



ABSTRACTS December 2024

Reliability of the McKenzie Method of Mechanical Diagnosis and Therapy in the examination of spinal pain, including the OTHER classifications: Reliability of the McKenzie Method in spinal pain

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Abstract:

Background: The McKenzie Method of Mechanical Diagnosis and Therapy (MDT) is used worldwide to classify and manage musculoskeletal (MSK) problems. The assessment includes a detailed patient history and a specific physical examination. Research has investigated the reliability of the MDT spinal classification system (Derangement syndrome, Dysfunction syndrome, Postural syndrome, and OTHER), however no study has assessed the reliability of the 10 classifications grouped together as OTHER.

Objective: To investigate the inter-rater reliability of MDT trained clinicians when utilising the full breadth of the MDT system for patients with spinal pain.

Methods: Six experienced MDT clinicians each submitted potentially eligible MDT assessment forms of 30 consecutive patients. A MSK physician and a faculty of the McKenzie Institute checked the 180 forms for eligibility and completeness, where a provisional MDT classification was blinded. Apart from their own assessment forms, the six MDT clinicians each classified 150 forms. Each patient could be classified into 1 of 13 diagnostic classifications (Derangement syndrome, Dysfunction syndrome, Postural syndrome, and 10 classifications grouped as OTHER). Reliability was determined using Fleiss' Kappa (k).

Results: The reliability among six MDT clinicians classifying 150 patient assessment forms was almost perfect (Fleiss' $\kappa = 0.82$ [95% CI 0.80, 0.85]).

Conclusions: Among experienced MDT clinicians, the reliability in classifying patient assessment forms of patients with spinal pain is almost perfect when the full breadth of the MDT system is used. Future research should investigate the reliability of the full breadth of the MDT system among clinicians with lower levels of training.

Do physical or imaging changes explain the effectiveness of progressive tendon loading exercises? A causal mediation analysis of athletes with patellar tendinopathy

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Abstract:

Objectives: To investigate whether the effectiveness of progressive tendon loading exercises (PTLE) on patellar tendinopathy is mediated through changes in physical or imaging properties.

Design: Mediation analyses based on a randomized clinical trial (n = 76) in patellar tendinopathy comparing PTLE with eccentric exercise therapy (EET).

Methods: Pain-related disability on Victorian Institute of Sports Assessment-Patella (VISA-P, 0 to 100) and pain (Visual Analogue Score) after single-leg decline squat (VAS-SLDS, 0 to 10) at 24 weeks were outcome measures. Selected mediators, including the physical (quadriceps muscle strength, ankle dorsiflexion range, jumping performance) and imaging domains (ultrasonographic tendon thickness and degree of neovascularization), were measured at 12 weeks. Directed acyclic graphs were performed to identify critical confounders. Causal mediation analysis was used to estimate natural indirect, natural direct and total effects by a simulation approach under the counterfactual framework.

Results: Complete data from 61 of 76 participants were included. There was no evidence showing that the beneficial effect of PTLE on VISA-P or VAS-SLDS outcomes was mediated by changes in any of the selected physical or imaging variables. The indirect effects for all mediators were unsubstantial (estimates ranging from -1.63 to 1.53 on VISA-P and -0.20 to 0.19 on VAS-SLDS), with all 95 % confidence intervals containing zero.



Conclusions: The beneficial effect of PTLE on patellar tendinopathy was not mediated by changes in physical properties, tendon thickness or degree of neovascularization. Healthcare professionals may consider exploring other potential factors when managing patients with patellar tendinopathy, but further large-scale research is needed to confirm these results and to identify alternative treatment targets.

The effectiveness of education for people with shoulder pain: A systematic review

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Abstract:

Objectives: To investigate the effectiveness of education for people with shoulder pain.

Design: Systematic review LITERATURE SEARCH: We searched several databases (e.g. MEDLINE, EMBASE, CENTRAL, CINAHL) and trial registries from inception to May 25, 2023.

Study selection criteria: Randomised controlled trials investigating any education for people with shoulder pain.

Data synthesis: Pain and disability were primary outcomes. The Physiotherapy Evidence Database (PEDro) scale was used to assess methodological quality. Meta-analysis was not appropriate due to heterogeneity.

Results: We included 14 trials (8 had high methodological quality). The one trial on rotator-cuff related shoulder pain did not assess pain or disability but found best practice education (vs. structure-focused education) increased reassurance and intentions to stay active. The one trial on adhesive capsulitis found daily reminders, encouragement, and education about exercise via text did not improve pain and disability compared to no education. For post-operative shoulder pain, two (of four) trials found education reduced some measure of pain, but none found an effect on disability or any other outcomes. For 'shoulder complaints' (i.e. mixed or unclear diagnosis), no trials found education was more effective than home exercise or no education for improving pain or disability.



Conclusion: Some forms of education appear to improve reassurance, treatment intentions, perceived treatment needs, recovery expectations, and knowledge, but their effect on pain and disability is unclear. High-quality trials are needed to resolve uncertainty surrounding the benefit of education for shoulder pain, particularly rotator-cuff related shoulder pain and adhesive capsulitis.

Tendon Cell Biology: Effect of Mechanical Loading

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Cellular Physiology and Biochemistry. 2024 Nov 21;58(6):677-701.

