

Citation: Hislop AC, Collins NJ, Tucker K, et al. Does adding hip exercises to quadriceps exercises result in superior outcomes in pain, function and quality of life for people with knee osteoarthritis? A systematic review and meta-analysis. *British Journal of Sports Medicine* 2020;54:263-271.

Review Submitted By: Barrett Coleman

Objectives: To see if adding hip exercises with quad exercises for pt's diagnosed with knee osteoarthritis improved outcomes with pain, function and quality of life.

Methods: Systematic review with inclusion criteria of being a RCT, symptomatic tibiofemoral arthritis confirmed via radiograph, interventions of land-based exercises that included hip and knee recruitment vs. just just quad exercises, and outcomes involving pain, self-reported function, and QoL measures.

Results: Eight articles out of 411 full-text assessed met this criteria for the quantitative assessment. This led a total of 341 participants. Interventions and assessment ranged from 4 to 12 weeks with no long-term follow ups. The pooled data provide evidence that combined hip and quadriceps exercise is significantly more effective than quadriceps exercise alone for improving walking function but not for outcomes of pain, patient-reported function, or stair function. Subgroup analyses reveal that hip resistance exercises are more effective than functional neuromuscular exercises for improving pain and patient-reported function. Multimodal exercise is no more effective than quadriceps strengthening alone for pain, patient-reported function, or stair function.

Conclusions: The systematic review does not support the addition of hip exercises to a quadriceps exercise programme for improving reported pain, function or QoL. However, through looking at subgroups (location of OA, type of hip exercise), the systematic review concluded that:

- 1) Adding resistance hip exercises to quadriceps exercises is beneficial for patient-reported outcomes and physical function in people with KOA in the short-term.
- 2) There was no difference between high-intensity and low-intensity resistance hip exercises across short-term outcomes.
- 3) Functional neuromuscular hip exercises combined with quadriceps exercises improved physical function (eg, walking) but not patient-reported outcome.

Commentary: We often include treatment of adjacent impairments in our POC due to their relationship to the primary problem. It has been hypothesized that weak hip abduction results in a pelvic hip drop and increased load on the tibiofemoral joint, particularly the medial compartment. Thus, it's important to identify this weakness in patients' presenting with knee OA and treat it.

This systematic tried to answer that question more objectively and ran into the same problems many systematic reviews do: they need more high-quality evidence; a variety of interventions; some interventions prescriptive while others clinical-reasoning driven; gaps in the reporting of information. This led them to rejecting their original hypothesis (effect

on pain, function, and QOL measures) and diving deeper into the data to figure out if there were any other positive findings of the study.

They found that for those with medial compartment OA there was an increased effect size of including hip strengthening interventions. This supports the aforementioned idea that weak hip abduction leads to more stress on the medial compartment. The preferred method with the greater effect of improving hip function was through resistance (bands, weights) and not just incorporating it functionally (step ups for example). This can drive some of our intervention choices realizing that we may need to strengthen the individual parts before working them together in the whole.

Due to the quality of the evidence and the lack of reporting on important variables in the studies (protocols, progressions, adherence), the conclusion of hip strengthening does not improve pain, function, or QoL is hard to take at face value.

Citation: Fisher LR, Alvar BA, Maher SF, Cleland JA. Short-term Effects of Thoracic Spine Thrust Manipulation, Exercise, and Education in Individuals With Low Back Pain: A Randomized Controlled Trial. *Journal of Orthopaedic & Sports Physical Therapy*. 2020;50(1):24-32. doi:10.2519/jospt.2020.8928.

Review Submitted By: Brandon Reynolds

Purpose: To see the short-term effects of thoracic spine manipulation compared to sham manipulation.

