

# Manual Therapy Research Review



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Reliability and difference in neck extensor muscles strength measured by a portable dynamometer in individuals with and without chronic neck pain. - P1

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## Welcome

Welcome to the 27th Edition of the Manual Therapy Research Review. A number of the studies I have selected in this review come from the *Journal of Manual and Manipulative Therapy (JMMT)* which provides great access to the IFOMPT family.

In this review, we have paper by Grondin et al (2022) on strength testing in the neck using the HHD, a study by Moll et al (2022) looking at the effects of cervical spine positions pre HVT on internal cervical artery blood flow, a systematic review by De Vestel et al on manual therapy for cervicogenic dizziness, and a paper by Gamble et al investigating online information for those potentially having an ACL repair. Enjoy! Duncan Reid



## Paper One

**Francis Grondin, David Colman, Nicolas Peyrot, Olivier Maillard, Sébastien Freppel, Teddy Caderby & Yannick Perdrix (2022). Reliability and difference in neck extensor muscles strength measured by a portable dynamometer in individuals with and without chronic neck pain. *Journal of Manual & Manipulative Therapy*, DOI: 10.1080/10669817.2021.2024676**

### Abstract

**Objective:** There are limited reports about the reliability of measuring neck extensor muscle strength using a portable dynamometer in neck pain patients. The aims of the current study were 1) to investigate intra- and inter-rater reliability of neck extensor isometric strength measurement using a portable dynamometer in patients with chronic nonspecific neck pain (CNSNP) and, 2) to compare neck extensor isometric strength in participants with and without CNSNP.

**Methods:** Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were followed. Two examiners received a 15-minute training before enrolment. Inter-rater reliability was assessed with a 10-minute interval between measurements, and intra-rater reliability was assessed with a 10-day interval. Three trials were assessed and examiners were blind to the strength values (in Newtons) from other sessions of 20 individuals with CNSNP (mean  $\pm$ SD= 37.9  $\pm$  9.8y; Neck Disability Index 29.2  $\pm$  7.4%) and 20 individuals with other musculoskeletal disorders (mean  $\pm$  SD = 32.8  $\pm$  46.2y).

**Results:** Intra-rater reliability was excellent with intraclass correlation coefficient (ICC)(3,1) of 0.95 (CI:0.90–0.97) and inter-rater reliability was good to excellent with ICC(2,1) of 0.88 (CI:0.77–0.94) in CNSNP. No significant difference of neck extensor strength was found between CNSNP (93.27N $\pm$ 31.94) and Individuals without CNSNP (111.43N $\pm$ 40.11) ( $p > 0.05$ ).

**Conclusion:** A portable dynamometer is a reliable tool for measuring maximal isometric neck extension strength in individuals with CNSNP. Slightly but no significant differences of neck extensor strength values between individuals with and without CNSNP. Future studies are needed to assess the generalisability of the findings in patients with other muscle deconditioning.

### Commentary

I have been involved in a large change management programme within NZ over the last two years to improve the patient outcomes for a range of musculoskeletal conditions. One of the new innovations in this programme was to introduce strength measures for a range of body sites, the cervical spine being one of them. Trying to get consistent measures and using devices that are relatively cheap was part of this challenge. I found few studies in the literature at the time I was setting up this project, and while there were studies by Jull et al (2002), and Falla et al (2004) on testing the deep cervical neck flexors using the biofeedback there were few using the hand held dynamometer (HHD). This study by Grondin shows good inter and intra rater reliability and good utility for patients with and without chronic neck pain. From a clinical perspective we have found patients in our current programme like being tested and seeing the improvements they are making with their rehabilitation. I think the HHD is a relatively cheap but useful tool to help demonstrate meaningful changes to your clinical input in patients with neck pain.

### References:

Jull, G., Trott, P., Potter, H., Zito, G., Niere, K., Shirley, D., ... & Richardson, C. (2002). A randomized controlled trial of exercise and manipulative therapy for cervicogenic headache. *Spine*, 27(17), 1835-1843.

Falla, D. L., Jull, G. A., & Hodges, P. W. (2004). Patients with neck pain demonstrate reduced electromyographic activity of the deep cervical flexor muscles during performance of the craniocervical flexion test. *Spine*, 29(19), 2108-2114.

