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Original Article

Myofascial Meridians as Anatomical Evidence of Acupuncture Channels

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ABSTRACT

Background: Conceptually, acupuncture Principal Meridians course through the myofascial layer of the body and send branches to one another and the organs they influence. Recent literature has described the concept of ''myofascial meridians'' as anatomical pathways that transmit strain and movement through the body's muscle and fascia.
Objective: To qualitatively explore the relationship of acupuncture Principal Meridians to myofascial meridians that have been identified by analysis of human anatomy.
Design and Setting: The 12 acupuncture Principal Meridians were qualitatively compared by visual estimation (using computer software with human figure outlines) with the 9 myofascial meridians to determine whether any correlations existed in their described distributions.
Main Outcome Measure: Overlap of Principal Meridians and myofascial meridians on the simulated human anatomical model.
Results: In 8 (89%) of 9 comparisons, there was substantial overlap in the distributions of the anatomically derived myofascial meridians with those of the acupuncture Principal Meridian distributions. In addition, the ''spiral'' myofascial meridian can be described as a combination of 2 acupuncture meridians.
Conclusions: The strong correspondence of the distributions of the acupuncture and myofascial meridians provides an independent, anatomic line of evidence that acupuncture Principal Meridians likely exist in the myofascial layer of the human body.

Key Words: Acupuncture, Anatomy, Meridians, Myofascial

INTRODUCTION

Experimental evidence of acupuncture channels has been documented by identifying reduced electrical resistance between acupuncture points along the principal acupuncture channels.[1] Pathologic studies have shown the anatomical presence of small myelinated and unmyelinated nerve fibers, lymphatics, arterioles, and venules at acupuncture points.[2] Conceptually, acupuncture Principal Meridians have 2 parts: a superficial one coursing under the skin and between muscles and tendons, and the deep portion that extends to the organs.[3,4] Langevin and Yandow demonstrated that 80% of 24 acupuncture points in cadaveric arm anatomical sections entered intermuscular or intramuscular

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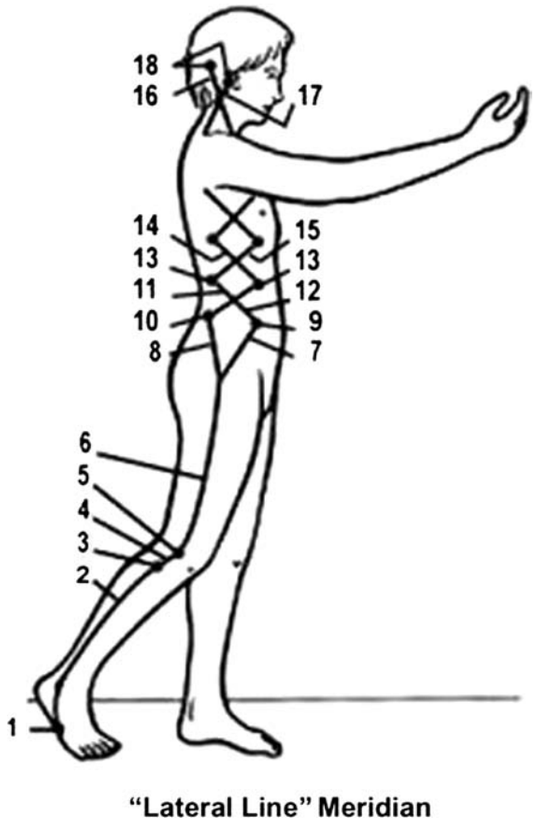

FIG. 1. Lateral line myofascial tracks and bony stations. Modified from Myers.[9] Used with permission.

Table. Myofascial Tracks and Bony Stations of the Lateral Line Myofascial Meridian

Bony stations	*No.**	*Myofascial tracks*
Occipital ridge and mastoid process	18	
	16, 17	Sternocleidomastoid, splenius capitis
First and second ribs	14, 15	External and internal intercostals
Ribs	13	
	11, 12	Lateral abdominal obliques
Iliac crest, ASIS, PSIS	9, 10	
	8	Gluteus maximus
	7	Tensor fasciae latae
	6	Ilitotibial tract/abductor muscles
Lateral tibial condyle	5	
	4	Anterior ligament of head of fibula
Fibular head	3	
	2	Peroneal muscles, lateral crural compartment
First and fifth metatarsal bases	1	

Abbreviations: ASIS, anterior superior iliac spine; PSIS, posterior superior iliac spine.

