

Motion acupuncture for musculoskeletal pain: principles and methods

Decheng Chen^{1,3}, Guanhu Yang², Xiaochuan Chen^{3,4}, Kehua Zhou⁵

¹ Natural Acupuncture & Wellness P.C., New York, NY, USA

² Acupuncture Wellness Center of Cincinnati, Cincinnati, OH, USA

³ Graduate School of Oriental Medicine, New York College of Health Professions, Syosset, NY, USA

⁴ Geno-Immune Medical Institute, Shenzhen, China

⁵ Department of Health Care Studies, Daemen College, Amherst, NY, USA

Original Research

Abstract: Musculoskeletal Pain is a common disorder with diverse etiology. Among a variety of modalities that are currently used in clinic, acupuncture has gained widespread popularity for treating musculoskeletal pain. In this article, we aim to introduce a novel acupuncture technique, termed motion acupuncture, for the treatment of musculoskeletal pain, which is characteristic of carrying out active or passive motions of the body parts by patients under supervision of an acupuncturist, with needles inserted and retained in the acupuncture points. Motion acupuncture is mainly composed of three procedures: finding targets (target examination), inserting needles, and performing motion with needles retained. Application of motion acupuncture in our daily acupuncture clinic has shown a rapid efficacy in alleviating musculoskeletal pain caused by various etiologies. In this article, the principles and methods of motion acupuncture are described, and the underlying mechanisms of action are reviewed and discussed.

Key words: Motion acupuncture; Musculoskeletal Pain; Fascia; Target points.

Corresponding authors:

Decheng Chen, Ph.D., LAc, Natural Acupuncture & Wellness P.C., 161 Madison Ave, Suite 2N, New York, NY 10016, USA . E-mail: dechengchen2000@gmail.com

Received: December 4 2016; **Accepted:** April 16 2016; **Published:** May 20 2016

doi: <http://dx.doi.org/10.18088/ejbmr.2.2.2016.pp19-24>

Introduction

Despite the development and application of a variety of therapeutic modalities, there are still a large number of patients suffering from musculoskeletal pain (1), such as knee pain (2-3), neck pain (4-6), which affects health-related quality of life significantly. Searching and developing novel approaches for the treatment of musculoskeletal pain is continuously desirable so as to provide better care and treatment for these patients. Acupuncture, originating and having thousands of history of practice in China, is one of the most common treatment methods for musculoskeletal pain, which has gained more and more popularity in Western countries. In this article, we describe a novel acupuncture technique, termed motion acupuncture that we developed recently (7), for the treatment of musculoskeletal pain. The key techniques and steps in motion acupuncture, namely target examination, acupuncture techniques and motion methods, are described and discussed in the following sections.

Target examination

From the perspective of practitioners, the target of motion acupuncture is the focus of the treatment, which not only includes Ashi points, transverse collateral, nodules, tied sinews, and "sick sites" as called in ancient Chinese literatures (8), but also includes any tender points mentioned in the Soft Tissue Surgery of Xuan Zheren (9), as well as the "trigger points" as termed in Western medicine, by Janet Travell et al (10-11). From the perspective of patients, the target can be regarded as a reaction point,

which includes pain and other sick sites such as nodules and tight muscle, or a site mainly exhibiting pain or tenderness. In general, targets points that are commonly used include painful points, tender/pressure points, tender points of Xuan Zheren, and trigger points (also termed myofascial trigger points). The theoretical basis of these concepts is summarized in Table 1. The target is characterized by pain, tenderness, paresthesia and morphological changes. The target area is usually sensitive to pain, where stimulus that should not be enough to cause pain can cause pain. Pressure on a target can elicit rebellious twisting of limbs, crying out or physically stopping the doctor. Besides pain and tenderness, the target area also has other sensations such as soreness, numbness, distention, heaviness, hotness, feeling of small electric shock or burning. Morphological abnormalities can also happen on the target and surrounding skin, such as nodules (round, oval, flat), stripes, induration and tight muscles (12).

