

Trigger Points And Acupuncture Points: Anatomic And Clinical Correlations

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ABSTRACT

Background Trigger point therapy to relieve myofascial pain is an accepted contemporary medical treatment. Acupuncture also may be a useful modality to treat myofascial pain.

Objective To explore the relationship between trigger and acupuncture points and their corresponding referred-pain patterns and acupuncture meridians.

Methods A total of 255 trigger points were compared with 747 acupuncture points. Anatomy software and atlases were used to find trigger and acupuncture points that are within 2 cm of each other and enter the same muscle, defined as corresponding points. The clinical pain indications of corresponding points were compared, as were the trigger points' referred-pain patterns and the acupuncture points' meridian distributions.

Results Of the 255 trigger points, 92% had anatomically corresponding acupuncture points. Of these acupuncture points, 79.5% had regional pain indications similar to their corresponding trigger points. Complete or near-complete agreement in the distributions of the myofascial referred-pain patterns and acupuncture meridians were found for 76% of corresponding points; at least some agreement was found for another 14%.

Conclusions The scientific basis of myofascial pain should help further elucidate acupuncture's therapeutic mechanisms in treating pain. This study's results may facilitate increased integration of acupuncture into contemporary clinical pain management.

KEY WORDS

Acupuncture, Myofascial Pain, Pain, Trigger Point Therapy

INTRODUCTION

Acupuncture has been used to treat illness for more than 4,000 years.¹ Nearly 97% of the 361 classical "channel points," each located on 1 of the 12 principal acupuncture meridians (channels) or on the midline "Conception" or "Governing" meridians, were described by the third century. Another 191 "miscellaneous" acupuncture points, mostly off channel, that were found to be clinically useful over the centuries are currently used, in addition to 195 "new" points described since the founding of the People's Republic of China in 1949.² Acupuncture continues to be an integral part of health care there; one of its uses is for musculoskeletal pain conditions.

Trigger point therapy is a well-accepted contemporary allopathic treatment for musculoskeletal pain. "Muscular calluses" were described by Froriep in 1843;³ a century later, Kellgren⁴ described the concept of referred pain to remote body areas by painful, tender muscle points. Travell and Simons^{5,6} described 255 myofascial trigger points and their referred-pain patterns in the 1983 publication *Myofascial Pain and Dysfunction: The Trigger Point Manual*.

The first comparison of acupuncture and trigger point therapy for treating musculoskeletal pain was published by Melzack et al in 1977.⁷ Classical acupuncture points that are primarily used to treat pain conditions were compared with a set of 48 myofascial trigger points. The results showed 100% anatomic correspondence of the studied acupuncture and trigger points and a 71% clinical correspondence in treating pain syndromes.⁷ This study, however, did not test for similarities in the referred-pain patterns of trigger points and the meridians of the corresponding acupuncture points.

The purpose of the present study was to comprehensively examine the anatomic and clinical relationships between each trigger point described by Travell and Simons^{5,6} and the classical, "miscellaneous," and "new" acupuncture points described by the Shanghai College of Traditional Medicine.² The present analysis included, for the first time, a systematic comparison of the distributions of myofascial referred-pain patterns and acupuncture meridians.

METHODS

Travell and Simons^{5,6} described 255 anatomically distinct trigger points with associated referred-pain patterns. The 361 classical "channel" acupuncture points delineated in the text by Deadman et al,⁸ as well as 386 "new" and "miscellaneous" points described in the Shanghai College of Traditional Medicine text,² were compared with the 255 trigger points to determine anatomic correspondence. A trigger point and an acupuncture point had anatomic correspondence if the following 2 criteria were met: the locations of the points were within a 2-cm radius of each other, and the points entered the same muscle. Although an arbitrary value, the 2-cm radius limit for anatomic correspondence was chosen for 2 reasons. First, trigger point locations are not precisely described, with only approximate locations given on surface anatomy drawings. Second, an injection needle penetrating a given trigger point in an oblique direction can easily reach a corresponding acupuncture point that is 2-cm away, and vice versa. The second anatomic correspondence criterion was needed to ensure that each acupuncture point entered the muscle of its anatomically corresponding trigger point.

Proportional measurements (distance ratios) were taken of the acupuncture and trigger point locations in these texts^{2,5,6,8} to determine whether the points met the first criterion for anatomic correspondence. Acupuncture texts describe precise criteria for acupoint localization as well as proper direction and depth of needle insertion. The current study allowed for deeper needle entry (if necessary) to reach the corresponding trigger point's muscle, and permitted needle insertion in any direction that allowed needle entry into that muscle.

Chen and Flower's cross-sectional anatomic study of acupuncture points⁹ was used to determine whether the acupuncture point entered the same muscle as its corresponding trigger point. These findings were validated by using anatomic pictures and drawings^{5,6,8,10} in conjunction with Primal human anatomy software (Primal Pictures Ltd, London, United Kingdom).¹¹ These resources^{5,6,8,10,11} were also used to determine anatomic correspondence for acupuncture points not described in Chen and Flower's text (most of the new and miscellaneous points).

