# Arthroscopic Findings After Traumatic Shoulder Instability in Patients Older Than 35 Years

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**Background:** Shoulder instability in the older patient traditionally has received less attention in the literature than in the younger patient population. However, when traumatic dislocation does occur, these patients often still have frequent pain, disability, and even continued instability.

**Purpose:** To characterize the pathoanatomy of traumatic anterior shoulder instability in the older patient population and to discuss the correlating symptoms that ultimately led to operative treatment.

Study Design: Case series; Level of evidence, 4.

**Methods:** Patients with a history of an initial traumatic anterior shoulder instability event occurring after the age of 35 years who underwent arthroscopic surgical intervention were prospectively enrolled. Exclusion criteria included posterior instability, major fractures of the shoulder girdle, and multidirectional instability. All patients initially underwent a period of nonoperative rehabilitation. Operative treatment was performed if a patient continued to have pain and/or instability. Operative reports and arthroscopic pictures were reviewed for pathoanatomical findings.

**Results:** A total of 27 patients (28 shoulders) met the inclusion criteria and were analyzed in this study (22 men and 5 women; mean age, 55 years; age range, 35-74 years). Surgical intervention was performed for recurrent instability in 7 patients, pain for 8 patients, and pain with instability for 13 patients. Arthroscopic findings demonstrated 18 rotator cuff tears (RCTs) (64.3%) and 18 Bankart lesions (64.3%). Nine patients had both an RCT combined with a Bankart lesion (32.1%). Three humeral avulsion of the gleno-humeral ligament (HAGL) lesions (10.7%) and 2 anterior labral periosteal sleeve avulsion (ALPSA) lesions (7.1%) were found. All shoulders demonstrated Hill-Sachs lesions of various size and depth.

**Conclusion:** Traumatic shoulder instability in the older patient may result in a wide array of pathologic findings as well as a diversity of clinical presentations. These findings suggest that the clinical diagnostician should maintain a high index of suspicion for RCT, Bankart lesions, and HAGL lesions in older patients who remain symptomatic after traumatic anterior shoulder instability.

Keywords: dislocation; instability; Bankart lesion; rotator cuff tear

Traumatic anterior shoulder instability is a relatively common injury in the young, active population.<sup>1,22</sup> The most common injury pattern is an avulsion of the anteroinferior aspect of the glenoid labrum and the capsular attachments

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The Orthopaedic Journal of Sports Medicine, 3(5), 2325967115584318 DOI: 10.1177/2325967115584318 © The Author(s) 2015 from the glenoid rim (Bankart lesion). Recurrent dislocations for patients younger than 30 years of age occur in up to 90% of subjects.<sup>9</sup> However, shoulder instability in patients older than this introduces a different spectrum of shoulder pathology. While there is a lower incidence of recurrent dislocation, concomitant rotator cuff tear (RCT) is frequent and well documented.<sup>7,9,15-18,20,21</sup> When traumatic dislocation does occur, these patients often persist with pain, disability, and possible continued instability.<sup>3,13,17,18,20</sup>

In today's society, the aging population is remaining more active later in life. This increased involvement in exercise and athletic activities has led to a rise in the number of older patients sustaining traumatic shoulder instability events.<sup>10,17</sup> Of first-time shoulder dislocations, 20% to 25% occur in people older than 60 years.<sup>16,17</sup> Many dislocations are not isolated incidents and can result in complications such as RCT, capsulolabral tears, and

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brachial plexus and axillary nerve injuries. The risk of RCT from shoulder dislocation is well documented in the literature, ranging from 35% to 86% in patients older than 35 years.<sup>7,15-17</sup>

The recurrence rate in older patients sustaining traumatic anterior shoulder dislocation is lower than that of the younger population. Rowe<sup>15</sup> reported recurrent dislocation rates of 94% in patients younger than 20 years, 74% in patients aged 20 to 40 years, and 14% in patients older than 40 years.<sup>15</sup> The lower recurrence rate in older patients sustaining shoulder dislocations has been attributed to the lower incidence of Bankart lesions.<sup>10</sup> Prolonged morbidity after dislocation in older patients is usually attributed to RCT.

