Meta-Analysis of Massage Research

The most important analysis of massage research ever done has just been published, and the results are startling. The study challenges common assumptions about the effects and effectiveness of massage and provides guidelines for future research, which may alter the course of our entire profession.

Psychological Bulletin, a respected, peer-reviewed academic journal, has just published *A Meta-Analysis of Massage Therapy Research*. The authors, all researchers at the University of Illinois at Urbana-Champaign, conclude that the most significant effects of massage may occur not in the body, but in the mind.

Specifically, their research finds that, in terms of reducing anxiety and depression, a series of massages provides relief similar in magnitude to a course of psychotherapy.

Since the mid-1980's, we have been assuming that the physical therapists, chiropractors and sports trainers were the ones who should be worried about professional massage encroaching on their turf. In fact, it appears that the people who really need to be looking over their shoulders are the psychotherapists and Prozac pushers.

Before we look at the research, a note to readers. If the next few sections make your head spin, I can assure you the original 15 page study would have you crying for mercy. This is my best, simplest summary of the research and, if you read carefully, I think you will find yourself better informed about how research happens and why this particular study is so important.

Alternately, you can just take my word for it that this study was very well designed, and skip to the juicy commentary on the conclusions at the end.

What is a "Meta-Analysis of Massage Research?"

One of the hallmarks of the scientific method is that research results must be reproducible. When you have a field, such as massage, where there are relatively few studies to begin with, and even fewer that have been duplicated, drawing conclusions can be a very dicey matter.

The meta-analysis technique allows investigators to pool all of the well-designed studies and sort them into categories to see if any scientifically valid conclusions can be drawn through statistical analysis.

Meta-analysis also provides an opportunity to assess the various theories that are being tested in a field and find out which ones seem the most likely candidates to produce positive results in future research. Additionally, a meta-analysis helps to understand the limitations of particular approaches to research in a specific field.

The Design of the Study

Prior to this effort, there have been only three meta-analyses of massage research. The largest focused on 19 studies examining the effects of tactile stimulation on infants and young children. However, its results were compromised because some of the research did not include comparison groups and random participant assignment. The results of the other two smaller meta-analyses were similarly compromised and also lacked sufficient statistics to validate their integrity.

The authors of this current meta-analysis did an exhaustive search of databases looking for massage-related research, and authors associated with massage research, to uncover existing published and unpublished work. They only considered studies that fit their definition of massage: “the manual manipulation of soft tissue intended to promote health and well-being.”

They further limited the studies to adults, rather than including research on infants, because they were interested in evaluating any psychological effects. They also examined only research published in English. When asked why, the primary researcher, Christopher Moyer, indicated that they had only found one other relevant study that was not published in English and it did not meet their criteria for inclusion.

Also eliminated were studies that focused on Therapeutic Touch (a system that does not actually require human contact), ice massage, self-massage, or massage with mechanical devices. After this initial culling, the researchers were left with 144 studies.

Next, each of the 144 studies was examined to insure that they “(a) compared a MT [massage therapy] group with one or more non-MT control groups, (b) used random assignment to groups, and (c) reported sufficient data for a between-

groups effect size to be generated on at least one dependent variable of interest."

Requiring that each study meet all three design criteria was essential for the meta-analysis itself to be able to report valid conclusions.

Only 37 of the 144 studies met all three criteria and were considered for the meta-analysis. Not surprisingly, 32% of the studies were conducted by the most prolific laboratory in the field, the Touch Research Institute in Florida. Also, reflecting the newness of massage research, 24 of the 37 studies were published in 1998 or later.

Theories of Massage Research

Even before reaching their conclusions, the authors have made a significant contribution by summarizing the current state of massage research, noting that, "there has been little emphasis on theory in MT [massage therapy] literature, with many researchers choosing to emphasize their predictions and results without testing, or in some cases even discussing, possible explanatory mechanisms."

They identified six primary theories in massage research:

- *Gate Control Theory of Pain Reduction*: This is the most popular theory. It postulates that the pressure of massage "interferes with the transmission of pain stimuli to the brain, effectively 'closing the gate' to the reception of pain before it can be processed."
- *Promotion of Parasympathetic Activity*: This theory suggests that massage pressure may stimulate vagus nerve activity leading to a reduction in stress hormones and physiological arousal. This then triggers a calming parasympathetic response that reduces anxiety, depression and pain and may also improve immune functioning and mental performance.
- *Influence on Body Chemistry*: Some studies have suggested that massage may increase levels of serotonin or endorphins thereby providing pain relief or feelings of well-being.
- *Mechanical Effects*: While studies measuring the effect of massage on circulation have produced inconsistent results, many teachers and practitioners theorize that manual breaking down of adhesions and increased circulation of blood and lymph may reduce pain associated with injury or exercise and speed healing.
- *Promotion of Restorative Sleep*: Researchers looking at fibromyalgia patients and elderly residents at an assisted-living facility suggest that massage promotes deep sleep, which produces chemical changes (increased levels of substance P and decreased levels of somatostatin) that reduce pain.
- *Interpersonal Attention*: The authors note that the first five theories primarily attempt to explain the role massage may play in reducing pain. In other words, the

research was based on a medical model. When interpersonal attention is considered in studies, the authors found that, "it is almost universally treated as a nuisance variable" that researchers try to control for in their comparison groups. "No study to date has examined it as an independent variable."

