**Fernandez-de-las-Penas C, Ortega-Santiago R, et al. Manual Physical Therapy Versus Surgery for Carpal Tunnel Syndrome: A Randomized Parallel-Group Trial. J Pain 2015;16:1087-1094**.

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Design: randomized clinical trial

Purpose of study: to compare the effectiveness of manual physical therapy with that of surgery for patients with carpal tunnel syndrome (CTS)

Population/sample size/setting:

* 120 women (mean age 46.5) treated for CTS at a university hospital in Madrid
* Eligibility requirements were at least 12 months of pain and paresthesia in the median nerve distribution which were worse at night, a positive Tinel and Phalen sign, with sensory and motor nerve deficits according to published guidelines of the American Academy of Neurology
	+ The nerve conduction results were classified as minimal, moderate, or severe
		- “Minimal” meant abnormal segmental-comparative tests only
		- “Moderate” meant abnormal median nerve sensory velocity conduction and distal motor latency
		- “Severe” meant absence of median nerve sensory response and abnormal distal motor latency
* Exclusion criteria were any sensory or motor deficit in the ulnar or radial nerves, age over 65, previous hand surgery or steroid injection, multiple diagnoses involving the upper extremity (such as cervical radiculopathy) , any systemic diseases associated with CTS (diabetes, thyroid disease), comorbid musculoskeletal conditions such as rheumatoid arthritis, pregnancy, presence of depressive symptoms, and male sex

Interventions:

* Randomization was to manual physical therapy (n=60) or carpal tunnel release (n=60)
* The PT group had three sessions once per week of 30 minutes duration by physical therapists with more than 6 years of experience in manual therapy approaches
	+ The therapy consisted of desensitization maneuvers using several soft tissue mobilization and nerve/tendon gliding exercises directed at potential entrapment of the median nerve in its entire course: the anterior scalene muscle, pectoralis minor, bicipital aponeurosis, pronator teres, transverse carpal ligament, and palmar aponeurosis
	+ A sequence of nerve/tendon gliding maneuvers were applied in sequence of shoulder girdle decompression, glenohumeral abduction/lateral rotation, supination of the forearm, and wrist, thumb, and finger extension
		- Speed and amplitude of the gliding maneuvers were adjusted to avoid pain, and were completed in 2 sets of 5 minutes duration with one minute of rest in between
	+ The final PT session included an educational teaching session on doing the tendon and nerve gliding exercises at home
	+ Patients were not asked to modify any work or activity levels
* The surgical group had carpal tunnel release, either open or endoscopic depending on each surgeon’s and patient’s preferences by surgeons with at least 15 years of practice
	+ Postoperatively, patients were referred for hand therapy according to the usual practice preferences of the surgeons, and were given the same educational session for performing nerve/tendon gliding exercises as the PT group

Outcomes:

* The primary outcome was pain intensity on the 11-point Numerical Rating Scale (NRS), both current pain and worst pain in the preceding week, assuming a minimal clinically important difference of 2 points
	+ The group comparisons used mixed-model repeated analysis of covariance, which adjusts the outcome scores at each followup time for the baseline differences between groups
* Secondary outcomes included both the functional status and severity subscales of the Boston Carpal Tunnel Questionnaire (BCTQ) and a global rating of change (GROC) from -7 (a great deal worse) to +7 (a great deal better)
	+ The authors assumed an MCID of 0.74 points in the function subscale and 1.14 points in the symptom subscale
* Followup was done at baseline and again at 1, 3, 6, and 12 months after the end of therapy
* Both groups improved on all outcomes during followup, and the 6 and 12 month outcomes showed no group differences
* However, there were several group differences at 1 and 3 months for NRS pain measures and for function on the BCTQ, all of them favoring the PT group over the surgery group
	+ For the current NRS pain item, the group difference at 1 month was 2.0 points, and the difference at 3 months was 1.3 points
	+ For the NRS pain item of worst pain in the previous week, the group difference was 2.9 points at 1 month and 2.0 points at 3 months
	+ For BCTQ function outcomes, the group difference was 0.8 points at 1 month and 0.3 points at 3 months
	+ For BCTQ symptom severity outcomes, the PT and surgery groups did not differ at any followup time
* No adverse events were reported in either group
* There were 3 patients in the PT group who had carpal tunnel release between the 6 and 12 month followup times
* The GROC outcomes did not differ when assessed at 6 months; both groups expressed similar satisfaction with their global improvement

