

Monthly Literature Review

Perriman A, Leahy E, Semciw AI. The Effect of Open vs Closed Kinetic Chain Exercises on Anterior Tibial Laxity, Strength, and Function Following Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis. J Orthop Sports Phys Ther. 2018 Apr 23;1-52. doi: 10.2519/jospt.2018.7656.

Review Submitted by: Sarah Bosserman, PT, DPT, CSCS

Objective: Primary aim was to determine if OKC quadriceps exercises resulted in differences in anterior laxity when compared to CKC exercises at any time point following ACL reconstruction. Secondary aim was to determine if there was a difference in strength, function, quality of life and adverse events with OKC vs CKC quadriceps exercises at any time point.

Methods: Seven electronic databases were searched in April 2017. RCTs that compared OKC and CKC quadriceps exercises for post op ACL-R patients were included. Outcomes had to include anterior tibial laxity (measured by arthrometry), lower limb strength, function, or quality of life. Data was grouped according to outcome and time-point follow up, for both early (<6 weeks) and late (>6 weeks) introduction of OKC exercises. Time-points for follow up where short term (<12 weeks), medium term (3-6 months), long term (6-12 months), and very long term (>12 months). Results were synthesized using meta-analysis and the GRADE approach.

Results: A total of 10 studies were eligible for review with a total of 494 participants. Mean age ranged from 19-34 years old and majority male (74%). Five were patellar graft studies, two hamstring graft studies, two included both, and one did not specify. For early addition of OKC, meta-analysis demonstrated low-moderate evidence of no increase in risk of having clinically meaningful laxity, regardless of intervention, across all time points. It was shown that there was a slight increase in laxity in the OKC groups, particularly for the hamstring graft, however, pooled differences were not statistically significant and between group differences were <2mm clinical laxity threshold. For late addition of OKC, there was limited evidence of no between group differences in laxity at medium and long term follow up. Low-moderate evidence from two studies showed no between group differences in strength outcomes at any time point with early introduction of OKC exercises vs CKC exercises. It was also found that there was low-moderate evidence of no between group differences in patient reported functional outcomes with early addition of OKC.

Conclusions: Considering all graft types, there was low-moderate evidence from three studies that there are no between group differences in laxity at any time point, when early OKC exercises are introduced compared to CKC exercises. For quad strength, functional outcomes, and physical function tests, there was limited to moderate quality evidence to demonstrate no between group differences at any time point with addition of OKC exercises before 6 weeks compared to CKC exercises.

Commentary: Although the pooled results showed no significant differences between groups, there did seem to be more inconsistency when studies were looking at hamstring vs patellar grafts. One study found greater laxity (Heijne et al) in OKC vs CKC exercises, while another found no differences (Fukuda et al). The study finding no differences used a more conservative protocol and progression of ROM that may suggest specific ranges for OKC exercises are safer than others for hamstrings grafts, however more research is needed. Further, the early addition of OKC exercises did not seem to provide a significant increase in strength and/or function over late addition OKC exercises. Clinically, considering graft

type and patient goals may be beneficial in deciding the best of treatment (i.e. are they a soccer player that needs strength in OKC, etc.). Limitations of the systematic review, including a mostly male population and the relatively small number of trials and sample sizes make this less generalizable to all patients. Furthermore, heterogeneity in graft type, interventions, and outcomes addressed limited the ability to complete meta-analyses. Future research investigating adverse events (vs laxity alone) and long term physical function outcomes may provide more meaningful information to the clinician.

Citation:

Fernandes S, Parekh M, Moses J, Fuller C, Scammell B, Batt E et al. Prevalence of knee pain, radiographic osteoarthritis and arthroplasty in retired professional footballers compared with men in general population: a cross-sectional study. *Br J Sports Med*, 2018;52:678-683.

