

Kavaja et al. (2018) Treatment after traumatic shoulder dislocation: a systematic review with a network meta-analysis. *Br J Sports Med.* (52):1498-1506.
<http://dx.doi.org/10.1136/bjsports-2017-098539>.

Review Submitted by: Cameron Holshouser, PT, DPT

Objective: to review and compare treatments after primary traumatic shoulder dislocation aimed at minimizing the risk of chronic shoulder instability and for chronic post-traumatic shoulder instability.

Methods: Invention systematic review with random effects network meta-analysis and direct comparison meta-analysis. Criteria: randomized controlled trials comparing any interventions either after a first-time, traumatic shoulder dislocation or chronic post-traumatic shoulder instability, with a shoulder instability, function or quality of life outcome.

Results: 22 randomized controlled trials were included. There was moderate quality evidence suggesting that labrum repair reduced the risk of future shoulder dislocation (relative risk: 0.15, CI: 0.03-0.8, $p=0.026$), and that with non-surgical management 47% of patients did not experience shoulder re-dislocation. Very low to low-quality evidence suggested no benefit of immobilization in external rotation versus internal rotation. There was low quality evidence that an open procedure was superior to arthroscopic surgery for preventing dislocations.

Conclusions: There was moderate-quality evidence that half of the patients managed with physiotherapy after a first-time traumatic shoulder dislocation did not experience recurrent shoulder dislocations. If chronic instability develops, surgery could be considered. There was no evidence regarding the effectiveness of surgical management for post-traumatic chronic shoulder instability.

Commentary: Previous research has shown that after a first-time traumatic shoulder dislocation, approximately half of patients develop recurrent shoulder dislocation within 2 years. This study demonstrated that there is moderate-quality evidence that patients who had labrum repair surgery after a first-time traumatic shoulder dislocation had lower recurrent dislocation rates than patients treated with PT. This study also found in the treatment of chronic post-traumatic shoulder instability, effectiveness of surgery compared to non-surgical treatment is not known. With direct access, physical therapists may encounter a patient with a first-time traumatic shoulder dislocation. Although we are typically biased towards conservative management, some patients may benefit in the long term by having labral surgery versus conservative management. For an individual with chronic shoulder instability, physical therapists still may be able to have similar outcomes. However, there were no RCTs exploring the effectiveness of surgery vs non-surgical treatment for chronic post-traumatic shoulder instability, so no recommendations can be made at this point. Brief limitations of this study include: use of valid outcomes and baseline values, studies did not generally meet the power, publication bias with unpublished negative results, no sensitivity analysis or meta-regression

was performed, and this study only applies to patients with intact bony glenoid – which is a common occurrence with dislocation.

Reliability and Validity of Frontal Plane Kinematics of the Trunk and Lower Extremity Measured with 2-Dimensional Cameras during Athletic Tasks: A Systematic Review with Meta-analysis. Lopes, Ferrari, et al. *J Ortho Sports Med* 2018. Volume 48. Number 10. Pages 812 – 822.

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

Objective: To determine 2-dimensional reliability and validity when analyzing frontal plane trunk and lower extremity kinematics during squatting, landing, and cutting movements.

Methods: Authors followed the recommendations of the PRISMA checklist and included 16 studies conducted through March 2017 from the databases MEDLINE, CINAHL, Embase, Scopus, and SPORTDiscus. Studies were included if they evaluated the validity and/or reliability of 2-dimensional analysis of frontal plank trunk and/or lower extremity kinematics when compared to 3-dimensional analysis of squatting, cutting, or landing tasks. There were no restrictions regarding population, study type, age, or sex.

Results: A Meta-analysis of 16 studies revealed moderate to excellent reliability among both single leg and landing tasks; however, landing task validity was deemed moderate whereas single leg task showed no correlation.

Conclusion: This study found that both interrater and intrarater reliability for 2-dimensional frontal plane analysis ranged from good to excellent, however this depends on the type of task and reliability. 8 of the 16 studies included observed validity, which demonstrated poor agreement between 2-dimensional and 3-dimensional analysis rendering them incomparable. This may be due to 2-dimensional analysis being unable to measure rotational values that occur in the frontal plane.