After the index instability event, shoulder pain, recurrent dislocation, and persistent disability in patients older than the frequently described "under age 30" group ultimately may require surgical intervention. To our knowledge, the literature is sparse of descriptions of arthroscopic findings of the pathoanatomy associated with traumatic anterior glenohumeral instability events in patients older than 35 years. The purpose of this study was to characterize the pathoanatomy and the clinical symptoms in those that required progression to surgical intervention. We hypothesize that this older population has a more complex subset of related shoulder pathology compared with the younger, traumatic dislocators.

## METHODS

With institutional review board approval, patients older than 35 years who sustained an initial traumatic anterior first-time glenohumeral dislocation or subluxation between January 2003 and January 2013 were identified and followed prospectively. All patients were seen and treated by a single fellowship-trained orthopaedic sports medicine surgeon. Dislocation was defined as a complete instability event, documented by radiographs, and requiring a manual reduction by a medical professional. An instability event with spontaneous reduction was classified as a subluxation.<sup>11</sup> Confirmation of anterior subluxation was based on history and physical examination findings consistent with anterior instability, such as the apprehension test, the relocation test, and pathologic anterior translation with the load-shift maneuver, as well as with radiographic studies such as radiographs and magnetic resonance imaging (MRI). The instability event was deemed traumatic if it occurred as the result of a clear athletic action, fall, or abnormal upper extremity positioning due to external forces. Exclusion criteria included history of prior dislocation before age 35 years, multidirectional instability, and current or prior major fractures around the shoulder girdle.

All patients underwent a clinical examination, standard radiographs, and MRI of the affected shoulder. Conservative treatment was initially presented to all patients, and each participated in a structured physical therapy program. Patients received a combination of nonsteroidal anti-inflammatories, corticosteroid injections, and activity modification as necessary on an individual basis. Patients who remained symptomatic after conservative treatment were then counseled about the risks and benefits of surgery. Recurrent instability was defined by findings consistent with anterior instability on physical examination, radiograph, or MRI. Those patients selecting surgical treatment were included and analyzed in this study.

Intraoperative arthroscopic findings were retrospectively reviewed and categorized from dictated operative reports. These diagnoses were verified by cross-referencing operative report findings with saved arthroscopic images. Clinic notes were reviewed to obtain clinical symptoms leading to operative intervention including pain and recurrent instability.

### RESULTS

A total of 27 patients (28 shoulders) older than 35 years underwent an operative procedure after anterior shoulder dislocation between 2003 and 2013. There were 22 men and 5 women, with a mean age of 55 years (range, 35-74 years). Seven patients chose surgical intervention due to recurrent instability, 8 secondary to pain, and 13 secondary to both pain and instability.

All patients initially underwent a routine diagnostic shoulder arthroscopy by the senior author (G.R.). A wide spectrum of pathoanatomy was documented arthroscopically. The findings are summarized in Tables 1 and 2. Eighteen shoulders had an RCT (18/28, 64.3%), 9 were combined with a Bankart lesion. Four of the shoulders with an RCT had partial or full subscapularis tears (4/18; 22.2%) and 5 had biceps tears or ruptures (5/18; 27.8%). There were 18 shoulders with Bankart lesions (18/28; 64.3%). Figure 1 shows an example of a Bankart tear from the anterior portal in the lateral position. Two Bankart tears were associated with a combined superior labrum anterior and posterior (SLAP) tear (2/18; 11.1%), and these were the only 2 SLAP lesions found in the study (2/28; 7.1%). Figure 2 demonstrates a displaced type III SLAP tear from the posterior portal in the lateral position.

One patient had an isolated humeral avulsion of the glenohumeral ligament (HAGL) lesion, 1 had an HAGL lesion combined with an RCT, and 1 had an HAGL lesion combined with both an RCT and a Bankart lesion. Two shoulders were found to have isolated anterior labral periosteal sleeve avulsion (ALPSA) lesions (2/28; 7.1%). Five shoulders had loose bodies evident in the glenohumeral joint that necessitated removal (5/28; 17.9%). All shoulders demonstrated Hill-Sachs defects of varying sizes (28/28; 100%). Four Hill-Sachs defects were large and were treated with a remplissage (4/28; 14.3%). Figure 3 demonstrates arthroscopic remplissage treatment of a large Hill-Sachs lesion in association with a large RCT. After arthroscopic inspection, 2 shoulders were converted to open HAGL repairs and 1 to an open ALPSA repair.

