Sappey-Marineier, E., Sonnery-Cottet, B., O'Loughlin, P., Ouanezar, H., Fernandes, F.R., Kouevidjin, B., Thaunat, M. (2019). Clinical Outcomes and Predictive Factors for the Failure with Isolated MPFL Reconstruction for Recurrent Patellar Instability. *The American Journal of Sports Medicine*, *47*(6), 1323-1330. doi:10.1177/0363546519838405

Review Submitted By: Casey Moler

Objective: Report the clinical outcomes of isolated MPFL reconstruction procedure in cases of lateral patellar instability and to identify factors that are predictive of failure (revision or patellar dislocation post-surgically).

Methods: This was a retrospective study looking at prospectively collected data between 2008-2014 on 211 MPFL reconstruction surgeries. All participants sustained a knee injury that lead to patellar instability. MPFL reconstruction surgery was given as a surgical option after 2+ patellar dislocations. All patients with previous bony procedures, MPFL reconstruction, ACL reconstruction were excluded from being participants of this study. All patients were assessed both clinically (apprehension, patellar tilt, and + J-sign (abnormal tracking)) and radiologically (Dejour classification, caton-deschamps index, patellar tilt, and TT-TG distance). Patients were followed up with clinical evaluation (apprehension and tracking test) and with the Kujala score pre and postoperatively at 2, 4, and 12 months followed by annual assessment. All 211 surgeries were performed by 2 surgeons using the gracilis tendon graft being 1st choice with fixation placed at 30 degrees of knee flexion. A univariate and multivariate analysis was run to determine potential risk factors.

Results: Preoperative risk factors found to be significant were patellar height (CDI >/= 1.3) and J-sign for both the univariate and multivariate analysis. The reported failure rate was found to be 10 (4.7%), all requiring revision surgery to address instability. Preoperative values for + J-sign were 27% while 93% were found to have trochlear dysplasia. The average CDI was 1.2, mean TT groove distance 15 mm, and patellar tilt 23. Kujala score improved from 56.1 preoperatively to 88.8. The average length of time patients followed was 5.8 years. All revisions resulted from a traumatic MOI that lead to "failure" with a mean age of 3 years of incidence.

Conclusion: Isolated MPFL reconstruction surgery for patients with patellar instability correction has a high success rate with "failure" being relatively low (4.7%). Patella alta (CDI >1.3) and + J-sign were found to be pre-operative risk factors for failure of isolated MPFL surgery.

Commentary: This article was of interest to me as my case load consists of several patients with pre-operative, post-operative, isolated and non-isolated MPFL reconstruction all with gracilis tendon grafts. This article not only gave a great description of the surgery but furthered my knowledge of the high success rate of this surgery to address patellar instability for those with severe trochlear dysplasia and in the absence of concomitant cartilage and/or chondral defects, tibial tubercle osteotomy or revisions. The authors argue, based on this data, that in the presence of radiologic trochlear dysplasia clinical findings of patella alta and abnormal tracking are "criti-

cal parameters" for appropriate assessment and should be taken into consideration with surgical options due to higher failure rates. With this data it also reveals why tibial tubercle osteotomy is most likely recommended with patients who have a CDI greater than or equal to 1.3. There were many limitations with this study however the results were very similar to prior systematic reviews and studies to date of failure rate. Caution should be taken with this data as every surgery is different and the population studied had no other surgical history to date or concomitant surgical interventions other than the MPFL reconstruction, which may have different outcomes. I take this information knowing that likelihood of recurrent dislocations might be low with this surgery however does not directly correlate to function, strength, or predict return to sport abilities.

Agres, A. N., Chrysanthou, M., & Raffalt, P. C. (2019). The Effect of Ankle Bracing on Kinematics in Simulated Sprain and Drop Landings: A Double-Blind, Placebo-Controlled Study. *The American journal of sports medicine*, *47*(6), 1480-1487.

Review Submitted by: Cameron Holshouser, PT, DPT

Objective: To assess the protective effect of an external ankle brace on ankle kinematics during simulated inversion sprain and single-legged drop landings among individuals with history of unilateral ankle sprain.