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Abstract:

Tendons play a crucial role in the musculoskeletal system, connecting muscles to bones and enabling efficient force transfer. However, they are prone to acute and chronic injuries, which, if not properly repaired, can significantly impair function. Tendinopathy, a prevalent condition affecting approximately 20% of musculoskeletal complaints, arises from an imbalance between micro-injury accumulation and repair processes. The extracellular matrix (ECM) of tendons is a hierarchical structure comprising collagen fibrils, proteoglycans, and glycoproteins that regulate organization, hydration, and mechanical properties. Mechanotransduction pathways, mediated by integrins and focal adhesion complexes, activate signaling cascades such as MAPK/ERK and PI3K/Akt, driving tenocyte gene expression and ECM remodeling. Adaptations to load involve region-specific remodeling, with tensile regions favoring aligned Type I collagen and compressive regions promoting proteoglycans like aggrecan. Stress shielding or reduced loading disrupts these pathways, leading to matrix disorganization and inflammation, predisposing tendons to degenerative changes. Insights into these molecular mechanisms inform rehabilitation strategies to enhance tendon repair and mitigate tendinopathy progression in both athletic and general populations.



Achilles Pain, Stiffness, and Muscle Power Deficits: Midportion Achilles Tendinopathy Revision – 2024

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Abstract:

The Academy of Orthopaedic Physical Therapy (AOPT) has an ongoing effort to create evidence-based clinical practice guidelines (CPG) for orthopaedic physical therapy management of patients with musculoskeletal impairments described in the World Health Organization's International Classification of Functioning, Disability, and Health (ICF). The 2024 Achilles Pain, Stiffness, and Muscle Power Deficit: Midportion Achilles Tendinopathy Clinical Practice Guideline (CPG) is a revision of the 2018 CPG and represents the third CPG from AOPT on this topic. The goals of the revision were to provide a concise summary of the contemporary evidence and to develop new recommendations or revise previously published recommendations to support evidence-based practice. This current CPG covers prevalence, pathoanatomical features, risk factors, clinical course, diagnosis, examination, imaging, and physical therapy interventions for the management of midportion Achilles tendinopathy.

Opposite effects of isometric exercise on pain sensitivity of healthy individuals: the role of pain modulation

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Pain Reports. 2024 Oct 10;9(6):e1195.

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Abstract:

Introduction: Exercise-induced hypoalgesia (ElHypo) among healthy individuals is well documented; however, the opposite effect of exercise, ie, exercise-induced hyperalgesia (ElHyper), has mainly been described in patients with chronic pain or after intense/painful exercise.

Objectives: We investigated the extent to which ElHypo and/or ElHyper occur among healthy participants and whether these responses are associated with individuals' pain modulation capacity.



Methods: Fifty-seven participants (mean age 29.20 ± 5.21 years) underwent testing of pressure pain threshold as an index of EIHypo/EIHyper: pain adaptation, offset analgesia (OA), and conditioned pain modulation as indices of pain modulation, prior to and immediately postsubmaximal isometric exercise ($n = 40$) or rest ($n = 17$, control group). Body awareness and exercise-evoked stress were also evaluated. Test-retest repeatability of the pain modulation indices was performed as well.

Results: Twenty-four participants (60%) exhibited EIHypo, whereas 16 (40%) exhibited EIHyper. Pressure pain threshold did not change in the control group. Baseline (preexercise) OA efficacy predicted EIHypo/EIHyper. Furthermore, OA significantly decreased postexercise in the EIHyper subgroup and slightly increased in the EIHypo subgroup. Exercise-induced hypoalgesia was associated with magnitude of daily exercise while EIHyper was associated with increased exercise-evoked stress and body awareness.

Conclusion: Submaximal isometric exercise can induce opposite effects on pain sensitivity among healthy participants-EIHypo or EIHyper. Descending pain inhibition pathways, and top-down influences over these pathways, seem to be involved in EIHypo/EIHyper effects. As such isometric exercise is often preferred in early stages of rehabilitation, preliminary screening individuals' vulnerability to this exercise is important; OA test may be used for this purpose.

Comparison of the sagittal distance of cervical protraction and retraction ratio between females with and without neck pain

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Abstract:

Background: Head excursion (HE) is a clinical tool used to assess neck pain. Although many clinicians use head retraction (HR) exercises to treat neck pain, studies investigating whether head protraction (HP) and HR differ between individuals with and without neck pain are lacking.

Objective: This study aimed to compare the differences in the sagittal distances of the HP, HR, HE, and protraction-to-retraction (PR) ratio, measured in a zero-starting position, in females with and without neck pain.



Methods: Fifty females (25 with neck pain and 25 without neck pain) participated in this study. We separately recorded videos of the sagittal movement of the HP and HR in a zero-starting position and analyzed them using the Kinovea software. An independent *t*-test was used to compare HP, HR, HE, and PR ratio between the two groups.

Results: Individuals with neck pain had a significantly decreased HR (2.73 ± 1.08 cm) and an increased PR ratio (2.22 ± 0.75) compared with asymptomatic individuals. However, there were no significant differences in HP or HE between the two groups. **CONCLUSION:** The sagittal distance of the HR and PR ratio should be considered when evaluating and treating patients with neck pain.