*Points for the tracks and stations along the lateral line myofascial meridian. Modified from and used with permission by Myers.[9]

tissue planes.[5] They postulated that acupuncture meridians may course through interstitial connective tissue planes, although this work has not been extended to other body regions to determine whether acupuncture points also enter fascial planes there.[5] No studies have definitively demonstrated an anatomic substrate of acupuncture channels, although some researchers have noted a degree of overlap of meridians and the peripheral nervous system in the extremities.[6–8]

In 2001, Thomas Myers, a therapeutic massage and bodywork specialist certified in Structural Integration (Rolfing), introduced the concept of ''myofascial meridians,'' which are defined as anatomical lines that transmit strain and movement through the body's myofascia.[9] These myofascial meridians were discovered through his analyses of human cadaver dissections that examined the interconnections of the body's fascia, tendons, and ligaments, which form anatomical grids postulated as integral to the support and function of the locomotor system.

Some of the myofascial meridians extend the entire length of the body, whereas others are regional (e.g., from chest to fingers). Myofascial meridians are postulated to occur along body paths where connective tissues (including myofascia, tendons, and ligaments) not only have anatomical continuity but also exhibit only a gradual change in tissue orientation (i.e., direction and/or depth of connecting fiber structures) along the entire pathways. This anatomical configuration conceptually allows strain to be transmitted across the structures in a given myofascial meridian. Although an individual myofascial meridian may attach at skeletal sites along its course to anchor these pathways (i.e., ''bony stations''), a portion of its fibers continue onward to the next part of its myofascial track (meridian).[9]

An example of the lateral line myofascial meridian is shown in Figure 1, with its ''myofascial tracks'' and ''bony stations''[9] listed in the Table. Depiction of an actual anatomical dissection demonstrating this meridian is shown in Figure 2. The Table presents correlation of the different portions of the lateral line myofascial meridian diagram to the picture of the actual anatomic dissection of this meridian.

The existence of these anatomically derived myofascial meridians has clinical importance as well. Myers[9] discusses how optimal treatment of musculoskeletal pain requires attention to the site of the patient's presenting pain complaint as well as to potential musculoskeletal problems anywhere along the myofascial meridians that course through the painful region. For example, a patient may present with recurrent posterior neck pain despite frequent neck manipulations. This patient may be found to have untreated hamstring and plantar fascia restrictions. Treatment of those musculoskeletal issues (on the same

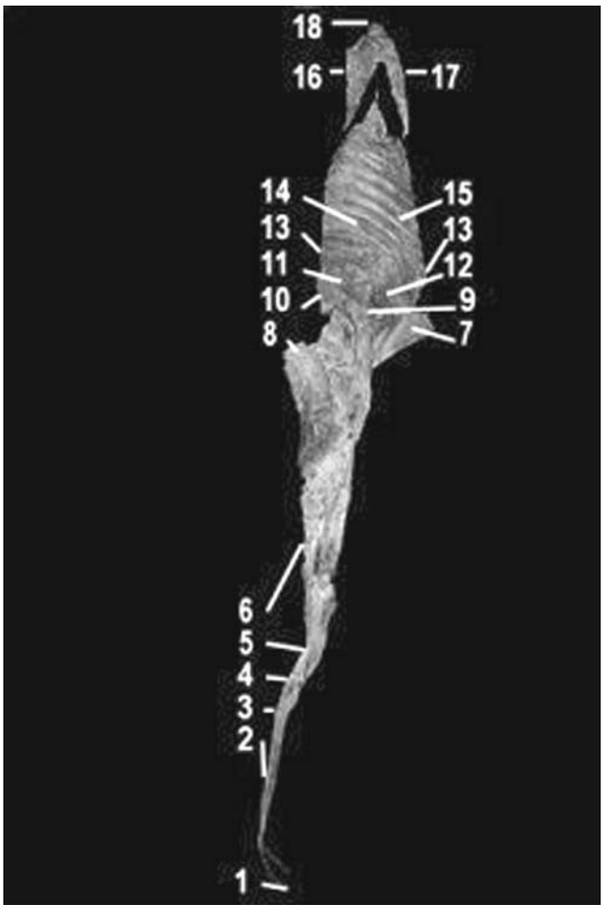

FIG. 2. Lateral line cadaveric dissection photograph. Courtesy of T.W. Myers. Used with permission.

