VIDEO Abstract

The Incidence of Glenohumeral Bone and Cartilage Lesions at the Time of Anterior Shoulder Stabilization Surgery

A Comparison of Patients Undergoing Primary and Revision Surgery

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Background: Intra-articular glenohumeral joint changes frequently occur after shoulder instability events.

Purpose: (1) To compare demographic characteristics, baseline patient-reported outcomes, and intraoperative findings for patients undergoing primary or revision shoulder stabilization surgery and (2) to determine the incidence of glenohumeral bone and cartilage lesions in this population while identifying factors independently associated with these lesions.

Study Design: Cross-sectional study; Level of evidence, 3.

Methods: The Multicenter Orthopaedic Outcomes Network (MOON) Shoulder Group shoulder instability database was used to identify all prospectively enrolled patients undergoing shoulder stabilization surgery for anterior instability between October 2012 and September 2016. Any patient who underwent surgery for posterior or multidirectional shoulder instability or concomitant rotator cuff repair surgery was excluded. Patient demographic characteristics, preoperative patient-reported outcomes, and intraoperative findings, including glenohumeral bone and cartilage lesions, were compared for patients undergoing primary and revision shoulder stabilization surgery. Additionally, patients with and without glenohumeral bone and cartilage lesions were compared and independent associations determined using multivariate analysis.

Results: There were 545 patients available for analysis (461/545 [84.6%] primary; 84/545 [15.4%] revision). Patients undergoing revision surgery were older ($P = .001$), were more frequently smokers ($P = .022$), had a greater number of instability events before surgery ($P = .047$), more frequently required reduction assistance ($P < .001$), and had lower Short Form–36 (SF-36) Mental Component Summary ($P = .020$) and Western Ontario Shoulder Instability Index (WOSI) ($P = .026$) scores preoperatively. Additionally, patients undergoing revision surgery had a higher frequency of bone and cartilage lesions than those undergoing primary surgery (47.6% vs 18.4%, respectively; $P < .001$). Male sex, revision surgery, black race, increasing body mass index, increasing patient age, and lower preoperative SF-36 Physical Component Summary score were independently associated with the presence of glenohumeral bone and cartilage lesions at the time of shoulder stabilization surgery. Revision surgery was strongly associated with the presence of glenohumeral bone and cartilage lesions (odds ratio [OR], 4.381 [95% CI, 2.591-7.406]) and glenoid bone loss greater than 10% (OR, 9.643 [95% CI, 5.128-18.134]) or 20% (OR, 13.076 [95% CI, 5.113-33.438]) of the glenoid width.

Conclusion: Glenohumeral bone and cartilage lesions are common at the time of shoulder stabilization surgery, occurring more frequently in patients undergoing revision surgery as compared with primary surgery. On the basis of these findings, future prospective studies should aim to compare the clinical outcomes in these 2 groups.

Keywords: shoulder instability; shoulder dislocation; glenoid bone loss; Bankart; Hill-Sachs

Anterior shoulder instability encompasses a spectrum of disease, ranging from traumatic dislocations to recurrent atraumatic subluxation events. Within this spectrum of disease, predictable intra-articular glenohumeral joint changes frequently occur,[39] with the incidence of labral, cartilaginous, or bony lesions approaching nearly 100% in some studies.[11,12,17,28,29,45] Glenoid and humeral head bone loss pose unique treatment challenges, as they can increase the likelihood of recurrent instability and frequently result in inferior clinical outcomes,[6,23,36,41] particularly in young, active patients.

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Despite advances in techniques and improved recognition of potential predictors of failure, recurrent instability after arthroscopic Bankart repair occurs in 10% to 30% of patients.[1,4,25,32,41,42,46] In addition to the risk of bone loss with recurrent instability events,[24] shoulder instability can result in progressive glenohumeral cartilage changes even after surgical intervention.[7,13] While the long-term effect of glenohumeral cartilage lesions on clinical outcomes in patients undergoing shoulder instability surgery is variable,[17,22] the likelihood of encountering bone loss, focal cartilage defects, or diffuse glenohumeral chondrosis at the time of revision shoulder stabilization surgery is high and should be anticipated by surgeons performing these procedures to counsel patients and optimize outcomes.[19,21,22,31,33,38]

The purpose of this investigation was to compare demographic characteristics, baseline patient-reported outcomes, and intraoperative findings for patients with anterior shoulder instability undergoing primary or revision shoulder stabilization surgery using data from a prospectively collected, multicenter shoulder instability cohort. Additionally, the incidence of glenohumeral bone and cartilage lesions in patients undergoing primary and revision surgery as well as factors independently associated with these lesions were determined.