In current clinical practice, there are basically four methods for target examination: (1) Examination along meridians: Find the point associated with the location of pain, which is based on meridians of traditional Chinese medicine, and determine which meridian dominates the pain according to where the pain is located. The tender points (Ashi points) can be found by pressing the gaps and edges among muscles, tendons and bones (i.e. three gaps and three edges) to determine where the target is located (13). (2) Examination along sinews: Find the point associated with the location of pain based on meridian sinews of traditional Chinese medicine (14) and determine where the transverse collaterals and sinew nodes are located.

Table 1. Relationship of target with pain point, tender point, trigger point and sick site of sinew.

Target	Sick site of tied sinew	Tender point	Trigger point
Theoretical source	Meridian sinew theory	Soft tissue muscle theory	Myofascial theory
Masterpiece	Chinese Meridian Sinew	Soft Tissue Surgery of Xuan Zheren	Myofascial Pain and Dysfunction--The Trigger Point Manual
Representative	Xue Ligong	Xuan Zheren	Janet G. Travell
Anatomical characteristics	Muscle origins and insertions	Muscle origins and insertions	Neuromuscular movement points-belly of skeletal muscle (myofascia)
Pathological characteristics	Transverse collaterals block meridians	Local aseptic inflammation	Spontaneous electrical activity
Properties of pain	Besides pain, there are also sourness, numbness, distention, and hotness	Tender point is the primary pain point	Referred pain and secondary pain
Characteristics of pain	Pain, sourness, numbness, distention, hotness, etc.	Hyperalgesia, pain response and persistent pain	Muscle contraction with severe pain, weakness Trigger point is located on muscle belly, not easy to be damaged, the pain is caused by conduction, mostly secondary pain
Different understandings	Twelve meridian sinew, point-line-surface-body	Tenderness attachment point is the focus of stress force, and is most likely to be injured	Pain, tight muscles, sensitive nodules, referred pain, referred tenderness
Observations, signs & symptoms	Pain, sourness, numbness, distention, heaviness, hotness, sinew node, tied sinew	Pain, referred pain	Superficial, myofascia
Location of lesion	Both deep and superficial, skin, flesh, tendon, bone, vessel	Deep, muscle	Relieve pain (symptom) Early stage: spray and stretch. Later stage: trigger point pressure relaxation technique, deep knocking massage, physiotherapy, transcutaneous electrical nerve stimulation, trigger point injection and dry needling
Treat symptoms or causes	Treat symptoms and causes	Treat pain(cause)	
Traditional therapy	Mainly long round needle	Soft tissue release surgery, intensive silver needle acupuncture, and strong stimulation massage	
Treatment principles	Untie the nodes	Firstly treat primary pain and then secondary pain. If secondary aseptic inflammation occurs, fascia of muscle belly should be treated.	Treat the pain where it is
Treatment keypoints	Sick site of tied sinew, acupuncture at the painful point	Firstly treat primary pain and then secondary pain.	Treat the pain regardless of whether primary pain or secondary pain
Treatment efficacy	Rapid short-term efficacy , long-term consolidation requires continuous treatments	Significant long-term efficacy	Limited long-term efficacy
General method	Motion Acupuncture	Motion Acupuncture	Motion Acupuncture

(3) Examination along muscles: Find the point associated with the location of pain based on muscle anatomy of Western medicine (9), mainly attachment points between muscles and bones, i.e. origins and insertions of muscles.

(4) Examination along fascia: Find the point associated with the location of pain based on myofascial theory of Western medicine (15), which is known as myofascial trigger point, also simply as trigger point.