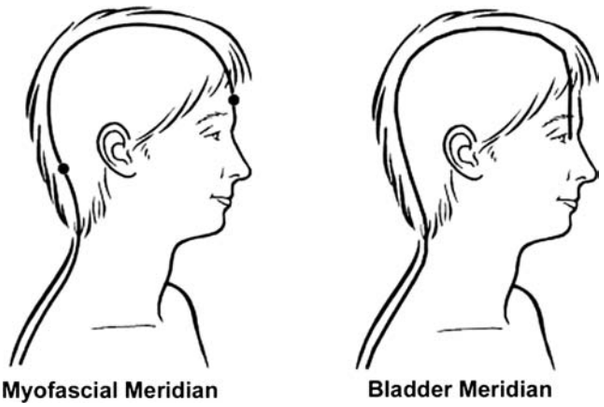

FIG. 3. Lateral view of superficial back line. Left, myofascial meridian; right, acupuncture Principal Meridian (here and in Figures 4–12). Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

''myofascial meridian'') in conjunction with localized neck pain therapy may lead to sustained improvement in the patient's neck pain. Clinically, this treatment concept is analogous to the use of distal extremity acupuncture points to influence pain and function in other areas of the body.

The purpose of this study was to evaluate whether the distributions of the anatomically based myofascial meridians are similar to those of the acupuncture Principal Meridians. If such a correspondence exists, it would provide independent anatomic evidence from manual medicine research that suggests acupuncture Principal Meridians exist in the myofascial layer of the body and could elevate meridians from being conceptual constructs to having a potential anatomic substrate.

METHODS

The 12 acupuncture Principal Meridians as outlined by Deadman et al[10] were qualitatively compared by visual estimation to the 9 myofascial meridians described by Myers[9] to determine whether any correlations existed in their described distributions. With Adobe Photoshop Elements software (Adobe Systems Inc, San Jose, CA), the distributions of corresponding acupuncture meridians were applied to the same human figure outlines used in Myers' text to allow direct side-by-side comparisons of the acupuncture and myofascial meridians. The accuracy of placement of the Principal Meridians in these graphics was independently confirmed by a physician-acupuncturist with more than 10 years' acupuncture experience using the meridian descriptions in the text by Deadman et al.[10] These relationships are graphically demonstrated in Figures 3 to 13.

RESULTS

In 8 (89%) of 9 comparisons, there was substantial overlap in the distributions of the anatomically derived myofascial meridians with those of the acupuncture Principal Meridian distributions.

The correspondences of these distributions were near complete for the Bladder (BL) meridian to the ''superficial back line'' myofascial meridian (Figures 3 and 4), the Gallbladder (GB) meridian to the ''lateral line'' myofascial meridian (Figure 6), the Lung (LU) meridian to the ''deep front arm line'' myofascial meridian (Figure 8), the Triple Energizer (TE) meridian to the ''superficial back arm line'' myofascial meridian (Figure 9), and the Small Intestine (SI) meridian to the ''deep back arm line'' myofascial meridian (Figure 10).

The Stomach (ST) meridian distribution has near complete overlap with the ''superficial front line'' myofascial

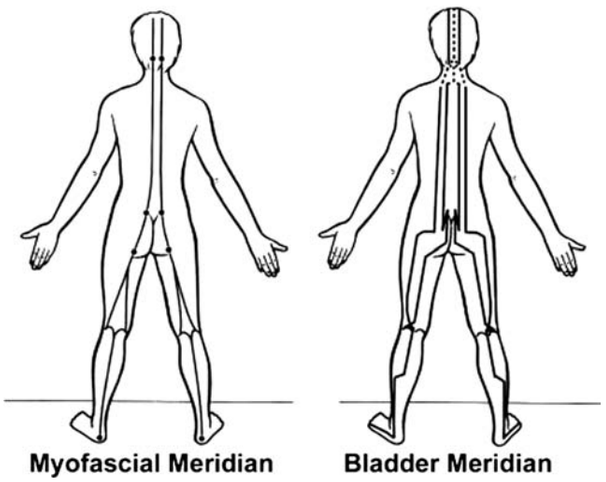

FIG. 4. Posterior view of superficial back line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

