

## **Anterior Shoulder Instability with Capsular Tear-type Pathology**

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### **INTRODUCTION**

The majority of anterior shoulder instability are caused by deficiency of the anterior capsular mechanism, especially the inferior glenohumeral ligament/labrum complex (IGHLLC). Most common pathology of functional deficiency of the IGHLLC is its detachment from anterior glenoid, e.g. Bankart lesion (85-95%) , however, there is also certain cases with humeral side disruption of the IGHLLC, e.g. HAGL lesion (5-10%) . In a cadaveric study, Bigliani et al showed that midsubstance tear or stretching of the IGHLLC could occur after an anterior shoulder dislocation, even with a detachment of the anterior labrum (Bankart lesion). This could be also true with regard to HAGL lesion that occurs at humeral attachment of the IGHLLC. On the other hand, there is also a pathology without visible Bankart lesion or HAGL lesion as a cause of anterior shoulder dislocation. We classified such a lesion as type 5 (slack glenohumeral ligament without a classic Bankart lesion), which is speculated to be a functional deficiency of the anterior capsule, e.g. anterior inferior glenohumeral ligament (AIGHL), due to its midsubstance tear and stretching. In such a case, anterior covering of the humeral head by the AIGHL and its tension are not sufficient when the shoulder is positioned at 90 degree abduction and externally rotated. Recently, visible "isolated" capsular tears and "concomitant" capsular tears associated with Bankart lesion are increasingly detected by arthroscope, maybe by virtue of the advanced imaging quality. We classified these "visible" capsular tears as a type 7 lesion that is a new causative pathology of anterior shoulder instability (**Fig. 1**).

In this symposium I will present my current strategy to diagnosis and arthroscopic treatment for recurrent anterior shoulder dislocation caused by glenohumeral capsular tear (Type 7 lesion) with or without Bankart lesion through my recent series.

**CLINICAL FEATURES**

Despite severe symptomatic instability in the patients with HAGL lesion or humeral-side capsular tear, the patients with mid-portion or glenoid-side capsular tear tend to have milder instability.

Average age at the initial dislocation seems to be higher for the patients with mid-portion or glenoid-side capsular tear compared with those of the patients with HAGL lesion or humeral-side capsular tear.

Inferior laxity (Sulcus sign) of the shoulder is less frequently noted in patients with visible capsular tear.

**DIAGNOSTIC IMAGING**Inferior glenohumeral ligament/labrum complex (IGHLLC):

For the preoperative evaluation of the IGHLLC, we use MRI examination (T2\*, GE) with the shoulder in abduction and external rotation (ABER-MRI). The thinning of the capsule was detected in affected side of the 8 patients. Five patients with glenoid-side tear showed the signal change near the glenoid. Two patients with mid-portion tear showed severe thinning or disappearance of the capsule. One of 2 patients with humeral-side tear showed the capsular thinning, and the other normal capsular appearance. The ABER-MRI appears to be valuable in detection of "capsular tear" at the glenoid-side and the mid-portion except for the humeral-side tear. On the other hand, MR arthrography with the arm at side demonstrated normal findings for type 7 capsular tear, whereas discontinuity of the capsule was noted in oblique coronal images of some patients with HAGL lesion.

Posterolateral notch at the humeral head (Hill-Sachs lesion):

CT arthrography of all types of capsular tears including HAGL lesion and midsubstance tear showed very small osteochondral defect adjacent to the bare area.

**SURGICAL TREATMENT**

We have experienced 11 cases of anterior shoulder instability due to midsubstance capsular tear with or without Bankart lesion, except for HAGL lesion. Ten out of such 11 cases could be repaired arthroscopically: Arthroscopic repairs with side-to-side suture technique using Suture hook (Linvatek) or ArthroSew (Surgical Dynamics) were undergone for 10 patients. We experienced

a case with humeral-side tear that required open repair because of the difficulty in arthroscopic repair. It should be noted that far lateral (humeral-side) capsular tear are impossible to be repaired arthroscopically using this technique.

## RESULTS

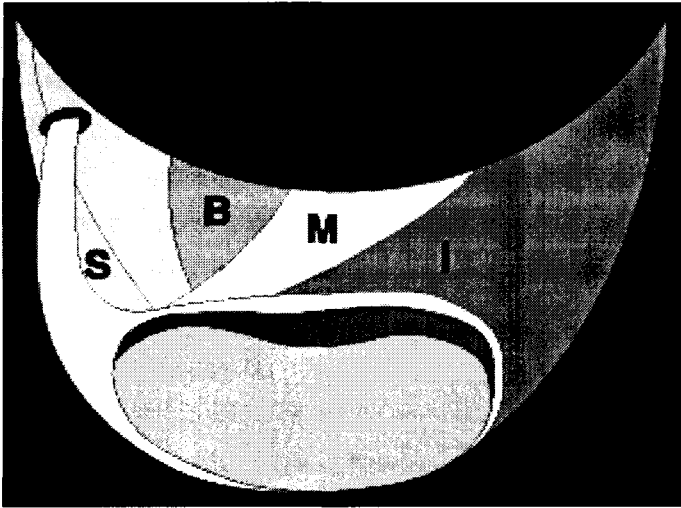
We evaluated 10 patients with minimum follow-up of one year. Arthroscopic capsular repair alone were undergone for 7 patients and combined arthroscopic capsular and Bankart repair for 3 patients. One of the 7 patients with capsular repair alone had a recurrence 2 years after surgery. The remaining 9 patients had an excellent outcome with good stability and range of motion (highly satisfied by female patients). A simple arthroscopic repair was successful for almost all the patients with capsular tear-type pathology except for humeral-side tear.

