**Horng Y-S, Hsieh S-F, Tu Y-K, and et al. The comparative effectiveness of tendon and nerve gliding exercises in patients with carpal tunnel syndrome: A randomized trial. Am J Phys Med Rehabil 2011; 90:435-442.**

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**Reviewer:** Linda Metzger 1-4-16

**Design:** Randomized controlled trial

**Objective:** To investigate the effectiveness of tendon and nerve gliding exercises as a part of combined treatments for carpal tunnel syndrome (CTS).

**Summary of Results:**

* A total of 53 patients or 94 hands were divided into 3 treatment groups: 1) tendon gliding + paraffin therapy+ splint, 2) nerve gliding + paraffin therapy+ splint, and 3) paraffin therapy+ splint.
* The results of this study suggest that to improve the functional status and quality of life of CTS patients, the combination of tendon gliding exercises, paraffin therapy, and splinting might be more effective than the combination of nerve gliding exercises, paraffin therapy, and splinting.

**Reasons not to cite as evidence:**

* The designation of a primary outcome was not clear. Thirteen outcome measures were reported including the Boston symptom severity scale and the functional capacity scale, the Disabilities of the Arm, Shoulder, and Hand questionnaire (DASH), the Taiwanese version of the World Health Organization Quality of Life Questionnaire Brief (WHOQOL-BREF) which included 4 parameters, VAS pain scale, and a nerve conduction test. A physical exam was also conducted that included the grasp and pinch power tests, a Semmes-Weinstein Monofilament sensory test, an examination of Tinel sign, and a Phalen test.
* Only one of 13 outcome measures was statistically significant and showed a positive difference between groups. The functional score on the Boston CTS showed greater improved function in the tendon gliding group than in the other 2 groups after 2 months of treatment. All the other outcomes showed no statistically significant difference between the 3 groups. Significant improvements were observed in the symptom severity and pain scale scores in all three groups. No significant differences among the three study groups were observed in the outcomes of the physical examinations and the nerve conduction test. Basing the conclusions of the study on just the one positive outcome is selective outcome reporting.
* Sample size was small. The 3 groups included only 53 total participants with 18, 19 and 16 patients in each of the 3 treatment groups. The study was more than likely underpowered to find an effect.
* Compliance and evaluation of compliance results was missing, since exercise diaries were not required. It is not known how often and how regularly the patients performed the exercises. Non-compliance would tend to underestimate the size of the effect and could have contributed to the non-significant results.
* A major limitation of the study was that it violated the assumption of independent observations for the Student T test which was used for data analysis. The observations in this study lack independence from one another, since most (94) of the 106 symptomatic hands analyzed in this study came from patients with bilateral CTS. For observations to be independent, they must come from different individuals. Non-independent observations can make the results of the Student T Test incorrect or misleading, or simply give too many false positives. Because the conclusions from this study are suspect for violating the assumptions of the statistical test, the conclusions are rejected.
* There were too many issues to make any evidence recommendations and the author’s conclusions were also too weak for evidence. Both tendon gliding and nerve gliding exercises may in fact be good non-invasive, cheap, and easily applicable treatment options with high patient compliance, but one can’t determine that from this study.
* Based on only this one study, there is lack of supporting evidence from any other studies to make a definitive statement that 2 months of self-administered tendon gliding exercises with paraffin therapy and wearing a night splint is more effective in improving function and decreasing pain in patients with carpal tunnel syndrome than nerve gliding exercises with paraffin therapy and wearing a night splint.

**Assessment:**

* Inadequate for evidence of the effectiveness of 2 months of tendon or nerve gliding exercises as a part of combined treatments in patients with carpal tunnel syndrome on pain and function.