

# Chapter 45

## Acupuncture for the Treatment of Pain in the Rehabilitation Patient

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### Introduction

Acupuncture is an ancient medical treatment with potentially powerful applications in the management of pain in the rehabilitation patient. Acupuncture can trace its origins to the Shang dynasty in China over 3000 years ago [1]. It is now practiced throughout the world for the treatment of pain, as well as many other medical problems. Acupuncture has increased in popularity and acceptance in the West over the last few decades. It is practiced by doctors of Chinese Medicine, medical doctors, dentists, and therapists. Many rehabilitation patients suffering from painful conditions have benefitted from acupuncture treatments. Anything as old and as geographically widespread as acupuncture is bound to be practiced with various distinct differences. With the understanding that there is a wide diversity in acupuncture styles and schools of thought, this chapter will focus on a modern approach to the management of pain.

### Brief History

Acupuncture is a component of the larger corpus of Chinese Medicine, which also includes herbal medicine, massage (Tui-Na), Qi Gong, and nutritional treatments. The origins of Chinese medicine are seen in texts from the Shang Dynasty (1500-1025 BCE). Shen Nong is said to have discovered the curing virtues of plants. Huang Di, the so-called “Yellow Emperor”, wrote the Nei Jing or “Canon of Internal Medicine” at this time. The first known mention of needles was during the Zhou

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Dynasty (500 BCE), during which time texts called the Shan Hai Jing “The Classic of Mountains and Rivers” mentions the use of needles in medical treatment [1].

The practice of acupuncture evolved over long stretches of time and geography, in the hands of countless practitioners who were trained in small schools or in master-apprentice relationships. Acupuncture was not well-known in the United States until president Nixon’s opening of China. In 1971, the journalist James Reston, a correspondent with the New York Times, was in China when he came down with acute appendicitis. He underwent an emergency appendectomy in Beijing and received acupuncture to manage his postoperative pain. Mr. Reston wrote about his experience in the New York Times and this account received widespread attention [2]. Acupuncture has since burst on the scene as an intriguing alternative treatment option for pain. As a result of the opening of China, many Americans went to China to train in acupuncture and brought back their knowledge upon their return.

In addition to the James Reston article, two other events helped to move acupuncture more into the mainstream of American medical practice. Prior to 1996, acupuncture needles were classified by the FDA as Class 3, or investigational. In March 1996, the FDA reclassified acupuncture needles to Class 2, which meant that they were deemed to be safe and effective, but requiring certain restrictions [1]. This classification is no different than for other medical devices, such as surgical scalpels or syringes.

The other occurrence was the publishing of a NIH Consensus Statement on acupuncture in 1997. The NIH convened a Consensus Conference, which brought together national and international experts in the fields of acupuncture, pain, psychology, psychiatry, physical medicine and rehabilitation, family medicine, internal medicine, substance abuse, health policy, statistics, epidemiology, biophysics, physiology, and representatives of the general public. After a thorough review of the available literature on acupuncture, the panel concluded that there were many flawed studies and that there were inherent difficulties in studying acupuncture, such as finding appropriate controls for acupuncture treatment. Despite this, the panel noted promising results revealing efficacy for the use of acupuncture to treat postoperative nausea and vomiting, as well as postoperative dental pain. In addition, the panel stated that the literature supported acupuncture as an adjunct or alternative treatment for headaches, tennis elbow, addiction, stroke rehabilitation, menstrual cramps, fibromyalgia, myofascial pain, osteoarthritis, low back pain, asthma, and carpal tunnel syndrome. The panel concluded that “there is sufficient evidence of acupuncture’s value to expand its use into conventional medicine and to encourage further studies of its physiology and clinical value” [3]. This stamp of approval from the NIH went a long way in paving the path for acupuncture to become a more accepted mainstream medical treatment in the United States.

## Basic Principles

Chinese medicine developed from ancient Chinese philosophy, with ideas about balance and harmony in the natural world, as well as the human body. The two main concepts behind these ideas are that of Yin and Yang, and the energy or life force or

**Table 45.1** Examples of Yin/  
Yang correspondences

|              |               |
|--------------|---------------|
| Yin          | Yang          |
| Ventral      | Dorsal        |
| Internal     | External      |
| Lower        | Upper         |
| Flaccid      | Spastic       |
| Hypofunction | Hyperfunction |
| Deficiency   | Excess        |
| Cold         | Warm          |
| Relaxed      | Agitated      |

**Table 45.2** Categorization of  
organs in Chinese Medicine

|             |                          |
|-------------|--------------------------|
| Yin Organ   | Yang Organ               |
| Lung        | Large Intestine          |
| Spleen      | Stomach                  |
| Heart       | Small Intestine          |
| Kidneys     | Urinary Bladder          |
| Pericardium | San Jiao (Triple Warmer) |
| Liver       | Gall Bladder             |

“Qi”, pronounced “chee”. These are concepts with which many Westerners are now well-acquainted. Yin and Yang represent two different manifestations of all things in nature and human experience, including the body itself. Yang is warm, active, rising, or energetic, while Yin is cool, quiet, sinking, or quiescent. Therefore, spring and summer are Yang, while fall and winter are Yin. Day is Yang, while Night is Yin. In human physiology, hypertension is Yang, while hypotension is Yin. See Table 45.1.