## CONCLUSION

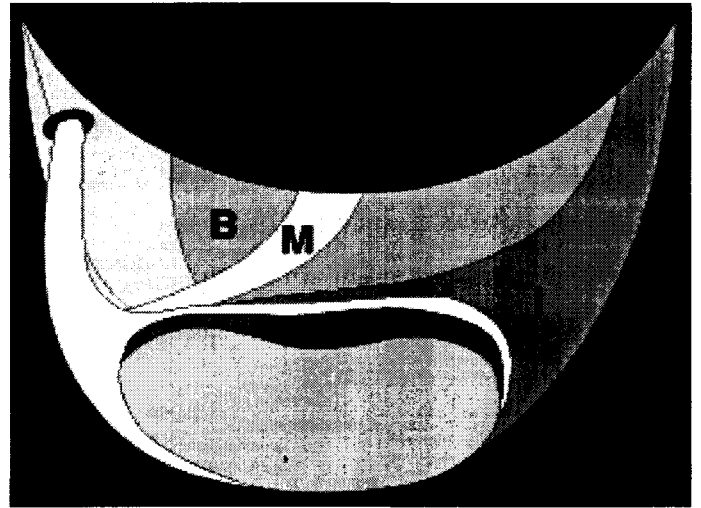
The arthroscopic repair for the type 7 lesion is one of the best indications on arthroscopic stabilization operation, because optimal selection of the minimally invasive procedures according to individual pathologies can be achieved. In addition, preoperative evaluation including MRI is extremely important for such pathologies to decide operative procedures.

### Fig. 1: Arthroscopic Bankart Classification

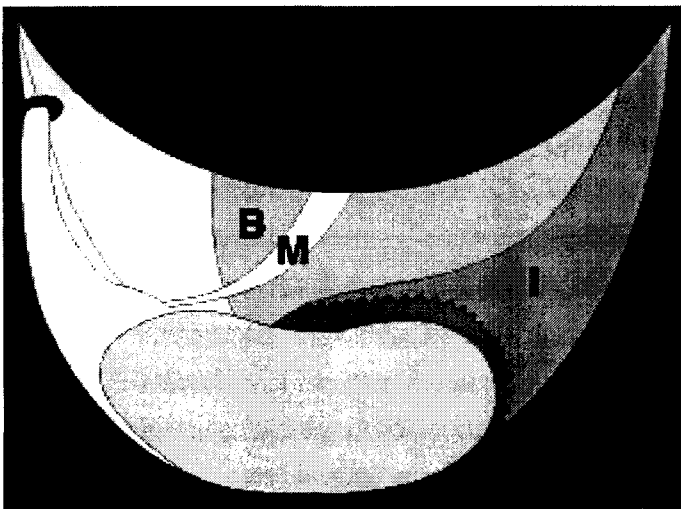
We classified pathologies of anterior shoulder instability into 7 categories. Preliminary, they were comprised of 4 types based on the arthroscopic findings: **Type 1 lesion** is labral detachment with a well-developed glenohumeral ligament; **Type 2 lesion** is labral detachment with a poorly-developed glenohumeral ligament; **Type 3 lesion** is a ligamentous tear with labral disruption; **Type 4 lesion** is a ligamentous disruption with a bony defect of the glenoid. Afterwards, 2 more types without a Bankart lesion were added: **Type 5 lesion** is laxity and functional lengthening of glenohumeral ligament without a classic Bankart lesion. The slack ligament might be caused by the stretched-out. **Type 6 lesion** is a HAGL lesion or a lateral capsular tear. More recently, Type 7 was created because of accumulation of the patients. **Type 7 lesion** is a visible mid-substance tear of the glenohumeral ligament.



