

Long-term Results of Arthroscopic Rotator Cuff Repair (SS-07)

We have been performing arthroscopic rotator cuff repair since 1991. Short-term results have been previously presented and have been encouraging. Presented here are long-term results (minimum of 8 years postoperative) in a consecutive series of 64 patients who underwent 64 arthroscopic rotator cuff repairs. Three patients had died and 6 could not be located, leaving 55 patients who were reevaluated. We were able to personally interview and examine 48 patients; 7 patients were interviewed by telephone. The average age of these patients was 68 years. The repair technique used in these patients was predominantly our older technique utilizing No. 1 PDS and push-in anchors. Most of the tears were nonretracted crescent shaped tears and were repaired directly end to bone. We have traditionally evaluated our patients using the Modified UCLA (MUCLA) scoring system (45 points maximum). This group of patients was also evaluated using this scoring system. Eight year postoperative American Shoulder and Elbow Society and Constant scores were also determined for this group. For MUCLA scoring, we were able to compare the preoperative scores with the results of our previously published evaluation at 2-3 years and our current evaluation at 8 years. The average preoperative MUCLA score was 17, the 2-3 year score was 41, and the 8 year score was also 41. Excellent results were achieved in 68% at 2-3 years and in 75% at 8 years. Good results were obtained in 25% at 2-3 years and 10% at 8 years. Fair results were obtained in 2% of both 2-3 year and 8 year follow-up groups. Poor results were recorded in 5% at 2-3 years and 13% at 8 years. American Shoulder and Elbow Society Scores at 8 years were as follows: 90.8 average overall score (range 40-100), Average pain score was 0.9. Average ADL score was 27.3. Average strength score was 4.8 (abduction) and 4.9 (IR and ER). Constant Scores at 8 years were as follows: 91.3 average overall score (range 68-100). Average pain score was 13. Average total ADL score was 18.8. Average ROM score was 36.1. Average strength score was 12.3. Average strength score when compared to the unaffected side (operated side score \times 25/unaffected side score) was 22.4. We used this comparison value to determine the overall average score. Overall, the results of arthroscopic rotator cuff repair are very good and have shown to be durable at 8 year follow-up. These results compare well to the long-term results of open repairs. It must be noted, however, that these are the results of the repair of only the smaller tears that were undertaken at the time. Currently we are using stronger sutures with higher pull-out strength anchors and are

repairing much larger tears. The short-term results of these repairs are also good but their long-term durability must still be determined.

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Fatty Infiltration and Atrophy of the Rotator Cuff Do Not Improve Following Rotator Cuff Repair (SS-08)

There has been controversy as to whether rotator cuff repair (RCR) can improve the fatty infiltration (FI) and muscle atrophy (MA) often seen in large rotator cuff tears. This study compares FI and MA seen on pre- and postoperative MRIs as part of a prospective outcome study of rotator cuff repair. Methods: The clinical outcome of 39 patients (mean 62yo, minimum follow-up 1yr) following RCR was determined with ASES and Constant scores. FI was graded on a 5 point scale and MA on a 4 point scale on pre and postoperative MRIs. Results: Pain, function, ASES and Constant scores all significantly improved following RCR ($P < .05$). FI and MA positively correlated with tear size ($P < .0001$, $r = 0.712$). Those with greater degrees of supraspinatus FI were more likely to retear ($P < .001$, $r = 0.745$). ASES and Constant scores, and strength measurements, all inversely correlated with FI and MA ($P < .03$). Strength in FF and ER was affected more by infraspinatus FI than similar levels of the supraspinatus. Pain relief was independent of the severity of FA/MA. Only one patient improved from moderate to mild MA. In 18 MA/FI were unchanged and in 21 MA and/or FI was actually worse. Conclusion FI and MA significantly affect the functional outcome following RCR even though pain is relieved. Neither FI nor MA appear to reverse following surgery, even with a successful outcome, and in moderate to severe cases may actually worsen. Patients' expectations should not include reversal of muscle degeneration once present.

