acceptable symptom state (PASS) for the ASEs and SANE did not differ significantly between groups. Thirty-four of patients in both cohorts returned to preinjury levels of work (77.27% vs 85.00%, p = 0.3677). Thirty-two (72.72%) repair patients and 33 (82.50%) of tenodesis patients returned to preinjury levels of sporting activity (p = 0.2850). There were no significant differences in the rates of medical discharge, failure of repair, or revision procedures between groups (p = 0.2019, p = 0.0624, p = 0.923). Conclusion Both arthroscopic SLAP repair and combined arthroscopic-assisted subpectoral biceps tenodesis and anterior labral repair led to statistically and clinically significant increases in outcome scores, marked improvement in pain, and high rates of return to unrestricted-active duty in military patients with type V SLAP lesions. The results of this study suggest that both procedures represent appropriate treatment options for the surgical management of this injury.

Category: Shoulder - Instability

How Does a Standardized Dynamic Arthroscopic Engagement Test Compare with Radiological Glenoid Track Method for Identification of On- and Off-Track Hill-Sachs’ Lesion

Abstract ID# 22666
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Summary:
A dynamic arthroscopic engagement test performed in a standardized manner (DASE test) is highly reliable with near-perfect interobserver agreement for classification of Hill-Sachs’ lesions. In contrast, radiological method was less reliable and showed greater interobserver variability. Incorporating DASE test in current algorithms may help reduce variability in surgical decision-making.

Data:
Purpose Radiological classification of glenohumeral bone defects into “on-track”, and “off-track” morphology has high inter-observer and intra-observer variability, and this may influence choice of surgical procedure. The purpose of this study was to assess the reliability, reproducibility, and diagnostic validity of a dynamic arthroscopic standardized engagement test (DASE) in comparison with the current gold-standard radiological track measurement method for identification of on/off-track bony lesions in patients with anteroinferior instability. Methods Between January 2018 and 2022, 114 patients who presented with traumatic anterior shoulder instability were evaluated clinically and radiologically (MRI and/or CT scan) and Hill-Sachs’ lesions (HSL) were classified as on-track or off-track, and peripheral-track (HSP%) by two independent researchers. During arthroscopy, a standardized method of evaluation (Dynamic Arthroscopic Standardized Engagement [DASE] test) was used to classify defects into on-track, peripheral-track, and off-track lesions by two experienced shoulder surgeons, and the interpretation was documented independently. Interobserver reliability for DASE test and radiological (HSO) method classification was calculated using Kappa statistics and reported as percent agreement along with 95% confidence intervals. Diagnostic validity (sensitivity, specificity, positive predictive value, and negative predictive value) of DASE test was calculated using the radiological (HSO%) track as a gold standard. Results Radiologically measured mean glenoid bone loss (GBL), Hill-Sachs interval (HSI) and Hill-Sachs’ occupancy (HSP) for off-track lesions were lower in the arthroscopically classified off-track lesions (DASE test) as compared with the radiological method. The arthroscopic method showed a near-perfect agreement between the 2 observers for the on-track classification system (k=0.96, p<0.001) as well as for the on-off peripheral-track classification (k=0.88, p<0.001). The radiological method showed greater interobserver variability (0.31, 0.24) with only fair agreement for both classification systems. Inter-method agreement varied between 71% and 79% (CI 62-86%) between the 2 observers, and reliability was assessed as only slight to fair agreement (k=0.38, 0.16). Overall, the DASE test showed maximum specificity (81%, 78%) for diagnosis of an off-track lesion by both observers when radiological peripheral-track lesions (HSP5% 100%) were considered as off-track lesions. Similarly, the DASE test demonstrated maximum sensitivity when arthroscopic peripheral track lesions were classified as off-track lesions. Conclusion The DASE test showed a near-perfect interobserver agreement for lesion classification and the radiological method demonstrated greater variability and less reliability. Clinical relevance: Incorporating the DASE test in current treatment algorithms may help reduce variability in score-based algorithms for decision-making in anterior shoulder instability. Level of evidence: Level 1 Diagnostic Keywords: Instability; Bone defect; glenoid track; Hill-Sachs lesion; Arthroscopy; engaging Hill-Sachs’ lesion