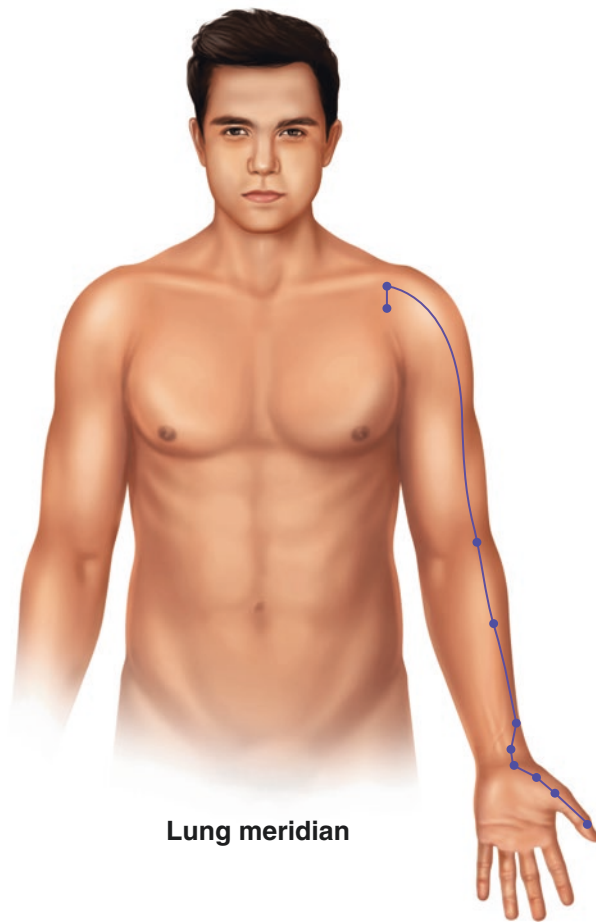
These ideas are very closely related to the concept of Qi. In Chinese medicine, Qi is the life force; every life process or organ function is an expression of the action and movement of the Qi. In Chinese medicine, there are three important sources of Qi. Each person inherits the Yuan Qi or source Qi. The Zong Qi is received from respiration, while the Yin Qi is obtained through food.

The Qi flows through the body in pathways, which are called meridians or channels. The meridians correspond to the organs of the body. In Chinese medicine, the organs are lung, large intestine, stomach, spleen, heart, small intestine, urinary bladder, kidney, pericardium, san jiao (triple warmer), gall bladder, and liver. The organs in Chinese medicine are not only the physical organs, but the larger functions that they are thought to govern. For example, the kidney functions in filtering impurities and in the creation of urine, but is also involved in sexual function. In addition, it influences a person’s will. The lung governs respiration as well as proper functioning of the skin. It is also related in some way to mood, especially depression. See Table 45.2.

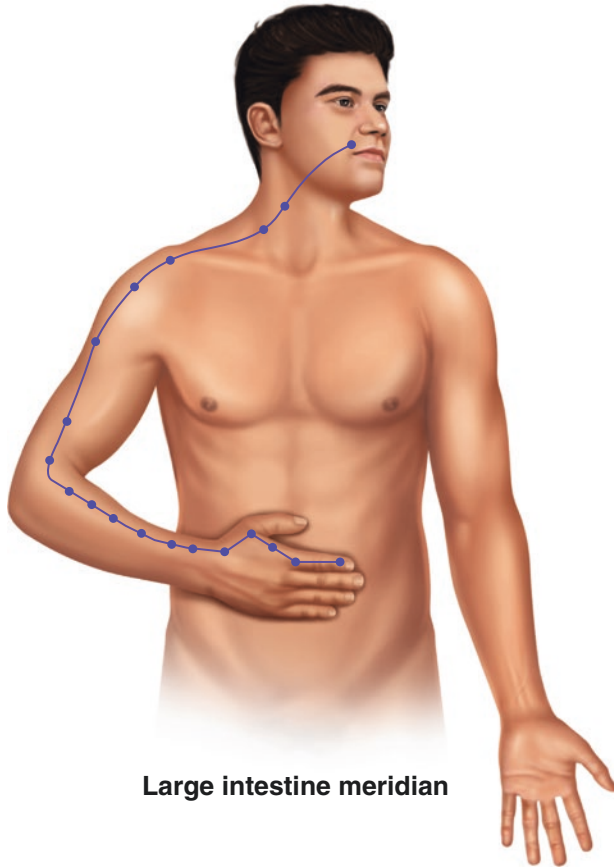
Acupuncture points are discrete pin-point areas found along the meridians. There are anywhere from 350 to 400 acupuncture points on the body. Many sources list 361 as the exact number. In Chinese medical theory, placement of needles at these points influences the flow of Qi through the corresponding meridians. In turn, this

influences the health or functioning of the corresponding organ. There are meridians corresponding to each organ of the body. In addition, there are two other meridians called Du mai and Ren mai, which do not have corresponding organs. Therefore, there are a total of 14 standard meridians of the body (see Fig. 45.1).

