

operatively ($p < 0.05$). The average ASES score improved from 61 preoperatively to 82 postoperatively ($p < 0.05$). Average satisfaction with surgical outcome was 7.8 out of 10. There was an association with age at surgery and satisfaction with outcomes but not the ASES score. Patient's pain and function improved significantly postoperatively ($p < 0.05$). Half of the patients were involved in sports and report their ability to compete improved significantly postoperatively ($p < 0.05$).

Conclusions: The best treatment for articular cartilage defects in the shoulder remains unknown. Mcfx has been shown to be an effective treatment option for cartilage injuries in the knee. Outcomes after Mcfx in the shoulder have not been well studied. Our study shows that patients have less pain and improved shoulder function after surgical intervention, which included a Mcfx procedure. The Mcfx procedure can improve function and pain in shoulders with symptomatic, full thickness chondral defects.

Chondroprotective Effects of Hyaluronic Acid Following Oxidative Stress (SS-49). *Valentina Grishko, PhD, Albert W. Pearsall, MD, Glenn Wilson, MD*

Summary: The purpose of current study was to examine the mechanisms of chondroprotective effects of hyaluronic acid following reactive oxygen and nitrogen species -induced stress. We find that hyaluronic acid protects human chondrocyte mitochondria from oxidative stress by decrease of mitochondrial DNA damage and enhancing mitochondrial DNA repair. Hyaluronic acid pretreatment of human chondrocytes prevented mitochondrial transcription and ATP levels decrease following oxidative stress. Also hyaluronic acid prevented apoptosis induced in human chondrocytes following exposure to ROS and RNS by direct prevention of cytochrome c release and activation of caspase 9.

Purpose: The intra-articular injection of hyaluronic acid was originally used in the treatment of osteoarthritis to increase the viscosity of synovial liquid. However, recent findings suggest that the activity of HA cannot be solely explained by its biomechanical properties. Current study was performed to determine the mechanisms of chondroprotective action of hyaluronic acid on articular chondrocytes following reactive oxygen and nitrogen species generation as observed during osteoarthritis development. Chondrocyte mitochondrial function, apoptosis and viability following oxidative stress were main targets of present investigation.

Methods: All work was performed on primary articular chondrocyte cultures. Reactive oxygen species were generated by xanthine oxidase/hypoxanthine exposure,

reactive nitrogen species by peroxyxynitrite. DNA damage and repair were studied by quantitative Southern blot analysis; mitochondrial dysfunction was evaluated by Northern blot analysis of mitochondrial transcription and changes in ATP levels by bioluminescence assay. Apoptosis was evaluated by quantitation of apoptotic cells following DAPI staining, cytochrome c release, and caspases activation. Cell viability was evaluated by MTT assay.

Results: Hyaluronic acid protects human chondrocyte mitochondria by amelioration of mitochondrial DNA damage and enhancing mtDNA repair. Hyaluronic acid preserved mitochondrial transcription and ATP levels following oxidative stress. Also HA pretreatment led to increase of chondrocyte viability and decrease of apoptosis following xanthine oxidase/hypoxanthine and peroxyxynitrite treatment.

Conclusions: Mitochondria are important targets of hyaluronic acid chondroprotective action.

Physical Exam and Magnetic Resonance Imaging (MRI) in the Diagnosis of Superior Labrum Anterior-Posterior (SLAP) Lesions of the Shoulder (SS-50). *Nirav K. Pandya, MD, Anne Colton, MD, David Webner, MD, Brian Sennett MD, G. Russell Huffman, MD, MPH.*

Introduction: There is limited data comparing the sensitivity of physical examination and MR imaging in the diagnosis of arthroscopically confirmed glenoid labral lesions.

Methods: A review of 50 consecutive patients with arthroscopically confirmed superior labrum anterior-posterior (SLAP) lesions and no history of shoulder dislocation was performed. The study was prospectively designed with IRB approval. All patients underwent a standardized physical examination that was compared to the official radiologist's report of MR and/or MR arthrogram imaging. Sensitivity analysis was performed. To determine a difference in sensitivity of 8% between testing modalities, a pre-study power analysis determined that the minimal sample size was 25 patients (for a study with a power of 0.80 and an alpha of 0.05).

Results: The sensitivity of O'Brien's active compression test was 90%, whereas the Mayo (dynamic) shear was 80% and Jobe's relocation test was 76%. The sensitivity of a physical exam with any one of these three tests being positive was 100%; the sensitivity of requiring at least two positive tests ranged from 64% - 72%, and the sensitivity decreased to 58% if all three of these maneuvers was deemed necessary for the diagnosis. Neer (42%) and Hawkin's impingement tests (32%) each had low sensitivity for SLAP lesions. The sensitivity of MRI

for SLAP lesions was 68% when interpreted by the performing surgeon, 54% when read by a radiologist. When the gadolinium enhanced MRI's were analyzed as a subset (performed in 17 patients), the sensitivity was 76% (surgeon) and 52% (radiologist), respectively.

