

# Is Manual Therapy beneficial in nerve related neck & arm pain?

## CRITICALLY APPRAISED PAPER (CAP)

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### Title of article

Nee RJ, Vicenzino B, Jull GA, Cleland JA, Coppieters MW (2012): **Neural tissue management provides immediate clinically relevant benefits without harmful effects for patients with nerve-related neck and arm pain: a randomised trial.** Journal of Physiotherapy 58: 23-31.

### Research questions

1. What are the short-term benefits and harms of neural tissue management compared to recommendations to stay active in patients with nerve related neck and arm pain?
2. If adverse reactions following neural tissue management take place, what do they look like?
3. Do these unfavourable effects diminish the benefits of neural tissue management?

### Introduction/ background

Neck pain that radiates down the arm is more common and disabling than neck pain alone (Daffner 2003). Neural tissue management is an often-used physiotherapeutic treatment strategy. Its goal is to reduce the tissue mechanosensitivity, decrease symptoms and improve function by means of certain movements and positions of neck and arms (Elvey 1986, Butler 2000, Coppieters and Butler 2008). **Manual therapy**, in particular the contralateral **cervical sideglide technique**, is effective in the treatment of neural radiations into the arm (Vicenzino et al 1996, Breig 1978, Elvey 1986).

### Methods

**Sixty participants** were randomised to an experimental (n = 40, **EG**) or a control (n = 20, **CG**) group.

**All participants** were instructed to remain active.

The “**neural tissue management group**” received additionally:

- **Educational part:** information that gently moving the nerves will desensitised the painful tissues
- **Manual therapy techniques:** contralateral sideglide technique in shoulder abduction (Abb. 1), passive shoulder girdle movements together with active neck flexion and extension (Abb. 2 und 3)
- **Home program** of nerve sliding & tensioning for the median nerve



Abb. 1: Manual therapy sideglide technique in shoulder abduction (© Neubauer)

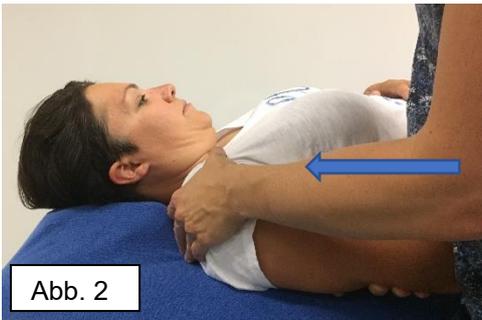


Abb. 2

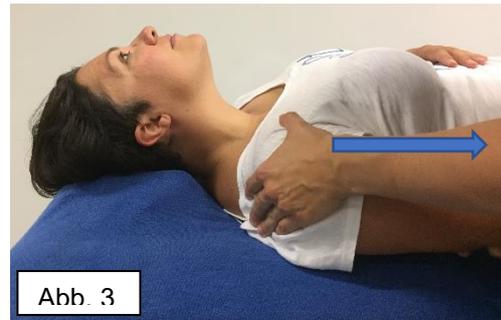


Abb. 3

Abb. 2: Passive shoulder girdle elevation with active neck flexion (© Neubauer)

Abb. 3: Passive shoulder girdle depression with active neck extension (© Neubauer)

**8 Physiotherapists** with postgraduate training in musculoskeletal physiotherapy provided 4 treatments over 2 weeks. Outcome parameters were evaluated at baseline and four weeks after the programme was finished.

## Outcome measures

### Primary outcomes

- 15-point Global Rating of Change scale: ranges: -7 (far worse) to +7 (very much better); changes  $\geq +4$  at follow-up were calculated as 'improved' (Jaeschke et al 1989); change  $\leq -2$  were classified as 'worse'.

### Secondary outcomes

- Neck/arm pain intensity: mean numeric pain rating scores (Cleland et al 2008)
- Neck Disability Index (Vernon and Moir 1991)
- Patient-Specific Functional Scale (Westaway et al 1998)

## Subjects

### Inclusion criteria

- Nerve-related neck and unilateral arm pain radiating distally to the deltoid tuberosity
- 18-60 years old
- 4 weeks of symptoms (before that, no symptoms for about four weeks or longer)
- Intensity of neck and arm pain, mean of both scores  $\geq 3/10$
- Reproduction of symptoms by the ULNT 1 (Upper Limb Neural Test 1) and changes of symptoms with differentiation manoeuvres (Butler 2000, Elvey 1997)

## Exclusion criteria

- Trauma
- $\geq 2$  neurological findings at the same cervical nerve root level
- bilateral arm symptoms
- symptoms or signs of cervical myelopathy
- Red flags (Childs et al 2004)
- Any physiotherapy for neck/arm pain within the last 6 weeks
- previous neck or upper limb surgery

## Dates Analysis

The authors analysed the benefits and harms of the interventions between both groups by means of the “Global Rating of Change” for ‘improvement’ ( $\geq +4$ ) and ‘worsening’ ( $\leq -2$ ).

