

Manual Therapy Research Review



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Welcome

Welcome to the 22nd issue of the Manual Therapy Research Review.

In this issue we have a review on carpal tunnel syndrome from Nick Kendrick from the Queensland Branch of the MPA, a paper on cervical spine biomechanics by Siccardi et al, a paper on the use of thrust manipulation in the thoracic spine by Henaghan et al, and finally, a paper on the measurement of cervical range of motion in the cervical spine by Thoomes et al. Enjoy, Duncan



Congratulations to Duncan who became a Life Member of IFOMPT at the 2020 IFOMPT General Meeting.

Article for Review

A submission by the Musculoskeletal Physiotherapy National Group (MPA) Queensland Branch Committee of the Australian Physiotherapy Association (APA). Contributor Nick Kendrick.

Lewis, K. J., Coppieters, M. W., Ross, L., Hughes, I., Vicenzino, B., & Schmid, A. B. (2020). Group education, night splinting and home exercises reduce conversion to surgery for carpal tunnel syndrome: a multicentre randomised trial. *Journal of Physiotherapy*. Volume 66, Issue 2, April 2020, Pages 97-104

Question: In people with carpal tunnel syndrome who are waitlisted for surgical consultation, does a therapist-led care pathway involving education, splinting and exercises reduce the need for surgery and improve patient outcomes?

Design: A multicentre, randomised controlled trial with concealed allocation, blinded assessment and intention-to-treat analysis.

Participants: One hundred and five people with electrodiagnostically confirmed carpal tunnel syndrome on a waitlist for surgical consultation and recruited from four public hospitals in Australia.

Interventions The experimental group (n = 52) received a one-off group session of education, splinting, and nerve and tendon gliding exercises. The control group (n = 53) continued on the waitlist without additional care.

Outcome measures: The primary outcome measures were conversion to surgery by 24 weeks, the global rating of change (GROC) scale and patient satisfaction. Secondary outcomes included symptom severity and functional limitation.

Results: At 24 weeks, conversion to surgery was 59% in the experimental group and 80% in the control group (risk difference 20.21, 95% CI 20.38 to 20.03). More participants in the experimental group identified as improved at 6 weeks (20% vs 4%; risk difference 0.15, 95% CI 0.03 to 0.28) but not at 24 weeks (24% vs 10%; risk difference 0.14, 95% CI 20.01 to 0.29). The intervention was also estimated to be beneficial on some measures of satisfaction, symptom severity and functional limitation. The study's estimates of the benefits came with some uncertainty, which makes it unclear whether the wider population of people awaiting carpal tunnel surgery would consider that the benefits make the intervention worthwhile. No serious adverse effects were reported.

Conclusions: A therapist-led pathway reduced conversion to carpal tunnel surgery and increased perceived improvement and satisfaction in people who were already on a waitlist for surgical consultation.

Commentary

This high-quality trial (PEDro score of 8/10) takes an interesting approach to a complicated problem. The problem they sought to tackle is Carpal Tunnel Syndrome (CTS). CTS is a big problem for health services, as it has a lifetime surgical prevalence of more than 3% and costs more than \$2 billion each year in the US. In Australia, surgical wait times are greater than five months.

The researchers sought to discover if a low-cost, simple, therapist-led intervention could reduce the conversion to surgery for patients waitlisted to undergo surgery for CTS. To be eligible for the trial, participants had to have a clinical diagnosis of CTS confirmed by nerve conduction studies, be aged between 18-75 years old and have experienced symptoms greater than two months. Patients were excluded if they had wrist OA, other upper limb conditions, compensable injuries, CTS due to trauma, disease or pregnancy, or had received a steroid injection within six months or hand therapy within three months. Interestingly, due to low recruitment initially, the researchers had to open the trial to participants who had CTS and diabetes.

The intervention arm of this study consisted of only one, 30-minute group-based education session, plus prescription of a home exercise program and a night-splint. Exercises included a global median nerve glider, a localised median nerve glider and flexor tendon gliding exercises. Participants were asked to complete these five times per day. Additionally, they were asked to wear a splint every night for the trial period. Control-arm participants continued on the waitlist.

The results of the study showed that participants in the intervention arm were generally compliant with treatment. Furthermore, intervention arm participants were 21% less likely to undergo surgery than control arm (59% vs 80%). However, 82% of participants who were deemed to have “severe” CTS, proceeded to surgery despite treatment allocation. Intervention-arm participants were more likely to have reported overall improvement on the GROG at six weeks (20% vs 4%). Unfortunately, at 24-weeks despite having on average 14% more subjects reporting overall improvement, the confidence interval crossed zero (-10% to 29%) and thus confidence in this outcome is reduced. Another impressive result from this trial is that 73% of intervention-arm participants who were not recommended surgery at completion of the trial continued to avoid surgery for an average follow-up of almost four years.