All 8 patients who presented with only pain as their clinical presentation had evidence of an RCT on arthroscopy (8/8; 100%). One of those RCTs was combined with a Bankart lesion (1/8; 12.5%). All 7 patients who complained of only instability on clinical presentation had a Bankart or an HAGL lesion (7/7; 100%). Three of these

Patient	Sex	Age, y	Instability	Pain	RCT	Bankart Lesion	Other Findings
1	М	58	+		+	+	
2	F	53	+			+	
3	М	51		+	+		Loose bodies
4	Μ	67	+	+	+		
5	$\mathbf{F}$	49	+	+		+	ALPSA lesion
6	Μ	38	+	+		+	SLAP tear, loose bodies
7	Μ	59		+	+		
8	$\mathbf{F}$	70	+	+	+	+	Biceps tear
9	Μ	47	+			+	Loose bodies
10	Μ	72	+		+	+	HAGL lesion
11	Μ	47	+	+	+	+	
12	Μ	57	+	+		+	ALPSA lesion
13	Μ	47	+	+	+	+	Large HS lesion
14	$\mathbf{F}$	59	+	+	+		HAGL, large HS lesions
15	Μ	45		+	+	+	
16	$\mathbf{M}$	38	+	+		+	
17	F	59	+				HAGL lesion
18	$\mathbf{M}$	74		+	+		Partial subscapularis tear
19	$\mathbf{M}$	63		+	+		
20	$\mathbf{M}$	51	+	+		+	Loose bodies, large HS lesion
21	Μ	40	+			+	
22	Μ	48		+	+	+	Partial subscapularis tear
	Μ	48		+	+		Subscapularis tear, biceps tear
23	Μ	68		+	+		Subscapularis tear, biceps tear
24	Μ	50	+		+	+	
25	Μ	72	+	+	+		Biceps rupture
26	Μ	46	+	+		+	Biceps rupture, SLAP tear, loose bodies
27	Μ	50	+	+	+	+	Large HS lesion

 TABLE 1

 Patient Demographics, Clinical Complaints, and Arthroscopic Findings<sup>a</sup>

<sup>*a*</sup>ALPSA, anterior labral periosteal sleeve avulsion; F, female; HAGL, humeral avulsion of the glenohumeral ligament; HS, Hills-Sachs; M, male; RCT, rotator cuff tear; SLAP, superior labrum anterior and posterior.

 TABLE 2

 Summary of Pathologic Arthroscopic Findings<sup>a</sup>

Pathology	n (%)
RCT	18 (64.3)
Bankart lesion	18 (64.3)
HAGL lesion	3 (10.7)
ALPSA lesion	2(7.1)
SLAP tear	2(7.1)
Loose bodies	5 (17.9)
Hill-Sachs lesion	28 (100.0)
Biceps tear	5 (17.9)
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<sup>*a*</sup>ALPSA, anterior labral periosteal sleeve avulsion; HAGL, humeral avulsion of the glenohumeral ligament; RCT, rotator cuff tear; SLAP, superior labrum anterior and posterior.

shoulders had a concomitant RCT that required repair (3/7; 42.9%). The 13 patients who presented with both pain and instability had more variability in their arthroscopic findings. Six patients had an RCT (6/13; 46.2%), 7 had a Bankart lesion (7/13; 53.8%), and 2 had both (2/13; 15.4%). Ten of the 13 patients (10/13; 76.9%) had either a Bankart lesion (7/13; 53.8%), HAGL lesion (1/13; 7.7%), or ALPSA lesion (2/13; 15.4%).

#### DISCUSSION

In this study, 27 patients (28 shoulders) older than 35 years underwent arthroscopic shoulder surgery for persistent symptoms after new onset shoulder dislocation. Pathology was found on every examination. All shoulders were found to have an RCT, a Bankart lesion, an HAGL lesion, or a combination of the above. Each shoulder had a Hill-Sachs lesion of varying size. During arthroscopic evaluation, 64.3% of shoulders (18/28) were found to have an RCT. This figure is consistent with previous literature.<sup>4-7</sup> However, our results are notable for finding Bankart lesions in 64.3% (18/28) of shoulders in patients older than 35 years. In addition, arthroscopic findings of loose bodies (17.9%), biceps ruptures (17.9%), ALPSA lesions (7.1%), HAGL lesions (7.1%), and SLAP tears (7.1%) were not infrequent. These findings suggest that traumatic shoulder dislocations in the older patient population result in a more variable spectrum of pathology than previously appreciated.

