

THE EFFECTS OF DIFFERENT TECHNIQUES OF  
ACUPUNCTURE ON KNEE PAIN

A Thesis  
Presented to the  
Faculty of Graduate Studies  
University of Manitoba

In Partial Fulfillment  
of the Requirements for the Degree of  
Master of Arts

by  
Janice Ramsay  
February, 1976



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### Acknowledgements

The author is grateful for the assistance of Dr. J. S. McIntyre and Dr. S. C. Man through all phases of this research and to Dr. M. P. Janisse and Dr. R. Melzack for their critical reading of this paper.

This research was supported by Grant Number MA 5288 of the Medical Research Council.

### Abstract

The purpose of the present investigation was to determine which of three techniques of acupuncture (distal, local, or combined distal-local) had analgesic effects on knee pain. The three techniques of acupuncture were determined by location of needle insertion relative to the area of treatment. These techniques were compared with similar placebo techniques where needles were inserted one centimetre away from the correct acupuncture point. To determine change in pain, subjects rated their knee pain twice before and five times after treatment.

The results indicated that there was a significant reduction in pain following treatment and that this analgesia was the same across groups and techniques. Because there was no difference in degree of analgesia between placebo and acupuncture subjects, it was concluded that a placebo effect was responsible for the pain reduction in this study.

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## THE EFFECTS OF DIFFERENT TECHNIQUES OF

### ACUPUNCTURE ON KNEE PAIN

Janice Ramsay

University of Manitoba

Acupuncture, an ancient Chinese medical practice, has recently roused the interest of North Americans. Although predominantly a Chinese tradition, the practice of acupuncture has not been limited to China. In fact, as both Melzack (1973a) and Mann (1973) have noted, acupuncture techniques have been practiced in many other countries as observed in historical documents of Egyptians, South Africans, Brazilians, and the Eskimo of Canada. Traditional Chinese acupuncture involves stimulation of discrete points of the skin to restore physical and/or psychological well-being (Mann, 1973).

Mann (1973) indicated that acupuncture would cure or would help diseases of the head such as migraine, trigeminal neuralgia, and senility of cerebral arteriosclerosis; diseases involving the limbs such as rheumatoid and osteoarthritis, tennis elbow, and intermittent claudication; diseases of the digestive system such as ulcers, bad breath, diarrhea, constipation, hepatitis, and chronic vomiting; diseases of the respiratory system, such as asthma,



emphysema, bronchitis, and colds could be cured or helped as could diseases of the cardio-vascular system such as tachycardia, hyper- or hypotension, and feeling cold easily. Other problems which Mann suggested could be solved with acupuncture are dysmenorrhea, impotence, nymphomania, weak eyesight, conjunctivitis, hay fever, nose bleeds, tonsillitis, acne, psoriasis, depression, stage fright, yawning, anemia, fatigue, excessive perspiration and being poor in mathematics. Although this is only a sample of Mann's list, it serves the purpose of indicating the wide variety of disease processes which are considered to be suitable for treatment by acupuncture.

#### General Acupuncture Procedure

##### Techniques of Stimulation

The most common technique used in acupuncture has been that of needle insertion, although other types of stimulation have been used (Mann, 1973). These have included vibration, ultrasound, electrical stimulation, and the technique of moxibustion which involves placing small burning balls of moxa on the skin. Some researchers have favoured procedures like injection of xylocaine into acupuncture points (Mannheim, 1974) or stimulation of

acupuncture points by ultrasound (Rossman, Wexler, & Oyle, 1974), or skin surface electrical stimulation (Kaslow & Lowenschuss, 1974) while others have concluded that best effects are obtained from needle acupuncture (Mann, 1973). As yet there have been no publications of experimental explorations determining whether there are differences in effects associated with the various techniques. However, needle acupuncture seems to have been the technique of choice for most researchers.

