock)
- Abrasion of the neck and glenoid rim to promote bony bleeding and optimal bed for capsular healing
- At least 3 anchors or more
- Sufficient inferior capsular shift
- Address capsular laxity (drive through sign, no history hospital reduction, general laxity sign, SLAP and so on)
- Good suture anchor placement
- Good knot tying technique or proper usage of knotless anchors

Cause of failure in arthroscopic stabilization

- Suboptimal position
- Poor suture anchor fixation
- Loss or improper knot configuration
- Limitation of reaching the lowermost point
- Sawing through
- Damage on the humeral head
- Retrieval difficulty

Results (recurrence rate)

- Tjourmakaris 2006 1%
- Rhee 2006 25% in collision athletes
- Mazzocca 2005 11% in contact and collision athletes
- Marquardt 2006 7.5%
- Ide 2004 7% nearly same in contact athletes and noncontact athletes
- Kim 2003 4%
- Bacilla 1997 7%
- Gartsman 2000 8% recurrence rate

(2) Open Reconstruction

Indications (open surgery general)

- a. Large anterior and anteroinferior glenoid rim defect or fracture (more than 25% bone loss?)
→ More bony procedure (Laterjet or iliac bone graft)
- b. Contact sport athletes
- c. Failed arthroscopic Bankart repair?
- d. Engaging Hill-Sachs lesion → more bony procedure
- e. Combined general laxity with sulcus sign > 2+
- f. Hill-Sach lesion with bone loss more than 40% → More allografting of HH

g. ...

A. Open Bankart repair

- Suture anchor made possible for easy labral repair and capsular plication 95% success

Key surgical issues:

- a. Excessive tightening of the anterior capsule and subscapularis can lead to limited comfort and function, as well as to the form of secondary degenerative joint disease known as capsulorrhaphy arthropathy. Rosenberg et al. Loss of ER and increase of degenerative changes
- b. Orientation of capsulotomy. Horizontal capsulotomy recovered more external rotation than vertical capsulotomy.
- c. Drilling holes in the lip of the glenoid is still considered safer and more secure for suture passage and attaching the capsule to glenoid.
- d. Addition of capsular shift or capsulorrhaphy to the Bankart repair does not seem necessary or advisable in the usual case of traumatic instability
- e.

Results

- Pelet 2006 29 year f/u 30/39 were followed among 30, 10% recurrence
- Hatstrup 9.5% recurrence
 - Morrey 0%
 - Hovelius 1979 2%
 - Freedman 2004 3.4%
 - Yamaguchi 26 papers 1399 shoulders 22~180 month f/u 4.7% recurrence

B. Bristow & Latarjet operation-Transfer of coracoid with musculotendinous unit

- Bone effect of enlarging the diameter of glenoid
- Ligament effect-CA ligament tenodesis with the capsule
- Muscle effect by a hammock creation beneath the subscapularis
- Good with bone loss more than 25%
- In general, long term results show good results, however there are some alarming concerns on the arthritic changes of the GH joint

Results

- a. Schroder 2006 15.4% recurrence, 70% good & excellent result 26.4 year f/u
- b. Hovelius 2006 14% severe arthropathy
- c. Weaver 1994 good result after 10 year period
- d. Wredmark 1992 2/44 recur 6 yr f/u 72% good to excellent result

- e. Rockwood and Young 1989: Bristow procedure is nonphysiologic and associated with too many serious complications and recommended that it should not be performed for routine anterior reconstruction of the shoulder
- f. Spoor 2005 5% recurrence 7.7 year f/u arthritic change 3/20 patients
- g. Singer 1995 good long-term shoulder stability but high incidence of radiological degenerative change
- h.

Magnuson-Stack & Putti-Platt (Not used)

- Plication of subscapular and limit the ER but ROM limitation and possible arthritis

Postoperative Regimen for both arthroscopic and open procedure

- 0~3 weeks; Arm sling in neutral rotation with elbow and finger exercise
- 3~6 weeks; Remove arm sling passive exercise, inhibit ER
- 6~12 weeks; ER start, progressive strengthening exercise
- 3~6 month; Rotator cuff and scapular stabilizer strengthening

Treatment of posterior instability

1. Acute

1) Nonoperative treatment

Closed reduction: With the patient supine, in-line traction is applied until the humeral head can be manually placed back into the glenoid fossa. Gentle internal rotation during the application of traction is sometimes helpful. Generous use of IV sedation and muscle relaxant is helpful during procedure.

2) Operative treatment

For irreducible dislocations

A large, anteromedial humeral head defect (McLaughlin lesion)

3) Rehabilitation

Concentrate on the external rotators and the scapula and followed by global shoulder exercises.

Avoid provocative activities, avoid voluntary subluxation

Restriction against resisted internal rotation for 6 weeks

2. Recurrent

1) Nonoperative treatment

Principle: similar to MDI

- Provocative maneuvers and any abnormal scapulothoracic rhythms should be addressed
- Focused on strengthening the posterior deltoid, infraspinatus, and teres minor

2) Operative treatment

Indication

- Failure of rehabilitation at least 4~6 months
- Emotionally stable and cooperation of postoperative regimen
- Pain and instability combined precluding adequate function

3) Soft tissue Procedure

- a. Reverse Bankart
- b. Reverse Putti-Platt (Posterior capsular infraspinatus tenodesis)
- c. Posterior inferior capsular shift
- d. Capsular suture placation (Wolf, Snyder)
- e. Labroplasty and capsular shift (Kim)

4) Bony procedure

- a. Glenoid osteotomy
- b. Posterior bone block
- c. Humeral osteotomy

5) Results

- a. Misamore and Facibene- 2000 open posterior capsulorrhaphy 93% stable
- b. Kim 2003 1/27 recur, good clinical result with capsulolabroplasty

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