Different manual manipulations and electrical parameters exert different therapeutic effects of acupuncture

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Abstract

Acupuncture is an important component part of Traditional Chinese Medicine (TCM). The therapeutic effects may be influenced by a variety of factors. Stimulation quantity is one of the factors for achieving good therapeutic effects in acupuncture practice. With the development of science and technology, besides the influence of manual manipulations, the parameters adopted for electroacupuncture have become the benchmark of stimulation quantity. This study, by referring to the related literatures, is designed to explore the influence of manual manipulations and electrical parameters on therapeutic effects of acupuncture. The results from the present study show that different manual manipulations and electrical parameters may exert different therapeutic effects of acupuncture, which are closely related to the characteristics of diseases. Different manual manipulations and electrical parameters should be adopted according to syndrome differentiation of TCM. This is very important in acupuncture treatment.

Key words: Acupuncture therapy; Electroacupuncture; Method of reinforcing-reducing; Manual manipulation; Treatment outcome

INTRODUCTION

Acupuncture plays an important role in Traditional Chinese Medicine (TCM). With a history that can be traced back to more than 3000 years, it is absolutely certain that acupuncture may present obvious therapeutic effects for many diseases, which are, nevertheless, influenced by multiple factors. The American Acupuncture White-Paper has pointed out that the factors contributing to the therapeutic effects of acupuncture include the specific non-needling components (i.e., history, diagnosis, education, palpation, moxibustion), the non-specific components (i.e., time, attention, credibility, expectation), and the needling components (i.e., location, insertion depth, stimulation, needle size and number). Whereas, on the stand of TCM itself, different body constitutions, the specificity of each acupoint, and the quantity of stimulation, all contribute to the therapeutic effects of acupuncture treatment. In accordance with traditional theories, the manual manipulations, as the means of stimulation quantity, may significantly influence the therapeutic effects of acupuncture treatment, which finally determines the prog-
The lifting-thrusting manipulations influence the therapeutic effects of acupuncture

It has been proved that the analgesic effect of acupuncture can be obtained by means of manual manipulation, and the needling with rotation can increase the pressure pain threshold. Kim et al. concluded that the twirling manipulation and lifting-thrusting manipulation can enhance the analgesic effect. This effect may be related to the suppression of the transcription of pain-related genes, such as Fos, opioid receptor-like 1, tachykinin 1, tachykinin receptor 1, mu-opioid receptor and 5-hydroxytryptamine receptor 2A in the spinal cord. Moreover, the twirling manipulation and the lifting-thrusting manipulation can increase the skin temperature. Meanwhile, the changes of skin microvascular perfusion in the acupoints and related areas have been noticed by numerous researches. Hence, some scholars hold that different manipulations imply different skin temperature changes, which might be correlated to the blood circulation, as well as excitement of the sympathetic nerves and metabolism of the tissues. On the basis of substantial clinic researches, it is easy to notice that, during the process of acupuncture treatments, the effects by adopting manipulation is better than without, and the effects by selecting the right reinforcing or reducing method according to the specific situation is better than simple balancing manipulation. Huang et al. by using functional MRI (fMRI), scanned the whole brain of stroke patients, and found that, compared to tactile stimulation, needling with twisting manipulation activated more widespread brain areas. However, the statement that lifting-thrusting and twirling-rotating have different therapeutic effects is not proven yet. According to the research on the energy input of acupuncture, it is found that the main difference of the energy input of acupuncture is mostly determined by the vibration amplitude. The lifting-thrusting amplitude is somewhat stronger than twirling-rotating. Some scholars believe that the lifting-thrusting and twirling-rotating manipulations may exert different therapeutic effects of acupuncture in clinic. Wang et al. found that the lifting-thrusting manipulation and the rapid twirling manipulation have the best inhibitive effect on spasm. Zhang et al. found that needling Zusanli (ST 36) with lifting-thrusting manipulation has a stronger effect on the gastroelectric activities, the plasma gastrin and the cyclic adenosine monophosphate (cAMP) than twirling-rotating. The rise in body temperature induced by lifting-thrusting manipulation was significantly higher than that of twisting-rotating. The needling sensation induced by lifting-thrusting is stronger than that of twisting-rotating, which may be caused by the following reasons: (a) may be related to the stimulation intensity. Since the manipulations are controlled subjectively by practitioners, the stimulation amount will not be accurately repeatable, the difference in the results of the experiments may consequently be brought up. (b) Meanwhile, significant discrepancies between the lifting-thrusting and twisting-rotating manipulations show that the mechanisms may be different and need to be researched thoroughly in the future.

The reinforcing and reducing manipulation influence the therapeutic effects of acupuncture

Hu et al. found that the lifting-thrusting reinforcing manipulation had an effect of increasing the skin temperature of acupoints. Li et al. have demonstrated that both the lift-thrust reinforcing and reducing manipulations increase blood perfusion at Zusanli (ST 36) acupoint; the increasing amount of blood perfusion is significantly higher in the reinforcing group than that in the reducing group. Wang et al. found that acupuncture with the twirling reducing method...
can increase the contents of calcitonin gene related peptide (CGRP) and nitric oxide (NO) in rats with stress-induced hypertension, inducing a blood pressure drop; however, no significant influence was found by using the twirling reinforcing method.

