



CONTROLLED RESEARCH STUDY

Hand arthritis pain is reduced by massage therapy

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KEYWORDS

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Summary Twenty-two adults with wrist/hand arthritis were randomly assigned to a massage therapy or a standard treatment control group. The massage therapy group was massaged on the affected wrist/hand once a week for a 4-week period and were also taught self-massage on the wrist/hand that was to be done daily at home. The massage therapy group versus the control group had lower anxiety and depressed mood scores after the first and last sessions, and that group reported less pain and greater grip strength after their sessions. The massage therapy group showed greater improvement than the control group on all of these measures across the study period.

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Introduction

Arthritis is a systemic inflammatory disease, frequently located in the small joints of the hands (Buljina et al., 2001). Arthritis affects the active, working-age population as well as the elderly, and it causes pain, activity limitations, and a lower quality of life (Dellhag and Burckhardt, 1995). Many daily activities, for example, require considerable hand strength, e.g., opening doors, opening jar lids, lifting and carrying items (Hoening et al.,

1993), and strength in patients with arthritis is 75% lower than in healthy patients (Jones et al., 1991).

Many interventions have been tried including splint use (Haskett et al., 2004; Pagnotta et al., 2005; Wajon and Ada, 2005) medications, physical therapy and various forms of exercise. Medications have been relatively effective, including chondroitin (Grifka et al., 2004; Rovetta et al., 2002, 2004). Yoga (Dash and Telles, 2001) and playing a keyboard (Zelazny, 2001) have also reduced pain and increased range of motion. Physical therapy has effectively used physical agents (e.g. heat, water, electric current, ice), and the use of movement known as exercise therapy (Buljina et al., 2001; Stamm et al., 2002; Suomi and Collier, 2003). Heat wraps (Michlovitz et al., 2004), mud compresses

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(Codish et al., 2005) and applying herbal cream (Gemmell et al., 2003) have also helped.

Massage therapy has not been researched specifically for arthritis of the hand, but has been successfully used in reducing pain in children with juvenile rheumatoid arthritis and in several other pain syndromes including migraine headaches, lower back pain, carpal tunnel syndrome and fibromyalgia (see Field, 1998 for a review), the most relevant being the study on carpal tunnel syndrome (Field et al., 2003). The purpose of the proposed study was to research the effects of massage therapy on the pain and grip strength problems associated with hand/wrist arthritis. Twenty-two adults were randomly assigned to massage therapy and standard treatment only control groups. Massage therapy was expected to (1) reduce joint pain; (2) to increase grip strength; and (3) to reduce the state of anxiety and depressed mood often associated with arthritis.

Method

Participants

Twenty-two adults (93% female) were recruited at a local university via advertising for people already diagnosed as having wrist/hand arthritis. The number of participants was determined by a power analysis based on a previous study on fibromyalgia patients (Sunshine et al., 1996). The participants had unilateral symptoms. They ranged in age from 20 to 65 ($M = 47$), were middle socioeconomic status ($M = 2.44$ on the Hollingshead Index) and distributed 72% Caucasian, 18% Hispanic, and 10% African-American. They were randomly assigned to standard treatment control and massage therapy groups. The groups did not differ on the above variables.

Procedures

The massage therapy group participants were massaged on the affected wrist/hand by a therapist once a week for a 4-week period and were also taught self-massage on the wrist/hand that was to be done daily at home prior to bedtime. The participants were called on a weekly basis to check on their ability to schedule daily sessions.

The 15 min massage consisted of moderate pressure stroking concentrated on the fingertip to elbow area. The massage begins with stroking the wrist up to the elbow and back down on both sides of the forearm. Next, a wringing motion (much like

milking a cow) is applied to the same area. This is followed by stroking, using the thumb and forefinger, in a circular or back and forth motion covering the entire forearm and hand. Finally, the skin is rolled using the thumb and forefinger across the hand and up both sides of the forearm.

The standard treatment control group received the same assessments as the massage group, but did not receive massage therapy during the study. They were taught the self-massage routine after the end of the study.

