**Soyupek R, Yesildag A, et al. Determining the effectiveness of various treatment modalities in carpal tunnel syndrome by ultrasonography and comparing ultrasonographic findings with other outcomes. Rheumatol Int 2012; 32:3229–3234**

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Purpose of study: (1) to investigate three treatment modalities for carpal tunnel syndrome: phonophoresis with corticosteroid, phonophoresis with an NSAID, and wrist splinting in the neutral position and (2) to assess the correlation between sonographically measured median nerve cross-sectional area and other variables such as median nerve conduction, symptom severity, functional status, and physical findings

Reasons not to cite as evidence:

* Three groups were allocated to either corticosteroid phonophoresis, NSAID phonophoresis, or wrist splinting in the neutral position
	+ The method of allocation is poorly specified; the abstract mentions that hands were randomized, but the methods section says nothing about the method of randomization
* The results were reported in terms of within-group baseline-three month before-after differences on pain VAS, on the Boston CTS questionnaire subscales for symptom severity and functional status, on ultrasonography of the median nerve, and on electrodiagnostic measurements
	+ However, between-group comparisons were lacking, which would be necessary in order to compare the effectiveness of the different interventions
	+ There were within-group improvements for Boston questionnaire symptom severity in all three treatment groups, and within-group improvements for functional status for steroid phonophoresis only
* There were 52 patients and 81 hands “randomized” to the three interventions, meaning that in a substantial number of patients, one hand was could have been allocated to one intervention while the other hand was allocated to a different intervention; it is also probable that in some patients, both hands were allocated to the same intervention
	+ This is not clearly presented; the results section begins by reporting the dropouts by stating that three patients in the splinting group, one in the steroid group, and one in the NSAID group did not attend the followup protocol; this strongly implies that the patient, not the wrist, was the unit of treatment allocation, and that both wrists were treated identically
	+ Two major liabilities arise if this is the case: the response in the wrists in the same patient are correlated (violating the assumption of independent observations in the statistical analysis), and a major opportunity to compare responses between treatments is missed (as could have been done by randomizing wrists in the same patient to different treatments, whereby the patient with bilateral CTS could have served as his or her own control; a major opportunity to compare the interventions was needlessly lost
* There are signs of carelessness in the preparation and submission of the manuscript
	+ The acronyms PCS and PCNAI are used to designate phonophoresis with corticosteroid and NSAID
	+ The manuscript reads, “ In the PCS and PNSAI groups, diclofenac diethylammonium jel and betamethasone valerate % 0.1 cream were used, respectively”
	+ Since diclofenac is an NSAID and betamethasone is a steroid, the manuscript was probably not edited carefully enough to meet minimum standards for journal submission
* It is possible that phonophoresis with steroid or NSAID is helpful in improving symptoms and function in the short term of three months, but this study does not provide evidence of that hypothesis
* However, a second study (Yildiz 2011) was better done and may provide some evidence of the effectiveness of NSAID phonophoresis for CTS

Reference:

Yildiz N, Atalay N S, Gungen G O et al. Comparison of ultrasound and ketoprofen phonophoresis in the treatment of carpal tunnel syndrome. J Back Musculoskelet Rehabil. 2011;24(1);39-47.

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