Therapeutic Touch in the Treatment of Carpal Tunnel Syndrome

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Background: **Alternative medical therapies are widely utilized, but there are few objective data to evaluate the effectiveness of these techniques. The purpose of this study was to determine whether one alternative therapy, Therapeutic Touch (TT), can improve objective indices of median nerve function in patients with carpal tunnel syndrome.**

Methods: **Participants with electrodiagnostically confirmed carpal tunnel syndrome were randomly assigned in single-blind fashion to receive either TT or sham therapeutic touch once weekly for 6 consecutive weeks. The distal latency of the median motor nerve along with visual analog assessments of pain and relaxation were measured before and after each treatment session.**

Results: **Twenty-one participants completed the study. Changes in median motor nerve distal latencies, pain scores, and relaxation scores did not differ between participants in the TT group and participants in the sham treatment group, either immediately after each treatment session or cumulatively. Immediately after each treatment session, however, there were improvements from baseline among all the outcome variables in both groups.**

Conclusions: **In this small study, TT was no better than placebo in influencing median motor nerve distal latencies, pain scores, and relaxation scores. The changes in the outcome variables from baseline in both groups suggest a possible physiologic basis for the placebo effect. (J Am Board Fam Pract 2001; 14:335–42.)**

Because alternative healing techniques are widely used by patients,[1–3] distinguishing those treatments that are effective from those that are not has relevance for a great many patients who use these therapies. For nonpharmacologic alternative medical therapies, most of the claims of efficacy have been based on studies using subjective outcome variables, usually assessments of pain or anxiety. The absence of objective documentation of effectiveness has resulted in skepticism or indifference on the part of most physicians.

One form of alternative therapy, Therapeutic Touch (TT), is a contemporary interpretation of several ancient healing practices. TT was developed in the late 1960s and early 1970s by Dolores Krieger, PhD, RN, and Dora Kunz.[4,5] It is a consciously directed process of energy exchange during which the practitioner uses the hands in a nontactile manner as a focus to facilitate the healing process. The theory underlying TT is that human beings are energy fields, and energy can be directed from one person to another.[6]

Using sham therapeutic touch as a control, previous studies have shown that TT significantly reduces subjective measures of pain,[7,8] facilitates wound healing,[9,10] and reduces anxiety.[11]

Because objective data to corroborate the subjective benefits attributed to TT are lacking, and because carpal tunnel syndrome is a pain syndrome for which there is an objective correlate to the subjective symptoms of pain and discomfort, the current study was designed to test whether TT can improve objective indices of median nerve function in patients with carpal tunnel syndrome.

Methods

Patient Selection

Participants were recruited through physician offices, advertisements in the city newspaper, and notices posted at the study site. Before enrolling in the study, eligible participants were required to have a diagnosis of carpal tunnel syndrome con-

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firmed by electrodiagnostic testing and to have a median motor nerve distal latency greater than 4.2 msec using a portable electroneurometer (NERVEPACE, NeuMed [Neurotron Medical], Lawrenceville, NJ).[12,13]

Patients were eligible to participate regardless of other medical conditions they had, including arthritis of the wrist, rheumatoid arthritis, diabetes, thyroid disease, and kidney disease. Patients were eligible to participate regardless of any other previous treatment they had used, including previous surgery for carpal tunnel syndrome. Pregnant patients and patients younger than 18 years were excluded.

The study took place at the General Clinical Research Center (GCRC), MetroHealth Medical Center, Cleveland, Ohio, between February 1998 and June 1999. The study was approved by the institutional review board at the MetroHealth Medical Center. Written, informed consent was obtained from study participants.