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### Paper Two

**Fabian Moll, Mona Sleiman, Dietrich Sturm, Roger Kerry & Harry von Piekartz (2022). Pre-manipulative cervical spine testing and sustained rotation do not influence intracranial hemodynamics: an observational study with transcranial Doppler ultrasound. *Journal of Manual & Manipulative Therapy*, DOI: 10.1080/10669817.2022.2068824**

### Abstract

**Introduction:** Manual joint mobilization and manipulation are recommended therapeutic interventions for people with neck pain. High-velocity thrust and sustained techniques have an uncertain association with serious arterial trauma. The validity of pre-manipulative tests of the cervical spine is often questioned, and the understanding of the effect of head/neck position on blood flow is still incomplete. Most of the evidence concerning hemodynamics in this area relates to extracranial flow (vertebral and carotid artery). Less is understood about the effects on intracranial flow while performing pre-manipulative tests and sustained positions like end of range cervical rotation mobilization. The aim of the study was to assess the influence of commonly used evaluation and treatment positions on intracranial hemodynamic parameters.

**Method:** A randomised, cross-over observational study using ultrasonography on healthy subjects (n = 19) was conducted to measure hemodynamic parameters (peak systolic velocity and end diastolic maximum) of intracranial arterial systems. Two test positions (sustained pre-manipulative thrust CO-1 and sustained cervical end of range rotation) were compared with a sham position for each test position.

**Results:** Neither the sequence of tests performed nor an independent variable (the two positions) had a significant effect ( $p < 0.05$ ) on peak systolic velocity (PSV) or end diastolic maximum (EDM).

**Discussion:** No effects from commonly used assessment and treatment of neck positions on hemodynamic parameters were found. This is consistent with previous studies. Further study is indicated on people with symptoms and known pathologies.

### Commentary

This is a useful study produced in association with Roger Kerry who we all know has significant expertise in the area of cervical artery dysfunction (CAD) and the IFOMPT CAD framework. I have to kick myself a little as this was a study that my colleague Prof Wayne Hing (Bond University) (also part of the CAD framework group) and I did some years ago, but we did not get it published!! These results though are exactly as we found although we only examined the vertebral artery not the internal arteries. The results are perhaps not that surprising that there is not differences in blood flow in the pre manipulative position in normal subjects. I think we need to move to the patient population who present with potential CAD to see if these types of ultrasound measures are more meaningful to determine risk than listening to the patient history and assessing the other risk factors as outlined in the International IFOMPT Cervical Framework (<https://www.ifompt.org/Research+and+Resources/OMPT+Frameworks+and+Clinical+Resources.html>).

## Paper Three

Charlotte De Vestel, Luc Vereeck, Susan A. Reid, Vincent Van Rompaey, Joris Lemmens & Willem De Her-togh (2022). Systematic review and meta-analysis of the therapeutic management of patients with cervi-cogenic dizziness. *Journal of Manual & Manipulative Therapy*, DOI: 10.1080/10669817.2022.2033044

### Abstract

**Background:** Patients with cervicogenic dizziness (CGD) present with dizziness, cervical spine dysfunc-tions, and postural imbalance, symptoms that can significantly impact their daily functioning.

**Objectives:** To provide evidence-based recommendations for the management of patients with CGD.

**Methods:** Three databases were searched for randomised controlled trials (RCTs) (last search 15 May 2021). Outcome measures included dizziness, cervical spine, and balance parameters. Cochrane stand-ard methodological procedures were used and included the RoB 2.0 and GRADE. Where possible, RCTs were pooled for meta-analysis.

**Results:** Thirteen RCTs (n = 898 patients) of high (two RCTs), moderate (five RCTs), and low (six RCTs) methodological quality were analysed. Six RCTs were included in the meta-analysis. Only three RCTs specified the cause of CGD. They showed inconsistent findings for the effectiveness of exercise therapy in patients with traumatic CGD. Manual therapy and manual therapy combined with exercise therapy may reduce CGD, cervical spine, and balance dysfunctions.

**Conclusion:** There is moderate quality of evidence that manual therapy reduces CGD, cervical spine, and balance symptoms. When manual therapy is combined with exercise therapy, the positive effect on CGD, cervical spine, and balance symptoms is even stronger. However, the quality of the evidence here is very low.