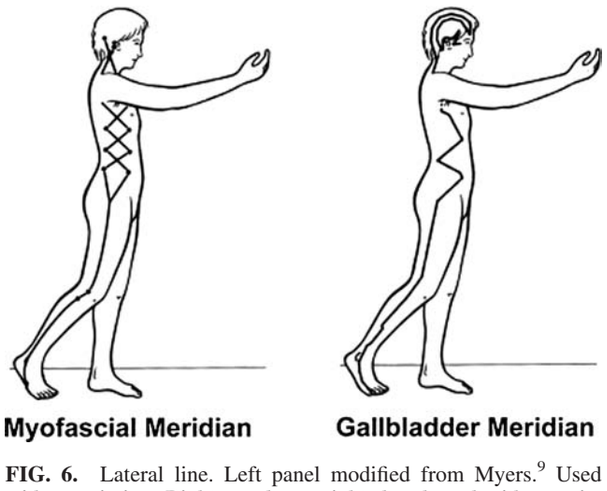

FIG. 6. Lateral line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

meridian in the lower extremity and anterior neck region, but courses more laterally in the trunk (Figure 5). The Pericardium (PC) meridian distribution has essentially complete overlap with the ''superficial front arm line'' myofascial meridian in the chest, forearm, and hand regions, but is distributed slightly more laterally in the brachial region (Figure 7). The Kidney (KI) meridian distribution has marked overlap with the ''deep front line'' myofascial meridian in the lower extremity and throat region, and partial overlap in the chest cavity (Figure 12). The KI meridian distribution in the abdominal region, though, is distributed more anteriorly.

The ''spiral line'' myofascial meridian distribution did not correlate closely with any single acupuncture meridian, but it could be viewed as a combination of the courses of the BL and ST meridians (Figure 11).

There are only 9 myofascial meridians described by Myers,[9] so, the Principal Meridians whose distributions were judged closest to those myofascial meridians were chosen for comparisons in the Figures 3–12. The distributions of the Heart (HT), Large Intestine (LI), Liver (LR), and Spleen (SP) Meridians did not correspond as well to the myofascial meridians. The HT Meridian would be the only other acupuncture meridian aside from the PC Meridian that could correlate to the ''superficial front arm line'' myofascial meridian. The HT Meridian distribution, however, is

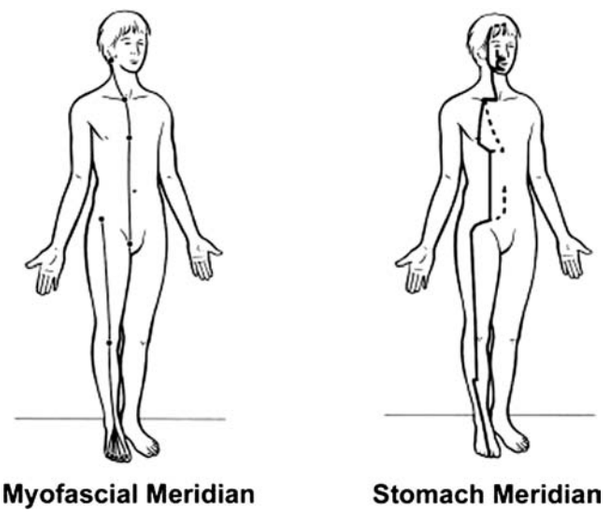

FIG. 5. Superficial front line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

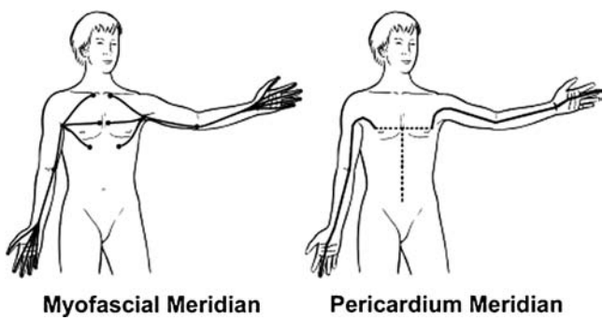

FIG. 7. Superficial front arm line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