METHODS

Study Design

The Multicenter Orthopaedic Outcomes Network (MOON) Shoulder Group instability database was used to identify all patients 12 to 99 years of age undergoing shoulder stabilization surgery for anterior shoulder instability. Patients were prospectively enrolled in the database, and patient demographic data and patient-reported outcomes were collected preoperatively using standardized questionnaires, while intraoperative findings were contributed by 25 orthopaedic surgeons practicing at 11 institutions across the United States using a standardized study form at the time of shoulder stabilization surgery. While the MOON Shoulder Group instability database was designed to allow prospective reporting of outcomes after shoulder stabilization surgery, the present study is a cross-sectional study of prospectively collected data at the time of the index shoulder stabilization procedure. Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at the University of Iowa.[10] REDCap is a secure, web-based application that provides an intuitive interface for data entry, audit trails for tracking data, and automated export procedures while providing means to import data from multiple external sources. All patients who were actively enrolled in the dataset between October 2012 and September 2016 were considered for analysis. The study protocol and collection methods were approved by the institutional review board at all participating institutions. All participants provided written informed consent before enrollment in the study.

Participants

All patients who provided informed consent before undergoing shoulder stabilization surgery were included. Included patients underwent primary or revision arthroscopic or open shoulder stabilization surgery, including glenoid or humeral head bone augmentation procedures, when indicated for their respective abnormality. Any patient who underwent concomitant rotator cuff repair surgery or had ongoing workers' compensation claims related to their shoulder stabilization surgery were not eligible for enrollment. For the purpose of this cross-sectional study, patients undergoing shoulder stabilization surgery for posterior or multidirectional shoulder instability or isolated superior labrum anterior-posterior (SLAP) tears were excluded. Considering these exclusions, patients with anterior shoulder instability accounted for 76.0% (545/717) of all patients enrolled in the database.

Data Elements

Preoperative patient demographic characteristics, general health and shoulder-specific patient-reported outcomes, comorbidities, surgical history, and instability event history were collected using standardized questionnaires and forms. At the time of surgery, surgeons completed an extensive intraoperative form that included the preoperative diagnosis, examination under anesthesia, and diagnostic and treatment information for capsular lesions, labral tears, biceps injuries, rotator cuff injuries, humeral head and glenoid articular cartilage lesions, and chondromalacia as well as glenoid and humeral head bone loss. Glenoid and humeral head bone loss estimates were made by the individual surgeons based on preoperative advanced imaging as well as intraoperative assessments. All treatment decisions were made by the treating surgeon, and treatments, regardless of the condition being addressed, were not randomized.

For the purpose of this study, glenohumeral bone and cartilage lesions were evaluated both individually and in

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a composite fashion. Patients with an Outerbridge grade 3 or 4 lesion of the humeral head or glenoid, osteochondral defect of the humeral head or glenoid, glenolabral articular disruption, glenoid bone loss >10% of the native glenoid width as assessed arthroscopically or radiographically, and humeral head bone loss involving >20% of the humeral head as assessed arthroscopically or radiographically constituted the composite "bone-cartilage lesion" (BCL) group. If a single patient had multiple individual intraoperative findings that fell within the BCL composite category definition, the patient was counted only once toward the total.

Statistical Analysis

Patients undergoing primary and revision shoulder stabilization surgery for anterior instability were compared using univariate statistical methods, including the Student *t* test and chi-square analysis for continuous and categorical variables, respectively. Patients with and without BCLs were similarly compared. Multivariate logistic regression models were created to determine independent associations between cartilage lesions and bone loss at the time of shoulder instability surgery. Patient demographics, shoulder instability event history characteristics, and preoperative patient-reported outcomes were considered for inclusion in the multivariate model when univariate measures of association were ≤0.2. A P value of <.05 was considered statistically significant for all analyses. All statistical analyses were performed using SAS software version 9.4 (SAS Institute).