Study Design and Intervention

The study used a randomized, single-blind, placebo-controlled experimental design. Participants, but not investigators, were blinded to the intervention. Participants were assigned to receive either TT treatment or sham therapeutic touch treatment once a week for 6 consecutive weeks. Three nurses working at the GCRC provided the TT intervention. Each TT nurse completed a beginner's level course involving theory and practice. Two of the nurses also completed intermediate and advanced classes. The three nurses had 1, 5, and 6 years of experience, respectively, practicing TT before the study. Other nurses working at the GCRC who did not practice TT were trained to mimic the physical movements of TT. The therapeutic components of the TT process, however, were omitted by the sham therapists. Rather than focusing on the patient with intent for wellness, the sham interventionists focused their attention on mentally counting backward from 100 to 1 in a repetitious manner.[7,11] Both the TT treatment sessions and the sham treatment sessions lasted about 30 minutes. Apart from an initial explanation about the study protocol, verbal communication between participants and therapists was not permitted during the treatment sessions.

Distal latencies of the median motor nerve were measured before and after each treatment session, and participants quantified their subjective pain or discomfort using a visual analog scale before and after each treatment session. After the initial 8 enrollees completed treatment, participants were also asked to quantify their state of relaxation using a visual analog scale before and after each treatment session. Visual analog scales for both pain and relaxation were based on a scale from 0 to 10. For the pain scale, 0 was designated to represent no pain or discomfort, while 10 was designated to represent pain or discomfort as bad as it could possibly be. For the relaxation scale, 0 was designated to represent totally relaxed, while 10 was designated to represent totally tense.

Initially it was anticipated that 50 to 100 persons would participate. When it became apparent that the study would not enroll that many participants, study participants were asked to cross over after a 6-week washout period. Thus, after at least 6 weeks without any treatment, participants who initially received 6 weeks of TT received 6 weeks of sham therapeutic touch, and vice versa.

Measurements

An electroneurometer was used to measure the distal latency of the median motor nerve before and after each treatment session.[12–16] The nurses who performed the TT and sham interventions were trained in the use of the electroneurometer. Because of staffing availability, nerve conductivity was usually done by the nurse who gave the treatment. Interrater reliability was established among the nurses trained in using the electroneurometer.

Statistical Analysis

Difference scores were computed by subtracting after from before measures of median motor nerve distal latencies and after from before visual analog scores for pain and relaxation for each treatment session. In addition, changes between the first treatment session (before any treatment) and the last treatment session (before the final treatment) for median motor nerve distal latencies, pain scores, and relaxation scores were computed. For all outcome scores, negative scores indicated improvement from baseline. To compare participants in the TT group with participants in the sham therapeutic touch group, Student *t* tests were used to compare all continuous variables, and chi-square statistics were used to compare categorical variables.

Table 1. Demographic and Medical Variables for Participants Initially Assigned to Therapeutic Touch (n = 11) and Sham Treatment (n = 10) Groups.

Variable	Therapeutic Touch No. (%)	Sham Treatment No. (%)	*P* Value
Mean age ± SD (years)	57.4 ± 14.9	55.2 ± 13.1	.73
Sex, female	5 (45)	5 (50)	.84
Ethnicity, white	10 (91)	10 (100)	.33
Marital status, married	6 (55)	5 (50)	.83
Education, less than high school	0 (0)	1 (10)	.80
Duration of carpal tunnel syndrome >4 years	8 (73)	5 (50)	.28
Symptoms of carpal tunnel syndrome in both hands	10 (91)	7 (70)	.90
Right handed	8 (73)	7 (70)	.90
Associated medical conditions of arthritis in wrist, diabetes	8 (73)	2 (20)	.02
Previous treatment—wrist splint	11 (100)	7 (70)	.05
Feel that carpal tunnel syndrome is related to job	6 (55)	3 (30)	.74

SD = standard deviation.

Results

Of the 21 patients who met the enrollment criteria, 11 were initially assigned to TT, and 10 were initially assigned to sham therapeutic touch. There were no significant differences between the two groups in terms of age, sex, ethnicity, marital status, education, or duration of carpal tunnel syndrome. TT participants were more likely to have arthritis in the wrist and to have diabetes, and they were more likely to have used wrist splints previously (Table 1). Although participants assigned to the intervention group had higher rates of associated medical conditions and used wrist splints more often than participants in the control group, neither variable was associated with initial or follow-up outcome measures; therefore, it was unnecessary to control for these variables in the subsequent analyses.

