Rahl MD, LaPorte C, Steinl GK, O'Connor M, Lynch TS, Menge TJ. Outcomes After Arthroscopic Hip Labral Reconstruction: A Systematic Review and Meta-analysis. *Am J Sports Med.* 2019:363546519878147.

Review Submitted by: Lauren Carroll

Purpose: To provide an updated review of current literature for arthroscopic hip labral reconstruction, with a focus on patient reported functional outcomes in cohorts with autograft and allograft tissues.

Methods: PubMed and Scopus online databases were searched with the key terms "hip," "labrum," "reconstruction," and "graft" in varying combinations. Procedures performed, complications, failures, and functional outcome measures were included in this analysis. The inverse variance method was used to calculate pooled estimates and 95% CIs.

Results: Eight studies with 537 hips were included. Mean age was 37.4 years (95% CI, 34.5-40.4 years), and mean follow-up time was 29 months (95% CI, 26-33 months). In the autograft cohort, failures included 0% to 13.2% conversion to total hip arthroplasty and 0% to 11.0% revision hip arthroscopy. Failures in the allograft cohort included 0% to 12.9% total hip arthroplasty conversion, 0% to 10.0% revision arthroscopy, and 0% to 0.8% open revision surgery. Based on 6 studies, the modified Harris Hip Score improved by a mean 29.0 points after labral reconstruction ($P < .0001$).

Conclusions: Arthroscopic hip labral reconstruction leads to clinically significant improvements in patient reported functional outcome measures. This study concludes that there are no significant differences in surgical outcomes based on graft type alone, but proper patient selection based on patient age and severity of degenerative disease can improve outcomes after hip labral reconstruction.

Commentary: This article does a great job of comparing the literature concerning arthroscopic hip labral repairs performed with allografts and autografts. I think the biggest take away from this systematic review is that although there are a lot of factors that contribute to less favorable outcomes, patient age and severity of the joint degeneration are the most impactful factors for failure of the labral reconstruction. Age >40 yo and decreased joint space (<2 mm) in the degenerative joint were correlated with a higher chance of the repair progressing to a total hip arthroplasty (THA). I think this information is helpful in the event that we do come across a patient with a labral reconstruction that is struggling with rehab and doesn't progress as well as expected. I think it also increases our awareness of the decision-making process that the doctors may use to determine who is a good candidate for which procedure.
The review did a great job of outlining some of the limitations of the study, including the variations in patient inclusion/exclusion criteria for each study, the variety of ages excluded (some >50, some >70) in the study, variable concomitant procedures performed, and the amount of procedures completed by one surgeon (317 out of 537 hips). These factors lead to

increased heterogeneity in the patient population and decreased reliability of the statistical analysis performed. The sample size for this review was also smaller, which may have skewed the data.

Ayman A. Mohamed, Yih-Kuen Jan, Wadida H. El Sayed, Mohamed E. Abd El Wanis & Abeer A. Yamany (2019): Dynamic scapular recognition exercise improves scapular upward rotation and shoulder pain and disability in patients with adhesive capsulitis: a randomized controlled trial, Journal of Manual & Manipulative Therapy, DOI: 10.1080/10669817.2019.1622896

Review Submitted by: Helen Shepard

Objective: To determine if dynamic scapular recognition exercise improves scapular upward rotation, shoulder pain, and disability in patients with adhesive capsulitis of the shoulder.

Methods: Sixty-six patients with adhesive capsulitis were randomly divided into two groups. One performed dynamic scapular recognition exercises using an audible biofeedback system where they were encouraged to move the scapula as much as possible and the other received placebo treatment of active range of motion exercises of the unaffected upper limb. Both groups had 40 minute sessions of physical therapy 3x/week for 2 months. Scapular upward rotation and shoulder ROM were assessed using a digital inclinometer and the SPADI was used to measure shoulder pain and disability. Inclusion criteria were inability to elevate the arm above 100 degrees in scapular plane, unilateral shoulder pain, limitation in both active and passive range of motion, and difficulty performing ADLs. Patients were excluded if they had a contraindication to shoulder exercise or lacked signs of scapular dyskinesis.