Methods: Patients were referred to physical therapy for low back pain between November 2016 and April 2018 were screened for eligibility. Inclusive criteria include: age 18-59, diagnosis of low back pain (pain between 12th thoracic vertebrae and gluteal folds, minimum pain intensity of 3/10, and disability of 20% on the ODI. Exclusion criteria included any contraindications to spinal manipulation, any neurological evidence of compromise of nerve roots or spinal cord, or cauda equina syndrome and had to have sufficient English skills to complete questionnaires or involved in litigation or workers' compensation cases. One hundred and one patients agreed and signed informed consent, Twenty-eight patients had acute low back pain and 73 patients had chronic low back pain. The two groups were then randomly assigned to manipulation and control groups. All therapists were OCS or currently enrolled in an orthopedic residency program. All therapists were provided with detailed manuals of operating procedures and trained in study procedures. They also went through training sessions for treatment procedures, including manual therapy techniques, exercises, sham techniques, and educational procedures to ensure treatment standardization. Patients were randomly assigned to a thoracic manipulation or sham manipulation treatment group. Groups received 3 visits that included manipulation or sham manipulation, core stabilization exercises, and patient education. Thoracic manipulation (experimental group) received supine thoracic manipulation with pistol grip for middle thoracic spine and prone thoracic manipulation for lower thoracic spine.

Results: Overall group-by-time interaction was not significant for modified Oswestry disability questionnaire, NPRS, FABQ-PA, FABQ-W, FABQ total score. No significant differences between groups in regards to GROC but 42% of the total population reported a clinically meaningful improvement during the study period.

Conclusion: Results of the study found that a short bout of thoracic spine manipulation, exercise, and education was no more effective at improving outcomes compared to sham manipulation, exercise, and education in individuals with chronic low back pain.

Commentary: Chronic low back pain is one of the most prevalent musculoskeletal conditions, resulting in chronic disability. Thoracic manipulations are utilized to assist in treating conditions in other regions of the body such as the cervical spine and shoulder to name a few. I thought this study was interesting in the fact that it separated acute low back pain and chronic low back pain before randomly assigning patients to the manipulation and control group. This study found that thoracic spine thrust manipulation was no more

effective than sham manipulation at improving disability, pain, or fear avoidance behaviors. This study has many limitations which may affect the results including a relatively small sample size for each group, the study could have been underpowered as the power analysis used to determine sample size did not account for stratification of participants. Also, only three sessions of thoracic manipulation/sham plus education and exercise were performed with each session only lasting a total of thirty minutes. I would be interested in seeing another study with more treatment visits to see if the outcomes became more significant.

Citation: Altintas B, Anderson NL, Pitta R, et al. Repair of Rotator Cuff Tears in the Elderly: Does It Make Sense? A Systematic Review. *Am J Sports Med.* 2020;48(3):744-753.
Doi:10.1177/0363546519834574

Review Submitted by: Taylor Blattenberger PT, DPT

Objective: To review the literature on outcomes of rotator cuff repairs for patients older than 70.

Methods: This systematic review utilized the PRISMA guidelines. Studies in English that reported the outcomes following open or arthroscopic rotator cuff repair in those 70 and older were included. The authors did not exclude studies involving patients undergoing concomitant procedure with the rotator cuff repair. Level 5 studies, basic science studies, care reports, and studies on debridement, revisions, partial tears, and graft or tendon transfer procedures were excluded.

Methodological quality was evaluated using the Coleman Methodological Score. Outcome measures included in data analysis were the SF-12, QuickDASH, American Shoulder and Elbow Surgeons, Constant-Murley, Modified Constant, SANE, Shoulder Rating Scale of UCLA, VAS, Katz ADL, and FIM. Retear Rate was also evaluated.

Results: The eleven studies included in the review were heterogeneous in population characteristics, follow-up, tear size, repair type, and outcome measures. Eight of the eleven studies were a level of evidence of 4. Five studies were found to be of poor methodological quality, five were fair, and one was good.