Pre–post session assessments (immediate treatment effects)

The participants completed the following assessments before and after the treatment sessions on the first and last days of the 1-month study. Perceived Grip Strength Scale is a 10 point scale, ranging from weakest (score of 0) to strongest grip (score of 10), where the participants determine their perceived grip strength after clenching both fists for 5 s. VITAS (1993) is a pre–post session pain assessment using a Visual Analogue Scale (VAS) ranging from 0 (No Pain) to 10 (Worst Possible Pain), anchored with 5 faces. Acceptable scores for criterion-related validity have been established. The State Anxiety Inventory (STAI) (Spielberger et al., 1970) consists of 20 items on how the participant feels at that moment in terms of severity from (1) “not at all” to (4) “very much so”. Typical items include “I feel nervous” and “I feel calm”. The STAI has adequate concurrent validity and internal consistency ($r = 0.83$) (Spielberger, 1972). The Profile of Mood States (POMS) (McNair et al., 1971) is a 5-point Likert rating scale on how well an adjective describes the participant’s feelings including helpless or gloomy feelings, depression and anxiety. The scale has adequate internal consistency ($r = 0.95$) (Pugatch et al., 1969).

Results

A group by repeated measures MANOVA was conducted on the of pre–post session measures on the first and last day including the self-reported pain, grip strength and anxiety/depression mood state measures (Table 1). The significant MANOVA ($F = 23.14$, $P < .01$) was followed by ANOVAs on each of the dependent measures. These were then followed by post hoc Bonferroni t -tests in the case of significant repeated measures by group (massage therapy vs. control) interaction effects. Significant

Table 1 Means for pre–post massage therapy session measures (control group in parentheses).

Pre-post measures	First day		Last day	
	Pre	Post	Pre	Post
Anxiety (STAI)	36.6 (31.5)	25.1 ^a (27.0)	32.4 ^b (31.0)	27.9 ^c (30.4)
Depression (POMS)	3.6 (3.0)	1.3 ^d (2.0)	2.5 ^b (2.3)	1.4 ^b (2.1)
Pain (VITAS)	2.8 (3.1)	2.0 ^b (3.0)	2.1 ^d (2.9)	1.3 ^d (2.8)
Grip strength	7.1 (7.6)	8.2 ^b (7.3)	8.6 ^b (6.3)	9.4 ^d (6.1)

Superscripts in columns 2 and 4 indicate pre–post differences and in column 3 indicate first day–last day differences by Bonferroni *t*-tests.

- ^a*P* < .001.
- ^b*P* < .05.
- ^c*P* < .005.
- ^d*P* < .01.

interaction effects revealed by ANOVAs were as follows: (1) reduced pain, *F* = 5.89, *P* < .01; (2) increased grip strength, *F* = 4.11, *P* < .05; (3) lower anxiety, *F* = 4.26, *P* < .05; and (4) lower depressed mood levels, *F* = 5.13, *P* < .01. Post hoc Bonferroni tests indicated significant changes for the massage group on all of these measures after the first and last sessions and by the end of the study (Table 1).

Discussion

Massage therapy has decreased pain in several pain syndromes including arthritis, fibromyalgia, lower back pain and migraines (Melzack and Wall, 1965). However, this is the first report of pain reduction in hand arthritis following massage therapy.

Increased grip strength could relate to massage therapy increasing muscle strength. Alternatively, grip strength may have increased as pain decreased. Decreases in self-reported anxiety and depression invariably occur following massage therapy associated decreases in pain (Field, 1998), so these effects were not surprising.

Research is needed to replicate these effects using a better control group (e.g. a group that receives some form of physical contact). In addition, the underlying mechanisms for the massage therapy/pain reduction relationship are not clear. A sleep study conducted with fibromyalgia syndrome suggested that massage enhanced deep sleep (Field et al., 2002) and, in turn, reduced substance P and

pain. A similar potential mechanism might be explored for wrist/hand arthritis.

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References

Buljina, A., Taljanovic, M., Avdic, D., Hunter, T., 2001. Physical and exercise therapy for treatment of the rheumatoid hand. *Arthritis and Rheumatism* 45, 392–397.

Codish, S., Abu-Shakra, M., Flusser, D., Friger, M., Sukenik, S., 2005. Mud compress therapy for the hands of patients with rheumatoid arthritis. *Rheumatology International* 25, 49–54.

Dash, M., Telles, S., 2001. Improvement in hand grip strength in normal volunteers and rheumatoid arthritis patients following yoga training. *Indian Journal of Physiology and Pharmacology* 45, 355–360.

Field, T., 1998. Massage therapy effects. *American Psychologist* 53, 1270–1281.

Field, T., Diego, M., Cullen, C., Hernandez-Reif, M., Sunshine, W., Douglas, S., 2002. Fibromyalgia pain and substance P decreases and sleep improves after massage therapy. *Journal of Clinical Rheumatology* 8, 72–76.