RESULTS

Overall, 545 patients with complete operative form data underwent primary (461/545; 84.6%) or revision (84/545; 15.4%) shoulder stabilization procedures. The mean age was 24.1 ± 8.7 years, and male patients comprised 83.5% (455/545) of the cohort (Table 1). For patients undergoing revision surgery, recurrent instability was cited as the reason for revision in 91.3% of cases. Patients undergoing revision were older (25.9 ± 8.1 vs 23.8 ± 8.8 years, respectively; P = .001), were more frequently current smokers (13.1% vs 6.1%, respectively; P = .022), described more instability events before surgery (P = .047), more frequently required reduction assistance (69.1% vs 48.2%, respectively; P < .001), had lower Short Form–36 (SF-36) Mental Component Summary (MCS) scores (67.4 ± 17.9 vs 71.8 ± 17.4, respectively; P = .020), and had lower Western Ontario Shoulder Instability Index (WOSI) scores (38.7 ± 18.8 vs 44.1 ± 20.2, respectively; P = .026). Within this multicenter cohort, patients undergoing revision more frequently underwent open surgery (73.8% vs 7.6%, respectively; P < .001), underwent surgery in the beach-chair position (81.0% vs 54.2%, respectively; P < .001), and underwent glenoid bone augmentation procedures, such as a Latarjet procedure, as part of their surgery (64.3% vs 6.1%, respectively; P < .001). However, when excluding patients undergoing open surgery, there was no difference in the rate of beach-chair utilization between the revision and primary groups (40.9% vs 50.8%, respectively; P = .420).

Patients undergoing revision had a higher incidence of BCLs than those undergoing primary surgery (47.6% vs 18.4%, respectively; P < .001) (Table 2). The most frequently noted lesion for both primary and revision groups was glenoid bone loss involving >10% of the glenoid, which was reported more frequently in patients undergoing revision (44.1% vs 7.8%, respectively; P < .001). Additionally, the amount of glenoid bone loss was more frequently larger for patients undergoing revision surgery (P < .001) (Figure 1). There was no difference in the incidence of Hill-Sachs lesions measuring >20% of the humeral head between the revision and primary groups (6.0% vs 3.3%, respectively; P = .214).

Patients with and without BCLs were compared further. Patients with BCLs were significantly older (26.1 ± 9.4 vs 23.5 ± 8.4 years, respectively; P = .001), more frequently male (93.6% vs 80.5%, respectively; P = .001), more frequently black (16.0% vs 7.6%, respectively; P = .016), current smokers (11.2% vs 6.0%, respectively; P = .046), and were more frequently undergoing revision surgery (32.0% vs 10.5%, respectively; P < .001) as compared with those without BCLs (Table 3). Additionally, patients with BCLs reported lower preoperative SF-36 Physical Component Summary (PCS) scores (63.8 ± 18.5 vs 67.6 ± 17.5, respectively; P = .029).

Multivariate logistic regression analyses identified several factors independently associated with BCLs at the time of shoulder stabilization surgery, including male sex (odds ratio [OR], 4.698 [95% CI, 2.082-10.600]), revision shoulder instability surgery (OR, 4.381 [95% CI, 2.591-7.406]), black race (OR, 2.797 [95% CI, 1.444-5.417]), increasing body mass index (BMI) (OR, 1.057 [95% CI, 1.002-1.115]), increasing patient age (OR, 1.039 [95% CI, 1.014-1.064]), and decreasing preoperative SF-36 PCS score (OR, 0.984 [95% CI, 0.972-0.996]) (Figure 2). An independent evaluation of glenoid bone loss revealed that revision surgery (OR, 9.643 [95% CI, 5.128-18.134]), an increasing number of instability events (OR, 6.668 [95% CI, 1.861-23.889]), male sex (OR, 5.186 [95% CI, 1.640-16.394]), black race (OR, 2.649 [95% CI, 1.157-6.068]), increasing BMI (OR, 1.057 [95% CI, 1.002-1.115]), decreasing preoperative shoulder activity scores (OR, 0.932 [95% CI, 0.875-0.994]), and decreasing preoperative SF-36 PCS scores (OR, 0.968 [95% CI, 0.952-0.985]) were independently associated with bone loss involving >10% of the glenoid width while only revision surgery (OR, 13.076 [95% CI, 5.113-33.438]) and decreasing preoperative SF-36 MCS scores (OR, 0.976 [95% CI, 0.954-0.999]) were independently associated with glenoid bone loss involving >20% of the glenoid width.

