

December Resident Article Reviews

Schrøder, Cecilie Piene et al. "Sham Surgery Versus Labral Repair Or Biceps Tenodesis For Type II SLAP Lesions Of The Shoulder: A Three-Armed Randomised Clinical Trial." *British Journal of Sports Medicine* 51.24 (2017): 1759-1766. Web.

Review Submitted by: Katie Long, PT, DPT

Objective: The objective of this study was to provide evidence for effectiveness of labral repair and biceps tenodesis as compared to sham control for treatment of those with type II SLAP lesions.

Methods: Inclusion criteria included patients aged 18-60 years old, shoulder pain >3 months, unresponsive to conservative treatment, and history of clinical and MRI findings positive for SLAP lesion. Exclusion criteria included patients who had had previous shoulder surgery, SLAP lesion with concomitant labral cyst, clinical and radiologic findings of arthritic acromioclavicular or glenohumeral joints, and tears to either the rotator cuff or biceps tendons. Surgeons were blinded to the patient group allocation until in the operating room, where the head nurse opened an envelope as determined by an independent statistician dictating the procedure to be completed once patients had been deemed eligible as evidenced by positive SLAP findings during arthroscopic diagnostic assessment. Patients then underwent labral repair, biceps tenodesis, or sham surgery (which included the original diagnostic arthroscopy in addition to an added incision to mimic that of the other two surgical scars). Postoperative rehabilitation was initiated for each patient, and physiotherapists were blinded to the allocation of each patient. Gradual biceps loading was introduced at 12 weeks post-op. Sports and job-specific training was introduced on an individual basis. Rehabilitation was administered for 3-6 months and included 12-16 sessions with a therapist. Primary outcomes measures included the Rowe score and the Western Ontario Shoulder Instability Index (WOSI) at 6 months and 24 months following surgery. Secondary outcome measures included WOSI and Rowe at 3 and 12 months, the Oxford Instability Shoulder Score (OISS), the EuroQol, and pain symptoms from baseline.

Results: All three groups had a significant improvement as compared to their baseline at both 6 and 24 month follow ups. There were no significant differences between any of the groups primary or secondary outcomes at 3, 6, 12 and 24 month follow ups. Fourteen patients in the sham group crossed over to receive surgery between 6 and 24 month follow ups. The outcome measures of these patients were not statistically different than the 14 patients with the lowest scores in the labral repair or biceps tenodesis groups. Six patients in the biceps tenodesis group were re-operated on and four in the labral repair group.

Conclusions: The authors conclude that there was a significant improvement in the objective and subjective outcome assessments related to shoulder function for all three groups, however there was no significant difference between the three groups at the 6 or 24 month follow ups. The authors note limitations of this study to include sample size, blinding, population studied and external validity threats. The authors did not investigate the effectiveness of the

physiotherapy care that all three groups received post-surgically and state that further investigation of comparison between non-operative and operative care should be conducted. Strengths of this study include the randomization, sham control group, blinded assessments, use of validated outcome measures, no cross overs at 6 months, and minimal loss to follow up. The results of this study do not support the use of either biceps tendodesis or labral repair for type II SLAP in this patient population as there was no significant difference in outcomes between intervention groups.

Commentary: This article provides a valuable educational tool for patients who are considering surgery for their shoulder pain. While the inclusion and exclusion criteria were relatively strict, limiting the generalizability of their results, this article provides an excellent opportunity for physical therapists to promote conservative management of those with type II SLAP tears. While this article did not examine the effectiveness of conservative treatment, all patients included in this study received postoperative physical therapy care and there was no significant difference between group outcomes at 6 and 24 month follow up.

Gattie E, Cleland JA, Snodgrass S. The Effectiveness of Trigger Point Dry Needling for Musculoskeletal Conditions by Physical Therapists: A Systematic Review and Meta-analysis. J Orthop Sports Phys Ther. 2017;;1-41.

Review Submitted By: Tyler France, PT, DPT

Objective: The objective of this systematic review was to examine the short-term and long-term effectiveness of trigger point dry needling when administered by a physical therapist for any musculoskeletal condition.

Methods: Electronic databases were searched for randomized controlled trials that included human subjects with musculoskeletal conditions who were treated with trigger point dry needling that was performed by a physical therapist, compared with a control or another intervention. The overall quality of evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation.

Results: Researchers selected 13 of the 218 articles found in their literature search for review. In the immediate 12-week follow-up period, studies provided evidence that dry needling may decrease pain and improve pressure pain threshold when compared to control/sham or other treatment. At the 6 to 12 month period, dry needling was favored for pain relief, but the results were not statistically significant. Dry needling, when compared to control/sham treatment, provides a statistically significant effect on functional outcomes, but not when compared to other treatments.