Review submitted by: Jennifer M. Boyle

Objective:

- 1) To determine the prevalence of knee osteoarthritis outcomes (knee pain, RKO, CC and requirement for TKR) and risk factors for knee OA for retired male football players vs in the general male population.
- 2) To compare prevalence of the outcome measures selected in ex – football players and the general population.
- 3) Determine the main risk factors for any increased prevalence in knee OA outcomes in ex football players.

Methods:

Cross sectional designed study utilizing questionnaires to ex- football players (inclusion criteria: > 40 y/o and played professionally) and men in the general population (inclusion criteria: > 40 y/o, not terminally ill and were able to give written consent). Information on knee pain, surgery and KOA risk factors including demographics, occupation, general health and current medications were taken into account. Those who consented underwent bilateral knee radiographs to determine RKO and CC. Radiographs performed in wbing semi – flexed, posterior – anterior and 30 degrees flex skyline views).

Results:

4775 questionnaires were sent out to ex – football players and 1207 responses were received. 40, 000 were sent to the general population and 4085 of men were returned completed. Over all prevalence of knee pain according to the questionnaire in ex football players was 52.2% compared with 26.9% of the general population. Ex football players also had more current knee pain then the general population. Radiographic findings show the RKO in ex football players to be 64% and in the general population 35.2%. They also found that in ex football players they had a higher prevalence of R > L RKO.

Conclusions:

The prevalence of knee osteoarthritis outcomes (knee pain questionnaire, RKO and TKR) are 2-3 times greater in male ex- football players in comparison to the general male population.

Commentary:

Football (soccer) was stated to be the most popular team sport world wide according to this article. If playing professionally it has been seen to have a 17% injury rate of the knee. It was stated that the repetitive micro trauma and joint overloading could further lead to degeneration of the knee joint and lead to knee osteoarthritis. Further understanding the prevalence of how much more football and other sports can have long lasting effects on people knee health is very valuable. This information helps us as clinicians emphasize the importance of proper care and pre/post rehabilitation to these athletes' knees at a younger age. If we are able to start picking out populations that are at a predisposition to these injuries later in life (aka football players for knee OA) then we can implement rehabilitation programs earlier in their career to give them a fighting chance to avoid injuries later in life.

Effect of physical exercise on musculoskeletal pain in multiple body regions among healthcare workers: Secondary analysis of a cluster randomized controlled trial. Jacobsen M D, et al. Musculoskeletal Science and Practice. April 2018. Vol 34. Pgs 89-96.

Submitted by: Justin Pretlow PT, DPT, OCS

Objective: To evaluate the effect of workplace versus home-based physical exercise on pressure pain threshold (PPT) and musculoskeletal pain intensity in multiple body regions among healthcare workers.

Methods: Study design: a two-armed parallel-group, single-blind, cluster randomized controlled trial with allocation concealment. Two-hundred female healthcare workers from 18 departments at three hospitals were cluster-randomized to 10 weeks of: 1) home-based physical exercise (HOME) performed alone during leisure time for 5×10 min per week or 2) workplace physical exercise (WORK) performed in groups during working hours for 5×10 min per week and up to 5 motivational coaching sessions. PPT (neck, lower back, lower leg) and perceived pain intensity in multiple body regions (feet, knee, hips, lower and upper back, elbow, hand, shoulder, neck, and head) were measured at baseline and 10-week follow-up

Results: In some of the body regions, PPT and pain intensity improved more following WORK than HOME. Between-group differences at follow-up (WORK vs. HOME) were 41 kPa [95% CI 13–70, effect size (ES): 0.22] for PPT in the lower back, and –0.7 [95% CI -1.0–0.3, ES: 0.26] and –0.6 points [95% CI -0.9–0.2, ES: 0.23] for pain intensity in the lower back and feet (VAS), respectively. HOME did not improve more than WORK for any of the measurements.