Category: Shoulder - Instability

Inferior Hill-Sachs Position Predicts Failure Following Primary Bankart Repair for On-Track Lesions

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Summary:
An inferiorly-based Hill-Sachs lesion represents a higher risk lesion as compared to superiorly-based lesions for recurrent instability following Bankart repair. Data: Background: The on-track/off-track concept for shoulder instability primarily describes the medial-lateral rotational relationship between an engaging Hill-Sachs lesion and a Bankart defect. Though clinically more protective, on-track lesions retain some risk for failure following primary arthroscopic Bankart repair. While some of this risk can be explained by the “near-track” concept, the role of the superior-inferior position of the Hill-Sachs lesion has never been studied in the context of failure of primary Bankart repair. This study aims to identify the relationship between the superior-inferior position of a Hill-Sachs lesion and risk for failure following primary arthroscopic bankart repair. Our hypothesis is that inferiorty-based Hill-Sachs lesions may engage with the arm in neutral and thus be higher risk for failure following primary Bankart repair. Methods: We performed a retrospective analysis of 201 individuals with on track lesions who underwent primary arthroscopic Bankart repair between 2007 and 2019 who have minimum 2 year follow-up. Patients with failure were defined as those who sustained a dislocation or subluxation after the index procedure. A pre-operative sagittal MRI cut showing the maximum Hill-Sachs diameter was used for position analysis. Sagittal position of the Hill-Sachs was defined the angle formed by the Hill-Sachs bisecting line through the humeral head center, against the mid-humeral axis on a sagittal MRI cut; An angle of 0 is twelve o’clock on the humeral head, while an angle of 90 is equatorial. We defined a priori four Hill-Sachs quadrants for semi-quantitative analysis, based on physiologic arm positions: Superior (angle < 40), Mid-Superior (40-60), Mid (61-90), and Inferior (>90). Hill-Sachs quadrants were then correlated against failure following primary arthroscopic Bankart repair. Results: Failure rates following arthroscopic bankart repair as it relates to superior-inferior position of the Hill-Sachs lesion is as follows: No Hill-Sachs (10 of 73, 13.7%), Superior (0 of 7, 0%), mid-superior (6 of 36, 16.7%), Mid (19 of 71, 26.8%), and Inferior (1 of 6, 16.7%). We grouped Hill-Sachs lesions into low grade (No Hill-Sachs, Superior, and Mid-Superior quadrants) and high grade (Mid, and Inferior quadrants). Low grade represented a 13.8% risk of failure, while High grade represented a 26% risk for failure (p=0.034). Receiver Operating Characteristic (ROC) analysis demonstrates a Youden Index of 66 degrees as optimal cut-off for high-risk Hill-Sachs. Conclusion: The superior-inferior sagittal position of a Hill-Sachs lesion may contribute to risk for failure of primary arthroscopic Bankart repair for on-track lesions. Inferiorly-based Hill-Sachs lesions may risk engagement at lower degrees of arm abduction, and in our study represent nearly double the risk of failure of arthroscopic Bankart repair as compared to superior Hill-Sachs positions.

Category: Shoulder - Instability

Capsuloligamentous Laxity Predicts Failure Following Arthroscopic Anterior Bankart Repair

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Summary:
A posteriorly based Hill-Sachs lesion may contribute to risk for failure of primary arthroscopic Bankart repair as it relates to superior-inferior position of the Hill-Sachs lesion is as follows: No Hill-Sachs (10 of 73, 13.7%), Superior (0 of 7, 0%), mid-superior (6 of 36, 16.7%), Mid (19 of 71, 26.8%), and Inferior (1 of 6, 16.7%). We grouped Hill-Sachs lesions into low grade (No Hill-Sachs, Superior, and Mid-Superior quadrants) and high grade (Mid, and Inferior quadrants). Low grade represented a 13.8% risk of failure, while High grade represented a 26% risk for failure (p=0.034). Receiver Operating Characteristic (ROC) analysis demonstrates a Youden Index of 66 degrees as optimal cut-off for high-risk Hill-Sachs. Conclusion: The superior-inferior sagittal position of a Hill-Sachs lesion may contribute to risk for failure of primary arthroscopic Bankart repair for on-track lesions. Inferiorly-based Hill-Sachs lesions may risk engagement at lower degrees of arm abduction, and in our study represent nearly double the risk of failure of arthroscopic Bankart repair as compared to superior Hill-Sachs positions.
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Summary:
Capsuloligamentous laxity is a significant independent risk factor for failure after arthroscopic Bankart repair, and hyperlaxity may increase the failure risk in younger patients with a small distance to dislocation.

