Walker M, Boyles R, Young B, et al. The Effectiveness of Manual Physical Therapy and Exercise for Mechanical Neck Pain: A Randomized Clinical Trial. Spine 2008; 33(22):2371-2378.

Critique author: Linda Metzger

Design: Randomized clinical trial

Reviewed (11-2-16): No changes to conclusions

Objective: To compare the effects of manual physical therapy and exercise (MTE) to a minimal intervention (MIN) approach in patients with mechanical neck pain with or without unilateral upper extremity symptoms.

Population /sample size/setting/interventions:

- 94 participants with mechanical neck pain with or without unilateral upper extremity symptoms referred from three physical therapy clinics. All participants were randomized to one of two interventions; 1) manual physical therapy and exercise (n=47), or 2) minimal intervention (n=47). The intervention period for both groups was 3 weeks and included treatment twice weekly for up to 6 sessions.
- The manual physical therapy and exercise (MTE) intervention included an initial physical assessment, followed by manual therapy consisting of joint mobilization, muscle energy, and stretching using an impairment-based approach, and a standard home neck exercise program prescribed by the physical therapist.
- The minimal intervention (MIN) consisted of an initial physical assessment followed by a basic treatment plan consistent with general practitioner care that included postural and neck mobility advice, range of motion exercises, medications, and subtherapeutic (placebo) ultrasound.
- Eligibility criteria included a primary complaint of neck pain with or without unilateral upper extremity symptoms, age greater than 18, Neck Disability Index (NDI) score of 10 points or more, Visual Analog Scale (VAS) pain score of 30 mm or more, eligible for military health care, residing within 1 hour of the treatment facility, and having sufficient English to understand questionnaires.
- Exclusion criteria included whiplash injury within the past 6 weeks, history of spinal tumors, spinal infection, cervical spine fracture or previous neck injury, pending legal action regarding neck pain, diagnosis of central cervical spinal stenosis, bilateral upper extremity symptoms, or 2 positive neurologic findings at the same nerve root level.

Main outcome measures:

- Primary outcome variables were the 100mm VAS pain score, and the 50-point Neck Disability Index (NDI) score. Patient-perceived improvement was measured using the 15-point global rating of change (GRC) scale ranging from +7 to -7, where 0 represents no change.
- Secondary outcome measures included treatment success rates for each group and the number of patient's seeking post-treatment healthcare utilization.

- Outcome measures were recorded at baseline and follow-up intervals of 3 weeks, 6-weeks, and 1-year after treatment completion by physical therapists that were blinded to the treatment group. One-year data was collected during telephone interviews.

- Ten participants failed to complete one of the three follow-up assessments.
- Baseline characteristics, NDI, and VAS pain scores did not differ between the 2 groups, except that 74% of patients in the MTE group had chronic pain symptoms for greater than 12 weeks compared to 48% in the MIN group.
- Primary outcomes:
    - Both groups improved over time with reductions in both NDI scores ($P \leq 0.001$) and cervical pain VAS scores ($P \leq 0.02$) with all change scores exceeding the minimum clinically relevant difference of 5 points for NDI and 12mm for VAS.
    - The MTE group demonstrated statistically greater improvement in NDI scores at all 3 follow-up periods ($P \leq 0.001$) compared to the MIN group. Pain reduction was statistically greater for the MTE group at the 3- and 6-week follow-up periods ($P \leq 0.004$), but a significant difference did not persist at 1-year ($P = 0.16$).
    - Perceived patient improvement on the Global Rating of Change Scale (GRC) was significantly greater in the MTE group at all follow-up intervals ($P \leq 0.011$).
- Secondary outcomes:
    - Treatment success rates were nearly twice as large for the MTE group as the MIN group and reached statistical significance at all follow-up intervals ($P \leq 0.034$).
    - Patients in the MIN group demonstrated statistically greater healthcare utilization at the 1-year follow-up than patients in the MTE group ($P = 0.02$). The MTE group sought additional care from 14 providers as compared to 33 providers in the MIN group.

Authors' conclusions:

- Manual physical therapy and exercise was significantly more effective in reducing neck pain and disability than a minimal intervention, and increasing patient-perceived improvements during short- and long-term follow-ups.
- Statistical and clinical improvement in upper extremity pain scores was demonstrated at all follow-up periods for patients receiving manual physical therapy and exercise.
- Treatment success rates, as determined by those patients achieving a large improvement in symptoms, were significantly greater in the manual physical therapy and exercise group than in the minimal intervention group at all follow-up periods.
- An additional benefit of manual physical therapy and exercise over minimal intervention includes the reduction of healthcare utilization.
- Manual physical therapy and exercise is a safe and effective treatment approach for patients with mechanical neck pain, with or without unilateral upper extremity symptoms.

Comments:

- This is a well-designed and documented study.
- The large proportion of patients in the study that perceived their recovery as successful ($\geq 49\%$) was not only statistically significant compared to the MIN group ($\leq 32\%$) ($P \geq 0.034$), but was unequivocal based on the stringent GRC cut-off level used to define

success (GRC≥6). These success rates were effectively maintained during long-term follow-up.

- One explanation for the significant improvement in patient outcomes demonstrated in this study compared to other similar studies may be the methodology of using an impairment-based approach which insures that every manual physical therapy intervention is followed by an immediate reassessment to be certain that observed changes are a direct result of the intervention. This also helps to assess the contribution of each modality, whether manual physical therapy or exercise, towards patient improvement.
- With active intervention being provided, it was impossible to blind patients as to their treatment allocation. Drawbacks of the study include not assessing blinding success and not addressing adverse effects.
- The study did not give separate results for active duty, military dependent and military retirees, which would have helped its interpretability.
- The study's ability to identify a specific subgroup of patients likely to respond to MTE was limited, because the patient population was not homogenous.
- The absence of a control group in this study limits its ability to assess whether the changes are due to the natural history of the neck pain or the passage of time.
- Limiting the study protocol to 6 treatment sessions impacted the ability of the study to achieve maximal therapeutic benefit for many patients within the MTE group.

Assessment*:*

- This study is adequate for some evidence that a three week program of twice weekly home neck exercises with manual physical therapy that includes joint mobilization, muscle energy, and stretching, reduces neck pain and disability compared with a minimal intervention for patients with chronic neck pain at 6 weeks follow-up, but did not persist at one year follow-up.