In terms of manipulating techniques for target examination, the following techniques are commonly used: The first technique is pressing along the points, which is a common method to examine the targets of sinew nodes and find the meridian sinews. To examine, put the finger pulp or lateral side of thumb or forefinger on the surface of skin and then press the targets with smoothly movement. To support and fix the target point, the examiner's left thumb should slightly press on the target surface, followed by point pressing, pushing, pressing along and lifting the positive points (sinew nodes) along the meridians with the finger pulp or lateral side of the right thumb and

forefinger moving from top to bottom and back again. The palpation should obey the order as follows: point-to-line, line-to-surface, surface to antagonism surface as a whole.

The second technique is sliding and pressing, which was invented by Xuan Zheren (9), which is carried out to examine the targets of attachment points of muscles and bones. The key for this technique is as follows: Using finger pulp, tip or lateral side together with a focal point of the thumb end and the tip of the distal phalanx, the practitioner makes a minor slip on the painful point, going around or up and down as the examiner's fingers are well pressed on the target. The direction of the force is towards the pain point and fingers must be perpendicular to the plane.

The third technique is pushing smoothly: In order to look for the stripe-like nodes and nodules in muscle tissues, fingers should push (brush) back and forth on the targets. Nodules are 1-4cm in diameter. This technique is applied on the superficial muscles, such as trapezius, rectus femoris and palmaris longus.

Another technique is grasping, which is often conducted with the thumb and other fingers firmly grasping the muscle tissue of the examination site, followed by pressing to palpate the hard nodule in the tissue. After the hard nodules are confirmed, their location and tenderness are determined, which are also known as trigger points, depending on the length. This technique is applied on the free edge of the surface muscles such as trigger points in teres major, lateral edge of the pectoralis major and triceps.

When palpation of pushing smoothly and sliding pressing cannot reach trigger points, we should choose deep palpation, poking, instead. In this technique, the practitioner puts his/her fingertip on the tight band of muscles at a right angle to the direction of the muscle band. A sudden pressing is needed while the practitioner's fingers are moving backward so that the muscle fibers will be rolling under fingers. This action is like playing guitar whereas the skin moves with the practitioner's fingers instead of sliding across it. Localized tenderness and pain at sick sites, accompanied by related movement disorders, are referred to as deep trigger points. This technique is often used to test for trigger points in deep muscles such as quadratus lumborum and psoas muscles.

Acupuncture techniques

Needling techniques in motion acupuncture involve the following aspects including selection of position, selection of needle insertion points, selection of needles, and selection of acupuncture techniques. Selection of body position should be based on the location of pain and motion style. Basically, common position in clinic should be selected, which should make the patient feel comfortable and relaxed and facilitate the manipulation of practitioner. First-visit, nervous, old, weak and seriously ill patients should lie comfortably, as far as possible. The selection of needle insertion points concerns whether successful motion of muscles and joints can be performed, thus directly influencing efficacy. The following criteria should be observed when selecting needle insertion points: (A) Needle insertion points are usually located above or below the target, or on the left or right side of target, 2-3 cm from the target, parallel or perpendicular to muscle fiber. (B) Avoid scars, nodules, injuries, depressions and protuberances on the skin. Avoid superficial blood vessels as far as possible to prevent bleeding. (C) There should not be any joints between the needle insertion point and the sick site. (D) Motion of muscle should not be influenced after needle insertion (16).

With regard to the selection of needles, it should be based on the following rules: (A) Ordinary acupuncture needle. (B) Thick needle (size 26-30, equal to 0.30-0.40mm in diameter) and long needle (2-3 cun, equal to 50-75mm in length) are mainly used. (C) It is the best if the surface of needle is coated with lubricant. A couple of acupuncture techniques can be used in motion acupuncture, including floating insertion, perpendicular insertion, oblique insertin, single insertion, and multi-insertion. With the needle retained in the target, muscle stretch and resistant motion can start. Floating insertion refers to that a needle is inserted along subcutaneous superficial fascia, in which long needles are mostly used. In perpendicular insertion, the needle is inserted perpendicularly, which can go deep into muscular layer or periosteum and short

needles are mostly used. The needle can also be inserted obliquely to form an angle of approximately 45°, with the needle point towards the target, in which short needles are mostly used. Both single and multiple insertions can be used in motion acupuncture. In single insertion, one needle is inserted on one target by floating insertion or perpendicular insertion, while in multi-insertion, multiple needles are inserted on one target by floating insertion. With the needle retained on the target, muscle stretch and resistant motion can start.