For the acupuncture points that were confirmed to have anatomic correspondence with trigger points, their clinical indications were examined to determine if they included any regional pain indications similar to those of the corresponding trigger points.^{2,8,9}

Finally, the distributions of the acupuncture meridians and the trigger points' myofascial-referred pain patterns were compared for all anatomically corresponding points. These distribution correlations between the meridians and referred-pain patterns were rated (by visual estimation) as follows:

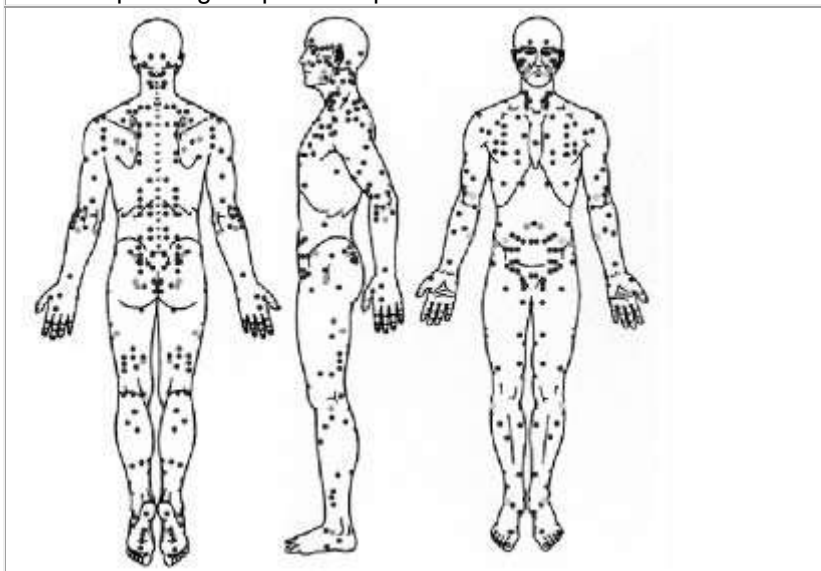
1. Excellent: a trigger point's local and distal referred-pain pattern followed its corresponding acupoint's meridian very closely
2. Good: the trigger point's local and most of its distal referred pain followed its corresponding acupoint's meridian
3. Fair: a trigger point's local referred-pain pattern followed its corresponding acupoint's meridian, but most of the distal referred pain differed
4. Poor: a trigger point's local and distal referred pain differed almost entirely from its corresponding acupoint's meridian distribution
5. None: a trigger point's referred-pain pattern had no similarity to its corresponding acupoint's meridian distribution.

RESULTS

Correspondence of Trigger Points and Acupuncture Points

Of the 255 trigger points, 234 (92%) had anatomic correspondence with classical, miscellaneous, or new acupuncture points. Classical acupuncture points comprised 70% (163/234) of the total correspondences to trigger points, new acupuncture points comprised 16% (38/234), and miscellaneous acupuncture points comprised 14% (33/234) (Figure 1).

Figure 1. Anatomic correspondence of trigger and acupuncture points. Black dots indicate corresponding acupuncture and trigger points. Light gray dots indicate trigger points with no corresponding acupuncture point. Medium dots indicate internal trigger points with no corresponding acupuncture point.



Only 21 of the 255 trigger points (8%) had no anatomic correspondence to acupuncture points. Seven of those 21 trigger points were in internal musculature (medial pterygoid, psoas, iliacus, and 2 each in the subscapularis and obturator internus). These points are not accessible to needling with acupuncture techniques, and, except for the medial pterygoid muscle trigger point, these points are not safely accessible by trigger point injections.

Clinical Correlation of Acupuncture and Trigger Points

Of 234 acupuncture points with corresponding trigger points, 186 (79.5%) had clinical indications for regional pain similar to trigger point therapy. Of those 186 points, 152 (82%) were classical acupuncture points, 22 (12%) were miscellaneous acupuncture points, and 12 (6%) were new acupuncture points.

Only 15% (34/234) of acupuncture points had no corresponding clinical pain indications, with this number including only 4 classical acupuncture points (BL 51, SP 8, SP 11, and LR 10). Thus, only 3% of classical acupuncture points that had anatomic correspondence to trigger points had no related pain indication.

Trigger Point Referred-Pain Patterns Compared With Meridians

Twenty-one trigger points had no correlating acupuncture points and thus, no corresponding referred-pain patterns to analyze. Another 61 trigger points correlated with off-channel miscellaneous or new points or had no myofascial-referred pain pattern described (e.g., "causes diarrhea" points). The referred-pain patterns of the remaining 173 trigger points were compared with the meridian distributions of their corresponding acupuncture points. These included 157 classical acupuncture points in addition to 13 new points and 3 miscellaneous points that are located on meridians.²

Seventy-six percent of corresponding acupuncture and trigger points showed complete or near-complete agreement of the myofascial-referred pain patterns and the associated acupuncture meridians. Another 14% of point correspondences showed at least some local or distal agreement of the referred-pain patterns and associated meridians. Only 10% of point correspondences showed little or no agreement of referred-pain patterns and associated acupuncture meridians. Correlations between referred pain and meridians are illustrated in Figures 2 through 4.