DISCUSSION

Despite improved recognition of risk factors that may lead to clinical failure, recurrent shoulder instability after shoulder stabilization procedures is not uncommon.[1,4,42,46] While a high incidence of glenohumeral bone and cartilage lesions has been described previously in patients undergoing primary shoulder stabilization procedures,[17] the incidence of these lesions in patients undergoing revision surgery has

TABLE 1
Characteristics of Patients Undergoing Primary and Revision Shoulder Stabilization Surgery[a]

	All (N = 545)	Primary (n = 461)	Revision (n = 84)	*P* Value
Patient demographics				
Age, mean ± SD, y	24.1 ± 8.7	23.8 ± 8.8	25.9 ± 8.1	.001
Male sex	455 (83.5)	383 (83.1)	72 (85.7)	.550
Body mass index ≥30 kg/m^2	63 (11.6)	55 (11.9)	8 (9.5)	.536
Race				.102
Black	52 (9.5)	45 (9.8)	7 (8.3)	
White	457 (83.9)	390 (84.6)	67 (79.8)	
Other	36 (6.6)	26 (5.6)	10 (11.9)	
Current smoker	39 (7.2)	28 (6.1)	11 (13.1)	.022
Dominant arm	271 (49.7)	228 (49.5)	43 (51.2)	.770
Beighton score				.062
<4	511 (93.8)	435 (94.4)	76 (90.5)	
4-6	21 (3.8)	14 (3.0)	7 (8.3)	
7-9	13 (2.4)	12 (2.6)	1 (1.2)	
Instability events				.047
0	88 (16.2)	80 (17.4)	8 (9.5)	
1	116 (21.3)	102 (22.1)	14 (16.7)	
2-5	208 (38.2)	169 (36.7)	39 (46.4)	
>5	133 (24.4)	110 (23.9)	23 (27.4)	
Reduction assistance	280 (51.4)	222 (48.2)	58 (69.1)	<.001
Patient-reported outcomes, mean ± SD				
SF-36 MCS score	71.1 ± 17.6	71.8 ± 17.4	67.4 ± 17.9	.020
SF-36 PCS score	66.7 ± 17.8	66.9 ± 17.7	65.7 ± 17.9	.534
WOSI score	43.3 ± 20.1	44.1 ± 20.2	38.7 ± 18.8	.026
ASES score	67.2 ± 20.6	67.4 ± 20.1	65.9 ± 22.9	.890
Shoulder activity score	13.1 ± 4.5	13.2 ± 4.3	12.3 ± 5.2	.343
Operative characteristics				
Open surgery	97 (17.8)	35 (7.6)	62 (73.8)	<.001
Position (n = 3 missing)				<.001
Beach chair	316 (58.3)	248 (54.2)	68 (81.0)	
Lateral decubitus	222 (41.0)	208 (45.4)	14 (16.7)	
Other	4 (0.7)	2 (0.4)	2 (2.4)	
Glenoid bone augmentation procedure	82 (15.1)	28 (6.1)	54 (64.3)	<.001

[a]Values are reported as n (%) unless otherwise noted. ASES, American Shoulder and Elbow Surgeons; SF-36 MCS, Short Form–36 Mental Component Summary; SF-36 PCS, Short Form–36 Physical Component Summary; WOSI, Western Ontario Shoulder Instability Index.

TABLE 2
Bone-Cartilage Lesions at the Time of Primary and Revision Shoulder Stabilization Surgery[a]

	All (N = 545)	Primary (n = 461)	Revision (n = 84)	*P* Value
Glenoid				
Bony Bankart lesion >10%	73 (13.4)	36 (7.8)	37 (44.1)	<.001
Osteochondral defect	4 (0.7)	3 (0.7)	1 (1.2)	.489
Glenolabral articular disruption	11 (2.0)	10 (2.2)	1 (1.2)	>.999
Grade 3 or 4 chondromalacia	40 (7.3)	37 (8.0)	3 (3.6)	.150
Humeral head				
Hill-Sachs lesion >20%	20 (3.7)	15 (3.3)	5 (6.0)	.214
Osteochondral defect	0 (0.0)	0 (0.0)	0 (0.0)	—
Grade 3 or 4 chondromalacia	7 (1.3)	5 (1.1)	2 (2.4)	.295
Total[b]	125 (22.9)	85 (18.4)	40 (47.6)	<.001

[a]Values are reported as n (%).
[b]Individual patients with multiple lesions were counted only once toward the total.