Manipulation of needles

Needles are inserted according to the common rule of acupuncture, i.e., steady and accurate insertion. Briefly, moderately stretch the skin at the site, hold needles with right hand, fix the tube of needle (needle with tube is the best due to ease of fixation and reduction of pain) with the left hand and never let the tube leave skin surface. Push the needle into the skin rapidly, adjust the angle of tip, and slowly insert the needle. "Quickly pricking, slowly inserting, mildly taking out or injuries will be caused." as quoted from He Ruoyu, an ancient Chinese physician in Jin Dynasty. After penetrating the skin surface, the needle should be lifted a little bit, but not too much, or it will remove from patient's body. In the mean time, a slight sound can be heard from the needle getting out from muscles and a sense of looseness can be felt in practitioner's hand. Then put the needle handle down close to the skin. Or, pick up the skin with left hand and press the needle handle with the right hand in order to lift the needle tip. Do not suppress the needle tip. While inserting, the practitioner may feel a slow movement of the needle tip beneath the skin and see a linearly uplift caused by the needle body. Patients feel distention or heaviness instead of pain. Some targets can also utilize perpendicular or obliqu needling, but ensure patients to feel no pain during and after inserting into the skin or during the muscle stretching exercises. If they suffer pain, it means the needle body is located inappropriately.

Regarding needling direction in motion acupuncture, subcutaneous transverse insertion is applied with the pricking point 2-3cm from the target. The needle body goes through the subcutaneous tissue of the target and the needle tip should be directed at the target. Either one needle or multiple needles are allowed in motion acupuncture. Multiple targets can be stimulated simultaneously. Perpendicular or oblique needling can also be conducted during the process of motion acupuncture. In subcutaneous needling, needles are inserted at 15-30 degrees between skin surface and the needle. Prick quickly, and then adjust the angle to 5-10 degrees, without insert too deeply to avoid penetrating the muscle layer. Go slowly along the subcutaneous tissue. Sometimes 45 or 90 degrees works, but do obey the principle of pricking quickly and inserting slowly. For transverse insertion, the body of needle stays in the subcutaneous superficial fascia, the length of which ranges from 1 to 3 cun based on patient's size. For perpendicular or oblique insertion, we often select short needles (0.5-1 cun). When finishing, the needles should be pulled out slowly along the angle of the needle body and press the hole with a clean dry cotton ball.

Principles of Motion

While performing motion acupuncture, it is important

that motion should be performed between pain and painlessness during extension or contraction, and the needle should be retracted if the patient feels pain. After motion, the patient should be told to move freely to see whether there is restriction or pain in a certain angle.

Sensation and depth of needle insertion

Traditional acupuncture techniques may produce soreness, numbness, distention, heaviness, pain, coldness, hotness or formication in the process of needling, which can be conducted along certain directions. During needle insertion, pain or severe pain can be produced at three sites. First, when the needle punctures skin, pain can be produced due to the pain receptors in the skin. Second, if the needle punctures blood vessels, pain can be produced. Third, if the needle punctures periosteum, instantaneous severe pain and also distention can be produced. Therefore, in order to avoid pain, the needle should puncture the skin rapidly, which can greatly reduce pain. In addition, contact of the needle point with blood vessels and periosteum should be avoided as far as possible. If contact occurs, the needle should be withdrawn a bit, then, after adjustment of direction, slowly reinserted.

