Pain Perception and Energy Healing in Healthy Adults:

A Preliminary Prospective Randomized Controlled Study

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Abstract:

Pain is one of the main indications for which consumers utilize complementary and alternative medicine (CAM). Controlled studies that use a standardized pain stimulus to examine the effects of CAM practices on pain perception are lacking. Furthermore, conventional statistical methodology to detect changes in individuals receiving CAM treatments are often inadequate. In the present study, we used a standardized pain model utilizing 0.5 ml of a 3% capsaicin solution administered to the medial surface of the forearm of healthy adult volunteer subjects. Subjects were randomized to an energy healing condition or to a no intervention control condition. Participants in both groups rated their pain perception on a 1-10 scale every two minutes for the next hour. Additionally, a novel quantitative methodology for assessing responses to CAM interventions was developed. Subjects in the energy healing group reported significant reductions in total pain scores, peak pain scores, and "pain decrement" score compared to the control group. The standardized effect sizes on the total pain and peak pain scores were large. In conclusion, we have demonstrated that energy healing elicits a reduction in pain perception in a standard model of pain stimulus administered to volunteer subjects under randomized conditions.

Perspective: This study represents a controlled trial evaluating the effects of an energy healing intervention on pain perception during a standardized pain stimulus condition.

Introduction: Unrelieved pain is one of the most common reasons for which patients seek treatment with complementary and alternative medicine (CAM) both for adults and for children [10, 27]. In addition, chronic pain specifically defined as pain lasting over 3 months is a frequent reason for which CAM approaches are sought [1,10,2].

Energy healing is a complementary and alternative medicine (CAM) therapy that is thought to involve the practitioner's ability to balance the subtle energies of the body or the energy field of the patient. As defined by the National Center for Complementary and Alternative Medicine (NCCAM), it is an "energy-based modality" in contrast to massage or biochemical modalities. Energy healing has its Western roots in ancient traditions of "laying on of hands" and has been taught in recent years by well known healers such as Rosalyn L. Bruyere and Barbara Brennan since the early 1970's. In addition, Rei Ki, Qi Gong and other similar eastern approaches to healing through the hands are thought to involve similar mechanisms of action. Energy healing approaches were introduced into conventional western nursing education as "Therapeutic Touch" and "Healing Touch" in the mid-1970's by Kunz and Krieger [18, 19]. Therapeutic Touch techniques do not involve touching the patient, though Healing Touch and most other forms of energy healing may involve light touch without manipulation of soft tissue. This technique is practiced in many hospitals and is one of the fastest growing CAM therapies [10].

There is a substantial literature on energy healing interventions in adults consisting primarily of case reports and uncontrolled series. Such studies suggest that energy

healing can produce reductions in acute and chronic pain, headache pain, decreased anxiety and accelerated wound healing [3, 7, 8, 9, 11, 12, 13, 16, 17, 20, 21, 24, 25, 26, 30, 31]. Although case reports and uncontrolled investigations can provide important preliminary information, rigorously conducted, controlled studies are needed to determine whether CAM approaches are effective treatments for pain [27]. However, several obstacles exist to studying the response of patients to CAM interventions. Controlled clinical studies of pain are problematic due to the challenge of standardizing pain stimuli in the clinical setting. Additionally, the impact of a pain stimulus in terms of perceived amount and quality varies greatly between individuals and is influenced by many factors including emotional state, disease severity, physiological maturation, social development, emotional development, temperament and personality, gender, precipitating events, family factors, etc [28]. Thus, the complexities involved in studying pain demand innovative approaches and novel methods.

To study the effects of an energy healing intervention on pain perception, we designed a prospective, randomized, controlled protocol using a standardized pain stimulus (topical administration of a 3% capsaicin solution) in healthy adult volunteers using an energy healing intervention condition and a “no intervention” condition. We hypothesized that a skilled energy healer would be able to diminish the perception of pain in a repeatable fashion throughout the course of the experiment. Furthermore, to answer this question, one of the investigators (B.H.) developed novel statistical methodology that combines between group and within subject methods for determining

whether the energy healing intervention did in fact have an effect on the perception of the painful stimulus [14].

