

# Mobilisation or manipulation? What is preferable for mechanical neck pain?

## CRITICALLY APPRAISED PAPER (CAP)

Adapted & commented by:

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### Title of article

Griswold et al. (2018): **Pragmatically Applied Cervical and Thoracic Non-thrust Manipulation versus Thrust Manipulation for Patients with Mechanical Neck Pain: A Multicenter Randomized Clinical Trial.** *Orthop Sports Phys Ther*;48(3):137-145.

### Research questions

The goal of this study was to compare the effectiveness of Manipulation (thrust Manipulation, TM) to Mobilisation (non-thrust Manipulation, NTM), applied to the affected and symptomatic level of the cervical and thoracic spines in patients with mechanical neck pain.

### Introduction/ background

Mechanical neck pain is provoked and/or aggravated by specific positions and moments of the cervical spine (Barry et al 1995). Physiotherapists (PTs) routinely use manual therapy techniques as part of their management for this second most common area of musculoskeletal problems (Hogg-Johnson et al 2008). Several studies show that mobilisation (Non-thrust manipulation) and manipulation (Thrust manipulation) to the cervical (Gross et al 2010, Vernon et al 2007, Walker et al 2008) and thoracic spine (Young et al 2014, Cross et al 2011), as well as a combination of these techniques (Dunning et al 2016, Dunning et al 2012, Griswold et al 2015, Gross et al 2015, Masaracchio et al 2013, Saavedra-Hernández et al 2013), are effective in treating neck pain. However, previous research was conducted under rather controlled conditions not conforming to the procedures usually performed in a manual therapy treatment. PT in the present study focussed his or her intervention on the actual area of impairment of each participant. Thus, this study is the first one that investigates the effect of these different techniques on the cervical and thoracic region in a pragmatic way.

### Methods

**103 participants** with mechanical neck pain were randomly allocated to the NTM (n = 55) or to the TM group (n = 48). The age range was between 18 and 70 years old.

### Subjects

#### Inclusion criteria

- Score of a minimum of 20% on the Neck disability index
- $\geq 2/10$  symptoms on the 24h Numeric pain rating scale
- The symptoms needs to be reproducible with PAIVMs on the cervical or thoracic spine

### Exclusion criteria:

- History of surgical interventions of the cervical or thoracic spine
- Any contraindications to orthopaedic manual therapy (OMT) such as osteoporosis, rheumatoid arthritis, malignancy, spinal myelopathy, nerve root compression signs, ect.

All **10 PTs** were experienced practitioners, trained as Orthopaedic Manual Physical Therapists (OMPT) and blinded to the outcome data. Prior to the cervical thrust manipulation, participants were examined separately and a risk benefit analysis – a procedure approved by the International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) (Rushton et al 2013) – was carried out. The PT decided whether or not a participant was in the condition to receive a thrust manipulation, which again underpins the pragmatic design of this study. In the obverse case, patients were discharged from the study.

In order to ensure that both interventions were applied in an equal number, PTs had to state in advance their general preference on either using mobilisation or manipulation interventions. Further, after conducting the assessments, the PTs were asked to declare their prioritised treatment technique for each individual case. A scale from -2 to +2 was used to visualize a potential tendency towards one treatment option. Thus, if a PT favored the NTM technique -2 or -1 were recorded. In this context, zero referred to an equipoise, while +2 or +1 indicated a preference towards TM.

### Outcome measures

An independent and blinded assessor performed the outcome measures as well as the endurance tests of the deep cervical flexor muscles at the first, second and final appointment.

### Primary outcomes

- Neck disability index (NDI)

### Secondary outcomes

- Patient specific functional scale (PSFS)
- Numeric pain-rating scale (NPRS)
- Deep cervical flexion endurance (DCF)
- Global rating of change (GROC)
- Number of visits
- Duration of care

### Examination

Each patient received a complete and individual clinical assessment of one PT.

- Passive accessory intervertebral movements (PAIVMs) of the cervical and thoracic spine were performed to diagnose the most symptomatic levels. This investigation method for using pain provocation to localise symptoms demonstrates high reliability (Seffinger et al 2004).
- The endurance ability of the deep cervical flexors was examined in supine lying with the chin tucked in and the head lifted off the plinth while recording the time span the patient could correctly keep the position.



Abb. 1: Manual therapy technique: posterior-anterior accessory movements (© Neubauer)



Abb. 2



Abb. 3

Abb. 2: Manual therapy technique: unilateral left sided posterior-anterior accessory movements (© Neubauer)

Abb. 3: Patient position of activation of deep neck flexors (© Raberger)

## Intervention

The PT defined the specific management for each particular patient:

- In the TM group, the PT had to perform a high velocity, low amplitude thrust at the most painful level of the cervical and thoracic spines. The modality of manipulation, in terms of direction and number of thrusts was based on the preceding assessment and were left with the PT.
- The same pragmatic procedure was done in the NTM group. Passive accessory intervertebral movements were applied in an oscillatory way to the cervical and thoracic spine.
- Both groups had to conduct two sets of active range of motion exercises for the cervical and thoracic spines (ten repetitions each) twice per day. Furthermore, they performed an individually adapted deep cervical flexor endurance training on a daily basis. All participants received postural instructions, the reassurance to stay active and the recommendation to keep up their normal daily activities.