Data:
INTRODUCTION Recurrent anterior shoulder instability after arthroscopic Bankart repair presents a challenging clinical problem, with the primary stabi-

lization procedure often portending the best chance for clinical success. The purpose of the study was to determine if capsuloligamentous laxity has a modi-

fying effect on the glenoid track, specifically for on-track lesions with a small distance to dislocation (DTD) from being an off-track lesion or the so-called “near-track” lesion. This may explain why some on-track lesions are at an increased risk of recurrent instability. We hypothesized that patients with liga-

mentous laxity and “near track” lesions would be at increased risk of recurrent instability following arthroscopic Bankart repair. METHODS Consecutive pa-

tients who underwent primary arthroscopic Bankart repair for recurrent anterior glenohumeral instability with at least 2-year follow-up at a single institution between 2007-2019 were retrospectively reviewed. Patients with glenoid bone loss > 20%, off-track lesions, concomitant remplissage, or rotator cuff tear were excluded. Capsuloligamentous laxity, or hyperlaxity, was defined as external rotation >85 degrees and/or grade 2+ or greater load-and-shift in two or more planes. RESULTS 173 consecutive patients with mean age of 20.5 years and mean DTD of 16.2 were included for analysis. 16.8% sustained a recurrent dislocation and 6.4% had recurrent subluxations (defined as any subjective complaint of recurrent instability without frank dislocation), with an overall recurrent insta-

bility rate of 23.1%. The rate of revision stabilization was 15.6%. Mean time to follow-up was 7.4 years. Independent predictors of recurrent instability were younger age (p = 0.001), smaller DTD (p = 0.021), >1 instability episode pre-op (p = 0.001), and presence of hyperlaxity on EUA (p = 0.013). Among patients with near-track lesions, those with hyperlaxity had a recurrent instability rate almost double those without hyperlaxity (OR 34.1, p = 0.036). The increased rate of failure and recurrent dislocation in the near-track hyperlaxity cohort remained elevated, even in patients with no bone loss. DISCUSSION Capsu-

loligamentous laxity is a strong independent risk factor for failure after arthro-

scopic Bankart repair alone and is an even greater risk factor in patients with a small DTD. As our understanding of the glenoid track continues to evolve, sur-

geons may need to consider the track concept as a continuum and consider surgical algorithms other than an arthroscopic Bankart alone in patients with near-track lesions and hyperlaxity at time of surgery.

Category: Shoulder - Instability

Remplissage Reduces Recurrent Instability In High-Risk Patients With “On-Track” Hill-Sachs Lesions

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Summary:
There is benefit in performing remplissage for patients with “near-track” lesions and all contact athletes with Hill-Sachs lesions.

Data:
Introduction: Recent studies have shown that “on-track” shoulders with a small distance to dislocation (DTD) have high rates of recurrent instability following arthroscopic labral repair (ALR). The purpose of this study was to compare recurrent instability rates and patient reported outcomes (PROs) between pa-

tients with “on-track” Hill-Sachs lesions who underwent ALR alone versus pa-

tients who had received ALR with remplissage (ALR + R). Our hypothesis was that performing a remplissage in addition to ALR would decrease the rate of recurrent instability, especially among high-risk subjects such as contact athletes. Methods: We performed a retrospective analysis of patients age 12-40 years old with “on-track” shoulders who underwent ALR + R between Jan 2014 and Dec 2019 at a single institution, with minimum 2-year follow-up. Exclusion criteria included: prior ipsilateral shoulder surgery, >20% glenoid bone loss (GBL), “off-