Methods: A double-blind, placebo-controlled study; 16 participants with ankle instability and previous sprain performed single-legged dropped landings and sudden inversion tilt perturbation. Kinematics of the affected limb were assessed in 3 conditions (active bracing, passive placebo bracing, and unbraced) across 2 measurement days. Participants were blinded to the brace type tested. The effected of bracing on kinematics was assessed with repeated ANOVA parametric mapping, with post hoc test performed for significant interactions. Participants had to report unilateral ankle instability and "giving way," history of lateral ankle sprain at least 1 year prior and regular participation in sports for a minimum of 3 hours/week. Exclusion criteria included a history of other lower extremity injury or surgery, injury with the past 4 weeks, vestibular or balance disorders, foot deformities, generalized hypermobility or an further condition that could affect test performance.

Results: Only active bracing reduced inversion angles during a sudden inversion when compared with the unbraced condition. This reduction was apparent between 65 and 140 milliseconds after the initial fall. No significant differences in inversion angle were found between the passive placebo brace and unbraced conditions during the sudden ankle inversion. No significant differences were found among all tested conditions in the sagittal plane kinematics at the knee and ankle.

Conclusions: During an inversion ankle sprain, only the actively protected ankle brace limited inversion angles among participants. These results do not indicate a placebo effect of external bracing for patients with ankle instability and a history of unilateral ankle sprain. Sagittal plane kinematics appear to remain unaffected by bracing during single-legged landing, owing to the

limited effects of bracing on sagittal ankle kinematics. These results highlight the role of brace design on biomechanical function during sports-related and injury-prone movements. Athletes prone to reinjury after lateral ankle sprain may benefit from brace designs that allow for full sagittal range of motion but restrict only frontal plane motion.

Commentary: Participants with a history of a lateral ankle sprain were able to decrease inversion angles during a simulated inversion ankle sprain (sudden inversion weightbearing test) when wearing an actively protecting brace, in comparison with the unbraced and placebo braced conditions. The results agree with previous research of lace-up, semirigid, and hinged ankle braces. The results of the study also found that patients with a history of lateral ankle sprain showed no differences in knee and ankle sagittal angles during a single-legged drop landing among all testing conditions, which implies that freedom of movement in the sagittal plane is unaffected by this particular ankle brace (illustrated below). Lace-up and semirigid bracing has been shown to lower knee and ankle mobility during sagittal plane single-legged landing. Reducing the maximum dorsiflexion angle during a single-legged landing may lead to increased ground-reaction forces at the knee and hip and lead to compensatory knee movement (dynamic valgus). Potentially choosing a brace that protects and limits frontal plane motion but allows for sagittal plane motion may the brace of choice for athletes returning to sport with chronic ankle instability. While this information may appear beneficial, the population was small, older population for ankle sprains (average age < 30 years), and poor generalizability due to lab-based study. The study did not mention how they defined their exclusion items of recent injury, foot deformities and hypermobility. They also did not mention how they recruited subjects, appears to be by convenience. Although the limitations of the study, I might recommend a brace with front plane support without sagittal plane limitation for individuals with CAI and are returning to a sport which requires frequent jumping. This might help provide stability at the ankle but also allow normal kinematics at the knee, which may prevent an increase of injury risk at the knee while using an ankle brace.

Jill L. Cook, Dimitrios Stasinopoulos & Jean-Michel Brismée (2018) Insertional and mid-substance Achilles tendinopathies: eccentric training is not for everyone – updated evidence

of non-surgical management, Journal of Manual & Manipulative Therapy, 26:3, 119-122, DOI: 10.1080/10669817.2018.1470302

Review Submitted by: Erik Kreil

Objective: To discuss the efficacy of a variety of treatments for Achilles Tendinopathy (AT) through a review of the literature.

Methods: Summarize findings from 49 research articles published discussing treatment of mid-substance and insertional AT.

Results: Clinical studies identify eccentric exercise as beneficial for mid-portion AT short term clinical outcomes, though long term benefits are unclear. RCTs show eccentric prescription for pain as having questionable or non-significant evidence to support, though satisfaction may Improve. Eccentric demonstrates superior outcomes to concentric exercise or wait and see, though dosage is unclear. High-volume injections for mid-substance AT demonstrates promising outcomes, at times superior to PRP. Insertional AT demonstrates improvement with eccentric exercise and stretching, while injections are effective and recommended for non-athletic population. Modalities may be effective when combined with a loading program.