Conclusions: Performing supervised group-based physical exercise with motivational coaching sessions during working hours is more effective than exercising alone at home in improving pressure pain threshold in the lower back and reducing musculoskeletal pain in the lower back and feet among healthcare workers. Companies aiming at improving employee health may consider offering daily physical exercises and motivational coaching sessions at work as it is accompanied by higher training adherence and improved pain compared to encouraged home-based exercise.

Commentary: The authors concluded that physical exercise at the workplace was more effective than home-based exercise in improving pressure pain threshold in the lower back. I like the idea of a workplace exercise program being beneficial but there are some significant limitations to this study. The average adherence to exercise was over 2 sessions per week for Work based and approximately 1 session a week for Home based. The exercise routine for Work-based included 10 exercises utilizing kettlebells, swissballs, and elastic bands. The Work based group performed a circuit of 4-6 exercises out of 10 each session. The Home based routine utilized elastic bands only with a poster of 10 exercises in which participants were instructed to pick 4 for each training session. Safety concerns were cited as a reason kettlebell exercise were not assigned to the Home based group. The authors could have offered training sessions to the Home based group initially or at intervals if they wanted to make the interventions somewhat comparable. The inclusion of motivational coaching sessions for the Work based group likely has a large impact on the results, but that effect cannot be quantified with only 1 group receiving motivational coaching. I think the limitations of this study outweigh any strengths. In short, it appears they offered the work based group a greater variety of exercises, proper training with an instructor, and motivational coaching sessions while the home based group received a few elastic bands and a poster illustrating 10 exercises. It's not surprising that the work based group showed greater changes in pressure pain threshold and VAS pain ratings.

Andrews, Dawn P. et al. "THE UTILIZATION OF MULLIGAN CONCEPT THORACIC SUSTAINED NATURAL APOPHYSEAL GLIDES ON PATIENTS CLASSIFIED WITH SECONDARY IMPINGEMENT SYNDROME: A MULTI-SITE CASE SERIES." *International Journal of Sports Physical Therapy* 13.1 (2018): 121-130. Web.

Review Submitted by: Katie Long, PT, DPT

Objective: To explore the effects of one thoracic Mulligan Concept SNAG treatment session on individuals classified with subacromial impingement syndrome, while utilizing a classification-based treatment protocol

Methods: Patients met the study inclusion criteria if they met the Boyles et al. classification-based criteria of reporting greater than 2/10 on the NRPS during Neer's impingement sign, Hawkins impingement sign, active shoulder abduction, resisted IR, resisted ER and empty can testing. Patients were excluded if their primary complaint was neck or thoracic pain, if they demonstrated neurological deficit, had a positive spurling's test, received mobilization to the glenohumeral joint or thoracic spine within last 30 days, received CSI within 30 days. The SNAG assessment was provided by the clinician identifying the painful or restricted vertebral level and applying an PA cephalad glide with the ulnar aspect of their hand. The patient then extended their trunk over the clinician's hand. A maximum of three consecutive vertebral levels were assessed for a pain-free response to guide intervention location. Treatment was directed at the identified vertebral level and included instructing the patient to extend their trunk over the clinician's hand for 3 sets of 10 repetitions with 1 minute rest breaks in between. Outcome measures included NRPS, SPADI and shoulder AROM taken at initial evaluation, immediately post-treatment and at 48-hours post-treatment.

Results: No significant differences in NRPS scores during Hawkins impingement test and Neer impingement test from initial, immediate follow up and 28-hour follow up. Patients reported significant improvements in NRPS during resisted shoulder resisted ER testing between initial and post-treatment testing as well as significant improvements from initial to 48-hour follow up testing. Patients achieved a statistical decrease in SPADI scores from initial assessment to 48-hour follow up, however this score was not clinically significant. SNAG intervention did not produce significant differences in overall shoulder ROM throughout assessment measures, although shoulder ER and flexion demonstrated moderate effect sizes.

