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Summary:
Improvement in symptoms and functional outcomes after PRP subacromial injections were significantly worse in patients who had a Partial thickness rotator cuff tears compared with patients who had an isolated tendinopathy.

Data:
Purpose: The purpose of this study was to compare the effect of subacromial leukocyte-rich PRP injections in patients with isolated rotator cuff tendinopathy (RCT) and those with partial thickness rotator cuff tears (PTRCTs) based on functional outcomes, pain improvement, sleep disturbances, and return to sports.

Materials and Methods: Between November 2019 and March 2021, 150 patients underwent PRP injections in our institution for refractory rotator cuff tendinopathy (105 RCTs and 45 PTRCTs). The American Shoulder and Elbow Surgeons (ASES) score, the visual analog scale (VAS) for pain, the Single Assessment Numeric Evaluation (SANE) and The Pittsburgh Sleep Quality Index were evaluated at 2, 6 and 12 month follow up. Return to sports was also evaluated. An ultrasound examination was performed to evaluate structural outcomes 12 months after the injection. Results: The mean age was 36.6 years (±9.08). Overall, the ASES, VAS, SANE and Pittsburgh scores showed statistical improvement after the injection (P < .01). Specifically, the improvement in the ASES score was the primary outcome measure was significantly greater in the group without tears than in the group with PTRCTs at all follow-up times. Moreover, 94% of the patients in the isolated RCT group and 49% in the PTRCTs group achieved a substantial clinical benefit at 12 months follow up. Ten out of the 50 patients (20%) who received PRP injections due to a partial RC tear underwent surgery due to lack of clinical improvement. Conclusions: Subacromial PRP injections produced a significant improvement in, shoulder function, pain and sleep disturbances in most patients with RCT refractory to conservative treatment that was maintained up to 12-month follow-up. Moreover, most patients returned to sports at the same level they had previous to the injury. However, improvement in symptoms and functional outcomes were significantly worse in patients who had a PTRCT compared with patients who had an isolated tendinopathy. Level of Evidence: Prospective Cohort study, Level of evidence II

Category: Shoulder - Rotator Cuff

Clinical Outcomes and Tendon Lengthening After Arthroscopic Rotator Cuff Repair

Abstract ID# 22403
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Summary:
It was a common phenomenon that the shortened supraspinatus tendon appeared to be lengthened after rotator cuff repair, and the tendon lengthening did not affect postoperative outcomes such as shoulder motion, clinical scores and postoperative pain; however, the amount of the lengthening had negative weak correlation with abduction strength index.

Data:
Introduction: There is a phenomenon in which the tendon appears to be extended after rotator cuff repair. However, it is unclear in which cases tendon extension occurs and how the degree of extension affects the surgical outcome. This study aimed to evaluate pre- and postoperative musculotendinous junction (MTJ) and tendon length on magnetic resonance imaging (MRI) and to assess the postoperative tendon lengthening and its impact on postoperative outcomes. Methods: We reviewed 109 patients with good repair integrity (Sugaya type I and II) after arthroscopic rotator cuff repair. Patients whose supraspinatus tendons were simply pulled out laterally without any additional procedures were included. They underwent serial MRI before surgery and at 3, 6, and 24 months after surgery. The location of the MTJ and the supraspinatus tendon length were measured. Clinical evaluation was conducted 2 years after surgery, including the range of shoulder motion, shoulder strength index (affected/unaffected strength), Constant score, University of California, Los Angeles (UCLA) score, and pain numeric rating scale (NRS). The characteristics of the preoperative tendon, change in tendon length over time, amount of the lateral shift of MTJ location and tendon length, and impact of tendon lengthening on postoperative clinical outcomes were analyzed. Results: The preoperative tendon retraction significantly correlated with the MTJ location (r = −0.75; p < 0.0001) and preoperative tendon length (r = −0.46; p < 0.0001). Tendon length at 3, 6, and 24 months after surgery was significantly longer than those before surgery (26.7 ± 5.8 mm, 27.9 ± 6.6 mm, 28.5 ± 5.6 mm, and 21.5 ± 5.1 mm, respectively). From before surgery to 24 months after surgery, the MTJ location moved 8.4 ± 8.6 mm laterally and the tendon extended 7.0 ± 6.1 mm. A significant and weak negative correlation was found between tendon lengthening and the abduction strength index (r = −0.22; p = 0.03); however, no significant correlation with pain, range of shoulder motion, external rotation strength index, Constant score, and UCLA score was found. Multiple linear regression analysis also showed that tendon lengthening was only associated with the abduction strength index (standardized coefficient = −0.20, p = 0.03). Conclusions: In this study, preoperative MRI showed that the more retracted the cuff tear, the more medially retracted the MTJ and the shorter the tendon length. With successful tendon repair, the shortened tendons appeared to be lengthened over time after surgery, extending an average of 7.0 mm at 2 years after surgery, and larger preoperative cuff tears appeared to have more postoperative tendon lengthening and lateral shift of MTJ location. The tendon lengthening did not affect postoperative pain, range of motion, or clinical scores; however, the amount of tendon lengthening had a weak negative correlation with the abduction strength index. Tendon elongation may decrease the tension of the supraspinatus muscle belly, resulting insufficient recovery of strength.