Conclusion: Eccentric loading is beneficial for both mid-portion and insertional AT, though the magnitude of superiority regarding specific dosage, program, and variation of treatment is unknown. Injections may be beneficial, though specific recommendation can be made for non-athletic population with insertional AT. Modalities are beneficial only when combined with a loading program. A wait and see approach or passive approach, such as modalities alone, is not recommended.

Commentary: Review of the literature demonstrates that a loading program is the single most signifiant requirement regardless of tendinopathy location, which coincides with the function and makeup of the anatomy being treated. The variable findings further support an individual approach, as a specific protocol is not identified. Pain tolerance will vary which of the supported additions to the loading program is necessary, some of which may vary in effectiveness depending on the site of tendinopathy. While a review of the literature demonstrates variable outcomes in efficacy of treatment, definite superior gains can be made with an effort to identify the location of tendinopathy and the anatomy at play (consider the compressive loads seen at the Achilles tendon with the superior calcaneous compared to the mid-portion tendon).

Citation: Young, I., Pozzi, F., Dunning, J., Linkonis, R., & Michener, L. (2019). Immediate and short term effects of thoracic spine manipulation in patients with cervical radiculopathy: A randomized controlled trial. *The Journal of Orthopaedic and Sports Physical Therapy, 1-36*, 1-36. doi:10.2519/jospt.2019.8150

Review Submitted By: Jeff Peckins

Objective: To assess if a single thoracic manipulation can lead to immediate to short-term improvements in pain and disability, cervical endurance and AROM, and upper extremity numbness and tingling in patients with cervical radiculopathy.

Methods: The RCT's consisted of 43 individuals who met the inclusion criteria of a neck disability index (NDI) score greater than 10/50 and having cervical radiculopathy defined by Wainner and Gill (at least 3/4 of the following: Spurling's test, cervical distraction test, upper-limb neurodynamic test with median nerve bias, and cervical rotation < 60 degrees towards the affected side). The experimental group received a supine thoracic manipulation, the control group received an open-hand sham manipulation without a thrust. Neither group was given any exercise or advice. The study's primary outcomes were numeric pain rating scale (NPRS) and changes in perceived improvement via the global rating of change (GROC). Secondary outcomes include NDI, deep neck flexor muscle endurance, cervical ROM, and numbness, tingling, and distribution of symptoms.

Results: Primary Outcomes - The manipulation group reported significantly decreased neck pain (NPRS) and increased subjective improvement (GROC) compared to the control group at all time points. For 48-72 hour follow-up, the number needed to treat for improvement in upper extremity symptoms was 3.1 (95% CI: 2.0, 8.1) and 2.2 for cervical symptoms (95% CI: 1.5,4.5).

Secondary Outcomes - There was a significantly decreased NDI score in favor of the manipulation group at 48-72 hours (95% CI: -13.1, -2.4; P<.01). At 48-72 hours, there was a statistically significant increase in cervical AROM in all directions except for sidebending to the asymptomatic side. For deep neck flexor endurance test, there was a statistically significant improvement in favor of the manipulation group at 48-72 hours (P<.025). Lastly, a significantly greater percentage of those in the manipulation group reported centralization of symptoms both immediately (55% vs 5%, P<.01) and 48-72 hours following intervention (64% vs 5%, P<.01).

Conclusion: A single session of thoracic manipulation improved perceived pain and function, and several cervical and upper extremity impairments in individuals with cervical radiculopathy.

Commentary: The results of this study show great efficacy for improving short-term symptoms in those with cervical radiculopathy with thoracic manipulation. A major limitation of this study however was that they did not do a good job of blinding the participants. 90% of individuals in the manipulation group believed they received the intervention, compared to only 57% of those in the control group. A strength of the study was that there were no instances of increased neck or upper extremity symptoms following manipulation, and no participants reported soreness lasting greater than three hours after the manipulation.