Field, T., Diego, M., Cullen, C., Hartshorn, K., Gruskin, A., Hernandez-Reif, M., Sunshine, W., 2003. Carpal tunnel syndrome symptoms are lessened following massage therapy. *Journal of Bodywork and Movement Therapies* 8, 9–14.

Gemmell, H., Jacobson, B., Hayes, B., 2003. Effect of a topical herbal cream on osteoarthritis of the hand and knee: a pilot study. *Journal of Manipulative and Physiological Therapeutics* 26, e15.

Grifka, J.K., Zacher, J., Brown, J.P., Seriola, B., Lee, A., Moore, A., Gimona, A., 2004. Efficacy and tolerability of lumiracoxib versus placebo in patients with osteoarthritis of the hand. *Clinical and Experimental Rheumatology* 22, 589–596.

Haskett, S., Backman, C., Porter, B., Goyert, J., Palejko, G., 2004. A crossover trial of custom-made and commercially available wrist splints in adults with inflammatory arthritis. *Arthritis and Rheumatism* 51, 792–799.

Hoening, H., Groff, G., Pratt, K., Goldberg, E., Franck, W., 1993. A randomized controlled trial of home exercise on the rheumatoid hand. *Journal of Rheumatology* 20, 785–789.

Jones, E., Hanly, J., Mooney, R., Rand, L., Spurway, P., Eastwood, B., Jones, J., 1991. Strength and function in the normal and rheumatoid hand. *Journal of Rheumatology* 18, 1313–1318.

McNair, D., Lorr, M., Droppleman, L., 1971. POMS-Profile of Mood States. Educational and Industrial Testing Services, San Diego, CA.

Melzack, R., Wall, P.D., 1965. Pain mechanisms: a new theory. *Science* 150, 971–978.

Michlovitz, S., Hun, L., Erasala, G., Hengehold, D., Weingand, K., 2004. Continuous low-level heat wrap therapy is effective for treating wrist pain. *Archives of Physical Medicine and Rehabilitation* 85, 1409–1416.

- Pagnotta, N., Korner-Bitnesky, N., Mazer, B., Baron, M., Wood-Dauphinee, S., 2005. Static wrist splint use in the performance of daily activities by individuals with rheumatoid arthritis. *The Journal of Rheumatology* 32, 2136–2143.
- Pugatch, D., Haskell, D., McNair, D., 1969. Predictors and patterns of change associated with the course of time-limited psychotherapy. Mimeo Report.
- Rovetta, G., Monteforte, P., Molfetta, G., Balestra, V., 2002. Chondroitin sulfate in erosive osteoarthritis of the hands. *International Journal of Tissue Reactions* 21, 29–32.
- Rovetta, G., Monteforte, P., Molfetta, G., Balestra, V., 2004. A two-year study of chondroitin sulfate in erosive osteoarthritis of the hands: behavior of erosions, osteophytes, pain and hand dysfunction. *Drugs under experimental and clinical research* 30, 11–16.
- Spielberger, C. (Ed.), 1972. *Anxiety: Current Trends in Theory and Research*. Academic Press, New York.
- Spielberger, C., Gorusch, R.C., Lushene, R.E., 1970. *The State Trait Anxiety Inventory*. Consulting Psychologists Press, Palo Alto, CA.
- Sunshine, W., Field, T., Quintino, O., et al., 1996. Massage therapy and transcutaneous electrical stimulation effects on fibromyalgia. *Journal of Clinical Rheumatology* 2, 18–22.
- Stamm, T., Machold, K., Smolen, J., Fischer, S., Redlich, K., Graninger, W., Ebner, W., Erlacher, L., 2002. Joint protection and home hand exercises improve hand function in patients with hand osteoarthritis: a randomized controlled trial. *Arthritis and Rheumatism* 47, 44–49.
- Suomi, R., Collier, D., 2003. Effects of arthritis exercise programs on functional fitness and perceived activities of daily living measures in older adults with arthritis. *Archives of Physical Medicine and Rehabilitation* 84, 1589–1594.
- Wajon, A., Ada, L., 2005. No difference between two splint and exercise regimens for people with osteoarthritis of the thumb: a randomised controlled trial. *The Australian Journal of Physiotherapy* 51, 245–249.
- Zelazny, C., 2001. Therapeutic instrumental music playing in hand rehabilitation for older adults with osteoarthritis: four case studies. *Journal of Music Therapy* 38, 97–113.

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