Materials and Methods:

Institutional Review Board approval was obtained prior to recruiting subjects. Subjects were recruited through word of mouth, institutional e-mail, and announcements posted within our institution. All participants were healthy adults with no history of asthma or sensitivity to hot peppers, i.e. capsaicin, the active ingredient in peppers, chilis, etc. After confirmation that the participant met the inclusion criteria, signed informed consent was obtained and the participant was randomized to the energy healing or no intervention group. To create a standard and reproducible pain stimulus, 0.5ml of a 3% capsaicin solution (weight per volume in 70% ethanol) (Sigma, St. Louis, MO) was applied to a 1 cm x 1 cm gauze pad that had been placed on the ventral surface of the participant's left forearm. The capsaicin saturated gauze was secured with an occlusive adhesive covering (Tegaderm ™, 3M Corporation, St. Paul, MN). The forearm was maintained in a stationary position on a horizontal surface during the one hour study period. A single batch of capsaicin solution was kept in a tightly sealed container at 4° C to minimize variability of solution from one session to the next.

Pain perception was rated by the participant using a ten point pain intensity scale. The assessment protocol began with the participant assessing his/her baseline pain intensity (1-10) before the capsaicin was administered. After 5 minutes the participant was asked to again assess and record the assessment on the scale. From that point on an

additional assessment was recorded every 2 minutes until the end of the session (48 minutes later); hence, 27 pain assessments were obtained from each subject during the 53 minute data recording session.

The same schedule of self-rating of pain perception was used in both groups, the energy healing group and the no treatment control group. The control group participants maintained the left forearm in a stationary position on a horizontal surface and read magazines in an open office cubicle. The investigators evaluated and checked on participants frequently during the 50 minute protocol. For participants in the energy healing group, an energy healing practitioner sat across from the participant in a small office with the door open. The left arm (with capsaicin) was supported by a pillow and the energy healer (K.W.) gently put his hands on the elbow and hand of the participant for four minutes and then took his hands off for four minutes until the end of the 48 minute session. There were six "hands on" intervals and six "hands off" intervals. To reduce expectancy effects, the participant was told that the energy healer was not trying to relieve the pain but was trying to assess the participant's pain perception through his hands. After the last pain rating, the participant's arm was washed thoroughly with mild soap and water and s/he stayed until the pain ratings had diminished to a maximum of "2" on the 1-10 scale. Infection control precautions were utilized by standardized hand- washing procedures.

Energy intervention-

The energy healing technique used in this study was developed by Rosalyn L. Bruyere and is consistent with the methods she generally teaches. It is a form of energy healing

that requires the practitioner to learn to control the use of his/her own subtle energy system to help regulate the subtle energy system of another individual through generating energy toward or withdrawing energy from the other person[4]. Frequently during energy healing interventions, energy is added to the patient's system. However, when working specifically with pain, often the strategy is to withdraw or "pull" energy from the patient. In this study, the energy healing practitioner "pulled" energy when he attempted to reduce pain perception in the subjects.

Data analysis-

Three pain scores were derived from each subject's 27 pain assessments. These scores capture three different aspects of pain perception. First, the *total* pain perceived during the entire measurement session was defined as the mean of the 27 pain assessments obtained from each subject. Second, the *peak* pain was defined as the highest perceived pain score observed during the entire session.

The third score derived from the 27 assessments was developed to measure the immediate *decrement* in within session pain associated with change in stimulus conditions. A relatively complex statistical model is required to describe within session effects because, even in the absence of experimental condition changes, the baseline pain trajectory follows a complex function of time. This constantly changing baseline function invalidates conventional single subject time-series methods of analysis. Under control (rather than active treatment) conditions, perceived pain increases during early observations, then reaches an asymptote, and eventually decreases near the end of the

data collection session. Under active treatment conditions the pain function is a combination of the complex baseline function plus additional intervention components. The model developed by one of the co-investigators (B.H.) includes a parameter that measures immediate change in the pain trajectory that may occur when the conditions change within the session. The estimate of this parameter is the decrement coefficient (i. e., the immediate pain decrement score).This score was obtained for each subject by fitting a high order polynomial time-series regression model of the intervention effect. This approach[14] contrasts the adequacy of two time-series intervention models in describing the within session pain trajectory. The first is an intervention model of the within session pain trajectory for a subject exposed to intervention conditions; the second is a model of the within session pain trajectory for the same subject not exposed to intervention conditions. The difference between trajectories associated with these models is expected to be larger for experimental subjects exposed to a within session intervention than for control subjects not exposed to a within session intervention. Hence, the decrement coefficient computed for each subject provides a parsimonious index of immediate within session change.

The evaluation of possible treatment effects was carried out in two stages. First, an overall test for treatment effects was carried out using O'Brien's nonparametric global test [22]. This test is used when there is more than one outcome variable and the issue of multiplicity is to be acknowledged in the analysis. Because three outcome variables were included in the study (i.e., *total* pain, *peak* pain, and *immediate pain decrement*) a global test was appropriate. The second stage of the analysis involved univariate tests.