## Dates Analysis

Data processing was conducted using SPSS.

For evaluating possible differences between groups with respect to the Neck Disability Index, the patient-specific functional scale, the numerical pain evaluation scale and the deep cervical spine flexion covariance analyses (ANCOVA) were conducted. Separate ANCOVA calculations were performed to analyse the global rating of change, the number of visits and duration of care needed. The data were analysed at baseline, visit two and after the final intervention. The level of significance was set at  $p < 0.05$ .

## Results

After screening of 150 patients at seven different clinical sites 47 participants were excluded. 103 patients were randomly allocated to the thrust manipulation ( $n = 48$ ) and non-thrust manipulation group ( $n = 55$ ). Data analysis following the intervention did not

reveal any significant differences between groups. Clinical equipoise was given in this study. In addition, the PTs' preference towards one treatment method (TM or NTM) did not affect the outcome.

19 participants in the TM and 15 in the NTM group suffered from minor side effects (e.g. increased pain level, dizziness, headache, feeling of stiffness and soreness) for less than 24 hours following the treatment.

### Discussion / Conclusion (study author)

In a population of mechanical neck pain patients treated with cervical and thoracic MT or NTM techniques, no between group differences in symptoms, disability and deep cervical neck flexor activation could be determined. The study authors showed that the participants had equal chances of success independent of the intervention they were allocated to. Also, the PTs' preference towards one treatment method (TM or NTM) did not affect the outcome.

The outcomes of the presented study differ from those reported earlier by Dunning et al (2012), who investigated the effectiveness of MT and NTM applied to the upper cervical and thoracic spine in patients with mechanical neck pain. Thus, Dunning et al. (2012) concluded that the MT group gained better outcomes. However, these results should be treated with caution as all participants in this study received the same standardised technique performed on the same spinal segment. Area and reproduction of symptoms were not taken into account. On the contrary, the PTs in this study determined the specific thrust technique, the dosage, the frequency and exact spinal location by their own. Therefore, the duration of treatment ranged from 1-8 minutes in the cervical and from 1-10 minutes in the thoracic spine. Any research exist that investigates the appropriate dosage for manual therapy applications in neck pain patients (Gross et al 2010). According to the study of Tuttle et al (2005) changes that happen within the treatment application are most likely to lead to alterations between the therapeutic appointments. In general, research shows conflicting opinions with regard to whether or not clinicians should treat the most symptomatic spinal level to gain better results (Aquino et al 2009, Chiradejnant et al 2002, Kanlayanaphotporn et al 2009, Schomacher et al 2009, Haas et al 2003).

The limitations of the study are the convenience sampling of the population, any inclusion criteria regarding symptom duration and the inability to blind the PT to the assessment and intervention.

### Comments of Michaela Neubauer

Thrust and non-thrust manipulations are frequently applied treatment options in the management of cervical pain disorders.

The **pragmatic study design** of the presented study allowed to examine the interventions in a **very clinical way**.

- The PTs screened for contraindications of thrust manipulations according to IFOMPT standards and were able to exclude ineligible participants from the study.
- Each treatment was based on an individual assessment.
- Intensity, time span, and even the technique of the thrust manipulation were based on a thorough examination.
- Further, the presented study stands out due to the fact that PTs were looking for symptom reproduction and applied the technique in the affected spinal areas. This is worth mentioning as several related studies did not take individual pain states into account at all.

- The title of the study gives the impression that the participants only received passive treatments. As it is done in the clinic, they were embedded in an overall management program.

The researching community often criticises the lack of continuity and control of similar studies, because not each subject receives the same standardised treatment and **PTs decide on the technique and dosage** the patients obtain. Contrary, clinicians' benefit from more clinical designed studies in order to easier translate scientific outcomes into their daily work.

A further enhancement of this clinical thought has to be incorporated in future work. For example, the inclusion of **clinical reasoning guided treatment decisions**. They guide PTs in deciding whether a treatment should be applied to a symptomatic or more remote region. In this paper, all the participants got the technique applied at the most symptomatic spinal area.

Additionally, **specific reassessments** after the mobilisation/manipulation and before the second meeting should be performed by the PT as there could be a need to adopt or change the technique.

In this study the examination of the **deep flexor muscles** was performed with tucking the chin in and lift off the head. Many patients experience some discomfort when moving the head of the plinth. Neither the symptom provocations nor their inclusion in the results of the deep flexion endurance test has been taken into account.

As frequently seen in physiotherapy research, the study authors were not able to blind the PTs regarding the assessments and interventions.

A major drawback of this research is the **lack of follow up** investigations.

When looking at the outcome of **pain, disability and motor performance** there is no difference between **mobilisation and manipulation** in a population suffering from **mechanical neck pain**.

This paper shows that **Mobilisations** are perfect options when contraindications **for Manipulations** exist.

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