Western researchers have tried to determine whether there are unique anatomical structures at acupuncture points. Melzac et al. found that 71% of acupuncture points correspond to trigger points. Deung listed structures found in the vicinity of acupuncture points. He found the structures to be as follows: large peripheral nerves; nerves emerging from a deep to a more superficial location; cutaneous nerves emerging from deep fascia; nerves emerging from bone foramina; motor points of neuromuscular attachments; blood vessels in the vicinity of neuromuscular



**Fig. 45.1** a,b Acupuncture points are discrete pin-point areas found along the meridians. There are anywhere from 350 to 400 acupuncture points on the body. There are meridians corresponding to each organ of the body, totaling 14. A: Lung Meridian. B: Large Intestine Meridian



**Fig. 45.1** (continued)

attachments. Heine found that 80% of acupuncture points correlate with perforations in the superficial fascia of the cadavers he studied [4]. In the majority, acupuncture points correlate with anatomical structures and, in fact, correlate with nerves or fascial layers.

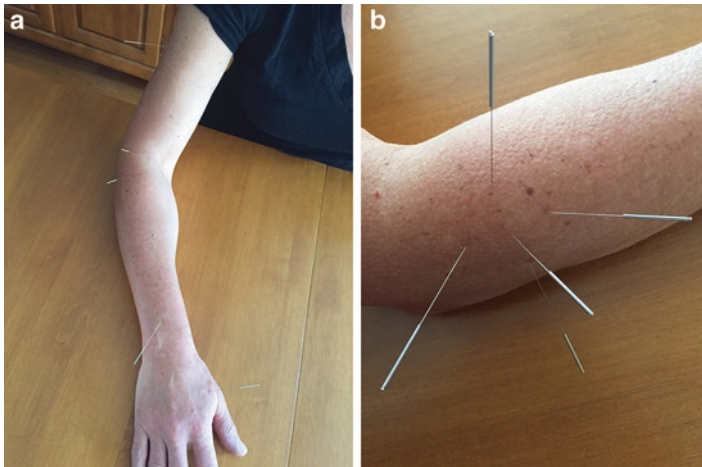
## Common Techniques

The acupuncture approach to the rehabilitation patient with pain should begin with a complete history and physical exam. It is important to know where the pain is, whether there is radiation of the pain, and exactly where it radiates to. The clinician should use his/her knowledge of the acupuncture points and meridians to determine whether the pain corresponds to them. It is important to find out what elicits the pain and what alleviates it. The clinician should also find out how long the pain has been present and what other treatments have been attempted. The best approach to pain

management is multimodal, with a focus on removal of any factors that interfere with full resolution of the pain. For example, muscular imbalances in strength or flexibility and/or improper posture need to be addressed in order to achieve the best outcomes. In the case of sports injuries, technique should be assessed to ensure that the athlete is using proper form and body mechanics when practicing or playing their sport.

Once the clinician has completed his/her assessment and finds the pain to be amenable to acupuncture, it is then important to determine point selection. The selection of acupuncture points is more of an art than a science. There are many different schools of thought, but basic principles are common in most cases. Pain treatment with acupuncture involves needling a combination of local points, distant points, and ah shi points. Local points are acupuncture points in the region of the pain. For example, LI 10 and LI 11 would be local points for the treatment of lateral epicondylitis, or tennis elbow. Distant points are points along the same or related meridians, which can influence the pain. In this same example of the treatment of lateral epicondylitis, distant points would be LI4 and SJ5. Ah shi points are tender areas in the region of the pain that do not correspond to any official acupuncture points. Often a technique called a “flower pattern” can be used when needling ah shi points (Fig. 45.2).

In addition to the needling of local, distant, and ah shi points, auricular or ear points can also be helpful in treating pain. Auricular points are points on the ear that correspond to different parts of the body. There are charts indicating all of these corresponding points, which can be used as a guide. Auricular points are treated with smaller needles placed in the auricular cartilage. The palm of the hand and the sole of the foot also have points, which correspond to different parts of the body.