Although there were blinding issues with the study, I do believe that the results are significant enough to provide a case for thoracic manipulation in those with cervical radiculopathy. Interestingly, the majority of results indicated a greater improvement in symptoms and objective find-

ings 48-72 hours following treatment than immediately after treatment. Not only does this give the clinician a window of opportunity to provide potentially more aggressive treatment following the manipulation in the clinic, but the window is open long enough for patients to perform a more comprehensive home exercise program, in theory facilitating a faster recovery. Future studies should improve their blinding and have longer duration of follow-up with inclusion of advice and exercise for a more comprehensive treatment plan.

Citation: Suarez AL, Martinez-Calderon J, Falla D. Role of kinesiophobia on pain, disability and quality of life in people suffering from chronic musculoskeletal pain: a systematic review. *Br J Sports Med*. 2019;53(9):554-559.

Review Submitted by: Matt Fung PT, DPT, CSCS

Background: The role of kinesiophobia in chronic musculoskeletal pain (CMP) has been explored extensively. In this regard, a large body of evidence has reported that kinesiophobia is associated with disability, pain, and quality of life. Furthermore, longitudinal studies have shown that high levels of kinesiophobia at baseline, predict negative changes in quality of life, and positive changes in disability, and pain.

Objective: The aim of this systematic review are to explore the level of association between kinesiophobia and pain, disability, and quality of life in people with CMP and to analyze the prognostic value of kinesiophobia on pain, disability, and quality of life in people with CMP.

Methods: This review was conducted in accordance with PRISMA statement. Initial search of electronic databases were done in February 2017 and included: PubMed, AMED, CINAHL, PsycINFO, and Pub Psych. An updated search strategy was performed in July 2017 to identify any new studies that could be included in this review.

Inclusion criteria:

1. Observational study – cross-sectional, case-control and longitudinal studies
2. Studies whose participants were adults diagnosed with CMP, defied in this review as persistent or episodic pain lasting > 3 months around the axial skeleton or peripheral joints. Additionally the ACCTION-APS Pain Taxonomy (AAPT) for chronic pain was used. This included participants diagnosed with chronic myofascial pain, fibromyalgia, chronic widespread pain, chronic fatigue syndrome, RA, spondyloarthropathies, and OA.
3. Only studies measuring kinesiophobia with the Tampa Scale for Kinesiophobia (TSK) were included.
4. No restrictions were applied on participants' gender, ethnicity and follow-up duration.
5. Studies recruiting participants from a general population, primary, secondary, and tertiary care.
6. Only articles written in English were included

7. Studies were included if there was at least on association between kinesiophobia and one of the following outcome measures: pain, disability and/or quality of life.

Exclusion Criteria

1. Studies of acute pain, subacute pain and chronic non-musculoskeletal pain according to AAPT.
2. Studies where CMP was associated with a diagnosis of major psychiatric disorders
3. Studies evaluating kinesiophobia in CMP attributed to previous fracture or exploring this factor before surgery or post-surgery
4. Studies analyzing kinesiophobia in individuals with CMP after trauma
5. Studies examining the role of kinesiophobia in experimental models of pain
6. Studies testing kinesiophobia in the context of a behavioral task or treatment
7. Review, clinical studies, case reports, editorial and abstracts

Results:

The association between kinesiophobia and pain in people with CMP (cross-sectional analysis). A total of 38 studies evaluated, 21 of which showed a significant association between a greater degree of kinesiophobia and greater levels of pain intensity. There was no significant relationship between kinesiophobia and pain intensity in 13 studies. Overall the quality of evidence was moderate.

The predictive value of kinesiophobia on pain in people with CMP (longitudinal analysis) was explored in two studies with conflicting evidence. The predictive value of kinesiophobia on pain severity in people with CMP was further explored in two other longitudinal studies and the overall quality was limited.

The association between kinesiophobia and disability in people with CMP (cross-sectional analysis) was evaluated by 46 studies. A total of 30 showed significant association between greater degree of kinesiophobia and greater levels of disability. There was no significant relationship between kinesiophobia and disability in 11 studies. The overall quality of evidence was strong.

The predictive value of kinesiophobia on disability in people with CMP (longitudinal analysis) was explored in seven studies. A greater degree of kinesiophobia at baseline significantly predicted greater levels of disability immediately after the intervention, and at 3, 6, and 12 months follow-up. Overall quality of evidence was moderate.