Results: Researchers found statistically significant differences between groups in scapular upward rotation and shoulder flexion and abduction at two weeks, however, SPADI and external rotation range of motion improved for both groups but a significant between groups difference was not seen. At longer term follow ups (two and six months), all objective measures showed statistical significance between groups.

Conclusions: This study showed that dynamic scapular recognition significantly improves scapular upward rotation and range of motion in the shoulder both in the short and long term. Restoring upward rotation is important in restoring pain free range of motion and correcting scapular dyskinesia in the presence of adhesive capsulitis. Authors theorized that improved upward rotation was possibly due to increased awareness of scapular movement both centrally and peripherally. External rotation is less affected by scapular mobility than flexion and abduction, which may be why a larger effect was not seen.

Commentary: This study demonstrates positive responses to biofeedback for upward rotation of the scapula. I think the use of biofeedback was good because many patients have difficulty understanding the concept of scapular movement. I would like to see a similar study done with rotator cuff pathology or other shoulder pathology instead of adhesive capsulitis. With the capsular changes being the main issue with adhesive capsulitis, I'm not certain that upward rotation of the scapular will make significant difference in these patients. The authors also did not comment on what stage of adhesive capsulitis the patients included in the study were in. The scapula does not start upwardly rotating until about 60 degrees, with more motion happening between 90 and 120 degrees, however, at baseline, most participants had less than 90 degrees of elevation so the effects of upward rotation would be minimal. From start to 6 months out, shoulder flexion range only increased from an average of 89 degrees to 110 degrees so even though it was statistically significant, I'm not confident it was clinically significant. This may be related to why a significant effect of decreased pain and disability was not achieved. The other issue is that scapular dyskinesis has been shown to have minimal effect on shoulder pathology. If it's present it's not likely the main issue, and many people have scapular dyskinesis but have no pain and full shoulder range of motion. In general, I think the findings of improved scapular upward rotation with use of biofeedback is clinically significant for many shoulder pathologies, however, possibly not adhesive capsulitis.

Alkhawajah H, Alshami A. The effect of mobilization with movement on pain and function in patients with knee osteoarthritis: a randomized double-blind controlled trial. *BMC Musculoskelet Disord*. 2019;20(1). doi:10.1186/s12891-019-2841-4

Review Submitted by: Anna Wilson

Objective: Few studies have investigated the effects of mobilization with movement (MWM) in patients with knee osteoarthritis (OA) compared to other procedures or sham procedures. In addition, investigating the widespread hypoalgesic effects of MWM in patients with knee OA are lacking. The aim of this study was to investigate the effect of MWM on function and pain in patients with knee OA compared to sham MWM.

Methods: This study was a randomized double-blind (patients and assessor) controlled trial. Forty adult patients with knee OA of grade II and above were recruited to receive either MWM treatment or sham MWM for the knee. The outcome measures included visual analogue scale (VAS) for pain, pressure pain threshold (PPT) test, the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index, the timed up and go (TUG) test, knee strength (measured by hand held dynamometer) and knee range of motion (measured by goniometer). The measurements were taken at baseline, immediately after intervention, and 2 days later.

Results: Compared with sham MWM, MWM resulted in greater immediate improvement in pain, PPT at both the knee and shoulder, TUG time, knee flexor and extensor strength, and knee flexion ROM. All of these findings were statistically significant with a p value <0.001. At 2 days follow-up, patients who received MWM also demonstrated a statistically significant greater improvement in pain, PPT at the shoulder (but not at the knee), TUG time, knee flexor and extensor strength, and knee flexion ROM. WOMAC scores and knee extension ROM showed no evidence of change at any stage after intervention.