If the needle point contacts a nerve, the patient can feel numbness, which can be conducted along the nerve. As the needle body enters the muscle belly, the patient may feel local soreness. This generally does not occur as a result of needling an organ or insertions of muscles. When the needle point or needle body enters subcutaneous superficial fascia, the patient may feel distention and heaviness, which can be conducted along certain directions, upward or downward. Patients can also feel cold or hot when the needle body enters the surface layer of skin, i.e. the layer between skin and superficial fascia, depending various acupuncture methods being used. The reason for this is that pain receptors, tactile receptors and thermo-receptors are all located there. After insertion of the needle, hotness will be produced if the needle is pressed downward and coldness will be produced if the needle is pulled outward. In addition, hotness will be produced if the needle stimulates a sympathetic nerve, while coldness will be produced if the needle stimulates a parasympathetic nerve (vagus nerve).

In motion acupuncture, the needle mainly reaches the superficial fascia. Therefore, after insertion of the needle body, the main sensations are distention and heaviness, though sometimes coldness or hotness is sensed. However, many people may have no special sensations at all.

Treatment Course of motion acupuncture

It is best to perform each motion 8-10 times, generally for 15-20 minutes, 2-3 times weekly.

Discussion

A similarity between conventional acupuncture and motion acupuncture is that both of them are a kind of friction or separation movement among soft muscle tissues. With acupuncture, the doctor performs various techniques after needle insertion, in which the patient receives passive stimulus. However, with motion acupuncture the patient performs various motions after the needle is inserted, thereby receiving active and self-controlled stimulus.

Normally, we use acupuncture to release soft tissue

pressure points and nodules. However, acupuncture techniques may be difficult to master well. If the technique is too soft, efficacy may be limited; while if the technique is too heavy, it may not be accepted by the patient or cause side injuries. Only one needle can be manipulated at a time in acupuncture, at most two if both hands are used, thus The motion is relatively limited. With acupuncture it says "the needle moves but the flesh does not." But in motion acupuncture, "the needle does not move but the flesh does." Both have the similar effects, but the effect of the motion acupuncture is superior. Motion acupuncture is also safer, and more easily accepted by patients. It is also more advantageous, as multiple needles can be inserted on the local site of pain. Synergic Motion of multiple needles is like a symphony; compared to simple acupuncture is like a solo.

In summary, the motion performed by patients with needles retained during acupuncture has the following functions: (1) Motion may promote blood circulation and metabolism, and increase the blood supply of muscles, thus repairing injured muscles (17). (2) Motion may recover and regulate the structural disorders of muscle and bones, so as to recover the function of muscles and relieve pain (18). (3) Needle-retaining motion may relax tight muscles, eliminate nodules of myofascia and promote blood circulation to improve the nutrition of ischemic and hypoxic muscles. (4) Through motion, body structures may automatically "restore" their functions. In clinical practice, all effective therapies including acupuncture are meant to provide an opportunity of motion for patients who dare not move due to pain, to allow for autonomic restoration of body structures. Only when recognizing this mechanism, can doctors understand and correctly evaluate the effects of each therapy, so that doctors can use the least and minimal motion to achieve the most safe and comfortable autonomic restoration and effectively prevent recurrence (19).

Like conventional acupuncture, the mechanism of motion acupuncture may mainly be through the action on subcutaneous loose connective tissues, especially stimulating superficial fascia, however, motion acupuncture may render stronger, more durable, and controllable stimulation on fascia, due to the motions performed by patient. Fascia can be divided into superficial fascia, aponeurosis, deep fascia and visceral fascia. As an uninterrupted viscoelastic tissue, fascia forms a functional 3-dimensional collagen matrix (20-21), which surrounds and connects each muscle as well as each visceral organ, forming a continued connective tissue network throughout the body, including aponeuroses, joint capsules, or endo-, peri-, and epimysium in muscles (22). Since each muscle is surrounded by epimysium, which is continuous with tendons that attach muscles to bones, the pain and functional limitations caused by soft tissue injuries may result, at least in part, from the disorder of fascial epimysium (23). Therefore, a mechanism of motion acupuncture may be through its action on epimysium. Motion acupuncture can directly stimulate the superficial fascia, which connects the deep fascia through aponeurosis. The whole fascia system is a connective tissue network running through the human body, which encompasses various structures such as muscles, muscle groups, blood vessels, nerves and bones (24). When motion acupuncture stimulates the superficial fascia, through the needle-retaining motion of muscles, it