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Complications of Arthroscopic Rotator Cuff Repairs (SS-09)

Arthroscopic techniques for treatment of shoulder problems especially rotator cuff tears has continued to gain popularity over the past ten years. Complications following shoulder arthroscopy have ranged from 5.3% to 9.5%, however, this number accounts for all types of shoulder arthroscopic surgeries. There has not been much written regarding the complications following arthroscopic rotator cuff repairs. Studies have demonstrated the results with arthroscopic rotator cuff repairs

are comparable to results from open and mini-open repairs. Our study was designed to determine the complication rate of arthroscopic rotator repairs in a series of patients. **Methods and Materials:** All patients undergoing an arthroscopic rotator cuff repair by the 2 senior surgeons between 2/03 and 7/03 were identified. A total of 263 patients were identified. All charts were retrospectively reviewed looking for size of tear, number of anchors and/or tacks used and any complications following surgery. We divided the complications into major and minor complications. Major complications were defined as those events that required additional operation or re-operation, resulted in neurovascular injury, had technique or hardware failures and resulted in prolonged temporary or permanent disability. Minor complications were defined as those cases that did not require any further surgery but may have required additional therapies or extended observation. **Results:** Of the 263 cases, a total of 12 complications were identified. The complication rate for this series of patients was 4.5%. There were 3 major complications and nine minor complications. Major complications included one deltoid detachment and one anchor pullout. Minor complications included 3 patients with adhesive capsulitis, 3 patients with synovitis due to bioabsorbable cuff tacks, and 3 infections that required oral antibiotics. **Discussion:** Complications following open and mini-open rotator cuff repairs are uncommon. Our study found a complication rate of 4.5% and the majority of the complications were minor. Arthroscopic rotator cuff repair continues to improve as techniques and hardware improves.

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All-Arthroscopic Versus Mini-Open Rotator Cuff Repair: Long-Term Follow-up (SS-10)

All arthroscopic repair has previously been shown to show equivalent short-term outcome and decreased morbidity compared to mini-open repair. Concerns have remained however about both the technical difficulty and long-term outcome of all-arthroscopic repair. From 1/96 to 3/99 501 patients were the subjects of an earlier report in 2000 on the preliminary results contrasting all arthroscopic repair and mini open repair. Two hundred twenty one of these had moderate or large tears or other diagnoses and were excluded, leaving 280 patients for review. 126 chose an all-arthroscopic repair versus 154 with an open repair. These patients were re-reviewed four years later to form the basis of this study. Follow-up averaged 84.3 months for the arthroscopic and 95.8 for open with a minimum of six years. Age, gender, associ-

ated findings at surgery, and duration of surgery were not significantly different between the two groups. There were two manipulations and two reoperations for failed repair in the open group (3%) in the early study; one additional repair in the open group failed at longer follow-up. One patient had a loose anchor (1%) using second-generation anchors and better technique. Two patients had early failed repairs and an additional two failed later with a total reoperation rate of 4% ($p = ns$). Final outcomes as measured by ASES, UCLA and SST scores were not statistically different. All arthroscopic repair is shown to offer a significant reduction in perioperative morbidity over mini open repair. Mid-range follow-up continues to show equivalent outcomes between the two techniques. While the anatomic outcome of the two techniques at mid to long-term follow-up remains unknown, clinical results between the two techniques remains the same.

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Hamstring Function 2 Years Following Anterior Cruciate Ligament Reconstruction Using Semitendinosus-Gracilis Autografts (SS-11)

This retrospective study evaluated the 2 year outcomes (25.8 ± 5 months postsurgery) of 20 patients post-unilateral ACL reconstruction using semitendinosus-gracilis autografts with EndoButton femoral and interference screw-staple tibial fixation. Patients underwent clinical examination including instrumented manual muscle testing of isometric knee flexion-internal rotation torque, conventional and prone isokinetic hamstring torque testing (60° and 180° per second), hop testing, knee arthrometry, modified VAS leg sensation evaluation, IKDC Subjective Knee Evaluation and IKDC Current Health Evaluation. One-way ANOVA were used to evaluate side-to-side differences and multiple regression analysis related these findings to knee function ($P < .05$). Patient activity levels were 6 = competitive, 6 = frequently sporting, 7 = sporting sometimes, and 1 = non-sporting. Involved side knee laxity was 66.7 N (1 ± 1 mm), 89 N (2 ± 2 mm) and 133.4 N (2.7 ± 2.5 mm), respectively. Involved side active knee flexion was decreased $8.2 \pm 5^\circ$. Peak isokinetic hamstring torque did not display significant side-to-side differences. Involved side isokinetic hamstring work was decreased 76.7 ± 118 J at 60° sec during conventional testing and was decreased 94.4 ± 107 J and 86.3 ± 115 J at 60° sec and 180° sec, respectively during prone testing. Isometric testing revealed decreased involved side hamstring torque at 90° flexion-neutral tibial rotation (17 ± 14 Nm), at 120° flexion-neutral tibial rotation (24.5 ± 14 Nm), at 90° flexion-internal tibial rotation (13.2 ± 12 Nm), and at 120° flexion-internal tibial