Conclusions: O'Brien's test was highly sensitive while the Mayo shear and Jobe's relocation tests had good sensitivity in the diagnosis of SLAP lesions. MR and MR arthrogram imaging had a lower sensitivity than these examination tests in diagnosing SLAP lesions. Patient history and physical examination remain central to the diagnosis of glenoid labral lesions. While MRI is not as sensitive, it remains an adjunct for the clinician in treating these patients.

Factors of Failure in SLAP Repair (SS-51). *Eric A. Khetia, MD, Alan Curtis, MD, Suzanne Miller, MD*

Purpose: Success rates of SLAP repair have been reported to be between 71% and 100%. However, a subset of patients have presented to our institution with residual pain and stiffness after SLAP repair. The purpose of this study is to identify the factors that led to SLAP repair failure in this subset of patients. We believe that in patients with SLAP lesions who are greater than 40 years of age and are not overhead athletes, the need for SLAP repair needs to be carefully considered, as repair can lead to postoperative pain and stiffness.

Methods: A retrospective review was performed from 2000 to the present to identify patients with unsatisfactory outcomes after having undergone SLAP repair. Medical records were reviewed for demographic data, physical exam findings, and concomitant surgical procedures.

Results: 21 patients (20 males, 1 female) were identified at an average of 11 months (range 4.5 months to 25 months) post-operatively after SLAP repair. The average age of patients was 41 years (range 17 to 55 years). No patients were competitive overhead athletes. All patients presented with pain and stiffness. Compared to the contralateral shoulder, the average loss of motion was 41 degrees of forward flexion, 34 degrees of external rotation, and 25 degrees of internal rotation. 2 patients had concomitant rotator cuff repairs and 2 had concomitant Bankhart repairs. 9 patients improved after intra-articular cortisone injection and physical therapy, while 12 patients required revision arthroscopy, which included one or more of the following procedures: subacromial decompression, lysis of adhesions, biceps tenodesis, debridement of suture and anchor material.

Conclusions: The precise indications for SLAP repair remain unclear. In patients with SLAP lesions who

are greater than 40 years of age and are not overhead athletes, the need for SLAP repair needs to be carefully considered, as repair can lead to postoperative pain and stiffness.

Correlation of the SLAP and Pulley (SS-52). *William F. Bennett, MD*

Summary: Three Hundred and sixteen consecutive arthroscopic shoulder surgeries were reviewed to determine the association of the SLAP lesion with the pulley lesion. Forces that affect the biceps anchor may very well affect the pulley system of the bicipital sheath. This study's findings support the postulate of the author that when operating upon SLAP lesions, and because there is a 43% association, the pulley should be inspected. SLAP lesions have been well-described in the literature and are thought to be secondary to traction injuries to the biceps anchor and/or falls on the out-stretched arm. The pulley has recently been described as a structure, which aids in the prevention of biceps instability.

Purpose: The purpose of this study was to determine a potential correlation of SLAP lesions and Pulley lesions, as forces that can disrupt the biceps anchor may also disrupt the biceps pulley or vice-versa.

Methods: Three Hundred and sixteen consecutive shoulder arthroscopies, performed by one surgeon, were reviewed retrospectively. Operative reports and arthroscopic photos were carefully reviewed with particular attention paid to the labral and pulley pathology. Selection bias was noted, as the author has never operated, primarily, on a Type 1 SLAP. Following, and as such, the exclusion criteria was a Type 1 SLAP.

Results: There were a total of 30 SLAP lesions and a total of 126 pulley lesions. There were 13 patients who had both a SLAP and pulley lesion, 17 patients who had a SLAP lesion without a pulley lesion and 96 pulley lesions without a SLAP.

A comparison of rates between patients who had pulley lesion with a SLAP and those who had a pulley lesion without a SLAP, for the 316 patients, and when tested with a Fisher exact test, revealed that there was no statistical significance, $p = 0.673$.

The prevalence of SLAP lesions in this population of 316 patients was 9.4%, Buford one percent, pulley lesions 39%, and SLAP with pulley lesions, 4 percent. All Bufords were associated with a SLAP and one with a SLAP and pulley. Finally, there was a 43% association of the pulley lesion with SLAP lesions. When looking at the rate for pulley lesions when restricted to patients with SLAP lesions, the pulley lesion rate was 43.3% (13/30; 95% confidence interval 19.6% to 66.9%). The pulley