Table 2 shows that between the beginning of the first treatment session and the beginning of the last treatment session, there were no significant differences in the mean median motor nerve distal latencies, pain scores, and relaxation scores between the TT group and the sham treatment group.

There were no significant immediate changes between the TT group and the sham treatment group in median motor nerve distal latencies, pain

Table 2. Changes in Median Motor Nerve Distal Latencies, Pain Scores, and Relaxation Scores Between Initial Treatment Session (Before First Session) and Last Treatment Session (Before Sixth Session) for Therapeutic Touch (n = 11) and Sham Treatment (n = 10) Groups.

Variable	Therapeutic Touch No. ± SD	Sham Treatment No. ± SD	*P* Value
Mean initial motor distal latency (msec)	5.4 ± 0.9	6.1 ± 1.8	.36
Mean motor distal latency before last treatment (msec)	5.2 ± 1.1	5.9 ± 1.0	.15
Mean initial pain score	4.8 ± 2.7	3.4 ± 2.3	.19
Mean pain score before last treatment	3.7 ± 2.55	3.8 ± 2.4	.92
Mean initial relaxation score*	5.0 ± 5.0	3.0 ± 2.6	.56
Mean relaxation score before last treatment†	2.7 ± 3.1	5.4 ± 2.7	.23

SD - standard deviation.
*n = 3 for therapeutic touch group, n = 5 for sham treatment group.
†n = 4 for therapeutic touch group, n = 4 for sham treatment group.

Table 3. Immediate Changes in Median Motor Nerve Distal Latencies, Pain, and Relaxation Scores After Intervention in Participants Initially Assigned to Therapeutic Touch (n = 11) and Sham Treatment (n = 10) Groups.

Variable	Therapeutic Touch No. ± SD	Sham Treatment No. ± SD	*P* Value
Mean change in motor distal latency (msec)	−.21 ± .32*	−.16 ± .17†	.71
Mean change in pain score	−.65 ± .89‡	−1.11 ± 1.41§	.36
Mean change in relaxation score‖	−.81 ± 1.11¶	−1.39 ± 1.50**	.44

SD = standard deviation.
*For difference from baseline, $P = .06$.
†For difference from baseline, $P = .01$.
‡For difference from baseline, $P = .08$.
§For difference from baseline, $P = .04$.
‖n = 7 for therapeutic touch group, n = 6 for sham treatment group.
¶For difference from baseline, $P = .11$.
**For difference from baseline, $P = .07$.

scores, and relaxation scores averaged for the 6 weeks of treatment (Table 3). There were significant immediate differences from baseline for participants in the sham treatment group in terms of median motor nerve distal latencies and pain scores (negative scores indicate improvement). There was a trend toward an immediate difference in relaxation scores in the sham treatment group, and there was a trend toward an immediate difference from baseline in terms of median motor nerve distal latencies, pain scores, and relaxation scores for participants in the TT group.

Six participants in each group crossed over to the other treatment after a washout period. There were no significant differences between the participants who crossed over and those who did not in terms of age, sex, ethnicity, marital status, education, duration of carpal tunnel syndrome, previous treatments for carpal tunnel syndrome, associated medical conditions, initial median motor nerve distal latency, initial pain score, and initial relaxation score.

Table 4 compares the total number of participants treated during TT sessions (those participants initially assigned to TT plus those initial sham treatment participants who crossed over) with the total number of participants treated during sham treatment sessions (those participants initially assigned to sham treatment plus those initial TT participants who crossed over). There were no significant differences between the two groups in terms of changes in median motor nerve distal latencies, changes in pain scores, and changes in relaxation scores. There were significant immediate

Table 4. Immediate Changes in Median Motor Nerve Distal Latencies, Pain, and Relaxation Scores After Intervention for All Participants Who Received Therapeutic Touch (n = 17) and Sham Treatment (n = 16).