TABLE 3
Characteristics of Patients With and Without Bone-Cartilage Lesions at the Time of Shoulder Stabilization Surgery[a]

	Bone-Cartilage Lesion (n = 125)	No Bone-Cartilage Lesion (n = 420)	*P* Value
Patient demographics			
Age, mean ± SD, y	26.1 ± 9.4	23.5 ± 8.4	.001
Male sex	117 (93.6)	338 (80.5)	.001
Body mass index ≥30 kg/m^2	16 (12.8)	47 (11.2)	.621
Race			.016
Black	20 (16.0)	32 (7.6)	
White	99 (79.2)	358 (85.2)	
Other	6 (4.8)	30 (7.1)	
Current smoker	14 (11.2)	25 (6.0)	.046
Dominant arm	64 (51.2)	207 (49.3)	.707
Beighton score			.606
<4	120 (96.0)	391 (93.1)	
4-6	3 (2.4)	18 (4.3)	
7-9	2 (1.6)	11 (2.6)	
Instability events			.077
0	16 (12.8)	72 (17.1)	
1	19 (15.2)	97 (23.1)	
2-5	52 (41.6)	156 (37.1)	
>5	38 (30.4)	95 (22.6)	
Reduction assistance	67 (53.6)	213 (50.7)	.571
Surgery type			<.001
Primary	85 (68.0)	376 (89.5)	
Revision	40 (32.0)	44 (10.5)	
Patient-reported outcomes, mean ± SD			
SF-36 MCS score	68.4 ± 19.6	71.9 ± 16.8	.141
SF-36 PCS score	63.8 ± 18.5	67.6 ± 17.5	.029
WOSI score	40.4 ± 20.1	44.1 ± 20.0	.064
ASES score	65.6 ± 22.4	67.7 ± 20.0	.518
Shoulder activity score	12.8 ± 4.7	13.2 ± 4.4	.645

[a]Values are reported as n (%) unless otherwise noted. ASES, American Shoulder and Elbow Surgeons; SF-36 MCS, Short Form–36 Mental Component Summary; SF-36 PCS, Short Form–36 Physical Component Summary; WOSI, Western Ontario Shoulder Instability Index.

only been described in small cohorts.[8,20] In the present study, 47.6% of patients undergoing revision were found to have BCLs at the time of surgery, with the most common finding being glenoid bone loss involving >10% of the glenoid. Controlling for other factors, patients undergoing revision shoulder stabilization surgery were over 9 times more likely to have glenoid bone loss involving >10% of the glenoid and over 4 times more likely to have a BCL compared with patients undergoing primary shoulder stabilization surgery.

The primary purpose of the present study was to compare demographics, patient-reported outcomes, and operative findings in patients undergoing primary or revision shoulder stabilization procedures. While comparative studies are limited,[20] male predominance for patients undergoing shoulder stabilization surgery for anterior instability, whether primary or revision, is consistent with the present findings. Additionally, the present study found that patients undergoing revision surgery were older, were more often smokers, described more preoperative instability events, more frequently required reduction assistance after an instability event, and had statistically lower SF-36 MCS and WOSI scores, although these differences likely do not constitute a minimal clinically important difference (MCID) for either measure.[9,15,40,44]