greatly increases the stimulus of acupuncture on fascia and conducts this stimulus to aponeurosis and deep fascia to regulate the mechanical force of fascia in the body, so that the balance among fascia, muscle and bone structures is promoted to achieve the purpose of analgesia and function restoration (25).

In addition, loose connective tissues are also known as areolar tissues characteristic of diversity of cell types, less fiber and loose arrangement. Loose connective tissues are widely distributed among organs, tissues and cells in the body, having multiple functions such as connection, support, nutrition, defense, protection and repair. Therefore, superficial fascia can directly communicate with visceral fascia, or connect with visceral fascia through aponeurosis and deep fascia. The fascia continuously runs through the body, and even visceral fascia (26). For this reason, stimulating superficial fascia by acupuncture may regulate the balance between internal organs and the body surface as well as that among the various internal organs, thus treating diseases of these internal organs. Studies on this point are being conducted, but therapeutic effects on some diseases of internal organs have already been shown, such as weight loss, constipation, gastro-intestinal dysfunction, tinnitus and gynecological diseases such as dysmenorrhea.

Pain can result from muscle injury caused by various factors. The malfunction of muscles leads to structural disorder of bones and other muscles. Muscle injury and bone injury may also exist together to cause structural disorder of bones and muscles. In the treatment, whether regulating structure to improve function or improving function to regulate structure both can achieve the purpose of relieving pain. Motion acupuncture is used to promote the autonomic restoration of muscle and bone structures through corresponding motion after acupuncture on the targets, so that the function can recover spontaneously and the pain can be relieved (27). Changing the tension of fascia muscle groups can correct joint disorders to varying degrees so as to achieve the effect of relieving pain.

Motion acupuncture, through the motions performed by patient, can provide stronger and more durable stimulation on fascia than conventional acupuncture, thus achieving better and quicker therapeutic efficacy for various musculoskeletal pain, and the fascial system plays a central role in this process. The exact mechanism of how the fascial system mediates the therapeutic effect of motion acupuncture remains to be investigated. Current studies have shown that fibroblasts in fascia respond rapidly to acupuncture with active remodeling of their cytoskeleton and autocrine purinergic signaling, and modulating the composition and organization of extracellular matrix, which play an active role in regulating the connective tissue tension and viscoelastic relaxation, thereby reducing the musculoskeletal pain (28). Future studies would be needed to investigate how motion acupuncture is integrated into these pathways, as well as the molecular and cellular mechanism that underlies its therapeutic effects.

Conclusion

In this article, we have introduced motion acupuncture for the treatment of musculoskeletal pain. Large-scale studies are needed to further demonstrate its clinical efficacy in various pain conditions that are related to musculoske-

letal and visceral disorders.