Category: Shoulder - Rotator Cuff

A Randomised Controlled Trial Of Autologous Tenocyte Versus Corticosteroid Injection for Partial Thickness Rotator Cuff Tears and Impingement Syndrome

Abstract ID# 22488
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Summary:
This is the first Level 1 prospective randomised controlled trial demonstrating that Autologous Tenocyte Injection resulted in a significantly better and sustained reduction in pain and improvement in shoulder function, compared with corticosteroid injection, as treatment for tendinopathy and interstitial tears of the rotator cuff.

Data:
Introduction: Intertstitial supraspinatus tears can cause persistent subacromial impingement symptoms despite non operative treatment. Preclinical and clinical studies of Autologous Tenocyte Injection (ATI) have shown that cultured tenocytes can synthesise extracellular matrix and facilitate healing of damaged tendon tissue. Therefore, ATI may be an effective treatment for interstitial cuff tears. This study presents the results from the first randomised controlled study to investigate the safety and efficacy of ATI compared to corticosteroid injection (CS) as treatment for tendinopathy and interstitial tears of the rotator cuff.

Methods: Eligible participants were randomised to receive ATI to the interstitial tear or CS to the subacromial bursa in a 2:1 ratio, under ultrasound guidance. Inclusion criteria were duration of symptoms >6 months, magnetic resonance imaging (MRI) confirmed intrasubstance supraspinatus tear and had previously undergone physiotherapy and at least one CS injection. Assessments were undertaken pre-treatment and at 1, 3, 6 and 12 months post-treatment, including the Constant Score, Visual Analogue Pain Scale (VAS) and American Shoulder and Elbow Surgeons Assessment (ASES). 3 T MRI was performed at baseline, 6 and 12 months post treatment. Results: Thirty participants were enrolled (19 randomised to ATI and 11 to CS). The mean age of enrolled participants was 50.5 years (SD 8.5, range 30.2-63.3) and there were 10 female and 20 male participants. Mean duration of shoulder symptoms was 21.8 months (SD 12.1, range 7-48). No pre-treatment group differences (p>0.05) existed. The ATI group performed significantly better in the Constant Score at 1 (p=0.020, ATI = 81.8, CS = 67.6), 6 (p=0.026, ATI = 84.9, CS = 71.1) and 12 (p=0.024, ATI = 86.5, CS = 65.4) months, reported better (p<0.05) VAS scores at all post-treatment timepoints and reported better ASES scores at all timepoints including 6 (p=0.012, ATI = 85.5, CS = 77.1) and 12 months (p=0.034, ATI = 92.4, CS = 82.9) post treatment. No pre-treatment group differences existed (p>0.05) in MRI, ASES and VAS outcomes at any timepoint. Conclusion: This study demonstrates that autologous Tenocyte injection is safe and effective for interstitial tears of the supraspinatus, with better outcomes at 1, 6 and 12 months compared with corticosteroid injection.
ATI = 88.6, CS = 74.0) and 12 (p<0.01, ATI = 93.3, CS = 62.9) months. The mean ASES scores in the ATI group improved from baseline to 6 and 12 months (14.4 and 19.1 points, respectively) and were greater than the MCID (12.0 points). At 12 months post treatment, 95% of ATI participants reported a PASS (patient acceptable symptom state) in their ASES score. Overall, 7 of 11 participants in the CS group withdrew from the trial between 6 and 12 months due to worsening shoulder pain and function. Conclusions: This study demonstrated that ATI resulted in a significantly better and sustained reduction in pain, and improvement in shoulder function, compared with CS. ATI is an emerging non-surgical treatment to promote tendon healing and repair. This is the first Level 1 study using ATI to treat interstitial supraspinatus tears with chronic impingement syndrome.