Table 3 Comparison of pain, pressure pain threshold, timed 'up and go', muscle strength, and range of motion between both groups

		Immediately after intervention			After 2 days		
Variables	Group	Change from baseline mean (95% CI)	Difference in mean change (95% CI)	*p*-value	Change from baseline mean (95% CI)	Difference in mean change (95% CI)	*p*-value
VAS (cm)	MWM Sham	−2.7 (−3.1, −2.2) −0.5 (−0.9, −0.0)	−2.2 (−2.8, −1.6)	<0.001*	−0.9 (−1.5, −0.3) 0.1 (−0.5, 0.7)	−1.0 (−1.8, −0.1)	0.026*
PPT knee (kPa)	MWM Sham	185 (131, 240) 10 (−45, 64)	176 (97, 254)	<0.001*	65 (29, 102) 27 (−9, 63)	39 (−14, 91)	0.142
PPT shoulder (kPa)	MWM Sham	209 (155, 263) −3 (−57, 51)	212 (136, 288)	<0.001*	106 (58, 154) −2 (−49, 46)	107 (40, 175)	0.003*
TUG (seconds)	MWM Sham	−1.6 (2.0, −1.2) 0.0 (−0.4, 0.4)	−1.6 (−2.1, −1.1)	<0.001*	−0.9 (−1.3, −0.5) −0.0 (−0.4, 0.4)	−0.9 (−1.4, −0.4)	0.001*
HHD knee flexion (kg)	MWM Sham	2.5 (2.0, 3.0) 0.5 (−0.1, 1.0)	2 (1.3, 2.7)	<0.001*	1.1 (0.6, 1.6) 0.2 (−0.4, 0.7)	0.9 (0.2, 1.7)	0.018*
HHD knee extension (kg)	MWM Sham	6.0 (5.0, 7.1) 0.4 (−0.7, 1.5)	5.7 (4.1, 7.2)	<0.001*	3.3 (2.7, 4.0) 0.3 (−0.3, 1.0)	2.9 (2.1, 3.9)	<0.001*
ROM knee flexion (°)	MWM Sham	15.1 (12.9, 17.4) 2.4 (0.2, 4.6)	12.8 (9.6, 15.9)	<0.001*	10.2 (7.7, 12.7) 1.9 (−0.6, 4.4)	8.3 (4.7, 11.9)	<0.001*
ROM knee extension (°)	MWM Sham	−0.6 (−1.2, −0.1) 0.1 (−0.5, 0.7)	−0.8 (−1.6, 0.1)	0.067	−0.3 (−0.9, 0.3) −0.0 (−0.6, 0.5)	−0.3 (−1.1, 0.5)	0.499

CI Confidence interval, *HHD* Hand-held dynamometer, *MWM* Mobilization with movement, *ROM* Range of motion, *PPT* Pressure pain threshold, *TUG* Timed "Up and Go", *VAS* Visual analogue scale
*Significance difference ($p < 0.05$)

Conclusions: MWM provided superior benefits over sham MWM in terms of local and widespread pain, physical function (walking), knee flexion and extension muscle strength and knee flexion ROM for at least 2 days in patients with knee OA.

Commentary: The methodology of the study was pretty sound with good internal validity. The assessor and the therapist performing the treatment had >5 years of experience. A strength of the study was that the assessor was blinded to the group allocation and the therapist performing treatment was not involved in measuring the outcome measures. The outcome measures they used were valid and reliable, and there were no statistically significant differences of group characteristics at baseline. A few limitations, that the authors noted as well, were the small sample size and the lack of long-term follow up. I would argue that improvements in ROM and MMT aren't necessarily functional measures, although you could also argue that improvement of these impairments could be associated with improved functional outcomes as well. The authors did, however, address this and made the connection of functional improvement to improved TUG scores rather than muscle strength or range of motion.