References

1. Zhang Q. Special issue on basic and clinical research for pain and its management and acupuncture studies. *Eur J Bio Med Res* 2015; 1: 1-1.
2. Zhang QH, Yue JH, Sun ZR, Lu Y. Acupuncture for chronic knee pain: A protocol for an updated systematic review. *BMJ Open* 2016; 6:e008027.
3. Zhang Q, Yue J, Lu Y. Acupuncture treatment for chronic knee pain: study by Hinman et al underestimates acupuncture efficacy. *Acupunct Med* 2015; 33:170.
4. Sun ZR, Yue JH, Zhang QH. Electroacupuncture at Jing-jiaji points for neck pain caused by cervical spondylosis: a study protocol for a randomized controlled pilot trial. *Trials* 2013;14:360.
5. Sun ZR, Yue JH, Tian HZ, Zhang QH. Acupuncture at Houxi (SI 3) acupoint for acute neck pain caused by stiff neck: study protocol for a pilot randomised controlled trial. *BMJ Open* 2014; 4:e006236.
6. Yue J, Zhang Q, Wang S, Gao W. Research progress of electroacupuncture treatment on cervical spondylosis radiculopathy in recent ten years. *Journal of Acupuncture and Tuina Science* 2011; 9: 127-32.
7. Chen D, Yang G, Zhou K. Traditional Theories and the Development of Motion Acupuncture: A Historical Perspective. *Int J Clin Acupuncture*, 2015; 24: 223-7.
8. Xue LG. Chinese Meridian Sinew. The Press of Ancient books of Traditional Chinese Medicine. Beijing, China, 2009.
9. Xuan ZR. Soft Tissue Surgery. Wenhui Press, Shanghai, China, 2003.
10. Travell JG, Simons D. Myofascial Pain and Dysfunction: The Trigger Point Manual (Vol. 1, 2nd Edition). Lippincott Williams & Wilkins, USA: Media, 1998.
11. Travell JG, Simons D. Myofascial Pain and Dysfunction: The Trigger Point Manual (Vol. 2). Lippincott Williams & Wilkins, USA: Media, 1992.
12. Huang JW. Therapy of Meridian Sinew. China Press of Traditional Chinese Medicine. Beijing, China, 1996.
13. Chen ZL, Li ZD. Three Gaps and Three Edges Point Pressure Experience of Professor Li Zhidao and Its Application in Teaching of Acupoint Location. *Journal of Tianjin University of Traditional Chinese Medicine*. 2003; 6:48.
14. Lu DH. Muscle Injury and Neck, Shoulder, Lumbar, Hip & Leg Pain. TCM Press, USA: Industry; 2000.
15. Clay JH, Pounds DM. Basic Clinical Massage Therapy: Integrating Anatomy and Treatment (2nd Edition). Lippincott Williams & Wilkins, Baltimore, 2006.
16. Chen DC. Single point Acupuncture and Moxibustion for 100 diseases (2nd edition). Trafford, 2010.
17. Lineras RC. Anatomia & Musculacion. Paidotribo, Badalona, Spain, 2014.
18. Albir GS. Anatomia & 100 Estiramientos. Paidotribo, Badalona, Spain, 2015.
19. Vella M. Anatomy for Strength and Fitness Training: An Illustrated Guide to Your Muscles in Action. New Holland Publishers, London, UK, 2006.
20. Yang C, Du YK, Wu JB, Wang J, Luan P, Yang QL, Yuan L. Fascia and Primo Vascular System. *Evid Based Complement Alternat Med*. 2015; 2015:303769.
21. Findley TW. Fascia research from a clinician/scientist's perspective, *International Journal of Therapeutic Massage & Bodywork*, 2011; 4:1-6.
22. Kwong EH, Findley TW. Fascia-current knowledge and future directions in physiatry: narrative review, *Journal of Rehabilitation Research and Development*, 2014; 51: 875-884.
23. Stecco A, Stern R, Fantoni I, De Caro R, Stecco C. Fascial Disorders: Implications for Treatment. *PM R* 2015; S1934-1482(15)00292-

- 0.
24. Wang J, Yang C. Fasciology General Education Text Book. Xinjiang People's Publishing House, Urumqi, China, 2015.
25. Myers TW. Anatomy Trains: Myofascial Meridians for Manual & Movement Therapists. Elsevier, New York, 2014.
26. Yuan L. Fasciology. Tsinghua University Press, Beijing, China, 2011.
27. Song YT. Applications for Soft Tissue Injuries. Ocean Press, Beijing, China, 2012.
28. Fox JR, W. Gray W, Koptiuch C, Badger GJ, Langevin HM, Anisotropic tissue motion induced by acupuncture needling along Intermuscular connective tissue planes, *J Altern Complement Med.*, 2014; 20: 290–4.