Despite these results, there are some limitations. Foremost is the low recruitment. This resulted in having to open eligibility to patients with diabetes. This is problematic for this trial, as 100% of patients with diabetes proceeded to surgery, despite treatment allocation. Even with opening up recruitment, the trial still didn’t reach the pre-calculated number of participants needed to adequately power the study (potentially increasing the risk of type-1 errors). They also made many comparisons (again opening the risk of type-1 errors). Finally, the authors intended to do an economic analysis of their results, but due to insufficient data, had to abandon this analysis after protocol publication.

The major take-home messages from this trial for me are that a low-cost, simple intervention is effective in treating patients with uncomplicated CTS. However, this treatment is not effective in reducing the conversion to surgery for patients with more “severe” CTS or for patients with co-morbid diabetes.

Paper Two

Nicola R. Heneghan, Emilio J. Puentedura, Isabel Arranz, Alison Rushton. Thoracic thrust joint manipulation: An international survey of current practice and knowledge in IFOMPT member countries.

Musculoskeletal Science and Practice 50 (2020) 102251

<https://doi.org/10.1016/j.msksp.2020.102251>

Background: The perceived relative safety of thoracic thrust joint manipulation (TTJM) has contributed to a growth in evidence supporting use in practice. Yet adverse events (AE) have been documented following TTJM. Knowledge of current practice is therefore required to support further research. Purpose: To investigate TTJM knowledge and pre-TTJM examination across IFOMPT Member Organisations (MO) and Registered Interest Groups (RIG).

Methods: An e-survey was designed based on existing evidence and piloted. Eligibility criteria: physiotherapists from member countries of the International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) who use TTJM. Recruitment was through IFOMPT networks (May 2018–March 2019). Data analyses included descriptive analyses and content analysis for free text data.

Results: Respondents (n = 363) from 20 countries. Pre-TTJM examination included patient history (22%, n = 81) and physical examination (69%, n = 248). Across presentations (>80% threshold of agreement) contraindications included osteomyelitis, fracture and metastatic disease. Spinal deformity, respiratory disease, serious joint disease and hypermobility achieved >60% agreement as precautions. Consent was obtained by 93% respondents (n = 250). Preferred technique was PA/AP thrust (61%, n = 144). Perception of primary effect was neurophysiological (52%, n = 134), biomechanical (42%, n = 109) and placebo (3%, n = 8). From those who reported AE (n = 100), these included fractures (36%, n = 42) and cord signs/symptoms (6%, n = 7).

Conclusion: Pre-TTJM examination is common, although bias towards physical examination. Differential testing for upper versus lower thoracic spine is limited. Inconsistencies across knowledge of contraindications and precautions, and beliefs for biomechanical effect were found. Findings highlight the importance of high levels of clinical reasoning during patient history for TTJM.

Commentary: Duncan Reid

This study is a good example of the collective work accessing the IFOMPT Family. This world-wide survey of IFOMPT members and RIGs gives a very good representation of use of spinal manual therapy for the thoracic spine. There was a very strong response rate (77%) to the survey and the results are meaningful to the OMT community. There was a high recognition of contraindications for spinal MT (80%) and very high levels of consent gained (93%). The preferred HVT technique was the PA/AP thrust. The interesting finding of the study is the perception of the main effect with 52% stating neurophysiological and 42% bio-mechanical. Another interesting finding was the percentage of adverse effects with 42% reporting either some transient event or more significant event such a fracture. These types of findings and studies are useful to help the member organisations and RIG's reflect on their educational programmes and use these results to refine the evidence base and clinical reasoning processes in their current and future curricula.

Paper Three

Siccardi D, Buzzatti L, Marini M, Cattrysse E. Analysis of three-dimensional facet joint displacement during two passive upper cervical mobilisations. *Musculoskeletal Science and Practice* Volume 50, December 2020, 102218 <https://doi.org/10.1016/j.msksp.2020.102218>

Background: Understanding the 3D-kinematics of the upper cervical spine during manual mobilization is essential for clinical examination and therapy. Some information about rotational motion is available in literature but translational components are often ignored, complicating the understanding of the complex inter-segmental motions.

Objectives: This study aims to describe the amount, trajectories and reproducibility of atlanto-occipital facet joints' displacement during a flexion-extension mobilisation and of the atlanto-axial facet joints during an axial rotation mobilisation.

Design: Original research using quantitative data. **Methods:** 20 fresh frozen human cervical specimens were examined with a Zebris® CMS20 ultrasound-based motion tracking system. Two physiotherapists performed regional mobilisations in flexion-extension and axial rotation. The amount of displacement and the trajectories were calculated along the XYZ axes. Difference between measurements was evaluated with the Friedman two-way ANOVA test. Intra- and inter-rater reliability were estimated through ICC scores.

