Spinal manipulative therapy (SMT) for neck pain and associated disorders in adults

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Guidelines

A 2016 clinical practice guideline[1] for the treatment of neck pain and associated disorders (NAD) and whiplash-associated disorders (WAD) concluded that in general, a multimodal treatment approach is an effective strategy for both acute and chronic neck pain.

The strength of all recommendations in the following is **weak**:

Acute NAD (0-3 months)

Low-quality evidence:

- For grades I to II, manipulation or mobilization based on patient preference

Moderate-quality evidence:

- For grades I to II, ROM home exercises, medication or multimodal manual therapy
- For grade III neck and arm pain, graded strengthening exercises with daily home exercises (including mobility, stability and muscle strengthening) 2x/week for 6 weeks

Chronic NAD (>3-6 months)

Low-quality evidence:

- For grades I to II, supervised Iyengar yoga over education and home exercises 1x/week for 9 weeks; supervised strengthening or home exercises for 20 sessions over 12 weeks; multimodal care including manual therapy (manipulation, mobilization, massage, traction), acupuncture, heat, TENS, exercise and/or ultrasound OR stress-management based on patient preference, prior response to care, and resources available; manipulation in conjunction with soft tissue therapy for 8 20-min sessions over 3 weeks; high-dose massage (3 60-min sessions/week for 4 weeks) over no-treatment based on patient preference and resources
- For grades I to III, multimodal care and/or advice based on patient preference

Moderate-quality evidence:

- For grades I to II, supervised group exercises (qigong or ROM, strengthening, flexibility) for 18-24 sessions for 4-6 months
- For workers, mixed supervised and unsupervised high-intensity strength training (3 20-min sessions/week for 20 weeks) or advice alone

Acute WAD

Moderate-quality evidence:

- For grades I to III, multimodal care including manual therapy (mobilization, soft tissue techniques), education and exercises over education alone

Chronic WAD

Low-quality evidence:

- Supervised exercises with advice or advice alone based on patient preferences and resources available

Another 2016 guideline[2] concluded for NAD grades I-III (<6 months), clinicians should first educate and reassure patients about the self-limited and benign nature of the condition and highlight the importance of staying active and mobile. Any patient with worsening symptoms or who develop new symptoms during their care should be referred for further evaluation. Specific treatment recommendations are:

Acute (≤3 months)

- For grades I-II, structured patient education along with ROM exercise, multimodal care (manipulation, mobilization) or muscle relaxants.
- For grade III, structured patient education with supervised strengthening exercises

Sub-acute (>3 months)

- For grades I-II, structured patient education along with ROM and strengthening exercises, qigong, yoga, multimodal care, clinical massage, low-level laser therapy or NSAIDS.

A 2014 guideline[3] made the following recommendations:

- For acute neck pain, a moderate recommendation was made for SMT as a treatment in combination with other conservative treatments (such as education, exercise and mobilization) for both short- and long-term improvements in pain and number of days to recover. Several treatment sessions were deemed appropriate, for example, 4-5 over a 2-week period and an average of 15 over a 12-week period. A weak recommendation was made for exercise alone. Due to insufficient evidence, thoracic spinal manipulative therapy (tSMT) and trigger point therapy could not be recommended.
- For chronic neck pain, SMT was weakly recommended as a treatment option benefitting pain and disability using 2 sessions per week for 9 weeks. Additionally, SMT as a part of a multimodal approach such as education, upper tSMT, laser therapy, massage, mobilization, exercise and stretching was strongly recommended. This was as a result of a number of treatments over several weeks as well as a single treatment in the short term. Insufficient evidence precluded the authors from recommending transcutaneous nerve stimulation, tSMT, laser and traction.

<u>Cervical spinal manipulative therapy (cSMT)</u>
When compared to a control, 1 trial[4] found that there were no changes in neck pain immediately following 1 manually-applied cervical manipulation, but statistically significant improvement was shown at the 7-day follow-up.

A 2015 Cochrane review by Gross et al[5] studied the effectiveness of manipulation or mobilization alone compared to a control or another treatment for neck pain. For the treatment of subacute or chronic neck pain, they found a single session of cSMT provided temporary pain relief when compared to an inactive control, but multiple treatments produced conflicting results at short-term follow-up. For acute to subacute neck pain, cSMT was more effective than various combinations of prescription medications for improving pain and function.

<u>Thoracic spinal manipulative therapy (tSMT)</u>
Systematic reviews that include evaluating the effectiveness of tSMT for the treatment of neck pain show:

- Reduced pain at short- and intermediate-term follow-up in patients with acute or subacute neck pain, and improved function in patients with acute to chronic pain as compared to a control.[5]
- Results indicating tSMT was superior to mobilisation, placebo, modalities, and no treatment as well as evidence supporting tSMT as an intervention for improvements in disability and range of motion (ROM) in the short term.[7]
- Some evidence that the combination of tSMT and other conservative treatments such as exercise, mobilisation, electro-thermal therapy, infrared radiation therapy, and education was more effective than any of the treatments delivered without the manipulation.[8]

Exercise

An update of a Cochrane review found moderate-quality evidence supporting the use of specific strengthening exercises either alone or combined with endurance or stretching exercises for chronic neck pain, and low-quality evidence reported minimal benefits when only endurance or stretching exercises were used for the cervical, shoulder and scapulothoracic regions.[9] Another review found a small clinical effect with supervised exercises (including qigong and/or graded activity combined with strengthening, ROM and flexibility) and superiority to wait list or advice to remain active.[10] Also, supervised strengthening and home ROM exercises showed similar improvements in neck pain to other conservative interventions such as manual therapy, NSAID, and acetaminophen but mild transient adverse events were higher for those using the medications.