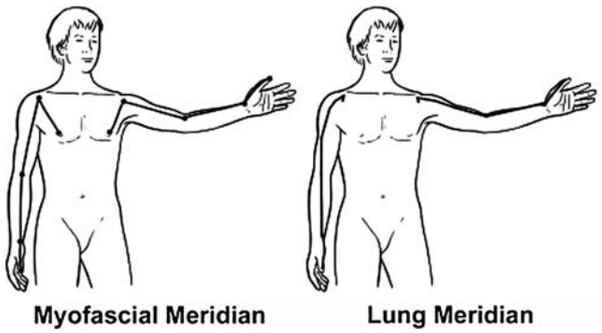

FIG. 8. Deep front arm line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

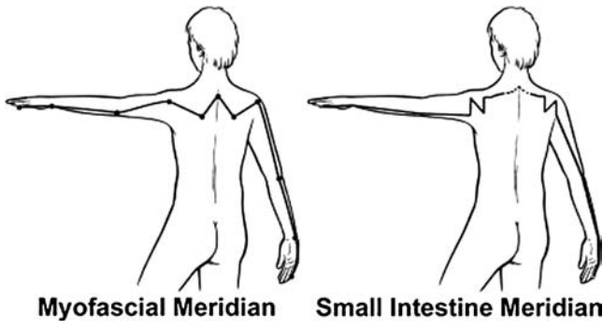

FIG. 10. Deep back arm line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

more medially distributed on the anterior surface of the forearm relative to that myofascial meridian than is the PC Meridian, though its distribution in the brachium corresponds better. The forearm segment is physically longer than the upper arm segment, so that the overall degree of correspondence of acupuncture meridian distribution to that of the ''superficial front arm line'' myofascial meridian is best for the PC Meridian.

The LI Meridian would be the only other acupuncture meridian aside from the LU Meridian that could correlate to the ''deep front arm line'' myofascial meridian, but the LI Meridian distribution runs posteriorly to this myofascial meridian on the dorsal surface of the upper extremity. The LR Meridian would be the only other acupuncture meridian aside from the KI Meridian that could correlate to the ''deep front line'' myofascial meridian. It has a similar amount of correspondence of its distribution to this myofascial meridian except in the ankle and foot region where the LR Meridian distribution is more superiorly distributed relative to the ''deep front line'' meridian than is the KI Meridian (Figure 13).

The SP Meridian would be the only other acupuncture meridian that could correlate to the ''superficial front line'' myofascial meridian, but the SP Meridian distribution is more medially distributed on the anterior surface of the lower extremity and more laterally distributed in the anterior trunk relative to this myofascial meridian than is the ST meridian.

DISCUSSION

The marked degree of correspondence noted in this qualitative study between the distributions of the anatomically derived myofascial meridians to those of acupuncture Principal Meridians is unlikely to be coincidental.

Each acupuncture Principal Meridian has 2 parts: a superficial one (on which acupuncture points exist) that courses under the skin and between muscles and tendons, as well as a second deep path that extends inward to the organs.[4] Myers' ''deep front line'' myofascial meridian has

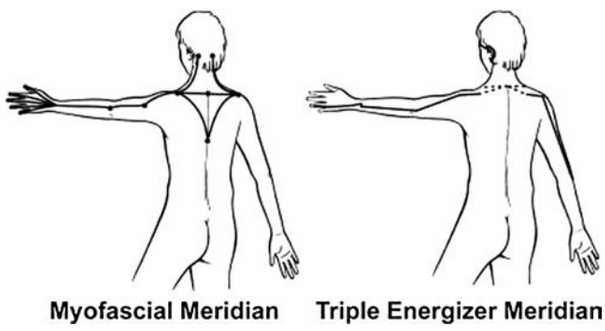

FIG. 9. Superficial back arm line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