There are a number of different procedures which may be employed in needle acupuncture. Traditionally, many different ways of inserting the needles were used and each procedure was supposed to be effective for specific disease processes (Mann, 1973). More recently, what is done with the needles once they have been inserted has been of greater concern than the method of insertion. For example, once inserted, the needles can be left untouched for a period of time, or can be twirled between the acupuncturist's thumb and first finger, or an electric current can be passed between the needles. The technique of choice is electrical stimulation (S. C. Man, personal communication, 1974), chosen, it would seem, on the basis of clinical experience for there has been no systematic study of the differences

between techniques.

### Acupuncture Points and Meridians

The Chinese have found and mapped about 1000 acupuncture points (Mann, 1973). Since so many points have been identified, some system of classification was needed. The main classificatory system involved grouping points which fell along a common pathway or meridian. Twelve meridians have been found and have been most often named for the primary organ affected. These are: the lung, large intestine, bladder, kidney, pericardium, gall bladder, stomach, spleen, heart, small intestine, liver, and the triple warmer (Mann, 1973). Mann has failed to offer an explanation of what the triple warmer is, but S. C. Man (personal communication, 1975) indicated that the triple warmer was so named because it consisted of an upper warmer, a middle, and a lower warmer. Each of these three was thought to affect specific systems. The upper warmer was for circulatory and respiratory functions, the middle warmer for digestive functions, and the lower for reproductive functions. Apparently, stimulation of a triple warmer point affected all of these specific systems but was not associated with a single specific body organ like the other

meridians.

The meridian classificatory system was further refined by categorizing the points within a meridian on the basis of the type of effect produced. In a secondary classification, the acupuncture points are arranged into tonifying points which, when acupunctured, are thought to result in stimulation of the intended site and sedating points which, in contrast to tonifying ones, result in sedation at the intended site. Other types of points were alarm points, connecting points, entrance and exit points, and the picturesque Window in the Sky points (Mann, 1973). Unfortunately, Mann's description of these points is inadequate and no alternative English source is available.

Various combinations of acupuncture points as determined by ancient Chinese formulae are used to treat specific diseases. Mann's (1973) system of coding the acupuncture points was to use one or more letters from the meridian name as well as the number assigned to the acupuncture point within that meridian. One example given by Mann (1973) was the treatment of a patient's chronic bladder problems by stimulating the bladder point B58 and the kidney point K6. This combination of stimulation, according to Mann, was responsible for terminating this patient's

symptoms.

#### Theoretical Explanations of Acupuncture

Several theories have been proposed to account for acupuncture. One of these involved an ancient Chinese concept of complementary opposites, the theory of Yin and Yang. According to this position everything can be classified as being Yin or Yang and if either the Yin or the Yang state alone is known, then the unknown can be determined. Therefore, knowing that day is a Yang state permits the prediction that night, the complementary opposite of day, is a Yin state (Mann, 1973). Within the natural world, Yin and Yang must be in a state of harmony and this is true also for the human body which is a part of the natural world. When Yin and Yang of the human body are disharmonious, then disease occurs (Melzack, 1973a; Mann, 1973) and traditionally, acupuncture was performed to restore health by re-establishing a balance between Yin and Yang. Although this theory is no longer in vogue among more modern Chinese doctors (Melzack, 1973a), S. C. Man (personal communication, 1973) has pointed out that a similar concept of complementary opposites exists in western medicine. When disease occurs, there may be either an excess, that is Yang, or a deficiency, a Yin state. Consequently, from such

imbalances, there are conditions such as hyper- and hypoventilation, hyper- and hypocalcemia, and hyper- and hypoacidity. The medical goal is to restore balance in the body with such diseases.

Another ancient Chinese theory is the theory of elements. All matter, including the organs of the human body, were classified as being of one of the five elements: wood, fire, earth, metal, or water. Then by the theory, the elements were thought to be capable of creating or destroying one another when disharmonious conditions existed. For example, an inflamed gall bladder can produce a diseased heart as in cholecystic heart disease and a diseased heart can involve the lungs.