Category: Shoulder - Rotator Cuff

Long-term Clinical and Structural Outcomes of Arthroscopic Superior Capsule Reconstruction for Irreparable Rotator Cuff Tears: 10-year Follow-up

Abstract ID# 23040
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Summary:
For irreparable rotator cuff tears, arthroscopic SCR restored shoulder function and relieved shoulder pain, with high rates of return to recreational sports and physically demanding work, and it maintained significant improvements in clinical and structural outcomes for at least 10 years after surgery.

Data:
INTRODUCTION Short-term follow-up studies have reported favorable clinical outcomes after arthroscopic superior capsule reconstruction (SCR) for irreparable rotator cuff tears. Our objective here was to assess whether these positive outcomes are maintained long-term and whether cuff tear arthropathy worsens over time after fascia lata autograft SCR. METHODS This study analyzed data collected prospectively from 34 consecutive patients (36 affected shoulders) with irreparable rotator cuff tears who underwent arthroscopic SCR from 2007 through 2011. Active shoulder range of motion (ROM) and American Shoulder and Elbow Surgeons (ASES), Japanese Orthopaedic Association (JOA), and Visual Analog Scale (VAS) scores were evaluated before SCR and at 1 year, 5 years, and 10 years after surgery; rates of return to participation in sports and physically demanding work were determined as well. In addition, radiography and MRI data were collected before surgery and at 3 and 6 months and at 1, 2, 3, 4, 5, and 10 years afterward. Acromiohumeral distance (AHD) and Hamada grade (stage of cuff tear arthropathy) were evaluated by using radiography. We defined Hamada grades 3 and 4b as acatabalizarization and grades 4a and 4b as glenohumeral osteoarthritis. Graft survival rate and thickness were assessed by using T2-weighted MRI. RESULTS Compared with presurgery values, ASES and JOA scores and active ROM (elevation and external rotation) were increased significantly at 1 year after SCR (P < 0.001) and maintained throughout follow-up. At 10 years after SCR, 88% (15 of 17 patients) of workers with physically demanding jobs and 90% (9 of 10 patients) of sports players still participated in these activities. Graft survival rate was 94% (34 of 36 shoulders) at 1 year after SCR, 92% (33 of 36 shoulders) at 2 to 4 years, and 89% (32 of 36 shoulders) at 5 to 10 years. In healed grafts, graft thickness was maintained for at least 10 years after SCR (7.8±2.0 mm at 3 months after SCR, 7.8±1.6 mm at 10 years). The incidence of acatabalizaration (affected shoulder, 9%; unaffected shoulder, 6%) and glenohumeral osteoarthritis (affected shoulder, 28%; unaffected shoulder, 16%) during the 10 years after SCR did not differ between affected and unaffected shoulders. The complication rate was 2.8% (1 of 36 patients, anchor pull-out). CONCLUSION For irreparable rotator cuff tears, arthroscopic SCR restored shoulder function and relieved shoulder pain, with high rates of return to recreational sports and physically demanding work, and it maintained significant improvements in clinical and structural outcomes for at least 10 years after surgery. In addition, graft healing completely prevented any progression of cuff tear arthropathy. Arthroscopic SCR is an effective surgical option for irreparable rotator cuff tears and retains positive outcomes for at least 10 years.