Patient satisfaction following rotator cuff repair was good ranging from 80%-97.5%. All but one study reported significant improvements in the QuickDASH, SF-12, modified Constant, SANE, UCLA, SST, Katz ADL, and FIM. Three studies also analyzed the outcomes between patients with return cuffs. These analyses were showed inconsistent results including some significantly poorer outcomes in those that retore, and some with no significant differences between these groups. In studies that analyzed range of motion there were statistically significant improvements following surgery.

Nine of the eleven studies performed dedicated imaging after surgery to monitor patients for retear. This imaging included 513 shoulders, 139 of which suffered retear of the rotator cuff (27.1%). There was no significant difference in the rate of retear between arthroscopic and open procedures. Those who retore were more likely to have had a larger tear preoperatively (Massive – 68.3; Large – 18.3).

Conclusion: Although those over 70 years old who undergo rotator cuff repair are more likely to retear, the procedure may be a viable treatment option to improve function. This option provides a joint preserving alternative to reverse total shoulder replacement.

Commentary: The authors of this study sought to analyze rotator cuff repairs in the elderly as an alternative to more invasive and joint compromising procedures such as

reverse total shoulder replacements. This study found high rate of retear rate in the population of interest. The retear rates were higher in those with large or massive tears. This may indicate that rotator cuff repair would not be indicated in those over 70 with these larger tears. When considering surgical options for those over 70, tear size should be strongly considered.

This study did not offer any insight into non-surgical care for these patients. This limits the applicability of this study to physical therapy practice. This does however provide us with information about what should be considered when surgical options are discussed, perhaps after failed conservative care. Analysis of the patient's expectations and goals should also be evaluated.

Citation: Hickey, Jack T, Timmins, Ryan G, Maniar, Nirav, Rio, Ebonie, Hickey, Peter F, Pitcher, Christian A, Williams, Morgan D, and Opar, David A. "Pain-Free Versus Pain-Threshold Rehabilitation Following Acute Hamstring Strain Injury: A Randomized Controlled Trial." *The Journal of Orthopaedic and Sports Physical Therapy* (2019): 1-35. Web.

Review Submitted by: Steven J. Lagasse

Objective: The objective of this study was to assess differences in a pain-free versus pain-threshold rehabilitation protocol. The primary outcome was to assess the number of days needed for subjects with hamstring strain injury (HSI) to return to play (RTP). The secondary measures assessed were isometric knee flexion strength, biceps femoris long head (BFLH) fascicle length, and fear of movement at 2-month follow-up, and reinjury occurrence at a 6-month follow-up.

Methods: This study was a double-blind randomized controlled trial. Subjects were accepted if they met the inclusion and exclusion criteria, and sustained a hamstring strain within seven days of starting the study. HSI was based on a clinical diagnosis as advanced medical imaging was not available. Subjects were split into either the pain-free (control) or pain-threshold (experimental) group. Despite being eligible for inclusion, no female subjects with an HSI pursued participation. Of the 52 male subjects who sought participation, 43 met the inclusion criteria. Subjects were stratified and randomly allocated into the experiment (n = 21) and control groups (n = 22). Subjects were blinded to the other intervention groups, and researchers were blinded to the allocation of the participants. All of the subjects participated in supervised rehab twice a week. They were encouraged to gradually return to sports training during this process. Once subjects were considered RTP, they were contacted once a month for six months to monitor for injury. Subjects who suspected reinjury were reassessed by a blinded investigator in person or over telecommunication.

Both groups were provided with identical rehabilitation protocols, where the numeric rating scale (NRS) was used to assess pain. The experimental group was educated to keep pain below 4/10. The control group was educated that rehabilitation should be pain-free. Isometric knee flexion strength was assessed with the tested extremity positions in 0 degrees of hip and knee flexion, followed by 90 degrees of hip and knee flexion. BFLH tissue was assessed by a blinded assessor via ultrasound. Fear-avoidance was measured via the Tampa Scale of Kinesiophobia. Reinjury occurrence was measured at a 6-month follow-up.