The results on each individual outcome measure were evaluated utilizing a Welch modified univariate *t*-test. This test was applied rather than a conventional independent samples *t*-test because the treatment and control variances were heterogeneous on all outcome measures.

Results

Twenty-one subjects were recruited and studied over a two week period of time utilizing a single batch of 3% capsaicin to avoid variability. No patients dropped out of the study nor were any unexpected adverse events noted. There were no differences in baseline pain perceptions ratings between the groups. The mean age of the energy healing and control groups was 31.3 and 31.8 years, respectively.

The O'Brien global test result was statistically significant ($p = .01$, $F = 8.07$, $df = 1, 19$); this is strong evidence that there is an overall effect of the treatment when considering all three outcome variables together. The combined evidence clearly indicates that the difference between active treatment and control groups is very unlikely to be the result of sampling or random error. Because there appeared to be a true overall effect of the treatment, we evaluated the results on each of the three individual outcome measures. We utilized one-tailed probability values in all our univariate pain variable analyses because our previous investigations have documented consistent reductions in pain ratings after energy healing interventions [14].

The results on total pain experienced by each subject (measured over 27 timepoints) is shown in Table 1. Notice that the difference between the treatment and

control means is a little over two points on the pain scale and that this difference is statistically significant (one-tailed p = .011).

The standardized effect size (d = -1.37) on the total pain score is considered very large according to the guidelines for effect size interpretation proposed by Cohen [6]. A value of this size can be interpreted to mean that the average total mean score for the treatment group is 1.37 standard deviation units below the average mean score for the control group. Correspondingly, the amount of total pain reported by the average treated person is at the 9th percentile of the control group. In other words, only 9% of the control subjects have a total pain score as low as that of the average treated subject. Another way of presenting the outcome is provided by the eta squared statistic. This statistic can be interpreted as the the proportion of the total variation on the dependent variable that is explained by the independent variable (i.e., treatment conditions). Hence, this statistic measures the degree of association between the independent and dependent variables. If the control and active treatment means were equal, eta squared would be zero; on the other hand, if all the variation among subjects on the total pain score could be attributed to the different treatment conditions (and there was no within group variation) then the value of eta squared would be 1.0. These extremes are rare and most studies yield values slightly greater than zero and far less than one. Guidelines for interpreting likely values of eta squared have been proposed by Cohen [6]. The eta squared value obtained on the total pain score outcome (.34) is considered evidence of a large association between the independent variable and total pain scores.

The results on the second outcome measure (peak pain perceived during the whole session) can be seen in part B of Table 1. Notice that the mean difference between the treatment and control groups with respect to peak pain is about 1.89 points (higher mean for the control group); this difference is statistically significant (one-tailed $p < .03$). The corresponding standardized effect size and eta squared values of -1.02 and .22, respectively, are considered large.

The results on the immediate pain decrement measure is shown in part C of Table 1. The mean difference on this measure indicates that the immediate decrease in pain was approximately a quarter of a point more from the hands off period to the hands on period for the treated group than for the control group. This difference is statistically significant (one- tailed $p < .05$). The standardized effect size is -.70 and the value of eta squared is .12; both of these values are considered medium effect sizes.

Discussion:

This study demonstrates that the presence of an energy healer utilizing energy healing techniques is associated with significantly lower total pain scores, lower peak pain scores and lower immediate pain decrement scores in healthy adults experiencing a standardized pain stimulus (topical capsaicin) compared to a control group not receiving an intervention. The results suggest that regardless of the way the outcome is conceptualized and quantifited (i. e., total pain throughout session, peak pain within the session, or amount of pain decrement immmediately following the hands on interval) all of these methods of operationalizing the outcome arrive at the same conclusion: the presence of the healer is associated with a difference between the intervention and control groups on perceived pain elicited by a standardized pain stimulus. The effect appears to be largest for total pain, somewhat less for peak pain, and smallest for immediate pain decrement, though the effects sizes for all three measures may be considered to be of clinical importance.

Conducting CAM research and, in particular, energy healing research for pain is difficult and complicated due to the subjective nature of pain perception, the effect of mood and emotional state on pain and the natural variation of pain over time. In order to demonstrate an effect of the intervention on perceived experimental pain, two different experimental design approaches were employed. First, conventional between-subject comparisons of randomly assigned experimental and control groups were carried out. Second, a methodology was developed that combines the internal validity of randomized group comparisons with a time-series intervention model of within-subject

change in the pain trajectory observed throughout the data collection session. The latter approach provided an outcome metric for between-subject comparisons of immediate pain change as well as a within-subject description of pain change across time.The combined between-group and within-subject information converged to support a cause and effect relationship between the actions of the practitioner and the response of the subjects.

