

Effects of Acupuncture on Chronic Lower Back Pain

Audience: Upper Division IPHY Majors

Introduction:

Lower back pain is the leading cause of limited physical activity and the second most frequent reason for physician visits for Americans under 45 years of age. According to a 1997 survey, more than half of the patients suffering from lower back or neck pain underwent complementary therapy, the most common therapy being acupuncture (3). Lower back pain disables 5.4 million Americans per year and is the second leading cause of work days lost (5). The prescription of acupuncture treatment is rapidly gaining popularity in the United States, and in 2002, the most common patients of acupuncture were those suffering from lower back pain (3). Considering the prevalence of lower back pain to our society, the question of whether acupuncture is a competent form of therapy for alleviating this disorder is relevant.

Recent studies have failed to resolve whether giving patients with chronic lower back pain needle acupuncture alleviates pain. Traditional Chinese Acupuncture has been practiced for over 2,500 years in eastern cultures, but has just recently been gaining popularity in the west. Acupuncturists claim that inserting varying sized needles under the skin at certain acupuncture points causes the activation of a pain controlling system that inhibits pain signals from causing a response in the nervous system. It is theorized that one type of sensory input (lower back pain) could be inhibited in the nervous system because of an over stimulation caused by another type of sensory input (needling) (2). Another theory states that the stimulation of acupuncture points (pain receptors) results in

the secretion of several hormone-like substances that play a role in pain control and analgesia (2). Many western scientists contend that the effects of acupuncture are due to a placebo effect, namely sham acupuncture (1). Sham acupuncture is used as a control method in which needles are inserted superficially into non acupuncture sites on subjects expecting a true acupuncture treatment (4). A majority of the studies present show no significant difference in the improvement of pain between subjects undergoing acupuncture and control subjects undergoing sham acupuncture. These results suggest that the correct location of needle placement is not necessary for acupuncture to elicit a positive analgesics response in subjects with lower back pain. The correct acupuncture treatment needs to be positively determined, so that a patients suffering from low back pain have a better understanding of treatment options.

Based on current acupuncture studies and the mechanisms of acupuncture, I will argue that the analgesic effects of acupuncture are due to the specific stimulation of points on the body and not due to the nonspecific placebo effect from sham acupuncture. I will attempt to prove this claim by showing that poor methodological quality in previous studies on the effects of acupuncture on lower back pain has caused most, if not all, experimental data implying that specific point acupuncture is no better than random point stimulation through sham acupuncture in treatment of lower back pain. I will support this claim by citing a recent meta-analysis, which presents conclusions parallel to my claim, and by refuting a controlled trial with results conflicting with my claim.

Body:

The majority of studies present on the analgesic effects of acupuncture on lower back pain show similar results for both acupuncture treatments and sham acupuncture treatments. These comparable results are flawed due to the poor quality of the experimental methods, and should not be interpreted to mean that sham acupuncture is as effective as specific point stimulation acupuncture in treating lower back pain. The meta-analysis conducted by Manheimer et al. (4) supports this claim, showing that acupuncture results in a significantly greater analgesic effect compared to sham acupuncture in the short term and long term ~~*(Table 1)*~~. Manheimer et al. conducted this analysis to clear up previous confusion about the effect of acupuncture on lower back pain in subjects, as compared to sham acupuncture (and also compared to other controls such as no additional treatment or other active treatment which is not relevant to my argument). The poor methodological quality of the majority of controlled trials testing the effectiveness of acupuncture for lower back pain improvement causes the results of these trials to vary significantly. This variance in results makes it more convenient to analyze the results of a meta-analysis of synthesized data rather than the results of each individual trial. A meta-analysis is useful when looking at results of several studies that address a single research question and present a variety of results. The data from 33 controlled trials considered in the Manheimer et al. paper were analyzed by several statistical software programs and the results of each were converted to a scale which allowed for comparisons between all of the studies. The scale used in this meta-analysis establishes one unit of effect size (the estimate of the percent of total variance between means that can be attributed to the result

of treatment (6)) to correspond to a difference of 25 points on the Visual Analog Scale and a 6 point difference on the Roland Disability Score. The Visual Analog Scale (VAS) is a simplistic method used as a self valuation of pain severity/ intensity; the patient is shown a 100-mm scale and asked to indicate their level of pain, a score of 100-mm represents “no pain at all” and a score of 0-mm represents “worst pain imaginable” (7). The Manheimer et al. analysis considered a minimum of a 10-mm difference between treatments to be significant. The Roland-Morris Disability Score is a questionnaire, based on a 24-point scale, administered to patients to determine the patient’s pain intensity and functional status (4). A 2-point difference on the Roland Disability score is considered clinically significant. The 33 controlled trials encompassed in this meta-analysis all tested the same out come (effectiveness of acupuncture on lower back pain compared to a control) but produced conflicting results. The trials were separated into subgroups according to acute or chronic pain, type of acupuncture used, and type of control group used. The Manheimer et al. meta analysis of the effectiveness of acupuncture for treating lower back pain states that subjects suffering from both short term lower back pain (6 weeks or less) and long term or chronic lower back pain (6 weeks or longer) have significantly greater improvement in pain when treated with acupuncture compared to treatment with sham acupuncture. An effect size of 0.58 was calculated for the comparison of acupuncture compared to sham acupuncture, which corresponds to a significant difference of 14.5 mm on the VAS, and 3.5 points on the Roland Disability Score (*).

Subjects given acupuncture treatment experienced an average 14.5% (14.5 mm) increase in their VAS score as compared to the subjects given the sham acupuncture treatment. This result is 4.5-mm greater than the predetermined minimum for significance. Subjects also experienced a significant increase in their Roland Disability scores (3.5 point increase) (4). These comparative improvements in test scores can be interpreted to show the significantly greater pain alleviation resulting from acupuncture compared to the pain alleviation from sham acupuncture. These statistics support my claim that specific stimulation of acupuncture points is more effective in treating lower back pain than the non-specific placebo effect of sham acupuncture.

Specific point acupuncture causes greater improvement in pain than non-specific point sham acupuncture because only the stimulation of specific areas of pain receptors, or “pain gates”, will cause the activation of the pain control response in the central nervous system (2). Acupuncture points for analgesic effects are located near afferent sensory nerve fibers and the stimulation of these points inhibit the neural activity of the dorsal periaqueductal gray region and the reticular formation of the brainstem in the central nervous system. This inhibition is a direct result of the stimulation of acupoints by acupuncture, and the resulting activation of the pain controlling system called the analgesia system. The analgesia system, when activated, is responsible for the secretion of endogen opioids. Endogen opioids, when bound to opioid receptors, cause pain inhibition by inhibiting the activity of the pain sensing regions of the brain (2). Based on this explanation, non-specific point stimulation by sham acupuncture is not capable of causing analgesia because the needle does not stimulate the pain receptors (nerve endings) present at acupoints during this treatment. This theory is supported by the

experimental data presented by the Manheimer et al. meta-analysis of the effectiveness of acupuncture on lower back pain.

References:

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- 7) North Dakota Health Care Review, Inc. Visual Analog Scale. http://www.ndhcri.org/pain/Tools/Visual_Analog_Pain_Scale.pdf [retrieved April 11, 2006]