All of the statistically significant differences they reported were outside of the MDC/MCID for the immediately post-intervention time period, but the changes in VAS and TUG scores at the 2 day follow up did not meet the MDC/MCID. This was not addressed in the article and I had to do a little digging into their references to see the values they were using to determine clinically important differences. That being said, even with more ambiguous evidence at the 2 day follow up, this study still gives good evidence to support the use of MWM in patients with knee OA. Having in session reduction of pain and improvement in ambulation, range of motion, and strength is beneficial to create a window of opportunity to progress exercises following

manual therapy. The article dosed their MWM at 10 repetitions for 3 sets moving into end-range flexion and extension. They chose which joint mobilization they performed by using the one that provided the most pain relief during assessment.

Shahul Hameed Pakkir Mohamed, PT, PhD, & Salem F. Alatawi, PT, PhD. (2019). COMPARISON OF KINESIO TAPING AND MANUAL THERAPY WITH SUPERVISED EXERCISE THERAPY FOR THE TREATMENT OF SHOULDER IMPINGEMENT SYNDROME. ***International Journal of Physiotherapy*****, 177-185.**
https://doi.org/10.15621/ijphy/2019/v6i5/186839

Review Submitted by: Steven J. Lagasse

Objective: To determine if kinesio taping (KT) or manual therapy (MT) is superior for the management of shoulder impingement syndrome when coupled with supervised exercise therapy (SET).

Methods: 32 male subjects between the ages of 25 and 60 were categorized into 2 groups: MT + SET, and KT + SET. In regard to KT, only one type of taping technique was performed on patients. On the contrary, MT was utilized based on therapist discretion and was made up of joint mobilization and soft tissue mobilization; manipulation was not utilized in this study. The objective measures utilized were a self-structured questionnaire, numeric pain rating scale, goniometric shoulder range of motion, and the Shoulder Pain and Disability Index outcome measure (SPADI). These measures were taken at baseline, at the end of the 3rd week, and the end of the 6th week.

Results: ANOVA was used to analyze comparisons within-group and between groups. Additionally, Scheffes' post hoc test was utilized. $P < 0.05$ was utilized to dictate a significant difference. At baseline, there were no differences between the two groups regarding any of the involved measures. ANOVA demonstrated positive significant differences for both groups at both the 3rd and 6th-week measures. Post hoc analysis demonstrated KT + SET having greater significant changes than the MT + SET group on all fronts from baseline to week the end of week three, however, was equal to that of KT + SET by the end of week six.

Conclusions: Based on this study, both KT and MT, in the presence of SET, demonstrated a significant difference in all outcome measures between baseline and at the 6th week of treatment. However, KT with SET showed to have greater benefit immediate benefit between weeks one and three when compared to MT and SET.

Commentary: A strength of this article would be their consideration of validated outcome measures, and acknowledgment of limitations. There were many weaknesses of this article: A lack of information regarding how groups were randomized, lack of a control group, a small

sample size, utilization of only male subjects, only taking into account flexion, external rotation, and abduction shoulder ranges of motion, and intra-articular degenerative shoulder changes being on the exclusion criteria. Additionally, the authors did not attempt to assess follow-up statistics to see if these significant changes were maintained. There was also failure to mention the amount of treatment time utilized in each group. Finally, the authors also failed to mention the specifics regarding manual therapy, and how it was performed and/or applied (i.e. treatment in open-pack position vs. into the patient's end range of motion). Something thought-provoking about this study was that 44% of patients in the KT + SET group had symptoms for three to six months - well into the chronic stages. However, in the MT + SET group, 50% of the patients had symptoms for only one to three months. It was interesting to see the KT + SET group achieve a reduction in symptoms more quickly when their group had a greater percentage of patients suffering from pain that was more chronic in nature.

Young JL, Wright AA, Rhon DI. Nonoperative Management Prior to Hip Arthroscopy for Femoroacetabular Impingement Syndrome: An Investigation Into the Utilization and Content of Physical Therapy. *J Orthop Sports Phys Ther*. 2019;49(8):593-600. doi:10.2519/jospt.2019.8581

Review Submitted by: Taylor Blattenberger

Objective: To investigate the use of exercise and the amount of visits utilized in physical therapy prior to surgery for femoroacetabular impingement.