An important tool to assist in evaluating the efficacy of an intervention was developed by the American Psychological Association (APA) Division 12 Task Force on Promotion and Dissemination of Psychological Procedures (referred to below as "APA Task Force") [5, 23].For a treatment to be considered "efficacious", there must be a minimum of two between-group experiments conducted by at least two independent research groups showing that the intervention is superior to a no-treatment control, an alternative treatment or placebo; or that the intervention is equivalent to a previously established treatment [5]. For a designation of "possibly efficacious" only one between-group study that meets these criteria is sufficient.

The present study achieves a significant contribution to the literature on energy healing by showing that the intervention is superior to a no-treatment control or standard medical care meeting the criteria of a "possibly efficacious" intervention [29]. Because well-designed, randomized studies of energy healing in experimental pain do not exist, the data presented in this study provide important evidence that an objective effect beyond the placebo effect is present during this energy healing intervention. Based

upon these findings, we are in a position to undertake a comparison between the energy healing intervention and an established therapy, e.g. analgesic medication and/or an attention/control/placebo condition.

For any therapy to find a place in clinical medicine, it is critical that its safety and potential to benefit patients outweighs its potential to cause harm. Practitioners associated with our program have administered energy healing interventions under the guidance of Rosalyn Bruyere to over 700 hospitalized children and their parents in the course of institutionally approved research protocols with no reports of adverse events, thus establishing its safety in a pediatric hospital setting [14]. In an uncontrolled study, self reported ratings of pain as well as distress, tension, discomfort and upset mood were all significantly decreased after energy healing interventions (N=250) [14]. In general, energy healing interventions are associated with few if any adverse events [15].

Although the findings of the current study would qualify energy healing as a "possibly efficacious" intervention according to APA standards, it should still be considered a preliminary study. Self-selection bias of the volunteers and other factors make it difficult to eliminate all sources of potentially false-positive results. Follow up studies by other investigators and subsequent investigations utilizing a sham healer will be necessary to determine whether these effects are due to specific characteristics of the energy healing (i.e., skills developed during energy healing training) or if they are due to less specific effects of the energy healing, e.g.the interaction with and presence of another person.

In conclusion, we have demonstrated that healthy adults experiencing a standardized pain stimulus (topical capsaicin) report significantly lower total pain scores, lower peak pain scores, and lower pain decrement scores during an energy healing intervention than adults in a no intervention control condition. The current work utilizes a statistical approach which may have far-ranging applications in clinical research for both CAM and conventional therapeutic interventions. A follow-up study using a sham healer control condition is currently being planned.

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Table 1. Results of Univariate Analyses (Including Significance Tests, Standardized

Effect Sizes (and Eta Squared) on Total Pain, Peak Pain,
and Immediate Pain Decrement Scores.

A. Total Session Pain.

Group	*n*	*M*	*SD*	*t**	*df*	One-tailed *p*-value
Active	12	3.34	.77	2.76	9	.011
Control	9	5.50	2.25			

Standardized Effect Size: *d* = -.1.37

Eta squared = .34

B. Peak Session Pain.

Group	*n*	*M*	*SD*	*t**	*df*	One-tailed *p*-value
Active	12	5.67	1.30	2.13	11	.028
Control	9	7.56	2.40			

Standardized Effect Size: *d* = -1.02

Eta squared = .22

C. Immediate Pain Decrement

Group	*n*	*M*	*SD*	*t**	*df*	One-tailed *p*-value
Active	12	-.097	.44	1.78	14	.048
Control	9	.150	.16			

Standardized Effect Size: *d* = -.70

Eta squared = .12

* Welch modified *t*-test.