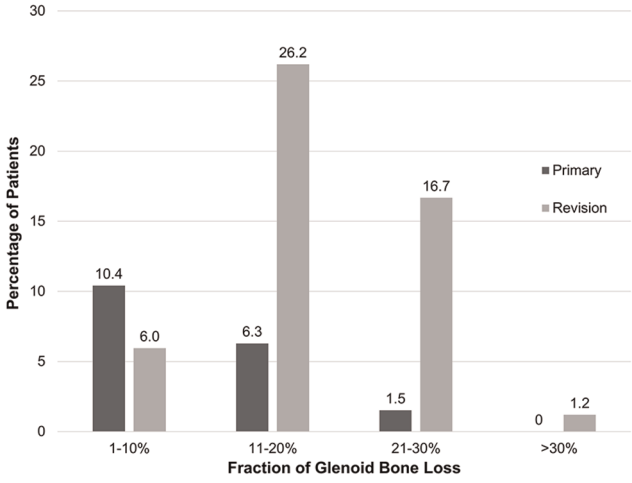

Figure 1. The percentage of patients undergoing primary and revision surgery with glenoid bone loss categorized by the proportion of glenoid involved.

While purely observational, as there was no treatment randomization in this study, it is interesting to note that

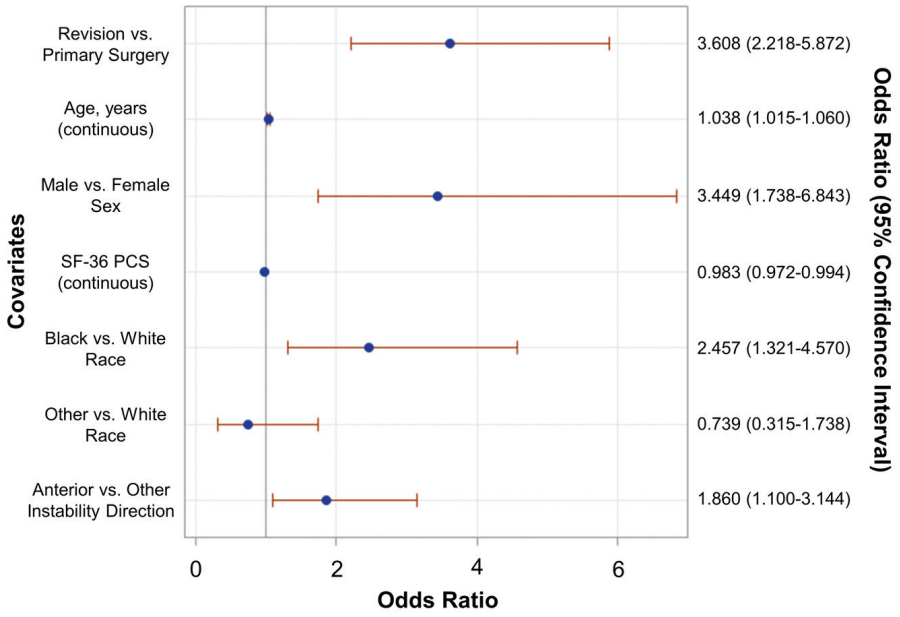

Figure 2. Factors independently associated with the presence of glenohumeral bone-cartilage lesions (BCLs) with accompanying odds ratios (dots) and 95% CIs (bars). SF-36 PCS, Short Form–36 Physical Component Summary.

nearly three-fourths of revision procedures included open approaches, while only 7.6% of primary procedures included an open approach. While this is likely driven by the large number of glenoid bone augmentation procedures performed during revision surgery, it may at least in part be caused by the positive results described with open shoulder stabilization procedures in the revision setting.[8,26] As these demographic differences and operative characteristics have not been reported previously, these data can serve as useful information for surgeons counseling patients with shoulder instability.

The most striking difference between the primary and revision groups in the present study was the intraoperative findings, specifically, the relatively high frequency of BCLs (47.6%) in patients undergoing revision surgery. Krych et al[17] explored the presence of glenohumeral bone and cartilage lesions in patients undergoing primary shoulder stabilization procedures and reported an incidence of 64%, which exceeds the incidence of lesions in both the primary and revision groups in the present study. However, in the study by Krych et al,[17] Outerbridge grade 1 and 2 chondromalacia were considered cartilage lesions and accounted for nearly 50% of their reported cartilage lesions. In the present study, only Outerbridge grade 3 and 4 chondromalacia were considered BCLs. Glenoid bone loss involving >10% of the glenoid comprised the majority of the BCLs in the present study, with significantly larger bone loss in the revision group. Similarly, Cho et al[8] identified glenoid bone defects involving ≥10% of the glenoid in over 30% of patients undergoing revision shoulder stabilization surgery. As the majority of revision procedures are presumably performed for recurrent instability, the increased incidence of bone loss in patients undergoing revision should not come as a surprise, given the positive association between instability events and bone loss.[24,37] As the proportion of glenoid bone loss considered clinically significant continues to be redefined,[2,36] it is important for surgeons to recognize the relatively high incidence of glenoid bone loss reported in patients undergoing revision surgery in this study. Given these findings, a thoughtful preoperative workup, including advanced diagnostic imaging, should be considered to increase the likelihood of successful outcomes for this patient population.

