Needle Manipulation May Hold the Key to Acupuncture’s Effects

By Michael Devitt

During a typical acupuncture session, many practitioners perform needle manipulation in order to achieve the *de qi* response. *De qi* is believed to be essential to the therapeutic effectiveness of acupuncture, and is often used as a signal to acupuncturists that the proper amount of needle stimulation is being performed.

When *de qi* occurs, patients usually feel an aching or heavy sensation in the area surrounding the acupuncture needle. The practitioner, meanwhile, perceives a sensation often referred to as "needle grasp." During needle grasp, the acupuncturist feels increased resistance to continued needle manipulation. The phenomenon can be subtle or quite strong; in some instances, a patient’s skin may actually lift up, or "tent," in response to a grasped acupuncture needle being removed.

The role of needle manipulation in obtaining therapeutic effects, and the significance of needle grasp to *de qi*, are two features of acupuncture that have remained largely unexplored. Scientists from the University of Vermont recently explored the function of needle grasp by measuring the force needed to remove manipulated acupuncture needles from selected points on the body. In a landmark study, Dr. Helene Langevin and a group of investigators established a link between acupuncture needling and body tissue. Their research confirms that acupuncture has a definite effect on the body, and suggests that the way in which needles are manipulated may exacerbate these effects.

A total of 60 volunteers (38 women, 22 men) participated in the study. The volunteers were divided into three groups. One group received acupuncture, but with no needle manipulation; a second group received acupuncture with unilateral, clockwise rotation; and the third group received acupuncture with alternating bilateral rotation.

Eight traditional acupuncture points were used: Liver 4; Stomach 36; Lung 6; Spleen 6; Heart 2; Gallbladder 32; Liver 11; and Bladder 57. For each location, right and left sides of the body were randomly selected to be used as either acupuncture points or control points. Throughout the testing, the volunteers were neither told, nor were they able to see or hear, any indication of which side was being used for each point and which type of needle manipulation was being performed.
For each point location, the examiner used a customized, computer-controlled needling system that controlled the depth and speed of needle insertion; the speed, amount and duration of needle rotation; the amount of time the needle was left in place; and the speed at which the needle was removed. The amount of force used to remove the needle ("pullout force") was measured in terms of grams, as was the amount of force encountered when needles were rotated unilaterally or bilaterally.

Results

Bar graph showing pullout force measurements between types of needle manipulation. - Copyright â Stock Photo / Register Mark

Figure I: Pullout force measurements between types of needle manipulation.

Langevin’s team found that a "significantly greater" pullout force was required to remove manipulated needles. The average amount of force needed to remove unilaterally rotated needles was 97.5 grams for unilaterally rotated needles (UNI) and 55.7 grams for bilaterally rotated needles (BI), compared to 36.5 grams for non-manipulated needles. They also observed "a greater average pullout force" at acupuncture points than at control points in seven of the eight locations tested. The greatest difference in pullout force was noted among acupuncture and control points that received unilateral rotation (109.3 and 87.2 grams, respectively).

"Our measurements of pullout force are the first quantification of needle grasp, a biomechanical aspect of the de qi reaction widely viewed as essential to the therapeutic effect of acupuncture," the researchers wrote. "Together, these results indicate that needle grasp is strongly influenced by needle manipulation, and that this effect is not unique to acupuncture points."

Bar graph showing mean pullout force, acupuncture points vs. control points. - Copyright â Stock Photo / Register Mark

Figure II: Mean pullout force, acupuncture points vs. control points. The researchers proposed several theories behind needle grasp. While it is a traditionally held belief that muscle contraction is responsible, Langevin’s team noted that "needle grasp can be observed at locations where no skeletal muscle is present," and concluded that while muscles may indeed contract during needle grasp, it "is not the primary mechanism responsible for this phenomenon."

Instead of muscle contraction, the researchers suggested that needle grasp may be due to the winding of tissue around the needle during rotation, and that unilateral rotation would produce a greater effect because the tissue would wind around in only one direction. "Because of its self-amplifying nature, a mechanism involving winding quickly can result in strong mechanical coupling between needle and tissue," the authors
wrote.

After attaining needle grasp, continued needle manipulation could alter the makeup of the surrounding connective tissue, resulting in the release of chemicals and other substances that have healing properties. "These effects," they explained, "may be prolonged and explain the perplexing claim that acupuncture treatments can have therapeutic effects lasting days to weeks and even permanently."

Langevin also hypothesized that since many classic acupuncture points are located along planes of where muscles or muscles and muscles and bones connect, they may contain larger amounts of connective tissue and neurovascular bundles. Manipulation at these points would result in greater pullout force and therefore produce more marked effects than at non-acupoint locations. Further research would be needed to prove this theory, however.

The researchers were quick to point out that they did not find any direct link between pullout force and the therapeutic effects of acupuncture; rather, their intention was to establish a link between acupuncture needle manipulation and biomechanical effects it might produce. Langevin’s team believes they have established that link. As they noted in their conclusion:

"This study for the first time demonstrates a link between acupuncture needle manipulation and biomechanical events in the tissue. These biomechanical events are potentially associated with long-lasting cellular and extracellular effects. Developing an understanding of these effects may eventually lead to insights into acupuncture’s therapeutic mechanisms · these same effects may also provide important biological markers that can be used in clinical trials of acupuncture."

References