**Fig. 45.2** (a) Ah shi points are tender areas in the region of the pain that do not correspond to any official acupuncture points. (b) The “flower pattern” technique can be used when needling ah shi points

These can be treated with needles, but more often, acupressure is used in these sensitive areas. Acupressure is the application of pressure to acupuncture points in order to achieve a similar effect as with placement of a needle. Pressure is usually applied with the hand.

Different practitioners have various techniques for needle stimulation. Manual stimulation of the needle, by spinning the needle once it is placed and periodically during the treatment, is the most traditional technique. Electrostimulation is also a popular technique for needle stimulation. Regardless of the type of needle stimulation used, it appears that the best pain relief results are obtained when the patient reports a *de qi* sensation. This is described by patients as a feeling of fullness, dull ache, or tingling sensation. The *de qi* sensation seems to be elicited by a combination of needle stimulation and proper placement of the needle over the acupuncture point. Electrophysiological evidence indicates that acupuncture stimulation of muscle afferent fiber types II and III are responsible for production of the *de qi* sensation [4].

Most acupuncture treatment sessions involve the patient lying down, although some areas such as the neck are more easily treated with the patient seated. The needles are placed either free-hand, or more commonly, with use of an insertion tube. The needles are left in place for 20 to 30 minutes. A course of treatment is usually about ten sessions, with treatments occurring once to twice each week; however, courses of treatment can vary considerably, depending on the condition being treated.

Acupuncture has potential applications in all aspects of rehabilitation practice. It can be used in both the inpatient and the outpatient settings, although the majority of treatments take place in an office setting. An increasing number of hospitals allow physicians with appropriate training to apply for privileges to provide acupuncture to inpatients. The types of conditions that are treated on inpatient units include headache, neck and back pain, nausea, insomnia, muscle spasms, and anxiety. Patients treated in the inpatient setting usually receive a few treatments each week, if not daily. Many inpatients benefit from these treatments and can continue these treatments at a lesser frequency when they are discharged to the community.

## Evidence

There has long been controversy about the mechanism by which acupuncture works to relieve pain. Many skeptics have argued that the entire treatment effect of acupuncture is obtained through the placebo effect. The current thinking, by those who practice and study acupuncture, is that the release of endorphins may explain how acupuncture helps to decrease pain. One of the earliest studies looking at this endorphin-acupuncture analgesia hypothesis was performed by Mayer et al. and published in 1977. This group studied acute laboratory-induced dental pain in human volunteers. They were able to achieve pain control with the LI4 point in the first dorsal interosseous muscle in the hand. In a double blind design, they gave the study group IV naloxone, an opiate receptor blocker, and the control group IV saline. The naloxone group showed no acupuncture analgesia, while the saline

group maintained the acupuncture-induced pain control. The interpretation of this study was that it showed a connection between the release of endorphins and acupuncture analgesia and that these endorphins could be blocked to eliminate the pain-relieving effect [5]. Since the publication of this study, there have been numerous studies in which systematically administered endorphin antagonists have been used to test the endorphin-acupuncture analgesia hypothesis.

Many studies have since been performed, which have shown that there is definitely a component of the placebo effect in the response to acupuncture for the treatment of pain. These studies use sham acupuncture, which generally includes placement of needles in non-acupuncture points, or making it appear to the subject that a needle has been inserted when it has not actually been. These studies usually involve three groups, which include an acupuncture group, a sham acupuncture group, and a group that receives usual care. These studies usually show significant pain relief with acupuncture, intermediate relief with sham, and the least pain relief with usual care.

A large meta-analysis published in JAMA in 2012 revealed this pattern of response to acupuncture. The authors reviewed 29 eligible high-quality randomized control trials, with a total of 17,922 subjects studied. They found that acupuncture was superior in pain control when compared to sham acupuncture and to no acupuncture for all pain conditions, which included chronic neck pain, osteoarthritis pain, and chronic headache. The differences between the acupuncture and sham groups were statistically significant, but relatively modest, which indicated that non-acupuncture effects were an important component of the treatment effect. The authors went on to say that "... the clinical decision made by physicians and patients is not between true and sham acupuncture, but between a referral to an acupuncturist or avoiding such a referral". The total effects of acupuncture, as experienced by the patient in routine practice, include both the specific effects associated with correct needle insertion according to acupuncture theory, the nonspecific physiologic effects of needling, and the nonspecific psychological (placebo) effects related to the patient's belief that treatment will be effective [6].

## Conclusion

Acupuncture is a valuable treatment for pain in the rehabilitation patient. It is a potentially powerful component of a comprehensive approach to pain management. It has an exceptionally long track record across vast stretches of time and geography. There has been scrutiny by the FDA and the NIH and there is a growing evidence base for efficacy and mechanism of action.

The integration of acupuncture into all aspects of rehabilitation practice has great potential to improve pain control, outcomes, and patient satisfaction with the care that is delivered to them.



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