1. Astin JA: Why patients use alternative medicine: results of a national study. Jama 279(19):1548-1553, 1998
2. Bausell RB, Lee WL, Berman BM: Demographic and health-related correlates to visits to complementary and alternative medical providers. Med Care 39(2):190-196, 2001
3. Blankfield RP, Sulzmann C, Fradley LG, Tapolyai AA, Zyzanski SJ: Therapeutic touch in the treatment of carpal tunnel syndrome. J Am Board Fam Pract 14(5):335-342, 2001
4. Bruyere RL: Wheels of Light: Chakras, Auras, and the Healing Energy of the Body. New York, NY, Fireside, 1994 pp 199-200.
5. Chambless D, Hollon, S.D.: Defining empirically supported therapies. J Consult Clin Psychol 66:7-18, 1998
6. Cohen J: Statistical power analysis for the behavioral sciences. New York, Academic Press, 1988
7. Daley B: Therapeutic touch, nursing practice and contemporary cutaneous wound healing research[see comment]. J Adv Nurs 25(6):1123-1132, 1997
8. DuBrey RJ: Therapeutic touch: a healing intervention. Hospital uses complementary therapy to aid healing, relieve pain. Health Prog 77(3): 46-48, 1996
9. Eckes Peck SD: The effectiveness of therapeutic touch for decreasing pain in elders with degenerative arthritis. J Holist Nurs15(2):176-198, 1997
10. Eisenberg DM, Davis RB, Ettner SL, Appel S, Wilkey S, Van Rompay M, Kessler RC: Trends in alternative medicine use in the United States, 1990-1997: results of a follow-up national survey. Jama 280(18):1569-1575, 1998
11. Finch A: Therapeutic touch and wound healing. J Wound Care 6(10):501-504, 1997
12. Giasson M, Bouchard L: Effect of therapeutic touch on the well-being of persons with terminal cancer. J Holist Nurs 16(3):383-398, 1998
13. Gordon A, Merenstein JH, D'Amico F, Hudgens D: The effects of therapeutic touch on patients with osteoarthritis of the knee[see comment]. J Fam Pract 47(4):271-277, 1998
14. Huitema B, Wang S: A time-series regression model for the analyses of designs with multiple intervention points and complex baseline behavior. Department of Psychology, Western Michigan University Technical Report, 2008 .
15. Jonas WB: Alternative medicine--learning from the past, examining the present, advancing to the future. Jama 280(18):1616-1618, 1998
16. Jonasen AM: Therapeutic touch. A holistic approach to perioperative nursing (continuing education credit). Todays OR Nurse 16(1):7-12, quiz 50-1 1994.
17. Kenosian CV: Wound healing with noncontact therapeutic touch used as an adjunct therapy. J Wound Ostomy Continence Nurs 22(2): 95-99, 1995
18. Krieger D: Therapeutic touch; an ancient, but unorthodox nursing intervention. J N Y State Nurses Assoc 6(2):6-10, 1975
19. Krieger D, Peper E, Ancoli S: Therapeutic touch: searching for evidence of physiological change. AJN, American Journal of Nursing 79(4):660-662, 1979
20. Leskowitz ED: Phantom limb pain treated with therapeutic touch: a case report. Arch Phys Med Rehabil 81(4):522-524, 2000
21. Meehan TC: Therapeutic touch and postoperative pain: a Rogerian research study. Nurs Sci Q 6(2):69-78, 1993
22. O'Brien P: Procedures for comparing sammples with multiple endpoints. Biometrics 40:1079-1087, 1984

23. Procedures T.F.o.P.a.D.o.P: Training in and dissemination of empirically validated psychological treatments: report and recommendations. Clin Psychol 48:3-23, 1995
24. Ramnarine-Singh S: The surgical significance of therapeutic touch. Assn of perOperative Registered Nurses J 69(2):358-369, 1999
25. Smyth PE: Therapeutic touch for a patient after a Whipple procedure. Crit Care Nurs Clin North Am 13(3):357-363, 2001
26. Snyder M, Wieland J: Complementary and alternative therapies: what is their place in the management of chronic pain? Nurs Clin North Am 38(3):495-508, 2003
27. Tsao JC, Zeltzer LK: Complementary and Alternative Medicine Approaches for Pediatric Pain: A Review of the State-of-the-science. Evid Based Complement Alternat Med 2(2):149-159, 2005
28. Walco GA: Pain in Children: Development, Assessment, and Treatment. Pangea Conference for the Future of Pediatric Wellness. Chicago, IL, October 27, 2006
29. Wild MR, Espie CA: The efficacy of hypnosis in the reduction of procedural pain and distress in pediatric oncology: a systematic review. J Dev Behav Pediatr 25(3):207-213, 2004.
30. Wirth DP, Cram JR, Chang RJ: Multisite electromyographic analysis of therapeutic touch and qigong therapy. J Altern Complement Med 3(2):109-118, 1997
31. Wirth DP, Richardson JT, Eidelman WS: Wound healing and complementary therapies: a review. J Altern Complement Med 2(4):493-502, 1996

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