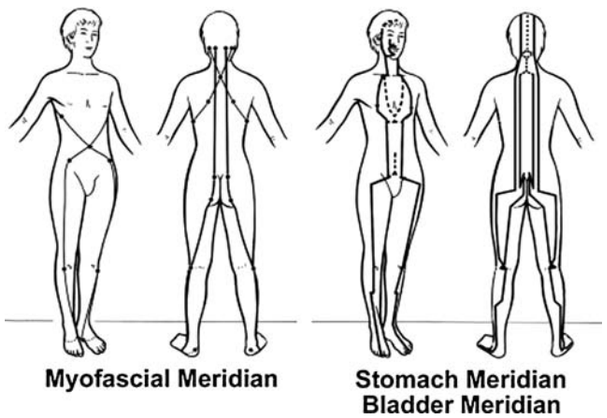

FIG. 11. Spiral line. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

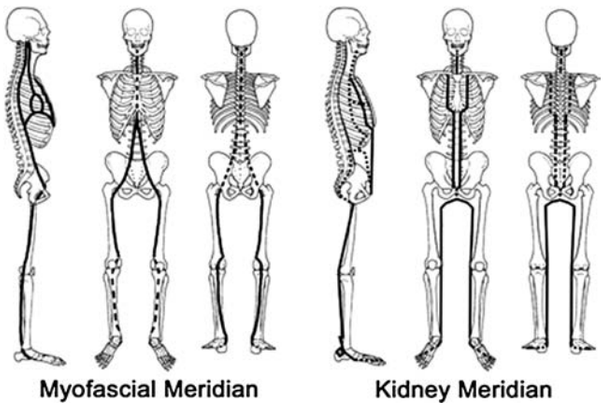

FIG. 12. Deep front lines and the Kidney Meridian. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

superficial and deep pathways similar to those of the KI and LR Meridians.[9,10] The other 8 myofascial meridians do not have deep connections to internal organ fascia.[9] Though it could be postulated that the myofascial meridians might more appropriately be compared to muscle channels rather than Principal channels (meridians), the ''deep front line'' myofascial meridian's deep connections to organ fascia is not consistent with characteristics of a muscle channel.[4,6]

Muscle channels are not distinct anatomic structures but instead represent a description of the body's tendinomuscular system within the overall framework of the traditional channel (meridian) system; furthermore, the muscle channels not only carry the same names as the Principal Meridians but also generally follow the same superficial pathways.[6] Muscle channels are termed ''Jing Jin'' in the *Nei Jing*, which can be translated as ''channel-like muscles'' or ''muscles of the channels.''[4] Thus, trying to distinguish whether myofascial meridians should best be compared with Principal channels vs muscle channels is likely more an academic, intellectual exercise than an anatomic issue.

Myers[9] states that the anatomically derived myofascial meridians are distinct from acupuncture meridians. Myers is not familiar with the acupuncture tradition (personal communication, DATE), and the fact that he has physically demonstrated each of the myofascial meridians in anatomic dissections (Figure 2, for example) clearly supports his myofascial meridians as anatomic structures. The present study, however, demonstrates that these myofascial meridians have distributions that are very similar to those of acupuncture meridians.

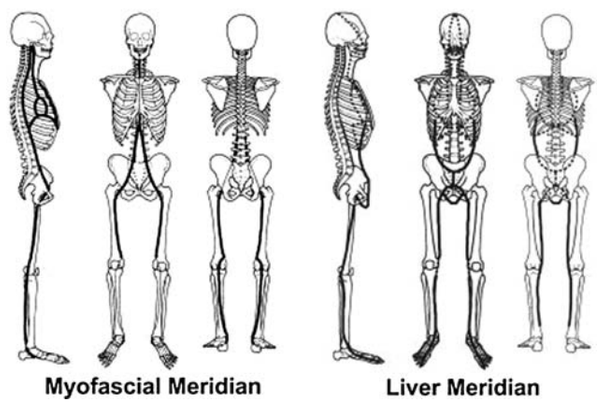

FIG. 13. Deep front lines and the Liver Meridian. Left panel modified from Myers.[9] Used with permission. Right panel copyrighted and used with permission of Mayo Foundation for Medical Education and Research.

CONCLUSIONS

Myofascial meridians,[9] anatomic structures that derive from study of the body's myofascial system in cadavers, have strong correspondence to the distributions of acupuncture Principal Meridians. This is still consistent with a nervous system basis of acupuncture's clinical effects,[6–8] since neurovascular bundles in the extremities course in connective tissue planes.

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DISCLOSURE STATEMENT

The author states that no competing financial conflict exists.

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