Results: At 2-month follow-up, the pain-threshold group demonstrates significant differences in both BFLH tissue length and isometric flexion strength. BFLH length improved by an additional 0.91 cm, and isometric knee flexion strength was greater by 15%. Although fear of movement improved in both groups, a significant difference was not seen. At 6-months follow-up subjects in the pain-free group returned to play in 15 days on average. This was two days sooner than subjects in the pain-threshold group. However, these findings were not significantly different. Two subjects reinjured in both groups.

Conclusion: Those subjects within the pain-threshold group demonstrate significantly greater knee flexion isometric strength and BFLH tissue length. Neither group sustained an injury during the rehabilitation process. It was not until subjects were allowed to RTP that injury occurred. These findings may imply that rehabilitation with pain is acceptable. Of the four individuals who reinjured, three of those injuries occurred within a 2-months follow-up. This may also imply that individuals who RTP sooner are more likely to become injured.

Commentary: Overall this a strong study that provides insight on HSI and RTP. The strengths of this article are the use of subject and assessor blinding. The study also reports how they obtained their sample size and their use of power. The authors do report how they calculated their sample size. Limitations of this study were the lack of specific advanced imaging to test for actual HSI and the degree of tissue injury. The study utilized a small sample size which was entirely male. This decreases the generalizability of the findings. Finally, the authors state that based on their findings, "The conventional practice of pain avoidance during hamstring strain injury rehabilitation may not be necessary." This implication, although it may be true, strays from the study's primary hypothesis that "... pain-threshold rehabilitation would accelerate the time needed to achieve RTP clearance compared to pain-free rehabilitation." Additional research is warranted if the authors wish to promote and/or encourage pain-free rehabilitation.

Citation: Fraser JJ, Saliba SA, Hart JM, Park JS, Hertel J. Effects of midfoot joint mobilization on ankle-foot morphology and function following acute ankle sprain. A crossover clinical trial. *Musculoskeletal Science & Practice*. 2020;46.

Review Submitted By: Lauren Carroll

Objective: Determine effects of midfoot mobilizations with 1 week HEP compared to sham mobilization with HEP in regard to morphologic foot assessment, pain with palpation of ligaments, muscle strength, and dynamic balance.

Methods: Laboratory based crossover, clinical trial comparing joint mobilization with HEP and sham mobilization with HEP effects on the measures listed above during a 2-week period in a population of active adults who suffered a lateral ankle sprain in previous 2-8 weeks.

Results: Significant pre to 1-week post improvements in both groups for FAAM-ADL, FAAM-Sport, and worst pain in previous week; no other significant changes in patient reported outcomes after 1st week of trial. Significant improvements in both groups that exceeded the MCID in patient reported outcomes immediately post intervention and 1-week post, but there were no significant differences between groups. Significant increase in pre-post weightbearing dorsiflexion and plantarflexion with rearfoot motion at post treatment and maintained at 1-week follow up.

Conclusion: There was a reduction in severity of pain in the previous week and improvements with subjective and physical outcome measures with both treatments, however midfoot joint mobilizations with the HEP resulted in greater reduction in pain and increased perceived improvement compared to the sham and HEP group.

Commentary: I feel like even though this study has a very small sample size, it was done very well. The authors were very specific with the inclusion criteria for the participants with “recreationally active” individuals defined as people that participated in 20 minutes of physical activity at least 3x/week, lateral ankle sprain between 2-8 weeks previously, and decreased forefoot-on-rearfoot mobility that was evaluated by a blinded, experienced clinician. The exclusion criteria were very reasonable with fractures, pregnancy, neurological/vestibular balance issues, diabetes, and soft tissue disorders, so this sample closely resembles a clinical population. The authors were also very specific with the HEP that was issued that contained detailed pictures and instructions to reduce errors in HEP performance. The area that seemed to lack some specificity was the degree of ankle sprain that each patient suffered. I feel like the range of severity of the sprains and the healing stage for each one could have impacted these results, and I also wonder if there would have been more between treatment differences if that information was available/taken into consideration. I also wish there had been a longer follow up appointment for this study. I’m interested to see how the patients looked more long term with return to activity/sport component or long-term mobility changes. Overall, I feel like this article demonstrates the importance of a well-rounded HEP, but also demonstrates that for some populations, mid foot mobilizations can reduce pain and improve motion more effectively than just the HEP.