All 8 patients presenting with pain and/or weakness had an RCT, 1 of whom had a combined RCT and Bankart lesion. Five of 7 (71.4%) patients with instability on clinical and physical examination had Bankart lesions, and the remaining 2 patients had HAGL lesions (28.6%). This correlation between clinical symptoms and operative findings is consistent with data found in the younger patient



**Figure 1.** Viewing from an anterior portal in the lateral position, a Bankart tear is visible extending from the 3-o'clock to the 6-o'clock position.



**Figure 2.** Right shoulder lateral position viewed from the posterior portal. A displaced bucket-handle type III superior labrum anterior and posterior (SLAP) tear is shown with the superior labrum displaced into the glenohumeral joint.

population.<sup>9,12,21,22</sup> Bankart lesions are more likely to cause instability symptoms, whereas RCTs are associated with pain and weakness.

The rotator cuff is an important dynamic stabilizer of the glenohumeral joint. Stevens<sup>19</sup> in 1926 and Codman<sup>2</sup> in 1934 suggested the possibility of a concomitant RCT occurring with anterior shoulder dislocation in older patients in contrast to the disruption of anterior glenohumeral ligaments in younger patients. It is hypothesized that the disruption occurs through the rotator cuff tendons or the tuberosity onto which they insert due to age-related



**Figure 3.** Left shoulder lateral position viewed from the lateral portal. A Hill-Sachs lesion is being treated by remplissage with suture anchor into the defect and passed through the infraspinatus.

weakening of the posterior elements of the shoulder and thinning and fraying of the rotator cuff while the anterior capsuloligamentous structures remain intact.

Few studies have specifically looked at older patients after shoulder dislocation. Pevny et al<sup>13</sup> studied 52 patients older than 40 years with a traumatic first-time anterior shoulder dislocation and found that 35% had an RCT, and that those patients treated surgically had better subjective and objective outcomes compared with those treated conservatively. Gumina and Postacchini<sup>3</sup> found a higher recurrence rate of 22% in a group of elderly patients (older than 60 years) with traumatic anterior dislocation and theorized that the high recurrence was due to their long-term followup of 7 years. Neviaser et al<sup>11</sup> reviewed 11 patients older than 40 years with an initial shoulder dislocation in which recurrent dislocation became problematic; all 11 patients had tears of the subscapularis tendon and anterior capsule. Each tear was repaired surgically with resolution of their instability symptoms.<sup>11</sup> Porcellini et al<sup>14</sup> reported a strong correlation between recurrent dislocation and associated RCT in a case series of 150 patients between the ages of 40 and 60 years. The authors found no correlation between capsular or Bankart lesions in this older age group.

While much of the literature on shoulder dislocation in older patients focuses on the high incidence of rotator cuff pathology, our study reveals a high incidence of Bankart tears—a finding that has not been reported previously for this age group. In addition, HAGL lesions have not been extensively described in this patient population. This additional pathology can be difficult to diagnose through imaging studies, and potentially can be missed if surgical intervention is not performed.

There are inherent weaknesses in this study. The patient sample size was small, and thus, statistical significance of associated pathology cannot be determined. Patients with previous shoulder injury were not excluded from the study so the potential for preinjury pathology could not be eliminated. Furthermore, the reported incidence of asymptomatic RCT in the older patient population is as high as 50%.<sup>8,10</sup> To ensure that the intra-articular findings in this study were solely from the traumatic dislocation, preinjury clinical examinations and MRIs would have been required. Therefore, age and prior conditions could influence the incidence of the pathology discovered arthroscopically. Also, patient outcomes specific to varied treatment were not specifically analyzed for this study. Thus, no conclusion can be drawn on how best to treat the pathology associated with anterior shoulder dislocation in this subgroup of older patients. Increased patient numbers and longitudinal follow-up would allow for critical analysis of surgical results.

## CONCLUSION

Traumatic anterior shoulder dislocations in patients older than 35 years present a different set of pathoanatomic issues from the younger traumatic dislocator. Despite a lower incidence of redislocation, these older patients may experience continued disability. Physicians should maintain a high clinical suspicion for intraarticular pathology, including not only RCT but also capsulolabral tears, biceps injuries, and loose bodies. Early imaging, including MRI, and potential surgical intervention should be considered when nonoperative treatment fails to return the older patient to an acceptable level of preinjury functioning.

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