The associated between kinesiophobia and quality of life in people with CMP (cross-sectional analysis) was evaluated in 8 studies. A total of 3 showed significant association, on study showed no significant relationship and 4 demonstrated inconsistencies. Overall quality of evidence was moderate.

The predictive value of kinesiophobia on quality of life in people with CMP (longitudinal analysis) was explored in 2 studies. The overall quality of evidence was limited.

Conclusions: This systematic review revealed that a greater degree of kinesiophobia is associated with greater levels of pain intensity, pain severity and disability as well a lower quality of life. The analysis of the prognostic role of kinesiophobia showed that greater levels of kinesiophobia at baseline predict higher levels of disability, pain severity and lower quality of life at 6-month follow-up, while kinesiophobia does not predict changes in pain intensity. The results of this systematic review encourage clinicians to evaluate kinesiophobia in patients with CMP, as the presence of kinesiophobia can impact on adherence to exercise therapy an may require specific management strategies such as selection of functional goals, education to manage safe behaviors and graded exposure to feared activates.

Commentary: The author's note that, "kinesiophobia is known to be a barrier to rehabilitation adherence in different chronic pain conditions. However, it is also considered to be a modifiable factor that may facilitate earlier achievement of pain relief and functional recovery. In this sense, clinicians should need to identify the presence of kinesiophobia prior to the prescription of any intervention… ideally the presence of kinesiophobia should be detected during the first assessment, to plan biopsychosocial treatment strategies focused on the modification of kinesiophobia." Overall I thought this systematic review reaffirmed the importance of treating the entire person not just their physical musculoskeletal complaints but addressing all factors that attribute to their pain. We need to properly identify contributing factors that are driving their pain cycle and address them accordingly. This means being cognizant of the words we use with these patients and be sure that we are listening to these patients and properly educating them on the power of perception of pain and movement.
From my experience these are typically patients who have gone through some form of therapy with failed interventions and have come to the conclusion that they are just going to have pain forever and the only way to prevent pain is to not move. Treatment initially would be able discussions on their belief system and how it is affecting their ability of recover as well as education on the importance of movement and cardiovascular activity. Then, followed by graded exposure toward movement patterns they have previously feared.

Estébanez-De-Miguel E, Jimenez-Del-Barrio S, Agud MF-, et al. Comparison of high, medium and low mobilization forces for reducing pain and improving physical function in patients with hip osteoarthritis: Secondary analysis of a randomized controlled trial. *Musculoskeletal Science and Practice*. 2019;41:43-48. doi:10.1016/j.msksp.2019.03.007.

Review Submitted by: Jon Lester

Objective: To compare the effect of three different intensities of long axis distraction mobilization on pain and function in patients with symptomatic osteoarthritis.

Methods: 60 subjects with unilateral primary hip OA were recruited for this study. Subjects were randomized into one of three different groups (double blinding utilized for examiner and subject). The groups differed based on the intensity (low, medium, high) of LAD mobilization that they would receive through the intervention duration. Low-force was defined as force prior

to the slack was taken up (26.4 +/- 6.8 N) and was applied through gentle, continuous mobilization. Medium force was provided at the point during which the examiner felt a marked resistance (50.7 +/- 7.8 N). The high-force group received mobilization beyond this point of soft tissue stretching (65.6 +/- 2.9 N). The medium and high force groups utilized periodic mobilization for 45” and 30 “, respectively. The intervention was performed for 10 minutes in the OPP of the hip throughout 3 sessions in alternate days. Outcome measures were the WOMAC-PF, TUG, 40-m self based walk test, VAS, and PPT to the most painful site at the hip region.

Results: All groups showed significant improvement in both VAS and function outcome measures ($p<.05$). However, there was no significant difference between groups. Each group demonstrated a large effect size for VAS score reduction, with the low force group having the greatest effect size (d = 2.0). Small or moderate effect sizes were noted in all groups for the physical function variables, with the high force group showing the largest effect sizes (TUG, d=0.7, 20m test, d=0.6, WOMAC-PF, d=0.5). All groups also displayed a significant improvement in PPT at all areas measured (hip, knee, heel). The low force mobilization group displayed the largest increase in PPT at all levels. Values are reported below in Table 3.