track” Hill-Sachs lesion, concomitant rotator cuff repair, and connective-tissue disorder. We then identified a cohort of patients meeting the same inclusion and exclusion criteria who had undergone ALR alone. Patient age, gender, follow-up time, first-time dislocation vs. multiple dislocations, and contact sport partici-

pation were recorded. GBL, Hills-Sachs Interval (HSI), glenoid track (GT), and DTD were measured from pre-operative MRIs. Western Ontario Shoulder Insta-

bility Index (WOSI), Single Assessment Numeric Evaluation (SANE) scores, and recurrent dislocation/revision surgery status was also collected. Subgroup an-

alysis was performed on “high-risk” patients (DTD <10mm and contact sport participation) from each cohort. Results: The ALR + R cohort had 17 subjects and the ALR cohort had 51 subjects. There were no differences in demographic variables or GBL between cohorts (P > 0.05). The ALR + R subjects had larger HSI (14.7mm ± 2.4 vs 5.7mm ± 5.0; P < 0.001) and smaller DTD (8.2mm ± 3.2 vs 16.2mm ± 5.7; P < 0.001). There were no difference in WOSI (304.2 ± 213 vs 302.4mm ± 344.2; P = 0.98) or SANE (84.3 ± 16.6 vs 87.3 ± 8.9; P = 0.94) scores between groups. Only 1 (5.9%) subject in the ALR + R cohort had a recurrent subluxation, and there were no dislocations or revision surgeries. The ALR cohort had 7 (13.7%) recurrent dislocations, 3 (5.8%) recurrent subluxations, and 6 (11.8%) revision surgeries. Univariate analysis showed that smaller DTD was predictive of recurrent instability (OR 0.88; 95% CI (0.77 – 0.99); P = 0.037). Multivariate analysis indicated that smaller DTD (OR 0.71; 95% CI (0.56 – 0.87); P = 0.001) and contact sport participation (OR 8.67; 95% CI (1.19 – 63.35); P = 0.033) were associated with increased risk of recurrent instability. After adjusting for contact sport participation and DTD value, the ALR + R cohort had a 98.8% lower risk of recurrent instability compared to the ALR cohort (OR 0.012; 95% CI(0.0001 – 0.22); P = 0.003). Among “high-risk” subjects, there was only 1 (11.1%) instability event in the ALR + R group and 4 (80%) in the ALR alone group (P = 0.023). Conclusion: DTD calculations can be used as an independent predictor of recurrent shoulder dislocation following ALR for treatment of anterior shoulder instability. For patients with “on-track” shoulder lesions, but small DTD measurements (“near-track” lesions), remplissage is protective against recurrent instability events and need for revision surgery. This may be especially true for “high-risk” patients, such as those who participate in contact sports.

Category: Shoulder - Instability

The Natural History of Nonoperative Treatment of Posterior Instability In a High Demand Population

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Summary:
In patients that underwent a minimum of 6-months of nonoperative management for isolated posterior glenohumeral instability, failure occurred approximately 47% of the time and was associated with a greater posterior humeral head subluxation, less posterior acromial coverage, greater posterior acromial height, and greater amounts of glenoid retroversion on index MRI than those who did not fail. Data:
Background: Nonoperative management of posterior shoulder instability is common, however there is limited data available to assess the pathomorphologic factors associated with failure of nonoperative treatment. Having a better un-

derstanding of the natural history of posterior glenohumeral instability as well as insight into specific morphology that is associated with poor survivorship of nonoperative management can play a key role in patient counseling and guide management. Purpose: The purpose of this study is to determine what, if any, glenohumeral pathomorphology may predispose patients to fail nonoperative management. Study Design: Retrospective Cohort Study Methods: We conducted a retrospective review of a consecutive series of patients with isolated posterior shoulder instability, defined as isolated posterior labral tear on MRI with cor-

responding physical exam findings (Kim and Jerk tests), had undergone nonop-

erative management for a period of 6 months and did not have any past surgical history with respect to the affected shoulder. Our primary outcome was risk factors for failure of non-operative management including posterior glenoid bone

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