Commentary: 3-dimensional analysis is the gold standard, however its clinical applicability is limited due to the equipment's expense. More recent research is demonstrating relationships between findings from observed 2-dimensional analysis kinematics and pathologic movement patterns, such as frontal plane projection angle and lower extremity kinematics during single leg squat in patellofemoral population. Clinicians therefore need to establish the reliability and validity of 2-dimensional analysis before recommending this method for widespread use. The findings of this study suggest that 2-dimensional study may be appropriate when relative values and indications are appropriate, rather than precise measurements regarding athletic trunk and limb kinematics during sport movement.

Luomajoki, Hannu Antero, and Christoph Michael Bauer. "Effectiveness of Movement Control Exercise on Patients with Non-Specific Low Back Pain and Movement Control Impairment: A Systematic Review and Meta-Analysis." *Musculoskeletal Science and Practice*, vol. 36, 2018, pp. 1–11., doi:10.1016/j.msksp.2018.03.008.

Review Submitted By: Jeff Peckins

Objective: To determine the effect of movement control exercise (MVCE) on pain intensity and disability in patients with non-specific low back pain (NSLBP).

Methods: The article reviewed RCTs that compared MVCE to other active interventions, however treatments in which trunk stabilization or motor control approach in the intervention groups were excluded. All subjects had NSLBP, there were no restrictions on age or pain duration. Studies included were rated for methodological quality and level of evidence.

Results: At the end of treatment, 3/9 studies showed a statistically significant decrease in pain in favor of the MVCE group, while the other six showed no difference between groups. Overall there was a small effect in favor of the MVCE group (SMD -0.39, 95% CI -0.73-0.04), however studies that restricted sampling to those with movement control impairment (MVCI) showed a large effect in favor of MVCE (SMD -0.82, 95%CI -1.25-0.40). After 12-month follow-up, the overall total effect showed no difference between groups, but those that restricted sampling to those with MVCI showed a small effect in favor of MVCE (SMD -0.46, 95%CI -0.83 to -0.09)

At the end of treatment, 4/10 studies showed a statistically significant decrease in disability in favor of the MVCE group, while the others showed no difference between groups. Overall there was a small effect in favor of the MVCE group (SMD -0.38, 95%CI -0.68 to -0.09), however studies that restricted sampling to those with MVCI showed a moderate effect in favor of MVCE (SMD -0.66, 95%CI -1.18 to -0.13). After 12-month follow-up, the overall total effect showed a small effect in favor of MVCE (SMD -0.37, 95%CI -0.69 to -0.04), but studies that restricted sampling to those with MVCI showed no difference between groups.

Conclusion: MVCE may be more effective in improving pain and disability in subjects with NSLBP compared to other interventions. MVCE shows better effectiveness for those who demonstrate MVCI.

Commentary: This systematic review differentiates MVCE treatment from motor control exercises by stating that MVCE's aim is to change movement behavior, rather than strengthening certain muscle groups (such as transversus abdominis, multifidus, etc).

Looking specifically at the interventions offered in the MVCE treatment groups, most centered around movements and education that matched the subject's directional preference or pain-free postures. The findings of this article suggest that MVCE treatment is best suited for patients who demonstrate MVCI. Since MVCE showed improved results for those with MVCI, it is important to accurately classify patients with NSLBP, as patients who do not fall under movement coordination impairment group may not have the same benefits as those who do. A further benefit of this systematic review is that the inclusion criteria did not restrict individuals based on age and duration of symptoms, so these findings are widely applicable.

The Rotator Cuff Healing Index: A New Scoring System to Predict Rotator Cuff Healing After Surgical Repair. Kwon J et al. Am J Sports Med. 2018 Nov;49:173-180.

Review Submitted: Casey B Moler

Objective: Determine the prognostic factors predictive of rotator cuff healing after surgical repair and associating them with a scoring system.

Methods: 603 patients who underwent rotator cuff repair by the same surgeon with these criteria: full thickness tear, MRI or CTA 1 year after surgery and a FOM at least 1 year after surgery. Clinical Variables including typical demographic information, sx duration, hx of steroid injections, pre-op motion, systemic disorders, preoperative radiographic images and intraoperative findings. A multivariate analysis was done to determine the independent variable associated with cuff healing after RC repair and to determine the ORs. The scoring system was then determined using clinical cut off values or ROC curves in a weighted manner for those factors that did not have clinical cut off values.