Neck/arm pain & Neck Disability Index were determined with analyses of covariance (ANCOVA).

An unpaired t-test helped to interpret the numbers of the “Patient-Specific Functional Scale”. The difference between group means and a standardised mean difference (each with a 95% confidence interval) was determined.

To establish which subjects with an adverse reaction had a reduced chance of improvement at the final measurements, a risk ratio with a 95% confidence interval was calculated.

## Results

All participants except two of each group finished the study.

In the EG ‘improvement’ happened significantly more often and they had better follow up scores for pain and activity limitation.

Furthermore, the EG received clearly better results for the intensity of neck/arm pain, Neck Disability Index and Patient-Specific Functional Scale.

No evidence could be found that neural tissue management was harmful and the chance of an “improvement” with neural tissue management was not diminished.

## Discussion / Conclusion (study author)

The study showed clinically substantial short-term benefits of neural tissue management in patients with nerve related neck and arm pain. The authors blamed the small sample size that no statistical significant numbers could be calculated.

16 of the 38 participants stated an adverse event. Most of them reported an aggravation of neck and arm pain as well as headache. 95% of the treatment reactions started within 24 hours and approximately 80% ended within another 24 hours. Nobody needed further treatment to reduce them. On average, the intensity of those affected were calculated with 4,7 of the numerical rating scale (from 0-10). Most importantly, the chance of gaining improvement from neural tissue management was independent of showing adverse reactions or not. That caused the researcher to categorise the reactions as “mild” responses. These results are similar to those from Hurwitz et al 2004 who investigated adverse reactions to **Manual therapy** in a sample of neck pain patients.

A limitation of the project is that the sample was taken from the general community. That means that the results are only valid for mild to moderate nerve related neck and arm pain. Furthermore, they have not looked for any long-term effects and it is not clear if the recommendation to stay active could have influenced the outcome of the EG.

Finally, the authors pointed out that future research should investigate long term effects of neural tissue management with a bigger sample size.

### Comments of Michaela Neubauer

Neural tissue management is an often integrated treatment option in the management of nerve related neck and arm pain. Especially the **side-glide technique** works very well in these patients. As it is often done in the clinic for both **manual therapy** manoeuvres the arms were placed into abduction as much as possible to pre-load the upper quarter neural tissues while at the same time not provoking any of the participant's symptoms. To maintain the treatment effects and to enhance movements of the painful structures the subjects were given home exercises. It is very positive that research is investigating physiotherapeutic relevant management strategies in such a clinical way.

It might be interesting if the authors could have reached statistical significant numbers if they would have payed attention to:

- The age range of the participants reached from 18 to 60 years of age. Especially older patients suffer from neural pain, because of degenerative bony changes within the spinal canal and intervertebral foramen and therefore they may respond differently to the same treatment strategy than younger people do. Consequently, it makes sense to investigate people older than 50 in a different research project.
- The application of the manual therapy techniques was emphasised on being symptom free. In subjects with minor problems it is in a lot of cases essential to move into resistance to gain better treatment effects. Therefore, in a future study the therapists should get encouraged to go further in range with passive manoeuvres, if there are no symptoms provoked.
- The EG received 4 treatments within 2 weeks. Thus, future research should investigate the neural management over a longer time span and reduce treatment frequency to once a week. It is an unusual therapy regime, in people with non-acute symptoms. If you see patient twice in seven days treatment reactions cannot settle down completely or can be evoked more easily.
- Another follow up investigation should take place at least 3 and 6 month after the intervention has finished.
- The aim of the study was to look at the benefits and harms of neural tissue management. A much clearer answer could be given when the recommendation to stay active would have been left out to diminish nonspecific treatment effects in the EG.

From the methodological perspective, this paper is well designed. They have not done any blinding of the subjects and the therapists. Nevertheless, it is well known that this is not possible in most of the experimental studies investigating the effects of **manual therapy** techniques. The authors have addressed the biggest limiting factors of their work. The fact that the subjects were not chosen from clinical setting means that the study results are valid for mild to moderate nerve related neck and arm pain.

### Coming back to the question: “Is Manual Therapy beneficial in nerve related neck & arm pain?”

- According to Nee and his team you can say: “YES, IT IS!”

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