(40-96) $p<0.001$ at follow up. Mean preoperative pain score improved from 3.83 (0-10) to 12.83 (5-15) $p<0.001$ at follow up. Mean preoperative forward flexion improved form 122.22 (60-170) to 162.44 (15-170) $p<0.001$. 35% (54 patients) had an arthrogram, 65% (100 patients) had an MRI and 0.7% (1 patient) during or after their follow up evaluation. Imaging demonstrated that 92%, 80%, 58% of the Type I, II, III lesions respectively were intact at follow up.

Conclusion: The results of this study indicate that the transosseous equivalent double-row rotator cuff repair (the suture bridge technique) has excellent results at greater than 1 year follow up.

A New Technique to Achieve Arthroscopic Rotator Cuff Repair Using Trans-osseous Fixation Instead of Suture Anchors (SS-03) *Marc Beauchamp, M.D., F.R.C.S.C.*

Introduction: We demonstrate a technique and the preliminary results of arthroscopic rotator cuff repairs performed by means of trans-osseous (bone tunnels) fixation, using newly designed instruments.

Methods: We have designed a curved awl and a curved hollowed hook enabling the making of bone tunnel under arthroscopy, and the visual retrograde passage of sutures through it. After testing it on arthroscopic training lab models, we have proceeded to forty (40) consecutive cases of arthroscopic rotator cuff repair (small and medium size tears). We have assessed the patients at 2,4 and 6 months post-operatively.

Results: We have achieved full repair in 38 of the 40 cases. In the two cases we did not succeed, it was due to bone bridge failure during the tying of the knots related to inappropriate distal entry in the humerus (i.e. less than 10 mm distal to the apex of the greater tuberosity). Both were converted to standard repair using suture anchors. Mean operative time was increased for the first 25 cases as compared with our "normal suture anchor time" (+ 11 minutes), but became normal for the last 15. Clinical results at 6 months were comparable to our regular suture anchor experience. Apart from the two cases mentioned above, we report no complications.

Conclusion: Trans-osseous rotator cuff repair can be safely achieved by arthroscopy. The use of reusable specially designed awl and hollowed curved hook facilitate the passage of the sutures under direct visualization. The bone tunnel should include a minimum of 10 mm of lateral humeral cortex for solidity. This technique provides excellent per operative fixation and clinical results that are comparable to those obtained with suture anchors, but at a substantially reduced cost.

Measurement of Rotator Cuff Tension In Vivo: Single-row vs Double-row Repair (SS-04) *David W. Wang, M.D., Joseph P. Burns, M.D., Mark H. Getelman, M.D.*

Introduction: The merits of single-row vs. double-row rotator cuff repair constructs have been debated in recent years. Some authors suggest that double-row constructs are biomechanically superior and provide restoration of the footprint of the rotator cuff. Others have suggested that the laterally based double row repair places significantly higher tension on the construct compared to a medially based single-row repair. The purpose of this research was to report the difference in rotator cuff tension between medially based articular margin single-row repairs compared to laterally based double-row repairs in vivo.

Methods: Patients with rotator cuff tears undergoing arthroscopic rotator cuff repair at a single institution were identified. After diagnostic arthroscopy, the rotator cuff tear is debrided back to normal, healthy tissue, and adhesions to the bursa or labrum are removed. The tear size is measured in the anterior-posterior and medial-lateral planes using a pre-measured marked suture. A tissue grasper is then placed onto the apex of the tear through the lateral portal. A calibrated digital weigh scale is then attached. The tendon edge is then pulled just lateral to the articular margin, simulating the location of a medially based single row repair, and the tension is recorded. Next, the tendon edge is pulled laterally to the edge of the greater tuberosity, simulating its final location after a double row repair, and the tension is recorded. All measurements are made with the arm abducted 20 degrees, simulating the position of post-operative sling immobilization.

Results: Twenty-one rotator cuff tears were available for measurement. 16 were crescent tears. 3 were L-shaped and 2 were bursal sided partial tears that required completion of the tear. The average AP tear size was 18.1 mm. The average ML tear size was 19.7 mm. The mean cuff tension when the tendon edge was approximated to the articular margin was 0.41 lb. The mean cuff tension when approximated to the lateral greater tuberosity was 2.16 lb. This is a 5.2 fold difference ($p<0.000001$). Sub-group analysis was done for small ($<=20$ mm ML) vs. large tears (>20 mm ML) tears. For the smaller tears, the average tension to the articular margin was 0.28 lb. The average tension to the lateral tuberosity was 1.73 lb for a 6.3 fold difference ($p<0.0005$). For the larger tears, the average tension to the articular margin was 0.63 lb. The average tension to the lateral tuberosity was 2.84 lb. This was a 4.5 fold difference ($p<0.0005$). When com-