Methods: The authors retrospectively looked at a cohort of patients undergoing hip arthroscopy for FAI syndrome. The variables of interest included utilization of physical therapy, number of total visits, and the number of exercise therapy visits. In order to analyze exercise therapy use, it was dichotomized as 5 or less, or 6 or more visits. Exercise therapy was the intervention of interest as it is highly advocated for in the CPG for FAI syndrome, and is regarded as a safe and effective intervention.

Results: Of the 1870 subjects in this study, only 40.9% received physical therapy before surgery. Of those that received physical therapy, 10.3% were seen for only the initial evaluation, 28.4% of these patients were seen for 1-2 visits, and 41.2% saw a physical therapist for 6 or more sessions. Of the entire cohort that underwent arthroscopy for FAI, 11.8% of subjects (28.8% of the PT cohort) completed 6 or more physical therapy sessions that included exercise therapy intervention.

Conclusion: Physical therapy and exercise therapy are infrequently utilized prior to hip arthroscopy for FAI syndrome. Those who did receive physical therapy treatment had short episodes of care that may not be adequate as described by current practice guidelines.

Commentary: Elective arthroscopic surgery for femoroacetabular impingement syndrome is significantly increasing in frequency over recent years. Typically conservative management is recommended for pathologies prior to the decision to move forward with surgical intervention.

Current nonoperative management of FAI frequently fails and prior research has been unsuccessful in identifying specific parameters and best practice regarding treatment.

This study identifies the under utilization of physical therapy for FAI syndrome. Of this cohort, over half of those undergoing surgery never saw a physical therapist. Furthermore, only about a quarter of physical therapy patients participated in more than 6 visits involving exercise therapy. This means that a large majority of people with FAI syndrome are not being provided an adequate opportunity to benefit from conservative management, if any opportunity at all.

Being a retrospective study, it can only be stated that physical therapy is not being adequately utilized for FAI syndrome prior to the initiation of the surgical path. Conclusions cannot be drawn from this study about the effectiveness of physical therapy. Current research regarding physical therapy vs. surgery for FAI syndrome has been inconclusive so far. Effectiveness studies should be evaluated in conjunction with this article when considering nonoperative management of FAI syndrome.

Aspinall SL, Jacques A, Leboeuf-Yde C, Etherington SJ, Walker BF. No difference in pressure pain threshold and temporal summation after lumbar spinal manipulation compared to sham: A randomised controlled trial in adults with low back pain. Musculoskeletal Science and Practice. 2019;43:18-25. doi:10.1016/j.msksp.2019.05.011

Review Submitted by: Barrett Coleman

Objectives: To perform a sham-controlled study with the specific objective of investigating changes in PPT (pain pressure threshold) and TS (temporal summation) short-term after lumbar SMT (Spinal Manipulation Therapy) compared to sham manipulation in people with low back pain.

Methods: This was a double-blind randomised controlled trial comparing high-velocity low-amplitude lumbar SMT against sham manipulation in participants with low back pain. Primary outcome measures were PPT at the calf, lumbar spine and shoulder, and TS at the hands and feet. These were measured at baseline, then immediately, 15 min and 30 min post-intervention.

Results: Eighty participants (42 females) were included in the analyses (mean age 37 years), with 40 participants allocated to each intervention group. Significant between-group differences were only observed for calf PPT, which could be explained by a decrease in PPT (increased sensitivity) after SMT and an increase after sham. Feet TS decreased significantly over time after both SMT and sham, and any other changes over time were inconsistent.

Conclusions: The results suggest that lumbar SMT does not have a short-term hypoalgesic effect, as measured with PPT and TS, when compared to sham manipulation in people with low back pain.