Category: Shoulder - Rotator Cuff

Temporal Changes in the Magnetic Resonance Imaging after Arthroscopic Rotator Cuff Repair with Superior Capsule Reconstruction for Reinforcement

Abstract ID# 21645
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Summary:
This study aimed to assess the temporal changes in magnetic resonance imaging (MRI) appearance after arthroscopic rotator cuff repair with superior capsule reconstruction for reinforcement (SCR-R). SCR-R prevented postoperative retear even in severely degenerated tendon tears. The MRI appearance of repaired tendon and graft continued to mature during 2-year follow-up.

Data:
Introduction: Retearing of repaired rotator cuff tendons often worsens clinical outcomes and decreases patient satisfaction after arthroscopic rotator cuff repair. Recently, arthroscopic rotator cuff repair with superior capsule reconstruction for reinforcement (SCR-R) was developed to improve the repair integrity and prevent retear of the repaired tendon for the treatment of degenerated rotator cuff tears. However, there have been no study which assessed the temporal changes in the structural integrity of repaired tendons and graft on magnetic resonance imaging (MRI) after SCR-R. Hence, this study aimed to assess the temporal changes in MRI findings after SCR-R. Methods: We retrospectively reviewed 33 consecutive patients (11 men and 22 women; mean age:71.0 years) with degenerated rotator cuff tears (thin and/or fatty degenerated tendon) who underwent SCR-R and completed postoperative MRI examinations at 3, 6, 12, and 24 months. Thirteen tears were medium and three were large tears. Seven shoulders had isolated supraspinatus tears, 23 shoulders had two tendon tears (supraspinatus and infraspinatus or supraspinatus and subscapularis), and three shoulders had three tendon tears (supraspinatus, infraspinatus, and subscapularis). The Goutallier grade of supraspinatus was 1–3. We assessed the postoperative repair integrity using the Sugaya classification and the high-intensity area between the repaired tendon and graft at 3, 6, 12, and 24 months. The McNemar test was used for the statistical analysis. Statistical significance was defined as P < .05. Results: None of the 33 patients had postoperative retears after SCR-R. Regarding repair integrity, five shoulders were type I and 28 were type II at 3 months; 10 were type I and 23 were type II at 6 months; 21 were type I, 10 were type II, and two were type III at 12 months; 26 were type I, 5 were type II, and two were type III at 24 months. There were 15%, 30%, 64%, and 79% type I shoulders at 3, 6, 12, and 24 months, respectively, with a significant increase between 6 and 12 months (P = 0.002). As for the high-intensity area between the repaired tendon and graft, there were 28, 23, 12, and 4 shoulders with high-intensity areas at 3, 6, 12, and 24 months, respectively. The rate of shoulders with high-intensity area between repaired tendon and graft was 85%, 70%, 36%, and 12% at 3, 6, 12, and 24 months, respectively, with a significant decrease between 6 and 12 months (P = 0.002) and between 12 and 24 months (P = 0.005). Discussion and Conclusion: SCR-R prevented postoperative retear of the repaired rotator cuff tendon even in severely degenerated tendon tears. During the 2-year follow-up after SCR-R, the MRI appearance of repaired tendons and grafts continued to mature. Furthermore, the rate of high-intensity areas between the repaired tendons and grafts continued to decrease. These results suggest that graft-to-tendon healing may occur following SCR-R.

Category: Shoulder - Rotator Cuff

New Bioactive Spatially-Embedded Growth Factor (SEGF) Scaffold Promotes Bone-To-Tendon Interface Healing After Chronic Rotator Cuff Repair

Abstract ID# 22490
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Summary:
This new bioactive spatially-embedded growth factor (SEGF) Scaffold effectively accelerated BTI healing in chronic rotator cuff tear model of rabbits.