Psychological/Education Interventions

In patients with a first episode of acute non-specific neck pain, a longitudinal study reported persisting anxiety in the early phase of the condition and depression at baseline are both risk factors for poor prognosis and could contribute to the progression from an acute to chronic disorder.[11]

A 2016 review evaluating psychological interventions for the management of NAD or WAD did not find clear evidence to support or refute the use of relaxation training, biofeedback or cognitive-based therapy, but for persistent WAD, there may be benefit in adding progressive goals to a PT program.[12]

One meta-analysis found very low- to low-quality evidence that showed an education program had no effect on pain, disability or fear-avoidance belief scores for the prevention or treatment of neck pain.[13] Another recent review reported that structured education as a sole intervention is not more effective than other conservative interventions for the treatment of NAD or WAD; however, patients with WAD may receive a small and short-lived benefit from structured education combined with PT.[14]

Dry needling and ischemic compression

In the treatment of latent trigger points in the upper trapezius muscles of women, a trial showed active and passive soft tissue therapies produced greater improvement in pain over the control (sham manual treatment); specifically, significantly decreased sensitivity of the trigger points, increased flexibility of muscle fibers, and improved ROM.[15]

Two systematic reviews were performed in 2015 studying the effectiveness of dry needling (DN) trigger points for the treatment of neck pain and found limited evidence. One review evaluated both DN and ischemic compression (IC) on trigger points in the upper trapezius musculature, and concluded there is strong evidence for a positive effect following DN and moderate evidence following IC in terms of pain reduction.[16] The reduction was greater when compared with active ROM exercises and a placebo or no intervention, but similar to massage, muscle energy techniques, ultrasound and passive stretching. Only weak evidence was found concerning effects on other outcomes such as function and quality-of-life. The second review included a meta-analysis and cautiously recommended DN for pain relief in the neck and shoulders following application to trigger

points in the corresponding musculature.[17] This was based on short- and medium-term follow-up when compared to a control or sham. However, wet needling was shown to be more effective for pain reduction than DN in the medium-term.

Radiculopathy

In symptomatic (subacute/chronic) patients with MRI-confirmed cervical disk herniations, a study[18] showed statistically significant improvements with cSMT over nerve root injections. No differences between the groups were shown when comparing acute patients. When compared to cervical computer traction, moderate-quality evidence showed cervical spinal manipulation showed significant immediate effects in improving pain.[19]

A 2016 review[20] found low-level evidence for:

Effectiveness of sole interventions

- Cervical manipulation and mobilization for pain and ROM at immediate follow-up (not thoracic manipulation and mobilization) but not at longer term
- Cervical mobilization with a neurodynamic intent
- Traction is no more effective than placebo traction

Effectiveness of multimodal interventions

- Combining spinal mobilization and motor control exercises superior to separate interventions or "wait and see"
- Multimodal with neurodynamic intent superior to "wait and see"

In a 2015 systematic review and meta-analyses, 3 included studies (N=502) compared cSMT to cervical computer traction (control group) for the treatment of degenerative cervical radiculopathy.[21] Mean differences in pain measured by VAS showed statistically significant improvements in the active groups in all studies. The authors deemed the level of evidence to be of moderate quality due to statistical heterogeneity (I^2 >50%).

According to a 2014 systematic review, "most patients with symptomatic cervical spine disc herniation with radiculopathy recover."[22] The course of symptomatic cervical disc herniation with radiculopathy is comparable with neck pain the general population (recurrent, and may be persistent and/or progressive). With regard to literature quality for prognostic factors for patients with this condition, the authors deemed it poor.

Prognostic factors for recurrence following SMT

A secondary analysis was performed of a prospective cohort study of chiropractic care for the treatment of neck pain with a 1-year follow-up and published in 2015.[23] Chiropractic care could include spinal manipulation, advice on activities of daily living, trigger point therapy, therapeutic exercises, and mobilization techniques as deemed appropriate by the treating clinician. In the assessment of the number of new episodes or recurrences after 1 year of treatment, 11% of patients reported recurrence or had a need for an additional intervention. Eighty-nine percent reported they had recovered from their neck pain episode. A previous episode of neck pain and age may be prognostic factors for recurrence.

Cervical lordosis

Concerning the status of cervical lordosis and practice implications, a 2015 cohort study[25] found:

- No statistically significant differences in the lordoses between patients with mild non-specific neck pain and matched healthy volunteers at baseline, suggesting that a reduction in lordosis is not necessarily associated with neck pain.

- Patients who received cervical SMT 2x/week for 4 weeks did show variable increases in cervical lordotic angle; however, only 14% of the patient's lordosis increased by at least the minimum detectable change, and overall changes were not statistically significant.

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