Variable	Therapeutic Touch No. ± SD	Sham Treatment No. ± SD	*P* Value
Change in motor distal latency (msec)	−.21 ± .29*	−.20 ± .25†	.95
Change in pain score	−.63 ± 1.10‡	−1.19 ± 1.20§	.18
Change in relaxation score‖	−.90 ± 1.21¶	−1.33 ± 1.22**	.40

SD - standard deviation.
*For difference from baseline, $P = .01$.
†For difference from baseline, $P = .005$.
‡For difference from baseline, $P = .03$.
§For difference from baseline, $P = .001$.
‖n = 13 for therapeutic touch group, n = 11 for sham treatment group.
¶For difference from baseline, $P = .02$.
**For difference from baseline, $P = .005$.

changes from baseline, however, in both the TT group and the sham treatment group for all three of these dependent variables.

Cohen[17] defines a moderate effect size as one in which mean differences are 0.5 of a standard deviation and a large effect size as one in which mean differences are 0.8 of a standard deviation. Thus, the changes in Tables 3 and 4 can be interpreted as moderate to large. These changes are both statistically and clinically meaningful for this size sample.

Discussion

This study found no significant differences between TT and sham therapeutic touch in terms of immediate or cumulative distal latency changes of the median motor nerve, pain scores, and relaxation scores. Although the apparent explanation is that TT lacks efficacy, other possible explanations and interpretations exist. Before rendering a decision as to the merits of TT, it is important to keep in mind the limitations of the study.

First of all, the small sample size makes any generalizations and conclusions tenuous.

A possible limitation of the study is the assumption that changes in median nerve motor distal latencies correlate with the degree of improvement of the carpal tunnel syndrome. Whereas nerve conduction studies confirm the diagnosis of carpal tunnel syndrome with a high degree of sensitivity and specificity,[18] these types of evaluations are not routinely performed after treatment for carpal tunnel syndrome.[19] Several studies document that measures of nerve conduction improve after surgical intervention,[20–23] but immediate improvement in distal latencies after surgery has not been found by all investigators.[24] Little research is available to evaluate objectively the efficacy of nonsurgical therapies for carpal tunnel syndrome, although one study showed that ultrasound therapy improves electrophysiological measures of carpal tunnel syndrome.[25]

There is a potential for bias in that the nurse therapists who performed the intervention also performed the electroneurometer readings. Ideally, the operator of the electroneurometer should be someone other than the person who performed the intervention. Unfortunately, staffing availability did not allow this optimal situation.

Another potential bias is that distal latency evaluations of the median motor nerve are not as sensitive as median sensory nerve distal latency evaluations using the portable electroneurometer.[14,26] In general, prolongation of median motor nerve distal latencies implies that the carpal tunnel syndrome is more advanced than when only the median sensory nerve distal latencies are abnormal.[26] It is possible that using another measure of median nerve function, such as sensory distal latencies, would allow the outcome measure to detect more accurately a subtle effect attributable to the intervention. A study that used a yoga-based intervention, however, measured median sensory nerve distal latencies in participants with carpal tunnel syndrome before and after treatment yet found no electrodiagnostic evidence of a treatment effect.[27] This finding suggests that median sensory nerve data might offer little advantage compared with median motor nerve data.

It is conceivable that using a crossover study design is not a valid method with this type of intervention because participants might be able to detect differences in the two treatments, thereby biasing their self-report of pain or relaxation. Participants were questioned after the initial 6 treatment sessions about which intervention they received. Twenty-five percent of the TT participants guessed that they received TT, and 75% were uncertain about which treatment they received. None of the TT participants guessed that they received sham treatment. Fifty percent of the sham treatment participants guessed incorrectly that they received TT, and 50% were uncertain about which intervention they received. None of the sham treatment participants guessed that they received sham treatment. Because no participant believed he or she received sham therapy during the initial sessions, and because most participants were uncertain as to which group they had been assigned, we do not believe that correctly detecting the intervention biased self-reports of relaxation or pain.

