

Citation: Quinlan NJ, Alpaugh K, Upadhyaya S, Conaway WK, Martin SD. Improvement in Functional Outcome Scores Despite Persistent Pain With 1 Year of Nonsurgical Management for Acetabular Labral Tears With or Without Femoroacetabular Impingement. *The American Journal of Sports Medicine*. December 2018:036354651881448. doi:10.1177/0363546518814484.

Review Submitted By: Jon Lester

Objective: To evaluate the effects of non-surgical, conservative management of symptomatic labral tears in those with and without FAI.

Methods: 52 patients (38.9 +/- 9.3 years) recruited for study who had all of the following: scheduled intra-articular injection, symptomatic labral tear (19.1 +/- 24.3 month hx) confirmed by MRA/MRI/radiograph, pursued non-surgical care for at least 1 year (education, activity modification, physical therapy). After injection, pt's were advised to avoid activities that impinge the hip (squats, lunges, distance runs). PT began 2 weeks post injection. PT focus was described to include hip, lumbar, SI, and core rehab/strengthening. The author recommended 3 Phases of PT with the last phase ending at 12-24 weeks post injection. Recommended patients to return to desired activities at a minimum of 6 months after initiating treatment. Outcome measures at baseline and follow-up included: mHHS, Hip Outcome Score – ADL subscale and sport subscale, and a questionnaire asking levels of pain, symptoms, degree of activity modification, patient satisfaction, and interest in pursuing surgery. Mean follow-up was 16.2 +/- 3.1 months.

Results: Significant improvements were noted when comparing all functional outcome measures (mHHS, HOS-ADL, HOS-SS, iHOT-33) from baseline to follow-up and in all patients regardless of the presence of FAI or no FAI. 44.2% of patients reported their hips as “normal or near normal” at baseline, which improved to 71.2% at follow-up. 55.8% of patients reported their hips as “abnormal or severely abnormal”, which decreased to 26.9% at follow-up. 48.1% had no change in pain at follow-up, 69.2% still felt limited in their activities, 75% continued to have symptoms post injection, and 71.2% were satisfied with the treatment regimen.

Conclusions: In those with symptomatic labral injuries, functional improvements after 1 year of non-surgical care can be experienced as measured by the mHHS, HOS-ADL, HOS-SS, and iHOT-33. However, this study demonstrated that high pain levels, functional limitation, and continued interest in surgery were common in those who underwent non-surgical management.

Commentary: The first major limitation that I found with this study was the lack of controlling of various factors that could have influenced outcomes, including somewhat standardized PT, scheduled follow-ups, a description of the phases of PT, and lack of comparison to a surgical group. Unfortunately, the findings of this study show that, although there is functional

improvement with non-surgical interventions, there was a large percentage of the subject pool that still had high pain levels, functional limitations, and felt that their hip was “abnormal or severely abnormal”. This changes the way that I might view/educate patients during their IE if I suspect a labral tear. Patients deserve fair assessment and education regarding their symptoms and prognosis. This study shows that functional outcome will likely improve, but pain levels and feelings of continued limitations may not – which is something that I will likely keep in mind when educating patients in the future (without setting them up for failure of course). Future research could look into more specific aspects and specific PT protocols for long term conservative care post-injections

Westad et al. (2019) The effectiveness of Mulligan’s mobilization with movement (MWM) on peripheral joints in musculoskeletal (MSK) conditions: a systematic review. Musculoskeletal Science and Practice. (39) 157 - 163.

Review Submitted by: Erik Kreil, PT, DPT, CSCS

Objective: To determine if Mulligan’s mobilization with movement is an effective treatment approach to improve pain and function in peripheral joints for musculoskeletal conditions.

Methods: RCTs with parallel group design were included in the systematic review. Case studies and crossover studies were excluded. There were no date, participant age, or duration of symptom restrictions. Studied participants were not cadavers or animals, and they must have had symptoms without having had surgery.

Results: 7 studies were included, which investigated the effectiveness of MWM on the hip joint (2), ankle joint (2), shoulder joint (1), and elbow joint (1). Diagnoses ranged from hip osteoarthritis, chronic ankle instability, shoulder impingement syndrome, and lateral epicondylalgia. A significant improvement in pain and function was demonstrated for 2-week treatment of shoulder conditions, however this is low quality evidence as this is based on just one study. Short and long term effect on pain and function was demonstrated for treatment of lateral epicondylalgia, however this is low quality evidence due to limitation in imprecision. Two studies showed improvement in pain and function in patients with hip osteoarthritis in both short and long term assessments, demonstrating moderate quality evidence. Two studies showed short and long term effects for pain and function in addressing chronic ankle instability, demonstrating moderate quality evidence.

