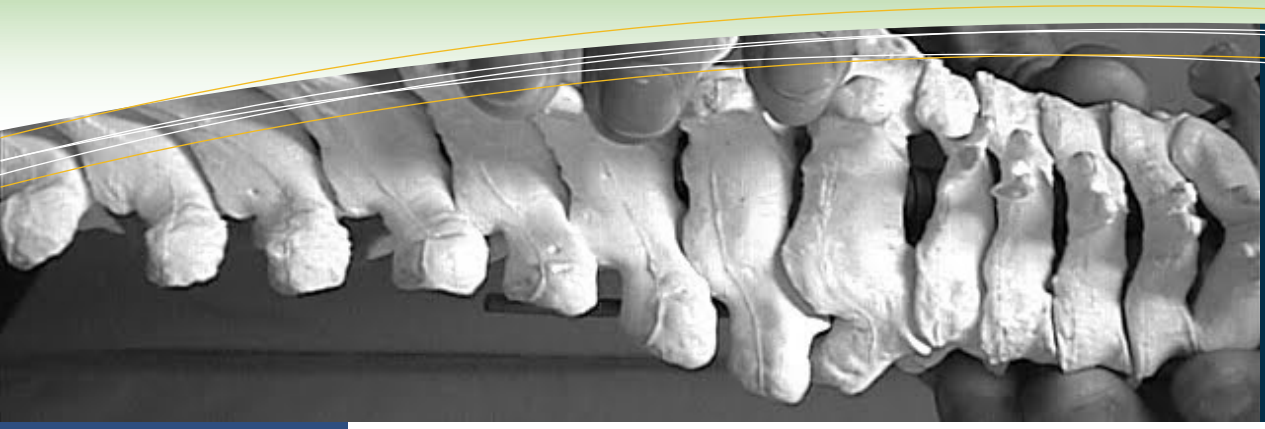
Manual Therapy Research Review



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This issue:

Welcome

Welcome to the 31st Edition of the Manual Therapy Research Review. I have included a wide range to recent research for you to read focussing on the neck and lumbar spine. There is a paper by Thomas et al (2023) investigating a predictive tool for cervical artery dissection, a paper by Althobaiti and Falla (2023) looking the reliability of hand held dynamometers for assessing trunk strength in those with chronic LBP, and two systematic reviews one by Minnucci et al (2023) looking at the effects of Spinal Manual Therapy (SMT) on neck pain and another by Wilhelm et al 2023 looking at the effects of manual therapy and exercise on neck pain.

Enjoy! Duncan Reid

Paper One

Lucy Caroline Thomas, Elizabeth Holliday, John R. Attia & Christopher Levi (31 Aug 2023). Development of a diagnostic support tool for predicting cervical arterial dissection in primary care. Journal of Manual & Manipulative Therapy, DOI: 10.1080/10669817.2023.2250164

Abstract

Objectives: Cervical arterial dissection (CAD) is an important cause of stroke in young people which may be missed because early features may mimic migraine or a musculoskeletal presentation. The study aimed to develop a diagnostic support tool for early identification of CAD.

Design: Retrospective observational study

Setting: Tertiary hospital

Participants: Radiologically confirmed CAD cases (n = 37), non-CAD stroke cases (n = 20), and healthy controls (n = 100).

Main outcome measures: The presence of CAD is confirmed with imaging. Predictive variables included risk factors and clinical characteristics of CAD. Variables with a p-value <0.2 included in a multivariable model. Predictive utility of the model is assessed by calculating area under the ROC curve (AUC).

Results: The model including four variables: age 40–55 years (vs < 40), trauma, recent onset headache, and > 2 neurological features, demonstrated excellent discrimination: AUC of 0.953 (95% CI: 0.916, 0.987). A predictive scoring system (total score/7) identified an optimal threshold of ≥ 3 points, with a sensitivity of 87% and specificity of 79%.

Conclusions: The study identified a diagnostic support tool with four variables to predict increased risk of CAD. Validation in a clinical sample is needed to confirm variables and refine descriptors to enable clinicians to efficiently apply the tool.

Optimum cutoff scores of ≥ 3/7 points will help identify those in whom CAD should be considered and further investigation instigated. The potential impact of the tool is to improve early recognition of CAD in those with acute headache or neck pain, thereby facilitating more timely medical intervention, preventing inappropriate treatment, and improving patient outcomes.

Commentary

The IFOMPT Cervical Artery Framework is now well recognised to help guide our clinical decision making to identify those patients that may be at risk of a vascular event when presenting with neck pain and headache. This paper by Thomas et al provides some really good empirical evidence that the medical and person related factors are helpful to identify risk and warrant onward referral for medical attention. Whilst the study was a retrospective review of confirmed CAD cases vs those without CAD, the finding indicates that age (40-55 range) recent onset of headache and trauma, and at least two neurological features are strongly predictive of a CAD event. These neurological features were balance disturbance, speech disturbance and limb weakness. These features are clearly not part of the normal presentation for people presenting with benign cervicogenic headache. These finding support the direction of the IFOMPT framework that the subjective information is key to the assessment of risk and the physical testing should be for potential neurological deficits and not physical tests of cervical rotation.