Citation: Yin, D., Cabana, F., Tousignant-Laflamme, Y., Bédard, S., & Tousignant, M. (2019). Can a physiotherapy student assume the role of an advanced practice physiotherapist in Orthopaedic surgery triage? A prospective observational study. *BMC Musculoskeletal Disorders*, 20(1). doi: 10.1186/s12891-019-2864-x

Review submitted by: Helen Shepard

Purpose: To assess the agreement between physiotherapy students and orthopedic surgeons for orthopedic diagnoses and surgical triage in order to assist with accessibility to orthopedic care.

Methods: This prospective study involved seven orthopedic surgeons who each had at least 10 years of experience and one physical therapy student who had undergone a 3 week intensive training. Consecutive cases over a period of 4 weeks were included. Eighty six adult patients (over 18 years of age) were evaluated by both the student and an orthopedic surgeon. Patients were referred for knee or hip osteoarthritis or a shoulder problem. The physical therapy student evaluated the patient first, including history, examination, and imaging interpretation then discussed with the surgeon who then also evaluated the patient. Recommendations of both clinicians were analyzed for agreement using raw percent agreement and Cohen's kappa with a 95% confidence interval. A modified version of the Visit Specific Satisfaction Instrument was used to evaluate patient satisfaction with the experience.

Results: The raw percent agreement for diagnosis was 95.3% and the agreement for surgical triage was also high with a raw agreement of 94.2%. Shoulder problems accounted for 3 of the misdiagnoses and knee problems for one misdiagnosis. From weeks 1 and 2 to weeks 3 and 4, surgical triage agreement improved from 91.9% (strong agreement) to 95.9% (almost perfect agreement). Additional management recommendations varied between the student and the surgeons with the surgeons being much more likely to suggest imaging. Both the student and surgeons suggested conservative treatment for a majority of the patients, however, agreement on the type of conservative treatment was weak. Patient satisfaction with the experience was high at 90.0%.

Conclusion: Since the physical therapy student and orthopedic surgeons agreed frequently about diagnosis and triage recommendations, it can be concluded that clinical experience alone is not a prerequisite for physical therapists to help increase accessibility to orthopaedic care. Also, patient satisfaction with the clinic experience including collaboration between a physical therapy student and surgeons was high. The student was capable of differentiating nuanced orthopedic entities, such as unilateral vs bilateral compartmental knee osteoarthritis. Since the majority of patients were not surgical candidates nor required follow up with orthopedic surgeons, it is recommended to have physiotherapists present to assist with triage and conservative management of patients. Formal training for physiotherapists should be initiated to assist with their role in the triage and evaluation of patients in this setting.

Commentary: This is an interesting article pointing on the agreement between an inexperienced physical therapist and very experienced orthopedic surgeons on general diagnosis and management of patients. The study was done in Canada where wait times for consultation with an orthopedic surgeon may be up to 2 years. Since most patients were not even surgical candidates and would benefit most from conservative care, it seems obvious that physical therapists should be used to assist with evaluating these patients to reduce wait times, improve system efficiency, and help people access care in a timely fashion. Interestingly, the surgeons felt patient had received “ideal management” of their condition prior to consultation in only 58% of cases. This fact highlights the need for better conservative management prior to surgical referral, another area that physical therapists should be involved in. Only 37% of patients had been to physical therapy prior to the surgical consultation. There is a need for improved access and awareness of the role of physical therapy in management of orthopedic conditions. Another interesting point the article brought up was that surgeons were much more likely to recommend imaging than the physical therapy student. While the article cited this may be due to the need for surgery planning, most of these patients were not going to have surgery. I believe this is an area of need for better education for orthopedic surgeons to reduce unnecessary imaging and thereby decrease cost in the medical system. With other recent studies showing imaging findings correlating poorly to symptoms, why order imaging if you are fairly certain of the diagnosis and do not plan to do surgery? Both surgeons and the physical therapist suggested “advice and education” equally, however, the physical therapist was more likely to suggest adjustments to medication and cortisone injection than the surgeon, and the surgeon was more likely to recommend physical therapy. This may be due to the lack of confidence in the physical therapy student but I feel patients would benefit from more frequent referral to physical therapy prior to resorting to medication and injections.