Authors’ conclusions:

* PT consisting of manual therapies with desensitization maneuvers was more effective than carpal tunnel release at 1 and 3 months, and was equally effective at 6 and 12 months
* Conservative treatment should be the first option for patients with CTS before considering surgery
* Some of the differences in favor of PT seen in the early followup evaluations could be due to the fact that recovery from surgery may take several weeks
* These results differ from some previously published comparisons of conservative and surgical treatment of CTS, but the PT program in this study targeted regions in addition to the hand/wrist area treated in previous clinical trials

Comments:

* All criteria for a high quality study, with the exception of blinding, were met
	+ Lack of blinding does not constitute an important source of bias, however; blinding is chiefly done to control the contribution of the placebo response to the total therapeutic effect of an intervention, and this placebo effect usually operates in favor of surgical interventions over conservative treatments
* The analysis of the results is also of high quality, since mixed models analysis of covariance is the best way to compare groups in a randomized trial with followup at various time periods
* The MCID for the subscales of the BCTQ were obtained from a previous study of carpal tunnel release (Kim et al 2012), and are reasonable effect sizes to examine
* It is not clear why only women were enrolled in the study, but there is no apparent reason not to expect the results not to apply to men
* The use of the term “desensitization maneuvers of the central nervous system” is not explained; it is clear that the maneuvers are directed at the entire course of the median nerve from the brachial plexus to the hand, but these are all parts of the peripheral nervous system, and the usage appears to be idiosyncratic
* The previous RCT of PT versus surgery, Jarvik 2009, was also of high quality and reported a small advantage of surgery over PT; this study, however, appears to have targeted the wrist/hand for PT, and also enrolled patients with a minimum of 2 weeks of symptoms rather than 12 months
	+ The enrollment criterion of at least 12 months of symptoms defines a population in which common initial interventions such as splinting have been attempted without success; it is implied, but not reported, that most of the patients had used splints (but not steroid injections)
	+ Presumably, none of the patients had progressed to the point of thenar atrophy, but the electrodiagnostic testing resulted in high percentages (35% of the PT group and 38% of the surgery group) of both groups classified as “severe”
		- Results are not reported separately for the different degrees of severity on the electrodiagnostic testing, but it would be surprising to see full recovery in severe CTS even with surgery
		- Whether the results are “too good to be true” given the levels of severity is not clear, but warrants discussion by clinicians with expertise in electrodiagnostic testing
		- It appears that none of the severe cases had needle EMG to look for denervation potentials, and no discussion concerning whether this was considered or would have been appropriate
		- Table 1 presents baseline characteristics for nerve conduction severity and for the clinical outcomes (average BCTQ function and symptom severity and pain NRS) but no description of these outcomes disaggregated by nerve conduction severity; these outcomes should be worse in the severe than in the minimal cases but the information is not reported

Assessment: a methodologically high quality RCT, but with an incomplete analysis of patient data (not broken down by severity) supporting some evidence that in patients with CTS, an initial treatment approach involving physical manual therapy directed at the entire course of the median nerve from the scalene muscles to the wrist, in combination with nerve and tendon gliding exercises, is as successful as carpal tunnel release at 6 months and at 1 year, and may show advantages over surgery at 1 and 3 months

References:

Jarvik JG, Comstock BA, et al. Surgery versus non-surgical therapy for carpal tunnel syndrome: a randomised parallel-group trial. Lancet 2009;374:1074-81.

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