Conclusions: Very low-quality to moderate quality evidence suggests that dry needling performed by physical therapists is more effective than no treatment, sham dry needling, or other treatments at decreasing pain and increasing pain pressure threshold in the immediate 12-week follow up in a patient presenting with musculoskeletal pain. Low-quality evidence

suggests superior functional outcomes with dry needling when compared to no treatment or sham dry needling. However, no difference in functional outcomes exist when compared to other physical therapy intervention.

Commentary: In the studies included in this article, the patients who received dry needling primarily experienced larger changes in pain and PPT than patients who received other interventions, even though the results were not always statistically significant. As physical therapists, we must determine whether or not we think the difference in visual analog scale improvements between dry needling and other soft tissue techniques are clinically meaningful, even though they are not statistically significant. In the short term, dry needling may be beneficial as part of a multi-modal approach in order to decrease pain enough to perform interventions that may have a longer lasting effect. Skill of the therapist at administering different soft tissue interventions as well as proper patient selection are critical when determining whether or not dry needling is more appropriate than other interventions.

Hip Arthroscopy for Femoroacetabular Impingement in a Military Population. Thomas D. The American Journal of Sports Medicine, Vol. 45, No. 14. DOI: 10.1177/0363546517726984

Reviewed Submitted by: Justin Pretlow, PT, DPT, OCS

Objective: to compare patient demographics with postoperative outcomes after hip arthroscopy for symptomatic FAI and to identify preoperative risk factors for poor outcomes.

Methods: Retrospective chart review of all hip arthroscopies performed for symptomatic FAI at the Naval Medical Center Dept. of Orthopedic Surgery. Inclusion criteria: Active duty and civilians ages 18-60 w/ symptomatic FAI and radiographic criteria for FAI. Primary Outcomes: Return to Full Duty(RTD), Referral for Disability Evaluation, Single Assessment Numeric Evaluation(SANE), VAS. 469 (309 males and 160 females) subjects. 456 active-duty personnel and 13 civilians. Mean follow up 2.5 yrs.

Results: Of the 456 active-duty personnel, 39% were able to return to duty (RTD), 18% were medically cleared to return to normal daily activities but did not remain on active duty, and 43% required referral to the Disability Evaluation System (DES). Increasing rank and male sex were positive predictors. Female sex, Axis 1 psychiatric diagnosis, revision surgery, concomitant psoas tenotomy, multiple medical comorbidities, and complaints of generalized pelvic pain were negative predictors for RTD. US Marine Infantry and Special Forces showed improved RTD rates (50%-86%) compared with administrative, more sedentary, occupations (22%). On average, Single Alpha Numeric Evaluation (SANE) and visual analog scale (VAS) scores improved after surgery. The mean postoperative SANE and VAS scores differed significantly between the RTD group and those not returning to duty; 87 and 1.2 points compared with 69 and 3.6 points, respectively (P<.0001).

Conclusion: Hip arthroscopy for the treatment of symptomatic FAI effectively improves pain symptoms and self-reported overall function regardless of RTD status. However, the rate of

return to full, unrestricted active duty in the general active-duty military population is lower than expected at 39%. Underlying psychiatric diagnoses, female sex, and more sedentary occupations are associated with lower RTD rates. Lower postoperative SANE and VAS scores are also associated with lower RTD rates. Only the more active and elite components of the military study population (i.e. Navy seals and Marine infantry) showed RTD rates consistent with previously reported outcomes of return to competitive sports after hip arthroscopy for FAI.

Commentary: The high RTD rates among elite military personnel is comparable to previous studies involving competitive and professional athletes. This higher RTD rate may be associated with motivation to return to work, higher job satisfaction, and higher self-efficacy. I suppose this can provide some insight to the PT on patients who are likely to make good progress, but it's much more relevant to the surgeon as a consideration for surgical candidate selection. Interestingly, the authors found no significant effect on RTD or referral to DES in the following preoperative demographics: BMI, history of smoking, pre-op VAS, pre-op SANE, Axis II psychiatric diagnoses. I would have thought higher BMI and/or higher pre-op pain rating may have a negative predictive value. Limitations of this study include the retrospective design and the use of 4 surgeons, making standardization more difficult. One surgeon was a fellowship trained sports medicine orthopaedic and that surgeon's RTD rates were higher. However, this surgeon operated on a much higher percentage of elite military personnel and males, so the higher rates of RTD make sense in light of the studies positive predictive findings. Overall, I think this study re-emphasizes that successful outcomes following hip arthroscopy can depend largely on selecting the right type of patient for this procedure.