Paper Two

Althobaiti, S., & Falla, D. (2023). Reliability and criterion validity of handheld dynamometry for measuring trunk muscle strength in people with and without chronic non-specific low back pain. Musculoskeletal Science and Practice, 102799.

Abstract

Background: Evaluating trunk strength is an important aspect of the physical examination of people with low back pain (LBP). Thus, reliable, valid, and easily applied measurement tools are needed to quantify trunk muscle strength and monitor changes in response to interventions.

Objectives: To determine within-day and between-day test re-test reliability and criterion validity of a handheld dynamometer (HHD) to evaluate maximum isometric trunk strength in people with chronic LBP and asymptomatic individuals.

Design: Reliability and criterion validity study.

Methods: Twenty adult participants with chronic, non-specific LBP and 35 asymptomatic individuals participated. Isometric trunk flexion, extension, and rotation strength were evaluated with the HHD (Active force 2) and the within-day and between-day reliability were determined with intraclass correlation coefficients (ICC2,1) and the standard error of the measurements (SEM), minimal detectable change (MDC), and the limits of agreement (LOA) using Bland-Altman plots. Criterion validity was evaluated using Pearson correlation coefficients to compare HHD measurements to isokinetic dynamometry for both isometric trunk flexion and extension strength.

Results: Good to excellent within-day and between-day reliability was observed for people with LBP and asymptomatic individuals with (ICC2,1) of 0.73–0.93 and 0.62–0.92 respectively. A moderate to strong correlation was found between measurements with the HHD and the isokinetic dynamometer with a correlation of r = 0.68–0.78 and r = 0.56–0.59 for people with LBP and asymptomatic participants respectively.

Conclusion: A HHD is a reliable, valid, and clinically applicable tool for the measurement of trunk strength in adults with and without chronic LBP.

Commentary

In New Zealand there has been a growing body of work for physiotherapists to provide more objectivity in the management of musculoskeletal conditions. Our national insurer have been running pilots to test the use of handheld dynamometers to assess strength changes in the knee, shoulder and lumbar spine. Often there are questions from clinicians about the reliability and validity of such testing methods. The knee has received quite a lot of attention in this area and there are studies that show good reliability in testing quads strength with HHD's vs isokinetic dynamometers (Sinacore et al 2017). This paper by Althobaiti and Falla (2023) demonstrates the HHD for trunk measure of flexion in supine and extension in prone, and rotation are reliably measured in people without LBP and also in those with chronic LBP. These results are consistent with a study undertaken by Blaiser et al (2018) that used the same type of tests but in a non-injured athletic population. The HHD is simple to use, but I suspect the next group we need to test with these methods is those presenting with acute LBP. This may provide more of a challenge when trying to test strength in the face of acute pain.

References

De Blaiser, C., De Ridder, R., Willems, T., Danneels, L., & Roosen, P. (2018). Reliability and validity of trunk flexor and trunk extensor strength measurements using handheld dynamometry in a healthy athletic population. Physical Therapy in Sport, 34, 180-186.

Sinacore et al. Diagnostic Accuracy of Handheld Dynamometry and 1-Repetition- Maximum Tests for Identifying Meaningful Quadriceps Strength Asymmetries JOSPT 2017 47 (2) 97-107 .

Paper Three

Minnucci, S., Innocenti, T., Salvioli, S., Giagio, S., Yousif, M. S., Riganelli, F., ... & Mourad, F. (2023). Benefits and harms of spinal manipulative therapy for treating recent and persistent nonspecific neck pain: a systematic review with meta-analysis. Journal of Orthopaedic & Sports Physical Therapy, 53 (9), 510-528.

Abstract

Objective: We aimed to estimate the benefits and harms of cervical spinal manipulative therapy (SMT) for treating neck pain.

Design: Intervention systematic review with meta analysis of randomised controlled trials (RCTs).

Literature Search: We searched the MEDLINE,Cochrane CENTRAL, Embase, CINAHL, PEDro, Chiropractic Literature Index bibliographic databases, and grey literature sources, up to June 6, 2022.

Study Selection Criteria: RCTs evaluating SMT compared to guideline-recommended and non recommended interventions, sham SMT, and no intervention for adults with neck pain were eligible for our systematic review. Prespecified outcomes included pain, range of motion, disability, health-related quality of life.

Data Synthesis: Random-effects meta-analysis for clinically homogenous RCTs at short-term and long-term outcomes. Risk of bias was assessed using the Cochrane Risk of Bias 2.0 Tool. We used the Grading of Recommendations, Assessment, Development, and Evaluations approach to judge the certainty of evidence.

Results: We included 28 RCTs. There was very low to low certainty evidence that SMT was more effective than recommended interventions for improving pain at short term (standardised mean difference [SMD], 0.66;95% confidence interval [CI]: 0.35, 0.97) and long term (SMD, 0.73; 95% CI: 0.31, 1.16), and for reducing disability at short-term (SMD, 0.95; 95% CI: 0.48, 1.42) and
long term (SMD, 0.65; 95% CI: 0.23, 1.06). Transient side effects only were found (e.g., muscle soreness).