Conclusions: Moderate quality evidence has shown both short and long term benefit to the inclusion of MWM on the treatment of chronic ankle instability and hip osteoarthritis for pain and function. Low quality evidence has shown both short and long term benefit to the inclusion of MWM on the treatment of shoulder impingement syndrome and lateral epicondylalgia. There is evidence to demonstrate superiority of MWM techniques when compared to placebo or no intervention controls, however corticosteroids and other PT interventions are superior to MSK in these studies.

Commentary: Evidence exists suggesting both short and long term utility of the inclusion of Mulligan mobilization with movement techniques for the treatment of peripheral upper and lower body musculoskeletal conditions. This study assessed a broad spectrum of peripheral musculoskeletal conditions in a variety of patients, however study construct was required to be an RCT with parallel group design in order to best compare interventions. From this, only 7 studies were included in this systematic review with varying short or long term assessment timeframes, demonstrating a gap in literature and need for further study. The existing evidence primarily suggests short term benefit following MWM treatment to peripheral joints, which may provide an initial period of pain-free movement to be followed by more traditional physical therapy treatment. Evidence-based MWM techniques encourages the utilization of combined motions that may include active patient involvement, rather than strict foundational passive accessory motion, which may be more accurate in representing natural human movement patterns. Further evidence is required to determine its utility in practice.

Citation: Bond CW, Hackney KJ, Brown SL, Noonan BC. Blood flow resistance exercise as a rehabilitation modality following orthopaedic surgery: a review of venous thromboembolism risk. *J orthop Sports Phys Ther.* 2019;49(1):17-27.

Review Submitted by: Matt Fung PT, DPT, CSCS

Objective: Blood flow restriction (BFR) resistance exercise has emerged as a promising means of augmenting traditional low intensity physical rehabilitation exercise and has yielded successful outcomes in a wide range of applications. The objective of this clinical commentary is to discuss BFR resistance exercise as a rehabilitation modality following orthopaedic surgery and the associated risk for venous thromboembolism (VTE).

Methods: Identify physiological effects of BFR and risk factors associated with VTE through available literature to this date.

Results: The collective literature appears to indicate that proper prescription of BFR poses little risk of directly causing a VTE event. Prior to admission of BFR it is essential to properly assess each patient for signs and symptoms of potential DVT or PE.

Conclusions: The VTE risk associated with BFR is likely similar to that of traditional high-intensity resistance exercise in healthy, active adults, yet the postsurgical patient has additional considerations. The current literature suggests that proper prescription of BFR in the context of Virchow's triad would not heighten the risk of developing VTE. Unfortunately, there are no universally agreed-upon standards outlining which postsurgical orthopaedic patients may safely perform BFR. Thus, implementation of BFR needs to be made individually for each patient based on subjective decisions made by health care providers. These decisions should be based on clinicians' comfort level with BFR, understanding of its physiological mechanisms, and perception of its risks.

Commentary: BFR is the new hip modality taking over the PT industry especially for post surgical patients. BFR allows patients to perform low intensity physical rehabilitation exercises to achieve a similar degree of muscle mass and strength restoration attributed to high-intensity resistance exercise. I really enjoyed how this article broke down considerations for the post-surgical patient and dove into changes that occur with surgical interventions at the tissue level. My biggest takeaway from this article is the associated risk from patients recovering from total knee or total hip replacements versus an arthroscopic ligament repair. Due to the fact that arthroscopic surgeries involve less invasive techniques they appear to have decreased risk of VTE as compared to total joint replacements. Additionally, the article noted that VTE risk is greatest in the first 6 weeks following surgery, however this is also the timeframe in which patients may benefit most from BFR. Thus, it is crucial to properly screen patients for the potential for adverse side effects before implementing BFR into patients plan of care. While I currently do not have or use a BFR unit in my clinical practice it appears to be a safe modality that can be used to appropriately load muscles post surgically with low intensity exercises.