The Effects of Massage

Besides summarizing the current theories, this meta-analysis also attempts to categorize the measurable physical and psychological effects of massage. The researchers divided the effects into *Single Dose Effects*, i.e. one massage, and *Multiple-Dose Effects*, i.e. a sequence of massages. This is new terminology that the authors believe will make it easier for researchers to have more precise conversations about nine specific effects.

In the Single-Dose category, the researchers examined a single massage's influence on state anxiety, negative mood, pain, cortisol, blood pressure, and heart rate.

For Multiple-Dose studies, they looked at the more enduring effects after a series of massages on trait anxiety, depression and delayed assessment of pain.

Other influences

Finally, the researchers were careful to assess the influence of any "moderators" on the studies they examined that might effect the results. These moderators included:

- Minutes of massage per session
- Mean age of participants
- Gender of participants
- Type of comparison treatment, further subdivided into (a) *active/placebo* treatments, such as progressive muscle relaxation, acupuncture, and chiropractic care and (b) *wait-list equivalent*, where control group participants essentially receive no care (rest, reading or a break) or continued care that was already in place for a particular medical condition.
- Level of practitioner training
- Laboratory effect (Did the fact that the greatest percentage of research was done by the Touch Research Institute skew the results?)

The Juicy Stuff

From the authors:

"This meta-analysis supports the general conclusion that MT [massage therapy] is effective. Thirty-seven studies yielded a statistically significant overall effect as well as six specific effects out of nine that were examined. Significant results were found within the single-dose and multiple-dose categories, and for both physiological and psychological outcome variables."

Specifically, participants in studies who received a single massage were more likely to experience a reduction in state anxiety, blood pressure and heart rate, than participants in the comparison groups. Cortisol levels, immediate assessment of pain, and negative mood showed no statistical improvements. According to the meta-analysis, those who received a series of massages "exhibited levels of pain that were lower, on average, than 62% of comparison group participants."

But the most significant results were the reductions participants who received a course of massage experienced in trait anxiety and depression. "The average MT participant experienced a reduction of trait anxiety that was greater than 77% of comparison group participants, and a reduction of depression that was greater than 73% of comparison group participants."

The study goes on to point out that, "These effects are similar in magnitude to those found in meta-analyses examining the absolute efficacy of psychotherapy, a more traditional treatment for either condition, in which it is estimated that the average psychotherapy client fares better than 79% of untreated clients. Considered together, these results indicate that [massage] may have an effect similar to that of psychotherapy."

Before we jump into our summary, a couple of other findings.

The study determined that all six moderators examined were non-significant in this research. In the future, other studies looking more specifically at these variables, such as the length of a massage or level of training, might find that some of these moderators do affect outcomes.

However, the authors do conclude that the length of a massage session was not as important a factor as they had anticipated and even short sessions of massage can be effective. They also believe the data shows that laypersons provided with minimal training can provide beneficial massage.

Further, the researchers point out that:

"the most popular theories are the ones least supported by the present results. The failure to find a significant effect for immediate assessment of pain contradicts the theory that MT provides stimuli that interfere with pain consistent with gate control theory. Reductions in blood pressure and heart rate resulting from MT do support the theory that MT promotes a parasympathetic response, although, if this theory is true, it would also be expected that a significant reduction in cortisol levels would have occurred, which did not."

On the other hand, the least investigated theory about why massage is effective, Interpersonal Attention, is the one that gets the greatest validation from this meta-analysis.

Because massage appears to have similar effects to psychotherapy, the researchers suggest that the mechanism for massage reducing depression and

trait anxiety may be similar to the common-factors model of psychotherapy. “In this model, factors such as a client who has positive expectations for treatment, a therapist who is warm and has a positive regard for the client, and the development of an alliance between the therapist and client are considered to be more important than adherence to a specific modality of psychotherapy.”
In other words, it may be that the reason massage is so good at dealing with anxiety and depression has less to do with the kind of massage and more to do with the quality of the time spent with the practitioner.

The Final Analysis

This study is a milestone because it takes a bird’s-eye view of all previous massage research and systematically examines what we think we know and what we really know.
We can expect much disagreement about the author’s lists of theories, effects and moderators, but at least, finally, there are lists to disagree with.
This study challenges current and future researchers to be far more rigorous in their designs and to actually attach their investigations to specific theories of causation rather than looking for isolated effects.
The authors also point out the bias toward physiological mechanisms in previous research and note that the data clearly cries out for a greater emphasis on psychological factors.
Massage Therapy for treating specific injuries and disease is clearly important. But with 75% or more of visits to Primary Care practitioners being stress related, this research suggests that the greatest impact that massage might have is in promoting relaxation.
Perhaps the massage industry, which is so intent on achieving credibility as a physical treatment (massage therapy), would do well to put more emphasis on its role in creating psychological well-being (massage). After all, only so many people need to be cured of a problem, but almost everyone needs mind-body healing.

Definitions and references:

- *State Anxiety*: An emotional reaction to one's current condition or environment marked by apprehension, tension, worry and heightened autonomic nervous system activity. Tends to be transient.
- *Trait Anxiety*: A more ongoing "personality" characteristic where one tends to respond with anxiety to perceived threats in the environment.
- *Moderators*: In research, these are variables that are not specifically being studied but might affect the results if they are not taken into consideration

To see the complete research, the citation for this study is:
Moyer, C., Rounds, J., & Hannum, J. (2004). A Meta-Analysis of Massage Therapy Research. *Psychological Bulletin, Vol. 130, No. 1*, 3-18.