Results: 3D-displacement (2.6–23.4 mm) was larger at C1–C2 during axial rotation, Atlanto-occipital flexion displayed the greatest variability in the C0 trajectory. During a right rotation, the left C1 facet moved mainly forward, and the right C1 facet moved backward. During a left rotation, the left C1 facet moved backward, while the right C1 facet moved forward. Intra-tester and Inter-tester ICCs varied between 0.5 and 0.90 ($p < 0.005$).

Conclusions: During passive spinal motion, there is an important variability in magnitude and trajectory of joints' displacement. Nevertheless, different clinicians may be able to achieve the same position at the end of the mobilisation.

Commentary: Duncan Reid

Eric Cattrysse and his research group have undertaken a number of studies over the years trying to provide greater understanding of cervical spine biomechanics and ligament stability tests. This current study investigates the movements undertaken at C0- C1 and C1-C2. This is a well-designed cadaveric study using an ultrasound-based motion analysis system. As expected with similar studies the C1/C2 joints showed the greatest motion with greater variability at the C0/C1 joint. The study does support the key principles of movements in these joints especially C1/C2 rotation that for example with right cervical rotation, the left C1 facet moves forward and the right face backwards. Gaining an appreciation of biomechanical movements are useful for clinicians to understand and try to relate to the patient population with motion testing. Another key point to always take into account is that motion variability is normal so we must build that into our assumptions when undertaking passive motion testing.

Paper Four

Thoomes-de Graaf M, Thoomes E, Falla D, Fernandez-de-las-Penas C, Maissan F, Cleland JA. Does the patient and clinician perception of restricted range of cervical movement agree with the objective quantification of movement in people with neck pain? And do clinicians agree in their interpretation? *Musculoskeletal Science and Practice* 50 (2020) 102226 <https://doi.org/10.1016/j.msksp.2020.102226>

Background: Measurement of cervical range of motion (ROM) is recommended when physically examining people with neck pain. However, little is known about the clinician's perception of "normal" versus restricted movement. Additionally, it is unknown if an objective measure of restricted movement correlates with the patient's perception of movement restriction.



Methods: One hundred patients with neck pain were asked to rate their total amount of restriction, using a movement restriction scale. Two physical therapists (PTs) measured cervical ROM using a CROM device. Assessors independently rated whether the patient was restricted in their cervical ROM for each movement direction (“yes” or “no”). Cohen’s kappa was used to assess reliability between both assessor’s interpretation for all movement directions. Correlations between the perception of ‘normal’ versus ‘restricted’ movement according to both the assessor and patient was compared with an objective classification of movement restriction using normative data.

Results: The agreement between PTs was high, ranging from substantial (K: 0.74) to almost perfect (K: 0.94). The correlation between the self-reported restriction scale and objective restriction was 0.44, indicating moderate correlation. The correlation between the PT’s interpretation and objective restriction ranged from 0.55 to 0.66 depending on the direction of movement.

Conclusion: A large proportion (85%) of the patients with neck pain exhibited restricted cervical ROM, relative to normative data. The agreement between PTs was high in judging whether a patient had restricted cervical ROM. However, the judgement of both the patient and the PT was not always in accordance with the objective measure of movement. 1. Introduction Total active cervical range of motion is often decreased in patients with neck pain when compared to healthy individuals, as confirmed in a recent systematic review (Stenneberg et al., 2017). Physical therapists (PTs) commonly measure cervical range of motion as part of the clinical assessment of patients with neck pain and improving cervical range of motion is often a goal of treatment. The Cervical Range of Motion (CROM) device is recommended in the American guidelines for the assessment of cervical range

Commentary: Duncan Reid

Range of motion testing is a key part of everyday physical therapy examination and often taken for granted. However, it is nice to see a paper that explores if what we expect to see actually matches up with clinical practice. This study undertaken by Marloes and Erik Thoomes (former IFOMPT Executive Committee member) and their research associates examines the patient and clinician perception of restricted range of cervical movement agreement with the objective quantification of movement in people with neck pain. Patients were asked to rate their total range of restricted cervical movement and then the therapists were asked to rate the patient’s level of restriction following measurement using a CROM device. There was a very strong correlation between the patients self-reported restriction and the objective measurement by the therapist. This is great result given how frequently we have to match these two things up and then apply effective treatments to alter this reduced ROM.



IFOMPT WORLD CONGRESS 2024 & 50TH ANNIVERSARY EVENT IN BASEL SWITZERLAND.

4TH - 6TH JULY 2024



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