Conclusion: There was very low certainty evidence supporting cervical SMT as an intervention to reduce pain and improve disability in people with neck pain.

Commentary

This very comprehensive review and meta-analysis builds on the previous review on this topic by Rubenstein et al (2019). When you look at the conclusion of these reviews, it is often a little disheartening not to have strong support for the things we do with our patients. However, when you look at the detail of the findings not unusually in these reviews the quality of the studies is not great. So, we need to design better studies in the future. The results do show good effect of SMT for pain of less than 6 weeks duration slightly less for 6-24 weeks but not as much effect on quality of life. I think the way in which we use SMT indicates it is a useful tool to manage pain in the first 6-12 weeks of a patient presenting with neck pain. On the positive side, there were few significant adverse events. The authors also offer some useful practice implications and debate the many challenges of trying to run trials evaluating the effect of SMT when a large part of this a skill-based intervention and the skills of the practitioners will have high levels of variability.

Reference:

Rubinstein, S. M., De Zoete, A., Van Middelkoop, M., Assendelft, W. J., De Boer, M. R., & Van Tulder, M. W. (2019). Benefits and harms of spinal manipulative therapy for the treatment of chronic low back pain: systematic review and meta-analysis of randomised controlled trials. bmj, 364.

Paper Four

Mark Wilhelm, Joshua Cleland, Anthony Carroll, Mark Marinch, Margaret Imhoff, Nicholas Severini & Megan Donaldson (24 April 2023). The combined effects of manual therapy and exercise on pain and related disability for individuals with nonspecific neck pain: A systematic review with meta-analysis. Journal of Manual & Manipulative Therapy, DOI: 10.1080/10669817.2023.2202895

Abstract

Background: Neck pain is among the most prevalent and costly musculoskeletal disorders. Manual therapy and exercise are two standard treatment approaches to manage neck pain. In addition, clinical practice guidelines recommend a multi-modal approach, including both manual therapy and exercise for the treatment of neck pain; however, the specific effects of these combined interventions have not recently been reported in the literature.

Objective: To perform a systematic review and meta-analysis to determine the effect of manual therapy combined with exercise on pain, disability, and quality of life in individuals with nonspecific neck pain.

Design: Systematic Review and Meta-Analysis
Methods: Electronic database searches were completed in PubMed, CINAHL, Cochrane, EMBASE, Ovid, and SportDiscus, with publication dates of January 2000 to December 2022. The risk of bias in the included articles was completed using the Revised Cochrane Risk of Bias Tool (RoB 2). Raw data were pooled using standardised mean differences and mean differences for pain, disability, and quality of life outcomes, and forest plots were computed in the meta-analysis.
Results: Twenty-two studies were included in the final review. With moderate certainty of evidence, three studies demonstrated no significant difference between manual therapy plus exercise and manual therapy alone in pain (SMD of −0.25 (95% CI: −0.52, 0.02)) or disability (−0.37 (95% CI: −0.92, 0.18)). With a low certainty of evidence, 16 studies demonstrated that manual therapy plus exercise is significantly better than exercise alone for reducing pain (−0.95 (95%CI: −1.38, −0.51)). Similarly, with low certainty of evidence, 13 studies demonstrated that manual therapy plus exercise is significantly better than exercise alone for reducing disability (−0.59 (95% CI: −0.90, −0.28)). Four studies demonstrated that manual therapy plus exercise is significantly better than a control intervention for reducing pain (moderate certainty) (−2.15 (95%CI: −3.58, −0.73)) and disability (low certainty) (−2.39 (95% CI: −3.80, −0.98)). With a high certainty of evidence, four studies demonstrated no significant difference between manual therapy plus exercise and exercise alone in quality of life (SMD of −0.02 (95% CI: −0.21, 0.18)).
Conclusion: Based on this systematic review and meta-analysis, a multi-modal treatment approach including exercise and manual therapy appears to provide similar effects as manual therapy alone, but is more effective than exercise alone or other interventions (control, placebo, 'conventional physical therapy', etc.) for the treatment of nonspecific neck pain and related disability. Some caution needs to be taken when interpreting these results given the general low to moderate certainty of the quality of the evidence.

Commentary
This systematic review and meta- analysis by Wilhelm et al (2023) provides a contrast to the review above by Minnucci, S et al (2023) in that the conclusions look far more positive. This review looked at the effects of manual therapy and exercise on the management of neck pain. The results demonstrate the multimodal approach is effective but similar to manual therapy alone and clearly superior to exercise alone or other interventions such as placebo or usual care physiotherapy. In this review, 22 studies met the inclusion criteria compared to 28 in the Minnucci review. Once again ,caution is recommended by the authors due to the ongoing challenge of low-quality studies. The authors also make a nice commentary about the influence of social media to bias the results of study findings, but that we must address this challenge with robust and informed debate. Reviews such as this add good support for a robust debate!