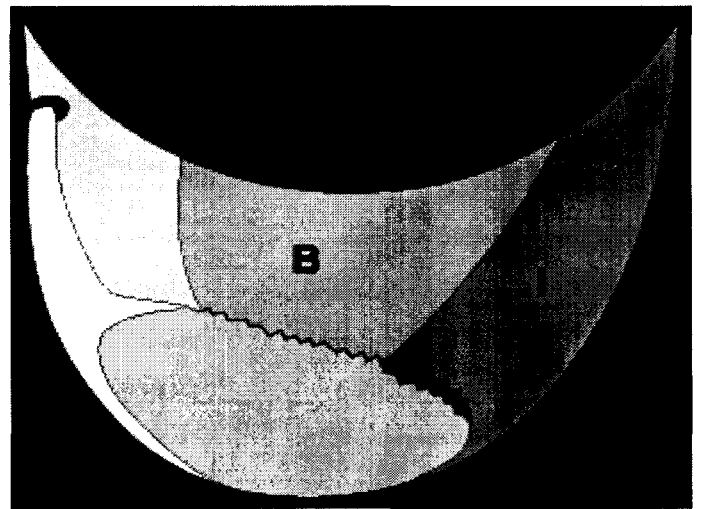
Type 1



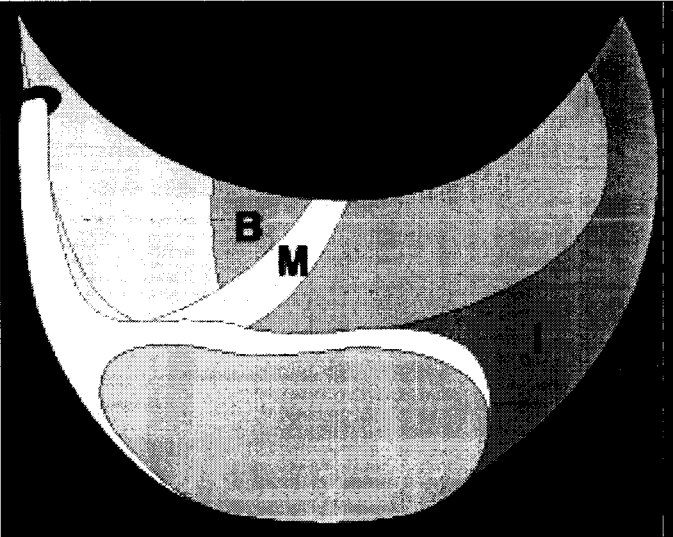
Type 2



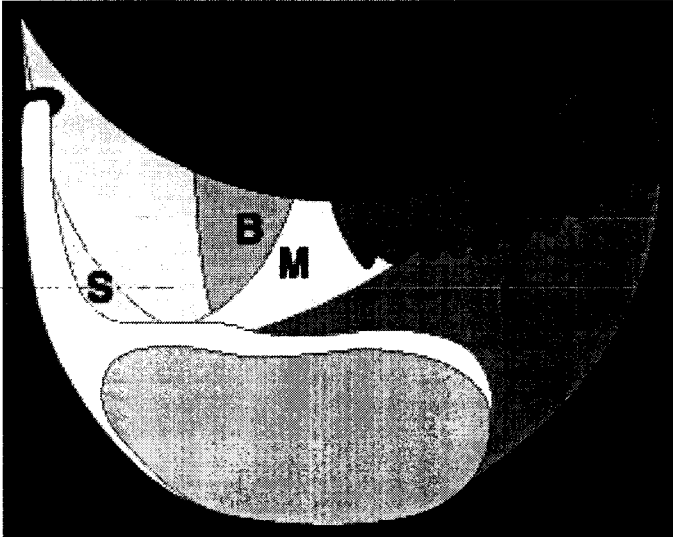
Type 3



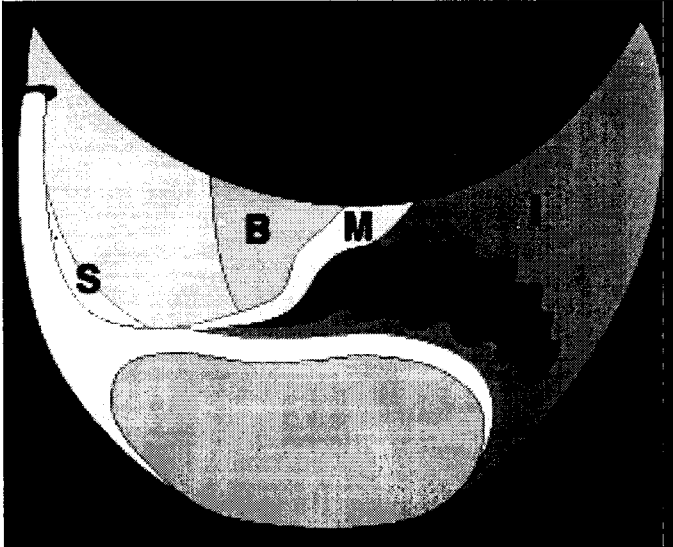
Type 4



Type 5



Type 6



Type 7

- S: SGHL
- B: Subscap
- M: MGHL
- I: IGHL