Conclusions: The results of this study show that the use of thoracic SNAGs in patients classified with subacromial impingement syndrome may be beneficial in short-term pain and disability. However, the results found in this study did not meet clinically meaningful differences for several hypothesized reasons. The authors indicate that their results may be different from the Boyles et al. study due to patient chronicity of symptoms, as the patients in this study had symptoms less than 30 days. The intervention of this study was targeted at one spinal segment, however the previous study protocol targeted three spinal levels with HLVA. The authors also postulate that the results of this study may have had greater effects on pain and disability if manual therapy directed at the glenohumeral joint had been added.

Commentary: This study utilizes concepts from several previously established articles supporting the use of intervention to the thoracic spine in those with shoulder dysfunction by applying the regional independence model. The results of this study show that while a single session of thoracic SNAGs may be beneficial in reducing pain and dysfunction, I believe it is crucial to consider additional interventions to the thoracic spine as well as manual treatment to the local impairments. This study's results may be useful in those with high pain and disability as a way to decrease irritability in order to perform more local interventions to the glenohumeral joint. It may also be useful in application to those whom may be

contraindicated for the use of HLVA intervention. As addressed as a limitation of this study, a single dose of intervention was all that was applied in these patients and there may be more significant effects if multiple sessions of treatment interventions had been applied.

Kim YS, Lee HJ, Kim JH, Noh DY. When Should We Repair Partial-Thickness Rotator Cuff Tears? Outcome Comparison Between Immediate Surgical Repair Versus Delayed Repair After 6-Month Period of Nonsurgical Treatment. Am J Sports Med. 2018;46(5):1091-1096.

Review Submitted By: Tyler France, PT, DPT, CSCS

Objective: The purpose of this study is to compare the results of immediate arthroscopic rotator cuff repair with repair after 6 months of non-operative care of partial thickness rotator cuff tears (PTRCTs) involving >50% of the tendon thickness.

Methods: The authors of this study prospectively randomized and analyzed 78 consecutive patients with either isolated bursal-side or articular-side partial thickness supraspinatus tears. Group 1 (n=44) received immediate rotator cuff repair. Group 2 (n=34) received delayed rotator cuff repair after 6 months of non-operative treatment including activity modification, NSAIDs, corticosteroid injections, and physical therapy. The American Shoulder and Elbow Surgeons (ASES) Score, Constant score, visual analog scale for pain, and ROM at initial visit; months 3, 6, and 12 post-operatively; and the last visit after 24 months were used for the evaluation. Cuff integrity was assessed with magnetic resonance imaging at 12 months post-operatively.

Results: There were no significant differences in age, sex, symptom duration, composition of PTRCTs, or clinical outcomes between Groups 1 and 2 at 24 months. In group 2, 10 patients voluntarily dropped out from the study due to improvement of symptoms during the 6 month non-operative treatment period. At the end of the study, both groups showed significant improvements in terms of functional scores and VAS scores compared to the initial period. There were no significant differences between the two groups, except for lower pain VAS score and higher ASES score in group 2 at 6 months post-operatively. At 12 months post-operatively, 1 patient from group 1 and 2 patients from group 2 had experienced a retear.

Conclusions: Both immediate surgical repair and delayed surgical repair with conservative treatments were effective in improving clinical outcomes, and there was a similarly low incidence of retears in both groups. However, at 6 months post-operatively, superior functional outcomes were observed in the delayed repair group compared with the immediate repair group. A trial period of pre-operative non-surgical care is reasonable, and immediate surgical repair is not crucial for the treatment of PTRCT.

Commentary: This study puts forth information that can help to encourage trials of non-operative care for patients with PTRCTs rather than jumping into surgery. There seems to be clear consensus that the surgery should be performed if the tear continues to progress and if pain and functional disability continue to become worse. However, there is no real consensus on how to manage patients with progressing pain and disability but no increase in tear size, or in asymptomatic patients with progressing tears. This article seems to indicate that pre-operative management should be attempted before operating on PTRCTs.