The influence on therapeutic effects by different reinforcing and reducing manipulations is quite obvious. It was found that in the oscillogram, the differences between the reinforcing and reducing manipulations are the longer duration of descending branch (t1) and shorter duration of ascending branch (t2) for the former, and shorter t1 and longer t2 for the later, due to slow insertion and rapid withdrawal of the acupuncture needle for reinforcing method, and rapid insertion and slow withdrawal of needle for the reducing technique. According to the objective evidence, during the acupuncture process, different reinforcing and reducing manipulations may exert different influence on the therapeutic effects of acupuncture treatments. Nevertheless, the difference between the lifting-thrusting and twirling-rotating manipulations doesn’t look obvious. Wang et al. found that the twirling reinforcing or reducing manipulation includes slight lifting-thrusting manipulation, that is, the twirling reinforcing manipulation is accompanied by lifting force and the twirling reducing manipulation is accompanied by thrusting force. The principle for the twirling reinforcing or reducing manipulation is similar to that of the lifting-thrusting reinforcing or reducing manipulation.

**DIFFERENT EA ELECTRICAL PARAMETERS INFLUENCE THE THERAPEUTIC EFFECTS OF ACUPUNCTURE**

The EA electrical parameters include wave form, amplitude, wave width, frequency and duration, all of which reflect themselves in the results of the stimulation quantity.

Numerous researches show that EA was effective for relieving pain. However, different EA parameters may exert different therapeutic effects. Le et al. suggested that the optimum parameters for EA treatment of inflammatory pain are 100 Hz, 0.1 mA and intermittent wave. Kuai et al. based on the index determination and variance analysis, found that EA at 100 Hz with successive wave and 0.2 mA, EA at 100 Hz with intermittent wave and 0.1 mA and EA at 100 Hz with intermittent wave and 0.2 mA fell into one category, with similarly good anti-inflammatory and analgesic effects. It was found that, for chronic compression and injury pain, both 1 mA and 5 mA may give analgesic effect, and that a lower intensity of EA may exert a more obvious analgesic effect. The analgesic mechanism for a lower intensity of EA is completely different with that of a higher intensity. Silva et al. found that the analgesia induced by 2 Hz EA depends on the noradrenergic descending mechanism and involves the spinal opioid and muscarinic mechanisms, while the duration of the effect depends on both the noradrenergic and serotonergic descending mechanism and involves the spinal GABAergic modulation; and that analgesia induced by 100-Hz EA involves the spinal muscarinic, opioid, and GABA receptor mechanisms, while the duration of the effect depends on the spinal serotonergic, muscarinic, opioid, and GABA receptor mechanisms. A systematic review show that the low and high frequencies of EA have different mechanisms with the selective release of β-endorphins, enkephalins or dynorphins. The electrical stimulation of acupuncture (ESA) at different frequencies may activate different regions in the spinal cord and central nervous system, and evoke different responses of the autonomic nervous system. Based on these findings, ESA with low and high frequencies may probably exert different therapeutic effects.

EA can facilitate uterine contraction. However, EA at 50 Hz has a better effect for pain relief than that at 100 Hz, and 2 Hz/50 Hz with dilatational wave can enhance the uterine contraction effect. EA therapy combined with a rehabilitation program is effective for the lower-limb spasticity in post-stroke patients. The therapeutic effects of EA at the frequencies of 100 Hz and 50 Hz are superior to that of 2 Hz, and 100 Hz may be optimal. Low frequency of EA at Shuigou (GV 26) can promote recovery of the motor function after focal cerebral ischemic injury. EA at 3, 20 and 100 Hz show significantly different regulative effects for derangement of gastric electric rhythm. Ma et al. found that 2 Hz and 2 Hz/100 Hz EA have relatively better effects for alleviating the undulate phenomena of mean arterial pressure and for heart rate at intubation and stabilizing CD4+/CD8+ after pneumonectomy. Ma et al. found that in EA-assisted anesthesia, 2 Hz/15 Hz disperse-dense wave may exert the optimal anesthesia as compared with 2 Hz/100 Hz disperse-dense wave, and inhibit the stress reaction induced by anesthesia in surgery. Su et al. found that EA with rarefaction wave was better than continuous wave for treatment of refractory tennis elbow syndrome. Either low or high frequency of EA can extensively regulate the spinal cord information processing. The low frequency of EA participates more in regulation of the neural plasticity, while high frequency of EA has more significant effects on the stress and immunoregulation.

**DISCUSSION**

The results from the present study show that different manual manipulations and electrical parameters may exert different therapeutic effects of acupuncture, which was closely related to the characteristics of diseases. So, in acupuncture treatment, the manual manipu-
lations and electrical parameters should be adopted according to syndrome differentiation of TCM. However, if the emphasis is exaggeratedly put on individual treatments, the research and development of TCM will be limited to a certain extent. To resolve this paradox is of significance for the development of TCM.

REFERENCES


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