As in the Yin and Yang theory, the element theory assumed that acupuncture functioned to restore the body to a state of harmony required for health by attaining harmony between the elements. The specific acupuncture points to be stimulated for achievement of harmony depended on traditional formulae.

When the phenomenon of acupuncture was recently introduced to North America some of those who could not accept it as a physiological process suggested that acupuncture effects were simply due to hypnosis (Chisholm,

1972; Kroger, 1972, 1973; MacIntosh, 1973). However, Melzack (1973a) in dismissing a hypnotism theory indicated that there were four reasons why hypnotism was not responsible for reported acupuncture effects. In the first place, the lengthy training sessions required of the patient for hypnosis were not evident in acupuncture because the acupuncturist had often not met the patient prior to the procedure. Secondly, that the rate of success for hypnosis has been reported to be much lower than that for acupuncture, has suggested that the two are different processes. Thirdly, normal, spontaneous behaviour is absent in hypnotized patients but not in acupunctured patients. Finally, Melzack stated that while hypnosis cannot be carried out with animals, there have been reports written of successful surgery using acupuncture anesthesia on a variety of animals. For example, Satory (1972) reported on the use of acupuncture for horses.

Members of the medical profession have used the ambiguous term hypnotic-suggestion (Kroger, 1973) which means suggestion rather than anything about hypnosis and the term may have been a source of confusion and error in the literature. Although hypnosis and suggestion may involve the same psychological process, suggestion does not involve the

elaborate and precise procedure that hypnosis does. There is little doubt that acupuncture is not a form of hypnosis as shown by Melzack (1973a); however, the acupuncture phenomena may be the result of suggestion. That is, any change in disease process following acupuncture may be the result of suggestion that acupuncture alters the disease state.

Belief that a procedure or a drug is effective has been shown to be capable of altering disease processes (Gardner, 1966; Melzack, 1973a, 1973b). Concerning the testing of any hypothesis of acupuncture effects, it is therefore essential that a theory of suggestion be discounted. Those researchers who have failed to do so cannot state that the effects were not the result of some process other than suggestion.

Mann (1973) has proposed a dual process theory to account for the effects of acupuncture which includes a segmental and an intersegmental theory. The segmental reflex theory considered two reflexes, a cutaneo-visceral reflex and a viscerocutaneous reflex. With a cutaneo-visceral reflex, stimulation of a skin point was believed to affect a specific viscera within the same dermatome, that is, within the area innervated by a dorsal spinal nerve. With the viscerocutaneous reflex, stimulation or disturbance of some



viscera was thought to affect a specific skin area, again, within the same dermatome. Therefore, from this theory, stimulation of acupuncture points resulting in changes at other yet nearby sites is caused by a segmental reflex.

Only acupuncture points on the abdomen, back, and arms fit a segmental reflex theory. Stimulation of leg and head acupuncture points, according to Mann (1973) does not result in changes in the same dermatome but instead the effect is at some more distant area. This is called distal acupuncture. For these exceptions, Mann devised another theory, the intersegmental reflex theory. Here, stimulation of acupuncture points in one dermatome could affect disease processes in another (and often distant) dermatome.

Mann's general reflex theory attempts to account for the resolution of all disease processes affected by acupuncture. Although Mann offers some support for such a reflex involvement in some diseases, it is improbable that such an explanation could cover the broad scope of disease processes for which acupuncture has been reported as a curative measure. Theoretically, successful use of acupuncture, for example, to improve mathematical ability (Mann, 1973) would mean that mathematical skills are under control of reflexes because stimulation of acupuncture

points would produce an intersegmental reflex response which would in some way control brain events to enhance mathematical skill. Similarly, many other processes would be under control of reflexes. Furthermore, according to the theory only physiological events in the skin and body organs are capable of producing changes attributed to segmental or intersegmental reflexes. The influence of various psychological states, for example, anxiety in reducing pain threshold (Melzack, 1973b), had no place in Mann's theory.