Abdollah V, Parent E, Battie M. MRI evaluation of the effects of exercises on the disc fluid content and location of the centroid of the fluid distribution. Musculoskel Sci Pract. 2018;33: 67-70.

Review submitted by: Jennifer M. Boyle

Objective: The objective of this study was to examine the immediate effects of a prone press-up extension technique on the mean signal intensity and location of the signal intensity weighted centroid lumbar discs using T2-weighted MRI.

Methods: Mid-sagittal MRI of the lumbar spine in a supine position before and after standard bouts of extension exercises were taken at levels L4-L5 and L5-S1 disc. Patients were scanned at baseline after resting 40 min in a supine position for the disc to reach a steady state of hydration. Then they performed 3 sets of 10 prone press-ups, followed by maintaining 15 min of sustained extension. Patients were rescanned immediately after.

Results: There was no significant difference between the MSI (mean signal intensity or increase in fluid content) or cephalocaudal coordinate of the SIWC (signal intensity weighted centroid or distribution of fluid within a structure) of the whole disc and nucleus before and after the extension exercises at either disc level.

Conclusions: This study suggests that the mechanism behind prone press-up extension exercises and symptom reduction is likely not due to an increase in disc fluid content or by the fluid distribution within the discs favoring a more anterior position.

Commentary: This study is showing that prone extension can still relieve symptoms in patients with low back pain but the previously hypothesized mechanism is not the reason why this provides relief. This study will not influence my management of patients presenting with extension symptom relief however it will influence my education as to why this is helping them. Some of the main limitations of this study is population size and degree of disc degeneration. It may be beneficial to recreate this study with a larger sample size and variety of disc degeneration in order to get a better grasp of what the mechanism it possibly occurring during these exercises.

Monthly Literature Review

A Systematic Review of Electromyography Studies in Normal Shoulders to Inform Postoperative Rehabilitation Following Rotator Cuff Repair. Edwards PK, Ebert JR, Littlewood C, Ackland T, Wang A. J Orthop Sports Phys Ther. 2017 Dec;47(12):931-944. doi: 10.2519/jospt.2017.7271.

Review Submitted by: Sarah Bosserman

Objective: To synthesize current literature regarding rotator cuff muscle activation in normal, uninjured individuals during common rehabilitation exercises prescribed following rotator cuff repair. The aim of the review was to define an optimal post-operative protocol that does not expose the healing cuff to loads that may cause structural failure.

Methods: Five electronic databases were searched, up until June 2016. Included studies were required to undertake EMG analysis of at least 1 rotator cuff muscle to compare intensity between different rehabilitation exercises. Studies must have been published in a peer-reviewed journal, include a sample with no shoulder pathology, and have a mean age limit of 50 years or younger.

Results: Twenty articles satisfied the selection criteria and were included for full review. EMG activity of the 4 rotator cuff muscles was compiled, summarized, and ranked from lowest to highest activation to allow for comparison. Overall, 20 exercises reported low-level (less than 15% MVIC) supraspinatus muscle activation, and were considered appropriate to implement in early-stage rehabilitation. For infraspinatus, 23 exercises were considered low-level from pooled means of muscle activations during passive, active-assisted, active, and strengthening exercises. Teres minor was least evaluated, with only 15 exercises selected and all of which were strengthening exercises. Only 6 studies evaluated subscapularis activation, of which only 3 were considered truly passive.

Conclusions: This review provides physical therapists with a continuum of specific shoulder rehabilitation exercises that can be safely prescribed to restore functional upper extremity movement and strength following rotator cuff repair.

Commentary: According to a recent consensus statement published in the Journal of shoulder and Elbow Surgery (Thigpen et al, 2016), rehab after rotator cuff repair shoulder include a 2-week period of strict immobilization followed by introduction of first passive ROM for 6 weeks, then restoration of active ROM, and finally progressive strengthening starting at week 12. Given repair strength is only 19%-30% of normal at 6 weeks and 29%-50% of normal at 12 weeks, care needs to be taken when progressing exercises to ensure continued tendon healing. This review provides helpful data when deciding on exercises to include in each phase of rehabilitation, however there was no restriction on the level of evidence selected and that data was based on reported values from younger (<40 years old), healthy individuals. Clinicians need to be aware of specific patient variables (age, size of tear, tissue quality, repair integrity, etc.) when deciding on an early or delayed program, which requires communication with both the patient and surgeon. Finally, EMG studies alone do not provide definitive guidelines on the safety of exercises without knowing specifically what forces may damage the repair, as plane of motion, weight/length of the limb, cyclic loading may also play a role. This study can offer clinicians a starting point for a graded rehabilitation program for the rotator cuff that are unlikely to result in failure in both early and later stages.