Koulidis, K., Veremis, Y., Heneghan, N., & Anderson, C. (2019). Diagnostic accuracy of upper limb neurodynamic tests for the assessment of peripheral neuropathic pain: A systematic review. *Musculoskeletal Science and Practice*, 40. doi:10.1016/j.physio.2018.11.301

Review Submitted By: Jeff Peckins

Objective: To determine the diagnostic accuracy of upper limb neurodynamic tests (ULNTs) in the assessment of peripheral neuropathic pain (PNP) compared to electrophysiologic studies and diagnostic imaging.

Methods: The systematic review included RCTs with a sample population of individuals 18 years or older with arm and/or neck symptoms with signs and symptoms consistent with PNP involvement. The authors in the systematic review considered a positive ULNT only when it reproduced patient's symptoms which could be altered through structural differentiation.

Results: There were five RCTs investigating the diagnostic accuracy of ULNTs in patients with carpal tunnel syndrome (CTS). The studies showed varying levels of sensitivity and specificity, however overall the likelihood ratios (LR) were between 0.5-2.0 so none were able to rule in or out CTS.

The systematic review included three studies investigating the diagnostic accuracy of ULNT1 (median) in patients with cervical radiculopathy (CR). Overall the studies found a high sensitivity but low specificity, and one study found a low LR (0.12), therefore suggesting that a negative ULNT1 is useful to rule out CR. The systematic review found that combined ULNTs (median, ulnar, and radial) showed high sensitivity (0.97, 95% CI 0.85-1.00) and moderate specificity (0.69, 95% CI 0.62-0.98).

Conclusion: The results of this systematic review suggest that ULNTs are not adequate in isolation for diagnosing CTS. However there is evidence to support that ULNT1 can be used to rule out CR.

Commentary: The article discusses the varied physiological presentation of PNP. Recent studies have found there is a higher incidence of small axonal damage present with peripheral nerve entrapment than previously believed. Individuals may present clinically with positive ULNTs, but the NCS was negative. This is due largely in part to the fact that NCS tend to detect large axonal damage, therefore possibly leading to many false-negative results. Conversely, many individuals with CTS present clinically with negative ULNT1 even though there is an obvious median nerve dysfunction, confirmed with NCS. This may be due to the fact that the neural dysfunction is very severe, and therefore some individuals present atypically with ULNT. This may result in false-negatives with ULNTs that were confirmed with NCS.

The systematic review discusses several issues that should caution the reader in the interpretation of the findings. The first is that the authors of the review had a different definition for a positive ULNT than some of the studies that were reviewed. This made it difficult to compare the findings of the RCTs. Also, the overall quality of evidence in the articles was rated as low to very low via the GRADE approach, so more high-quality RCTs should be conducted in order to draw more accurate conclusions. Until more research is conducted, the overall conclusion is that ULNT is not useful for CTS in isolation and is only helpful in ruling out CR with a negative ULNT1.

Haroy et al. The Adductor Strengthening Programme prevents groin problems among male football players: a cluster-randomised controlled trial. *Br J Sports Med* 2019;53:150-157.

Review Submitted By: Casey B Moler

Objective: To evaluate the effect of a single-exercise approach, utilizing the Copenhagen Adduction exercise, on the prevalence of groin problems in male football players.

Methods: 35 professional football teams (652 players) were randomized into the Copenhagen single exercise adductor strengthening intervention or control group (train as normal). The intervention group incorporated the adductor strengthening program (1 of the 3 exercises outlined in Figure 1) 2-3x/week for 6-8 weeks during their preseason training routine. The level of difficulty of the exercise was determined for each athlete based on their tolerance and pain levels with the activity, starting with the highest level (3). The frequency then decreased to 1x/week during the competitive season (28 weeks). The prevalence of groin injuries was measured weekly retrospectively by each players using the OSTRC (Olsa Sports Trauma Research Centre) overuse injury questionnaire.

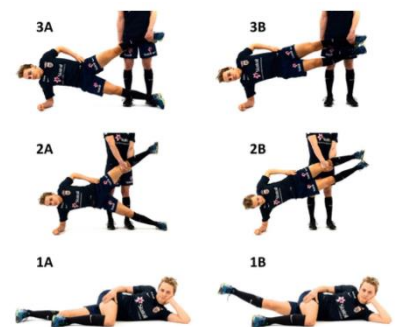


Figure 1

Results: The average prevalence of groin problems during the season was 13.5% in the intervention group and 21.3% in the control group. The intention to treat analysis revealed the risk of reporting groin problems was 41% lower in the adductor single-exercise strengthening group. The intervention group also had 18% lower risk of reporting substantial groin problems however, this was not found to be significant.