Melzack's (1973a) theory is restricted to the effects of acupuncture on pain. Its development was consistent with the gate control theory of pain proposed by Melzack and Wall (1965). With regard to the effectiveness of acupuncture, Melzack has acknowledged how important are suggestion and the belief that acupuncture relieves pain. Both of these could lead to an alteration in pain perception.

In addition, Melzack believed that when needles are inserted near the intended site of analgesia, the stimulation from acupuncture would activate large fibers of sensory nerves. According to the gate control theory, impulses travelling along the large fibers stimulate the substantia gelatinosa which, once a critical level of activity is attained, inhibits transmission in the small

fibers of sensory nerves. Once blocked, these small fibers no longer transmit information about pain.

When the needles are far from the intended site of analgesia, Melzack thought it possible that the acupuncture stimulation affects the brainstem. In turn, the descending impulses of the brainstem inhibit further upward transmission of impulses. The importance of the brainstem in pain mechanisms is evidenced by Melzack's reports of findings that direct stimulation of discrete parts of the brainstem may result in analgesia over extensive areas of the body. The power of Melzack's theory of acupuncture is that it is consistent with a well-developed and supported theory of pain mechanisms.

While Melzack (1973a) noted that suggestion does account for some of the acupuncture effect, others (Chisholm, 1972; Kroger, 1972, 1973; MacIntosh, 1973) have assigned suggestion a much larger role. It remains the task of those who hold other views to discount the suggestion theory. Therefore, researchers must devise experimental manipulations to determine the role of suggestion in any acupuncture effect. Furthermore, there must be some way of determining whether any changes which follow acupuncture are the result of spontaneous remissions or alterations in the

disease process that would occur even in the absence of acupuncture treatment. These important experimental controls unfortunately are not often seen in the literature on acupuncture.

#### Clinical Studies of Acupuncture

The data presented by Mann (1973) came from his own records and also from records of others. There are basic and significant faults with all of the data for there is no evidence of the use of a control group to test spontaneous remission and no indication that a placebo was employed to test the effects of suggestion. Therefore, where success following acupuncture was observed, exact statements concerning the reason for those changes cannot be made.

The outcomes following acupuncture were generally classified as cured, improved, or failure. Lacking are operational definitions of those class names indicating precisely in what way they differ and how assignment of patients to these groups was accomplished. Furthermore, the records are so incomplete that there is not enough information to determine the degree of patient selection bias present. There is no doubt that this was a select group of patients for, in the French records Mann presented, the patients had all failed to improve after conventional

medical procedures. However, it is not known if there was an additional selection process by the acupuncturist. Even in the absence of other methodological problems, it would be virtually impossible to draw conclusions from Mann's data because the number of patients in most disease groups was very small, often fewer than three.

The French data contained an impressive list of diseases that could be "cured" by acupuncture including the problem called bad at mathematics which presumably would usually be treated by professionals other than medical doctors but for which the French acupuncturists obtained a 100% successful cure among four individuals. Some of the diseases cured were among those for which psychological factors are often implicated like asthma, paroxysmal tachycardia, gastric ulcers, chronic vomiting, nervous hypertension, excessive sleepiness, and insomnia.

The Cantonese statistics Mann reported were taken from a Chinese journal and concerned 49 patients with appendicitis, treated by acupuncture and for whom "good results" were obtained. There was no indication whether or not some of these patients had appendectomies but the inference seemed to be that they were treated and cured by acupuncture alone. However, it seems possible that this

represents a select group of patients for whom symptoms would have disappeared even without acupuncture, surgery, or any other treatment.