When considering the effect of BCLs on patient outcomes and function, variable results have been reported. Krych and colleagues[17] reported that the presence of an articular cartilage lesion did not significantly affect shoulder-specific outcomes at midterm follow-up. Meehan and Petersen,[22] on the other hand, found that patients with glenohumeral arthritis and bony Bankart lesions had significantly lower shoulder-specific outcomes in a cohort of patients undergoing revision surgery. In the present study, patients with BCLs had statistically lower SF-36 PCS scores at the time of surgery, but this difference did not meet the MCID.[44] Additionally, as a cross-sectional study, these outcomes were not followed longitudinally. However, given the negative influence of glenohumeral arthritis and glenoid bone loss on outcomes after shoulder stabilization surgery,[6,22,36] factors associated with glenohumeral cartilage lesions are important to recognize in the perioperative period. Although male sex and revision surgery were most strongly associated with both BCLs and glenoid bone loss, patient race, specifically black race, was also independently associated with BCLs and glenoid bone loss involving >10% of the glenoid width, which is a novel finding worth noting. Although several nonmodifiable patient demographic and social factors have been shown to influence access to care for similar

sports medicine procedures routinely performed in young, active patients,[27,30,43] further study of this particular finding in patients with shoulder instability is warranted.

The present study does have several limitations. As a cross-sectional study, the presented results should be considered "time zero" findings, and further follow-up of these patients and a re-evaluation of the described associations are warranted as longitudinal data become available. Additionally, treatment decisions, including open versus arthroscopic stabilization and patient positioning, were at the discretion of the treating surgeons and not randomized in this multicenter cohort. Because of this, the operative variables reported should be considered purely observational and are not necessarily evidence based. Glenoid bone loss >10% of the glenoid width and humeral head bone loss larger than 20% of the humeral head were considered BCLs in this study. As discussed previously, defining clinically significant glenoid and humeral head bone loss continues to be a challenge, although it is certainly moving away from the classic definition that described 20% to 25% of glenoid bone loss as clinically significant.[3,5,18,36] For measurements of glenoid bone loss, treating surgeons could utilize both preoperative advanced imaging and intraoperative assessments. Although no specific technique was recommended for this measurement, both preoperative and intraoperative techniques to estimate the degree of glenoid bone loss have significant limitations,[14,16,34] and reliable methods for the measurement of humeral head bone loss are nonexistent.[35] As patients self-reported the number of instability events, it is unknown whether those instability events were dislocations or subluxation events. While the recent literature suggests that both dislocations and subluxations may result in similar intra-articular injuries,[37] the imprecision of self-reporting for these episodes should be considered when interpreting results. Lastly, the surgical history of patients undergoing revision before enrollment in this study is largely unknown, and thus, the effects of prior surgical intervention(s) on patient-reported outcomes and intraoperative findings cannot be determined. While these limitations do exist, the multicenter, multisurgeon nature of this study likely makes the reported results more generalizable than a single-surgeon series.

CONCLUSION

Glenohumeral BCLs were a common intraoperative finding in this prospectively collected, multicenter shoulder instability cohort. While several demographic and operative variables differed between patients undergoing primary and revision shoulder stabilization surgery, the most notable difference was the significant increase in glenohumeral BCLs identified in patients undergoing revision surgery as compared with those undergoing primary procedures. Additionally, the present study identified several factors independently associated with the presence of glenohumeral BCLs at the time of surgery including male sex, revision surgery, black race, increasing BMI, increasing patient age, and lower preoperative SF-36 PCS scores. On the basis of these findings, future studies should aim to compare outcomes in patients undergoing primary and revision shoulder stabilization surgery while taking into consideration the presence or absence of glenohumeral cartilage lesions.

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