Results: Overall failure rate was 24% for those who had a full thickness RTC tear repair. The following risk factors were identified with the multivariate analysis: age >70. y.o., AP tear size (>2.5cm), tear retraction, fatty infiltration of the infraspinatus, BMD, and level of work activity. The scoring system based on their results are of the following:

(4 Points)

1. **Retraction** (maximum 4 points)
 - i. 0 pts= <1cm
 - ii. 1 pts= 1cm to <2cm
 - iii. 2 pts= 2cm to <3cm
 - iv. 4 pts= ≥ 3cm

(3 Points)

1. **Fatty Infiltration** ≥ grade 2

(2 Points)

1. **Age >70 y.o.**
2. **AP tear size >2.5cm**
3. **BMD <-2.5**
4. **Work activity high**

Those who scored $\leq 4/15$ accounted for 6.0% failure to heal, while $\geq 5/15$ and $\geq 10/15$ had a failure rate of 55.2% and 86.2% respectively. The mean score for the healing group was 3.0 points with 5 points identified as the critical point because of its max sensitivity and specificity.

Conclusion: The current study, identified, and integrated prognostic factors associated with RTC healing after surgical repair (bolded above) in to a new scoring system to predict the failure rate of the repaired tendons.

Commentary: It would be important when using this scoring system to compare your patient to the inclusion and exclusion criteria as well as comparing the surgical procedure and post-operative care details clearly defined in the study. For example, most patients had a subacromial decompression during these surgeries (~95%) which was decided by the presence of a spur $> 7\text{cm}$ in thickness. Surgeons and their surgical procedures/techniques can vary tremendously so comparing it to the operative details of your specific patient would be very important when weighing the predictive value of the postsurgical repair outcomes. Similarly, being critical of the post-surgical instructions and rehabilitation protocols like length of abduction brace ($<1\text{cm}=4\text{weeks}$; $3-5\text{cm}=5\text{ weeks}$; $>5\text{cm}=6\text{ weeks}$) and the recommendation of PROM for those who had small and medium sized tears should be considered.

Previous studies found similar prognostic factors to the current study however, the large cohort with the incorporation of small, medium and massive RTC tears makes this study unique. This study also looked at 2 different variables that often are overlooked when predicting the failure rate of these tendons post-operatively. One of those prognostic factors being bone density. Bone density, measured via DEXA in this study, was implied by authors may be a missing parameter, that if addressed, could augment the healing potential for RTC muscles. The second variable unique to this study that was found as an independent prognostic factor was the level of work activity of the cuff during the healing process post-surgically. The authors imply that this often is overlooked and may be due to the low interest of the orthopedic surgeons which is where we as physical therapists can be advocates for our patients. The authors acknowledge there are a lot of variables that could affect outcomes and treatment results leading to failure to heal not addressed in this study. However, this information can be useful in order to predict with some confidence what the outcomes may be regarding failure rate and drive decisions regarding patient's plan of care after RTC repair surgery.

Citation:

Pamukoff DN, Montgomery MM, Choe KH, Moffit TJ, Garcia SA, Vakula MN. Bilateral Alterations in Running Mechanics and Quadriceps Function Following Unilateral Anterior Cruciate Ligament Reconstruction. *Journal of Orthopaedic & Sports Physical Therapy*. 2018;48(12):960-967. doi:10.2519/jospt.2018.8170.

Review Submitted by: Jon Lester

Objective: To determine the differences in quadriceps function and running mechanics in those who have underwent an ACLR vs control.

Methods: 38 individuals s/p ACLR were matched with controls by age/sex/BMI. Average time since ACLR was 48 months \pm 25 months. Presence of meniscal repair/meniscectomy and graft time was also recorded and presented. Quadriceps function was determined by performance with isokinetic testing at 60, 180, and 240 deg/sec, as well as isometric strength at 45 deg and 85 deg. For the isometric trials, the slopes of the torque-time curve from 0 to 100 ms (RTD100) and from 0 to 200 ms (RTD200) following contraction onset were recorded. Running mechanics were determined via 3D motion analysis by running across a force plate for 5 trials on each limb. Running evaluation included assessment of these factors when the GRF hit 20 N: knee flexion angle (KFA), knee extension moment (KEM), rate of knee extension moment (RKEM), vertical instantaneous loading rate (VILR), and vertical impact peak (VIP). Involved limb vs unininvolved limb were compared via paired t-testing. Involved and unininvolved vs control were compared via independent t-testing.