Citation: Corkery MB, Hensley CP, Cesario C, Yen S-C, Chui K, Courtney C. Use of thrust joint manipulation by student physical therapists in the United States during clinical education experiences. *J Man Manip Ther.* 2020:1-9. doi:10.1080/10669817.2020.1720948

Review submitted by: Anna Wilson

Objective: Thrust joint manipulation (TJM) is used in physical therapy practice and consistently taught in entry-level curricula. However, updated studies determining utilization of TJM by students in clinical education experiences is needed. The purpose of this study was to explore the use of TJM in SPT clinical education and factors influencing implementation.

Methods: In a cross-sectional exploratory study, accredited physical therapy (PT) programs in the US (n = 227) were invited to participate in an electronic survey. The study was developed based on a literature review then modified based on feedback from five manual therapy experts in the field before being distributed. The survey asked about clinical practice and use of TJM (frequency, body region, barriers, and facilitating factors). SPTs were also asked to rate their confidence in clinical reasoning, psychomotor skills, and academic preparation for use of TJM using a 5-point Likert Scale.

Results: Forty-five programs participated in the study, consisting of 2,147 SPTs. Of those, 414 (19.3%) responses were used for analysis and 69% reported using TJM. SPTs who utilized TJM were more likely to have a CI who used TJM and/or had advanced certification/ training in manual therapy. The strongest factor that negatively influenced their decision was their CI not using TJM.

A majority of students agreed or strongly agreed that their academic preparation provided them with clinical reasoning tools (84%) and psychomotor skills (69%) necessary to perform TJM. However, only 56% reported feeling extremely or somewhat confident in their clinical reasoning and psychomotor skills. SPT use of TJM was facilitated by CI clinical practice, SPT competence in psychomotor skill, confidence in clinical reasoning, and practice setting.

Conclusion: Clinical practice of the CI appears to be a key factor in determining student practice in this study, highlighting the critical importance of the clinical instructor to the success of the SPT. Our findings among SPTs who did not use TJM indicate external factors (CI clinical practice, patient caseload, and practice setting) may be more likely to negatively impact TJM use than student-related factors.

Commentary: The biggest limitation of this study that stuck out to me was the low response rate. The authors pointed out that this group of 414 SPTs out of an estimated 10,672 who graduated in 2018 is a very small subset of this whole population (3.9%). Likely this specific group had a personal interest in this topic and results cannot be directly applied with certainty to the SPT population as a whole. However, I still think that it highlights an important point of the influence of CI's on their student's practice pattern.

As I am getting ready to add on the role of being a CI, I found this article helpful for a few reasons. I don't feel like it is very earth shattering that CI use of a manual therapy technique influenced student use of that technique, but it is interesting that it was stronger predictor than personal factors. A recommendation of the authors was to ensure sufficient practice and feedback time, in line with motor learning principles, to help facilitate use of TJM, which can also be applied across any manual therapy technique. These results challenge us as clinicians to 1) be competent and confident in use of TJM and other manual therapy techniques, 2) facilitate use of evidence based treatments, and 3) put aside time for practice of manual therapy with appropriate feedback and within a clinical reasoning framework.