Commentary: There are many proposed effects of spinal manipulation, and this study investigated the effect on pressure threshold levels and temporal summation. The study had good methodology for ensuring that the two groups were the same at baseline, blinding, and follow up on effects. However, it's selection for participants was too broad: people only had to have experienced one episode of back pain in the past year. To address this, they used a tool called the Visual Trajectory Questionnaire that categorizes people by the frequency and duration of their LBP to make sure both control and intervention groups had equal amounts of each category. While this accomplishes the goal of the two groups being similar, there is a big difference between chronic LBP and some one who has had only one episode in the past year.

This factor makes it difficult to know who this study applies to and its clinical applicability. Even if we accept the findings, there are multiple venues still available for pain modulation that the study didn't investigate. The study mentioned that the sham treatment still involved therapist-patient contact, movement of the patient's body, and patient expectations. It is possible that there were no differences between groups because these factors were more important giving credence to the idea that the specific effects of a technique are not as important as the non-specific effects all manual therapy interventions share.

Poulsen E, Goncalves GH, Bricca A, et al. Knee osteoarthritis risk is increased 4-6 fold after knee injury – a systematic review and meta-analysis. British Journal of Sports Medicine Published Online First: 09 May 2019. doi: 10.1136/bjsports-2018-100022

Review submitted by: Brandon Reynolds

Objective: To see if there is a relationship between ACL, meniscus or combined ACL and meniscus injury and future knee osteoarthritis (OA)

Methods: This systematic review and meta-analysis included multiple eligibility Criteria including the following: 1)The design of the study had to have been prospective or retrospective with a follow-up time of a minimum of 2 years after knee injury/surgery. 2) Participants having an ACL injury, meniscal injury, or a combination of ACL and meniscal injury must have had a mean minimum age of 18 years at the time of injury and studies including patients with reported OA were excluded. 3) The risk of the injured knee needed to have been compared with either the contralateral leg or a non-injured control group. Finally 4) an outeomce with development of knee OA defined as: (1) radiographic knee OA of the tibiofemoral joint according to either Kellgren & Lawrence classification ≥2, Ahlbäck grading scale ≥1, International Knee Documentation Committee (IKDC) radiographic scale C and D, Fairbank ≥2 or other radiographic scoring systems as well as reporting of total knee arthroplasty (TKA) due to OA, (2) symptomatic knee OA (ie, defined by criteria such as those developed by the American College of Rheumatology) or (3) self-reported knee OA.

This systematic review and meta-analysis selected studies in the following manner. Following the removal of duplicates from the initial search, two authors (GHG/EP) independently

screened the articles by title and abstract to identify relevant studies. Full text of all abstracts considered relevant by either of these reviewers was obtained and screened independently for eligibility by both. The full-text studies were assessed independently by the same two authors and reasons for exclusion were listed. For the updated search, the authors EP and AB repeated these procedures.

Results: This meta analysis found 53 studies totalling ~1 million included participants. Of these participants 185,219 had an ACL injury, 83,267 participants had a meniscal injury, and 725,362 participants had a combined injury. The occurrence rate of developing knee OA was found to be 4.2x, 6.3x, and 6.4x increased after an ACL, mensical, and combined injury respectively.

Conclusion: The odds of developing knee OA following ACL injury are approximately four times higher compared with a non-injured knee. A meniscal injury and a combined injury affecting both the ACL and meniscus are associated with six times higher odds compared with a non-injured knee. Large inconsistency (eg, study design, follow-up period and comparator) and few high-quality studies suggest that future studies may change these estimates.

Commentary: This systematic review and meta analysis searched the literature to establish the odds for developing knee OA after an ACL injury, meniscus injury, and combined injuries. This paper shows that the odds of developing OA increase by 4.2x, 6.3x, and 6.4x after an ACL injury, meniscus injury, and combined injury respectively. This is clinically applicable as each of these diagnoses are seen in outpatient orthopedic clinics regularly. Physical therapists can also lead the way in creating and implementing knee injury prevention programs in order to decrease risk for ACL and meniscus injuries and therefore may be able to decrease risk for knee OA.