Table 3

Baseline, final values, change scores and effect size for pain and physical function outcomes.

Outcome measure / group	Baseline	Post-treatment	Within-group changes	Within-group effect sizes	Between-group P values	Between-group effect sizes
VAS (0–10)						
Low Force	3.1 ± 1.5	1.0 ± 1.5	−2.1 [−2.5, −1.7]	2.0	0.032	1.2
Medium Force	3.5 ± 1.5	1.1 ± 1.5	−2.4 [−2.8, −2.1]	1.6		
High Force	3.9 ± 1.5	1.2 ± 1.5	−2.6 [−2.8, −2.3]	1.9		
Timed up and go test (seconds)						
Low Force	13.0 ± 3.1	11.5 ± 3.5[2]	−1.5 [−1.9, −1.1]	0.5	0.050	1.5
Medium Force	11.6 ± 2.6	9.9 ± 2.0	−1.6 [−2.7, −2.5]	0.8		
High Force	10.9 ± 2.0	10.1 ± 1.0	−1.0 [−1.7, −0.4]	0.7		
40-m self-paced walk test (seconds)						
Low Force	35.2 ± 20.6	28.6 ± 12.2	6.6 [11.8, 1.4]	0.5	0.050	3.4
Medium Force	31.8 ± 15.0	25.2 ± 13.4	6.6 [9.8, 3.4]	0.4		
High Force	49.3 ± 7.2	45.0 ± 8.4	−4.4 [−6.6, −0.4]	0.6		
WOMAC-PF (0–68)						
Low Force	30.2 ± 11.8	22.2 ± 12.1	8.0 [3.9, 12.1]	0.6	0.050	1.4
Medium Force	25.8 ± 14.1	16.3 ± 11.8	−9.5 [−11.8, −6.9][1]	0.7		
High Force	26.9 ± 12.0	20.9 ± 9.4	−5.9 [−9.7, −2.2]	0.5		

Table 3

Baseline, final values, change scores and effect sizes for pain pressure threshold outcomes.

Outcome group	% difference pre- to post-			Between-group P values	Between-group Effect size
	Mean	SD	95%CI		
Hip PPT					
Low Force	30.3[2]	9.9	25.1–34.5	0.006	0.6
Medium Force	21.7[1]	10.1	15.8–26.5		
High Force	25.6	8.9	22.4–29.5		
Knee PPT					
Low Force	31.6[2,3]	15.1	25.2–38.3	0.002	1.2
Medium Force	15.5[1]	11.1	8.2–22.0		
High Force	21.0[1]	6.5	17.8–24.4		
Heel PPT					
Low Force	25.0[2]	12.2	19.9–31.6	0.008	0.9
Medium Force	15.5[1]	8.1	12.6–20.6		
High Force	21.4	6.6	18.9–24.7		

PPT: pressure pain threshold.

Superscripts denote significant differences among groups (low force group = 1, medium force group = 2, high force group = 3).

P < 0.05, significant difference.

Conclusion: All groups improved in pain and physical function regardless of the mobilization intensity they received. The subject's that received the lower intensity mobilization force (mobilization prior to tissue resistance) had the greatest reduction in VAS score and increase in PPT. For the subjects who received a high-force mobilization (beyond tissue resistance), there was a greater improvement in physical function as measured by the TUG, WOMAC-PF, and 20 m walk test.

Commentary: I think the findings of this study can be immediately applied to clinical practice and will likely confirm practice patterns that most of us utilize. For patients with high levels of pain with activity or weight bearing, gentler mobilization (grade I/II) would likely be more beneficial. However, in patients where physical function limitation is their primary complaint, higher grade mobilization (grade III/IV) would likely serve them better and carry over to improved function based on the results of the study. As the authors of this study suggest, we can modulate the intensity of LAD mobilization to address a specific goal for the patient. I find it uplifting that all groups improved in all outcome measures, showing that LAD can be a great technique regardless of intensity in patient's with unilateral hip OA. We can adjust our intensity to appreciate the findings of this study, but it's nice to find that a large portion of our patient's could likely respond to this form of mobilization in some capacity.