Conclusion: Incorporating the Copenhagen single-exercise adductor strengthening program during preseason training found to be significant in reducing the prevalence and risk of groin related injuries in male football players.

Commentary: This injury prevention trial is unique as it studies the effect of one groin-specific exercise programme to reduce the risk of groin injuries in a large population of football players not excluding those with a history of groin pain. One of the biggest strengths in this study was the compliance rate, approximately 70% of the recommended protocol was carried out both during preseason and the competitive season. Although the questionnaires were filled out retrospectively by each participant, the compliance rate was much higher than most injury prevention trials. Both the results and the authors highlight the importance of compliance and its direct correlation with injury prevention. The risk of sustaining an injury was found to be lower for the higher compliance group ($\geq 90\%$ compliance rate) than those players of lower compliance (47% compared to 41%). The results from this study suggest a large advantage for teams in this patient population to incorporate the single adductor exercise prevention protocol as it would be easy to integrate into routine warm-ups in short amount of time (<5 minutes during competition season). It should be noted that adductor strength is only addressing one of the areas that are related to groin pain however studies have shown that adductor-related groin pain accounts for $>2/3$ of all hip and groin injuries in football.

Table 1
Training protocol for the Adductor Strengthening Programme

Week	Weekly sessions	Sets per side	Repetitions per side
Preseason (weeks)			
1	2	1	3–5
2	3	1	3–5
3–4	3	1	7–10
5–6	3	1	12–15
7–8	2	1	12–15
In season	1	1	12–15

Harry Von, P., Maloul, R., Hoffmann, M., Hall, T., Ruch, M. M., & Ballenberger, N. (2018). Diagnostic accuracy and validity of three manual examination tests to identify alar ligament lesions: results of a blinded case-control study. *Journal of Manual & Manipulative Therapy*, 1-9.

Review Submitted by: Cameron Holshouser, PT, DPT

Objective: The purpose of this study was to assess the accuracy of detecting lesions of the alar ligaments using three different individual alar ligament tests, to evaluate a cluster of all three tests compared to two different kinds of MRI scans and to evaluate agreement in detecting alar ligament lesions between two different forms of MRI scan.

Methods: A single blinded examiner manually assessed alar ligament integrity using the lateral shear test, rotation stress test, and side-bending stress test on a sample of convenience including of 7 subjects with MRI confirmed alar ligament lesions and 11 healthy people for control. Alar ligament lesions were identified using both supine and high-field upright MRI.

Results: The rotation stress test had a sensitivity of 80% and specificity of 69.2% with a +LR of 2.6 and -LR of 0.29. The side-bend stress test and the lateral shear test had identical sensitivity and specificity of 80% and 76.9% respectively with +LR of 3.46 and -LR of .26. In cases where all three tests were positive, the specificity increased to 84%. These numbers are reflective of manual testing versus the standard supine MRI. 5 out of 7 subjects with lesions of the alar ligaments detected by standard supine MRI were found to be positive in the high-field strength upright MRI which corresponded to a Cohen's Kappa of 0.75, which is high but not perfect.

Conclusions: The manual alar stress tests may have some diagnostic utility when assessing alar ligamentous integrity, however these findings require further corroboration in a larger sample.

Commentary: This article found that a cluster of manual alar stress tests can have some diagnostic value for determining alar ligament integrity when comparing to gold standard supine MRI. The limitations that the authors describe include: recruitment of extreme status of disease or using a population with a known defect to alar ligament; all three manual tests were performed consecutively which could lead to confirmation bias if the first test was positive; all subjects had symptoms from a WAD which occurred more than one year prior to the study so the results of this study do not apply to acute or subacute patients which is major population for clinical use of these tests; and small sample size. Despite the limitations of this study, it does provide potential value for screening alar ligamentous stability for chronic WAD patients. Using a cluster of these tests may help rule in a diagnosis of potential alar ligamentous pathology. Using this cluster may help determine whether a patient is appropriate for physical therapy, specifically maybe a patient with no prior imaging and has had chronic WAD symptoms.
