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Critical Findings on MR-Arthrogram in Posterior Shoulder Instability Compared to an Age-Matched Controlled Cohort

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65.5% complain of decreased range of motion during throwing. The results should be considered preoperatively in remplissage candidates who are engaged in throwing sports.

Biomechanical Comparison of a Hill-Sachs Reduction Technique and Remplissage: The Potential Benefits of Anatomic Reconstruction

SS-03

April 14, 8:45 AM

GRANT GARCIA, M.D., PRESENTING AUTHOR

RYAN DEGEN, M.D., M.Sc., F.R.C.S.C.

MICHELLE MCGARRY, M.S.

CHRIS BUI, M.D.

DAVID ALTCHER, M.D.

THAY LEE, Ph.D.

JOSHUA DINES, M.D.

Introduction: Hill-Sachs reduction represents a potential alternative treatment method to remplissage. The purpose of this study is to biomechanically compare the stabilizing effects of a Hill-Sachs reduction technique and remplissage procedure, in a complex instability model.

Methods: This was a comparative cadaveric study of 6 shoulders. For the Hill-Sachs lesion, a unique model was used to create a 30% defect, compressing the subchondral bone while preserving the articular surface in a more anatomic fashion. Also a 15% glenoid defect was made. The Hill-Sachs lesion was reduced through a lateral cortical window with a bone tamp, and the subchondral void was filled with Quickset (Arthrex) bone cement to prevent plastic deformation. Five scenarios were tested; intact specimen, bipolar lesion, Bankart repair, Remplissage with Bankart repair and Hill-Sachs reduction technique with Bankart repair. Translation, dislocation events and range motion were recorded.

Results: For all 6 specimens no dislocations occurred after either Remplissage or the reduction technique. Total translation with a 40N force at 90 degrees of external rotation (ER) was 5.1 mm following remplissage and 4.4 mm following the reduction technique, in comparison to the bipolar lesion at 11.1mm ($p<0.001$). Similarly, with a 40N force at 90 degrees of ER, total anterior-inferior translation was 5.9mm for remplissage and 4.7 mm for the reduction technique, in comparison to the bipolar lesion at 11.6 mm ($p<0.001$). Average ER for the remplissage was 125.2 degrees and 128.4 degrees for the reduction technique ($p=0.83$).

Conclusion: Similar joint stability was seen following both procedures, though remplissage had 3.2-degree loss of ER in comparison. While not statistically significant, any ER loss may be clinically detrimental in overhead athletes. Overall, the reduction technique is a more anatomic alternative to the Remplissage procedure with similar ability to prevent dislocation in a biomechanical model, making it a viable treatment option for engaging Hill-Sachs lesions.

Effect of Sagittal Rotation on Axial Glenoid Width and Version: CT Scan Analysis in the setting of Anterior Bone Loss

SS-04

April 14, 8:50 AM

MATTHEW PROVENCHER, M.D., PRESENTING AUTHOR

RACHEL FRANK, M.D.

PETAR GOLJANIN, B.S.

BRYAN VOPAT, M.D.

DANIEL GROSS, M.D.

VIDHYA CHAUHAN, M.D.

ANTHONY ROMEO, M.D.

Introduction: As standard 2-dimensional (2D) CT scans of the shoulder are often aligned to the body as opposed to the plane of the scapula/glenoid, the 3-dimensional (3D) anatomy of the glenoid may be distorted, and result in inaccurate measurements of glenoid width, version, and degree of GBL. The purpose of this study was to determine the effect of sagittal rotation on axial anterior-posterior (AP) glenoid width measurements in the setting of GBL.

Methods: A total of 44 CT scans from patients with a minimum of 10% anterior GBL were reformatted utilizing open-source DICOM software Osirix MD (version 2.5.1 65-bit) multi-planar reconstruction (MPR). Patients were grouped according to degree of anterior GBL: I) 10-14.9% (N=8), II) 15-19.9% (N=18), and III) >20% (N=18). The uncorrected (UCORR) and corrected (CORR) images were assessed in the axial plane at 5 standardized cuts and measured for AP glenoid width. When the measured AP width of the UCORR scan was less than that measured on the CORR scan, the AP width of the glenoid was considered underestimated, and the degree of GBL was considered overestimated.

Results: For Groups I and III, the UCORR scans underestimated the axial AP width in cuts 1 and 2, while in cuts 3-5, the axial AP width was overestimated. In Group II, the axial AP width was underestimated, while in cuts 2-5, the axial AP width was overestimated. Overall, AP glenoid width was consistently underestimated in Cut I, the most caudal cut, while AP glenoid width was consistently overestimated in cuts 3-5.

Conclusion: Uncorrected 2D CT scans inaccurately estimate glenoid width and the degree of anterior GBL and the findings of this study suggest a role for the utilization of corrected 3D reconstructions to allow more accurate measurements of the glenoid in order to accurately define the anatomy and quantity of GBL.

Critical Findings on MR-Arthrogram in Posterior Shoulder Instability Compared to an Age-Matched Controlled Cohort

SS-05

April 14, 8:55 AM

JOSEPH GALVIN, D.O., PRESENTING AUTHOR

STEPHEN PARADA, M.D.

XINNING LI, M.D.

