

## **Conservative Treatment for 1<sup>st</sup> Time Shoulder Dislocation**

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Shoulder dislocation is the most common traumatic dislocation in human body, with 98% occurring in the anterior direction. Anterior dislocation of the shoulder is well known of its high recurrence. Evidence has been provided that conventional immobilization of the arm to the trunk, i.e., with the arm in internal rotation, is of no use in preventing further dislocations. We hypothesized that the position of immobilization after dislocation of the shoulder had been inappropriate. In order to prove our hypothesis, we performed a series of following studies.

### **Coaptation of simulated Bankart lesion in cadaveric shoulders**

A Bankart lesion needs to be approximated for healing during immobilization after reduction of shoulder dislocation. Position of immobilization has been adduction and internal rotation, but no scientific background exists to support or not to support this position. The purpose of this study was to determine the relationship between the arm position and the coaptation of a simulated Bankart lesion created in cadaveric shoulders. Ten fresh cadaveric shoulders were used for experimentation. All the musculature was removed to expose the joint capsule. A Bankart lesion was created by sectioning the anteroinferior capsule from the labrum. Using linear transducers attached to the anteroinferior and inferior portions of the Bankart lesion, the opening and closing of the lesion were recorded with the arm in the following positions: 1) 0, 30, 45, and 60 degrees of elevation in the coronal plane and the sagittal plane; and 2) rotation from full internal to full external rotation in 10-degree increment. In adduction, the simulated Bankart lesion was coapted in the range from full internal rotation to 30 degrees of external rotation. In 30 degrees of flexion or abduction, the lesion was coapted in neutral and internal rotations, but it was separated in external rotation. In 45 and 60 degrees of flexion or abduction, the lesion was separated regardless of rotation. This study demonstrated that there was a

"coaptation zone" where the lesion was kept approximated in cadaveric shoulders without the surrounding muscles.

### **Coaptation of Bankart lesion in patients**

The *in vivo* shoulder seems to have a "coaptation zone" which may or may not be similar to the one in cadaveric shoulders. Various clinical data indicate that the tight anterior soft tissue helps to keep the lesion approximated. Within the coaptation zone, therefore, a position with increased anterior soft tissue tension such as adduction/external rotation may be better than the conventional one where the anterior soft tissue is lax. Using MRI, we assessed the lesion in shoulders after dislocation with the arm positioned in internal and external rotations to determine the effect of arm rotation on *in vivo* coaptation of the lesion. Coaptation of the Bankart lesion was examined on MRI with the arm at the side of the trunk in internal rotation (mean 29 degrees) and external rotation (mean 35 degrees) in 19 shoulders with initial (6 shoulders) or recurrent dislocations (13 shoulders). In order to assess the coaptation of the Bankart lesion, the separation and displacement of the anteroinferior labrum from the glenoid rim were measured on the axial images. Coaptation of the anterior capsule to the glenoid neck was also assessed by the measurements of the detached area, opening angle, and detached length. These measurements were compared between the two rotations of the arm. The separation and displacement of the labrum were significantly smaller in external rotation ( $0.1 \pm 1.8$  mm,  $0.0 \pm 2.4$  mm) than in internal rotation ( $1.9 \pm 3.1$  mm,  $2.7 \pm 4.0$  mm) ( $p=0.0047$ ,  $0.0017$ ). Regarding the anteroinferior capsule, the detached area and opening angle were smaller ( $p=0.0003$ ,  $p<0.0001$ ) and the detached length was shorter ( $p<0.0001$ ) with the arm in external rotation. Thus, coaptation of the detached labrum and the capsule to the glenoid was confirmed to be better with the arm in external rotation than in internal rotation. We

conclude that a new position of immobilization to keep the arm in external rotation better approximates the Bankart lesion than the conventional position of internal rotation.

### **Randomized prospective trial**

We conducted a prospective randomized study to determine whether immobilization with the arm in external rotation would decrease the rate of recurrence after initial dislocation of the shoulder. Forty patients with initial shoulder dislocations were randomly assigned to 1) a conventional immobilization in internal rotation (IR group, n=20) or 2) a new method of immobilization in external rotation (ER group, n=20). The recurrence rate was 30% in IR group and 0% in ER group at an average 15.5 months (p=0.0079). Among those who were younger than 29 years of age, recurrence rate was 45% in IR group and 0% in ER group (p=0.0110). Immobilization with the arm in external rotation is effective in reducing the rate of recurrence after initial dislocation of the shoulder.

### **References**

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