Finally, the study design might not have allowed the TT intervention to be maximally effective. The TT therapists in our study reported unease at not being able to communicate verbally with participants during the treatment sessions and believed that this minimized the impact of the intervention. Because the sham therapists had no verbal interaction with participants in order to keep participants blinded to the intervention and in order to be able

to make parallel comparisons between the TT treatments and the sham treatments, this precaution was necessary. Whereas this protocol potentially weakened the effectiveness of the TT, previous placebo-controlled studies of TT used a similar nonverbal experimental design.[7,8,11]

Keeping these biases and limitations in mind, the most interesting findings of our study are the significant changes in the median motor nerve distal latencies from baseline for both the TT and the sham therapeutic touch groups. There are several possible interpretations of this curious finding. One possible interpretation is that the distal latency changes represent a temperature effect involving the hands and wrists when they are being evaluated. Temperature changes influence the median nerve; the warmer the extremity, the faster the nerve conduction.[28–30] Unlike conventional electrodiagnostic testing equipment, the portable electroneurometer lacks the capacity to monitor or correct for skin temperatures. Because the participants who received both the TT and the sham therapeutic touch reported improved relaxation, and because relaxation can influence skin temperatures in the extremities, it is possible that the electrophysiologic changes represent the effect of warmer temperatures in the posttreatment extremities.

A second possible interpretation is that the participants in the sham treatment group inadvertently received TT. The study attempted to ensure that the sham therapists did not unintentionally administer TT. The sham therapists had no previous experience with TT. They had never attended any lectures or workshops, they had received no explanation as to how TT works, and they never received a TT treatment. When questioned after completion of the study, all the sham treatment therapists admitted that their thoughts had strayed at times from the task of counting backwards from 100. Only 1 of the 4 sham therapists admitted that she had wished a participants to be well during a treatment session. Hence, through their physical movements or through their physical movements combined with an unintentional concern for the welfare of their participants, one or more of the sham therapists might have unknowingly administered TT. If this explanation is correct, then another experimental design, one in which participants could in no way receive inadvertent TT,[9,10] would be required to distinguish the effects of TT from sham therapeutic touch.

A third possible interpretation is that both TT and sham therapeutic touch are placebo interventions. Our data suggest, however, that there are positive physiologic changes in response to these interventions. The placebo effect is commonly understood as a suggestion effect that occurs when an inert treatment elicits a sense of subjective improvement. This interpretation of the placebo effect assumes that any benefit is attributable to psychological influences. Because psychological phenomena occur within the brain, this explanation assumes that the placebo effect is limited to the central nervous system.

In contrast to this conventional understanding of the placebo effect, one possible interpretation of our data is that that there are non–central-nervous-system manifestations of the placebo effect. The median nerve is part of the peripheral nervous system, separate from the central nervous system, and seemingly outside the influence of psychological phenomenon. Yet our data suggest the possibility that objectively measurable changes occur in the peripheral nervous system in response to a placebo intervention. If this interpretation is correct, it begs for a plausible explanation.

One possible explanation is that the central nervous system regulates the median nerve. With some autonomic portions of the nervous system, the central nervous system exerts an influence either in the form of up-regulation or down-regulation. Although this influence is theoretically possible, there is no empiric evidence to suggest that the central nervous system regulates median nerve functioning in this manner.

An alternative explanation, based on our data, is that the placebo effect is a relaxation response.[31,32] Our data indicate that both TT and sham therapeutic touch facilitate relaxation. It is possible that relaxation, either by itself or in concert with other psychological factors, exerts an influence on physiologic processes, thereby allowing the body to function in a more optimal manner. Using the median nerve as an example, if relaxation hastens the velocity of nerve conduction, then the result would be not only a subjective sense of improvement, but an objectively measurable improvement as well. This outcome is plausible because, as mentioned earlier, by increasing blood flow to the hand and wrist, relaxation might warm the extremity, thereby speeding nerve conduction.

That the placebo effect might represent a relaxation response offers a fresh perspective by which to interpret the findings of previous surgical, pharmacologic, and alternative medicine interventions that have been classified as placebo effects. If this perspective is correct, then our findings would not only add to the mounting evidence verifying the importance of the mind-body connection and its influence on healing and wellness, but would also provide some insight as to the mechanism of the connection.

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