### Commentary

This systematic review that includes Dr Susan Reid as one of the investigators demonstrates moderate level evidence for the use of manual therapy in the management of cervicogenic dizziness. While the overall rating of the evidence was low this is also a function of the small number of studies that met the inclusion criteria (6). However, I think these types of approaches to the management of dizziness are really helpful. Trying to sort out the causes of dizziness in patients that present following whiplash or concussion are often challenging but the use of SNAG's for example can be a very quick and not particu-larly stressful way to see if one can alter the dizziness presentation. Interestingly, the study by Reid et al (2008) that was part of this review, was also one of the stronger methodologically reviewed studies. Having more studies undertaken in this space will be great going forward.

### References

Reid SA, Rivett DA, Katekar MG, et al. Sustained natural apophyseal glides (SNAGs) are an effective treatment for cervicogenic dizziness. *Man Ther.* 2008;13(4):357–366.

## Paper Four

Gamble, A. R., McKay, M. J., Pappas, E., Dale, M., O'Keeffe, M., Ferreira, G., ... & Zadro, J. R. (2022). Online information about the management of anterior cruciate ligament ruptures in Australia: A con-tent analysis. *Musculoskeletal Science and Practice*, 59, 102555.

### Abstract

**Background:** Most people who suffer an anterior cruciate ligament (ACL) injury search for information online.

**Objectives:** Summarise the proportion of webpages on ACL rupture management that present evidence -based information.

**Design:** Content analysis.

**Methods:** We examined webpage information on ACL ruptures identified through (1) Google searches using terms synonymous with 'anterior cruciate ligament rupture' and searching 'knee surgeon' linked to each Australian capital city, and (2) websites of professional associations. The primary outcome was the proportion of webpages that suggest people can return to at least some form of sport with non-surgical management. Secondary outcomes included webpage information on return to sport with ACL reconstruction (ACLR) and non-surgical management, benefits, harms, and risk of osteoarthritis related to these options, and activity modification.

**Results:** Out of 115 webpages analysed, 48% suggested people can return to at least some form of sport with non-surgical management. Almost half of webpages suggested most people will return to some form of sport following ACLR (41%) and mentioned benefits of ACLR (43%). Fewer webpages mentioned benefits of non-surgical management (14%), approximately two in three people return to pre-injury level of sport following ACLR (4%), risk of re-injury following ACLR (23%), most people return to sport within 9 months of ACLR (27%), activity modification as a management approach (20%), and ACLR will reduce the risk of osteoarthritis (23%).

**Conclusion:** Most online information on ACL rupture management is not aligned with the best available evidence. Inaccurate information could mislead patients' treatment choices and create unrealistic expectations for return to sport.

**Commentary**

I found this paper fascinating in relation to the large amount of missing information concerning the value of surgery (or not) in the management of the ACL injured knee. There is very clear evidence from a high-quality long-term study by Kvist et al (2020) that shows that the prevalence of symptomatic OA, radiographic patellofemoral OA, and knee symptoms were similar in patients irrespective of ACL treatment (surgical vs non-surgical). Overall, the prevalence of OA after ACL injury was found to be high in that study. This is key information for patients to understand if they want to get the full picture of the impact of the ACL injury on their knee. The ability for patients to understand that a surgery followed by a lengthy period of rehabilitation, may not prevent OA nor stabilise their knee is important. The fact that only 23% of websites in this study mentioned the long-term outcome of OA is quite a significant omission.

**References**

Kvist, J., Filbay, S., Andersson, C., Ardern, C. L., & Gauffin, H. (2020). Radiographic and symptomatic knee osteoarthritis 32 to 37 years after acute anterior cruciate ligament rupture. *The American journal of sports medicine*, 48(10), 2387-2394.

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**BELGIUM ECMT 2023**  
**PATIENT-CENTERED CARE:  
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ABSG MATHERA, our Belgian MO has invited the IFOMPT family to meet up in person again and to join them in celebrating their 10th anniversary conference at the Ghelamco Arena in Ghent on 15 and 16 September 2023

**IFOMPT EVENTS**

- Membership Meeting on 13 September 2023
- Teachers Meeting on 14 September 2023

- ✓ IFOMPT Membership Meeting
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