Mann's (1973) persistent use of the word cure in reference to the effects obtained from acupuncture should be criticized. Cure has implied complete resolution of the pathology. Many of the disease processes, as mentioned by Mann have known no cure by any traditional western medical approach and it would be odd if acupuncture could "cure" not one but many of these diseases. It appears that Mann frequently used the word cure erroneously where symptomatic treatment would have been more appropriate. In the Chinese language, unlike English, there is no distinction between the words treat and cure (S. C. Man, personal communication, 1975). (Man(2)).

The recent literature on acupuncture reveals a number of clinical studies about the effects of acupuncture on different disease processes. For example, Kaslow and Lowenschuss (1974) used surface electrode stimulation of all acupuncture points on the outer ear to determine the effect of acupuncture on seven patients with hearing loss. The patients gave subjective reports on hearing changes and also listened to the experimenter's watch and reported if the

ticking could be heard. The experimenters concluded that acupuncture was effective in restoring hearing ability. A similar study on sensori-neural deafness in 10 patients was completed by Peng (1973). While Peng gave pretreatment audiograms to all patients, his report of an 80% success rate was based completely on subjective estimates of hearing abilities. Kao, Baker, Leung, Slippen, and Ampolsakdi (1973) did pre- and post-treatment audiograms on five patients treated by acupuncture. While it was concluded that hearing had improved, (no statistical analysis was presented) this was tempered by the caution that the results could have been caused by the suggestion associated with acupuncture rather than the acupuncture itself.

Other researchers (Marcus & Goldenberg, 1974; Rintelmann, Oyer, Forbord, & Flowers, 1974) have pointed to the lack of experimental control in hearing studies like that of Kaslow and Lowenschuss (1974) and Peng (1973) where no control or placebo groups were employed, no experimental blind was used, and measurement methods were often inadequate. However, there is little to recommend their own studies. Marcus and Goldenberg (1974) conducted a single case study of a man with hearing loss. Audiometric tests were completed before and after acupuncture and no change

was found. Another study (Rintelmann, et al, 1974) also used the case history design for a single patient and obtained results similar to those of Marcus and Goldenberg (1974). Other than that more appropriate testing methods were used, both of these studies are guilty of poor experimental control, for there were no control and placebo treatment phases and no experimental blind. In view of the failure of both groups of researchers to demonstrate correct use of a single organism experimental design, the conclusions of these studies are no less tenuous than the earlier studies.

Tabarka and Cupalova (1973) reported a substantial decrease in bedwetting for children treated with acupuncture. The 29 children were given 30 acupuncture treatments and occurrences of enuresis recorded. About 62% of the children had 50 to 100% improvement in the number of episodes of enuresis. Once again there was a lack of essential experimental control in this study where no control, no placebo, and no experimental blind were included in the experimental design.

Another disease process for which acupuncture had been used was for cerebral vascular accidents or strokes (Roustan, 1974; Ng & Liu, 1974). Ng and Liu reported a single case of a left cerebral vascular accident where,



following acupuncture, the patient was able to walk and talk and blood pressure dropped to a more normal range. They indicated that they had treated a total of 23 patients with cerebral vascular accidents and had a 100% success rate. However, this data was not further reported. Roustan (1974) reported another case of stroke with a response to acupuncture. Again, the case history method of study as used by these researchers had little to recommend it.

Kobos (1973) believed that acupuncture improved hair growth and so used the technique with apparent success for baldness. Kajos (1973a) treated fifty-one patients for allergic rhinitis and disappearance of the disease occurred for 40%, while another 50% of the patients had a reduction in the number of attacks. Bergsmann and Bischko (1973) attempted to reduce pulse rate and increase peddling performance with acupuncture. The subjects had a pre-acupuncture trial where pulse was counted and peddling was done and a day later, immediately after acupuncture, a second trial was conducted. The anticipated changes in pulse and peddling were found and were concluded to be the result of the acupuncture. However, because of the design, it is not clear whether these changes might be the result of suggestion or of increased familiarity with the procedure