JOSEF EICHINGER, M.D.

Introduction: The purpose is to determine the prevalence and severity of radiographic risk factors on shoulder MR-arthrogram in patients with arthroscopically confirmed posterior labral tear and symptomatic posterior shoulder instability compared to an age-matched cohort without posterior instability who received shoulder arthroscopy for a distal clavicle excision.

Methods: Patients presenting at an academic institution over a 5-year period with symptomatic posterior shoulder instability that had arthroscopically confirmed repair of a posterior labral tear (66 patients) were compared with an age-matched control group of patients without posterior instability (56 patients) who had a shoulder arthroscopy for a distal clavicle excision. All patients received a shoulder MRA preoperatively and we excluded patients who had prior surgery and collagen disorders. Glenoid version, posterior humeral head subluxation, glenoid dysplasia, and linear and capsular area measurements were evaluated between the two groups. Interobserver reliability for continuous and categorical variables was performed for all measurements.

Results: Multivariable logistic regression revealed that the presence of glenoid dysplasia, posterior humeral head subluxation, and increased axial posterior capsular cross-sectional area were significant risk factors for posterior labral tears and symptomatic shoulder instability in comparison to the control group. Glenoid version was found to be a statistically significant risk factor with univariate analysis for posterior shoulder instability but not with multivariate logistic regression. Interobserver reliability was good to excellent for all measurements but poor for total capsular area.

Conclusion: The presence of glenoid dysplasia, posterior humeral head subluxation and increased posterior capsular area are independent radiographic risk factors in patients with posterior labral tears who develop symptomatic posterior shoulder instability. Identification of the critical radiographic variables on MRA assists in the accurate diagnosis and management of clinically significant posterior shoulder instability.

Arthroscopic Partial Rotator Cuff Repair in the Management of Massive Rotator Cuff Tears: Long-term Follow-up

SS-06

April 14, 9:25 AM

STEPHEN WEBER, M.D., PRESENTING AUTHOR

Introduction: Surgical options for the patient with a massive rotator cuff tear remain limited. Short term reports have shown reasonable early results but long-term results remain lacking Presented here is the first report of all-arthroscopic partial rotator cuff repair in the treatment of massive, unrepairable rotator cuff tears with long-term follow-up.

Methods: Eighty patients with large or massive rotator cuff tears were evaluated. All patients were Thomazeau class 2 to 3 for atrophy, and Goutallier class 2 to 4 for fatty infiltration. All patients had primary closure attempted; if solid closure without tension could not be obtained by

primary repair, partial rotator cuff repair with acromioplasty, preserving the coracoacromial ligament, was performed. All patients were reexamined, with UCLA, SST, and ASES scores obtained, and follow-up radiographs and MRI scans were obtained and compared to preoperative studies. MRI scans were obtained at a mean of 44 months postoperative Survivorship data was obtained, with the endpoint of reoperation and/or conversion to shoulder arthroplasty.

Results: Sixty five patients had repair of the infraspinatus only, with 15 patients combined infraspinatus and subscapularis. Follow-up was a minimal 36 months (average 50.7 months). While initial good or excellent results were obtained in 88% of cases final follow-up showed decreases in all outcome scores. Pain scores showed the most significant decrease, with functional scores showing less improvement. MRI scanning at final follow-up showed progression of atrophy and tear size despite partial repair in 78% of cases. Despite diminished outcomes with time, survivorship was 91% at follow-up.

Conclusion: Good early results can be obtained with partial rotator cuff repair, but these results tend to diminish with long-term follow-up. This technique represents a reasonable, low-morbidity salvage option for the patient with a rotator cuff tear that is not primarily repairable.

Triple-Loaded Single-Row versus Suture-Bridge Double-Row Rotator Cuff Tendon Repair with Platelet Rich Plasma Fibrin Membrane: A Randomized Control Trial

SS-07

April 14, 9:30 AM

F. ALAN BARBER, M.D., F.A.C.S., PRESENTING AUTHOR

Introduction: to compare the structural healing and clinical outcomes of triple-loaded single-row to suture-bridging double-row repairs of full thickness rotator cuff tears both augmented with platelet rich plasma fibrin membrane (PRPFM).

Methods: A prospective, randomized, consecutive series of full-thickness rotator cuff tears under 3cm in AP length were treated with either a triple-loaded single-row (20) or suture-bridging double-row (20) repair augmented with PRPFM. Randomization took place by opening a sealed envelope in the operating room after confirming the patient's eligibility. The primary outcome measure was cuff integrity determined by MRIs obtained 12 months postop interpreted by radiologists blinded to the study. Cho criteria were used to assess tears. Secondary outcome measures were American Shoulder and Elbow Surgeons, Rowe, Simple Shoulder Test, Constant, and Single Assessment Numeric Evaluation scores. An a priori power analysis was used to determine group size

Results: MRI and outcome scores were obtained in 40 patients (mean clinical follow-up 27 months and mean MRI interval 12.6 months). 3 of 20 single-row repairs (15%) and 3 of 20 double-row repairs (15%) had tears at follow up MRI. The single-row group had retears in 1 single tendon repair and 2 double tendon repairs. All 3 tears failed at the original attachment site (Cho type 1). In