Results: KFA of the involved limb in the ACLR group was determined to be significantly less as compared to the unininvolved limb ($p=.016$). Interestingly, the KFA for the unininvolved limb in the ACLR group was also found to be less than the control ($p=.01$). All other running mechanics were determined to not be statistically different when comparing limbs of the ACLR group. Additionally, there were no differences between the involved and unininvolved limbs in the ACLR group for all quadriceps function variables. When comparing the involved limb to the control limbs of the control group, smaller KFA ($p<.001$), smaller KEM ($p=.001$), lower RKEM ($p=.004$), and higher VILR ($p=.016$). There was a significantly lower RTD100 ($p=.015$), as well as lower peak torque at 60 deg/s ($p=.007$) and 180 deg/s ($p=.016$) in the involved limbs of individuals in the ACLR group compared to the limbs of those in the control group. Weak associations were observed between isokinetic peak torque at 180 deg/s and RKEM ($r=0.38$, $p=.01$) and between RTD100 and RKEM ($r=0.26$, $p<.05$) for the involved limb of the ACLR group.

Conclusions: Both the involved and unininvolved limb of the ACLR group were found to have a smaller KFA during stance compared to control limbs. Additionally, higher VILR, lower KEM, and lower RKEM were found in the involved limb of the ACLR group compared to the limbs of those in the control group. RKEM, RTD100, and peak torque at 180 deg/s were also found to have weak correlations within the involved limb of the ACLR group.

Commentary: The results of this study tell us that there are bilateral quadriceps and running faults in those s/p ACLR. This tells us that training the involved limb only might not be in the best interest of a patient's LTGs if they include activities of running/sports/etc. Additionally, the speed of contraction of the involved limb appears to be impaired in those s/p ACLR. Because of this, we should add focus on rate of force development when retraining quadriceps function, especially in those with an interest in RTS or running. In the future, I plan to place increased emphasis in those with ACLR in regard to bilateral quadriceps function, especially in the later stages of rehab. Additionally, sagittal plane running analysis is crucial to getting the complete picture of quadriceps function, analyzing both the involved and unininvolved limbs for kinematic faults.

Citation: Ross M, Adams K, Engle K et al. The knowledge of low back pain management between physical therapist and family practice physicians. *J Man Manip Ther.* 2018;26(5):264-271.

Review Submitted by: Matt Fung

Objective: The purpose of this study was to compare knowledge in managing patients with low back pain (LBP) between physical therapist (PT) and family practice physicians.

Methods: A quasi-experimental cross-sectional case-control study design was used to explore the differences in knowledge, attitudes, the usefulness of clinical practice guidelines (CPGs), and management strategies for patients with LBP. Surveys containing questions from Buchbinder et al. and Finestone et al. previous studies were sent to 500 family physicians and 500 physical therapist. Beliefs of physical therapists and family practice physicians about LBP were compared using relative risks and independent t-tests.

Results: Seventy-three non-military physical therapist and 30 family practice physicians completed standardized examinations assessing knowledge, attitudes, the usefulness of clinical practice guidelines, and management strategies for patients with LBP. Scores related to knowledge, attitudes, and the usefulness of CPGs were similar between groups. In addition, there was no difference between the groups for knowledge regarding optimal management strategies for patients with LBP. However, PTs were less likely to have difficulty assessing motivation levels of patients with LBP compared to family practice physicians (64.6% vs 26.7%) and PTs were less likely to agree that interventions by health care providers have little positive effect on the natural history of acute LBP. (17.8% vs 50%).

Conclusions: The results of this study may have implications for third-party payers and health care administrators regarding the utilization of PTs in the management of patients with LBP in expanded scopes of practice, including direct access and potential placement in primary care clinics. The results of this study are generally consistent with those of previous research who have shown that physical therapist have knowledge levels that are equal to or higher than all physical specialties except for orthopedic surgeons in managing musculoskeletal conditions. There were many limitations in the study design that may have skewed the results of this study. More specifically, there may be a difference between how participants responded to the questions in this study and their daily clinical practice patterns. Additionally there was only 18% and 6% response rate from physical therapists and physicians respectively.

Commentary: While this study did have its limitations in regards to design and lack of control for answers provided, it again supports Physical Therapist push to become autonomous practitioners for the treatment of musculoskeletal issues specifically non-specific LBP. We need to be advocates for ourselves as a profession and promote direct access for our patients to ensure they get expedited care. I found it very interesting that practitioners were more likely to believe that interventions provided by health care providers have little positive effect on the natural history of acute LBP. Again only a small sample size of practitioners participated in this study skewing the results but these patients' outcomes, especially those of chronic nature depend on their belief systems and if their health care provider does not believe that interventions are beneficial their chances for a positive outcome diminishes greatly.