Figure 2. Anatomic comparison of the locations of the upper trapezius (TP 1) referred-pain pattern (left) and the upper gallbladder (GB 21) acupuncture meridian (right).



Figure 3. Anatomic comparison of the locations of the middle scalene referred-pain pattern (left) and the large intestine (LI 17) acupuncture meridian (right).

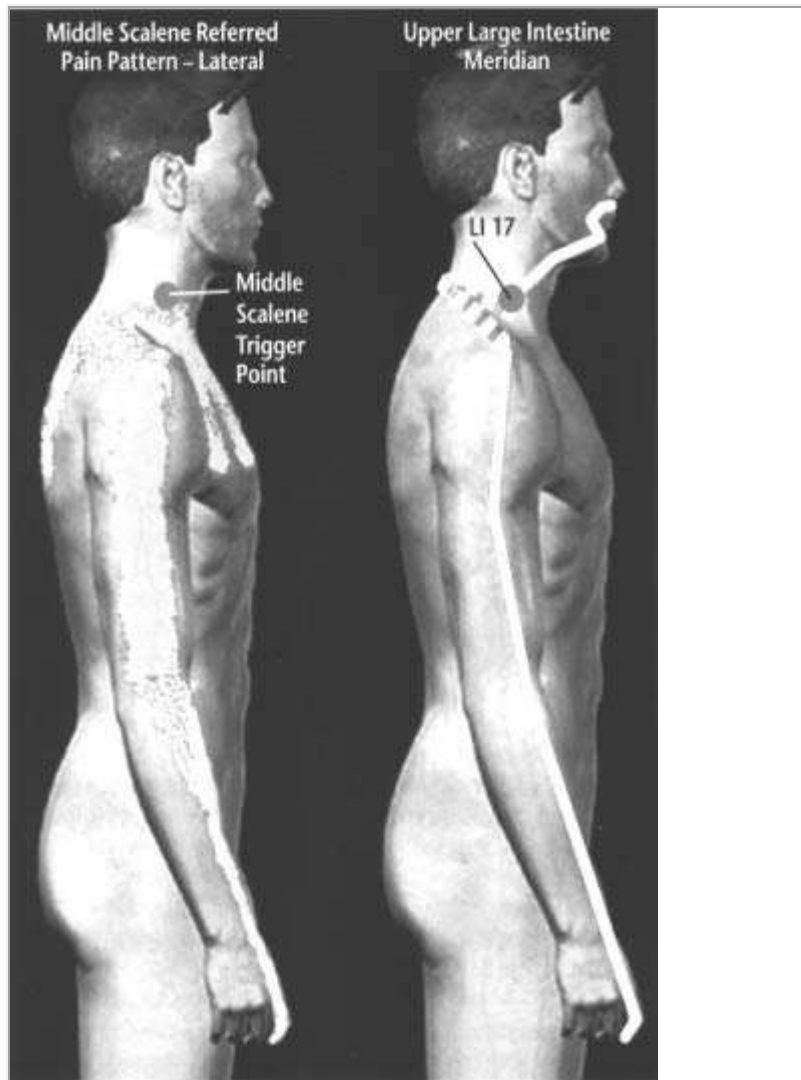


Figure 4. Anatomic comparison of the locations of the gluteus minimus referred-pain pattern (left) and the upper gallbladder (GB 29) acupuncture meridian (right).



DISCUSSION

This study demonstrates that the trigger points as described by Travell and Simons^{5,6} have remarkable

correspondences to acupuncture points, both anatomically in terms of point location, and clinically in terms of use for regional pain conditions. The referred-pain patterns of myofascial trigger points accurately follow the meridian distributions of their corresponding acupuncture points in 76% of cases, and have at least some relation in another 14% of cases. Computer graphic demonstration of each of these 234 trigger point-to-acupuncture point anatomic correspondences, and meridian-to-referred pain correlations, has been completed to document these relationships but is too voluminous to present here. (It will be available in the near future as text and software for critical review.)

As shown in Figure 1, the high degree of anatomic correspondence of the trigger points with acupuncture points, most of which were classical (channel) acupuncture points, agrees with the conclusions of Melzack et al.⁷ However, the overall degree of anatomic correspondence was slightly less in the present study, and its correspondences include some non-channel points. This decreased rate of anatomic correspondence was most likely a result of several important limitations in the study by Melzack et al.⁷ First, only 48 distinct trigger points were studied compared with 255 trigger points delineated subsequently in Travell and Simons' myofascial pain text.^{5,6} Second, their study examined few classical acupuncture points typically used for major pain syndromes or discrete pain locations. Almost every classical acupuncture point has a pain use included in its clinical indications.⁸ Their study also did not consider any of the 386 miscellaneous or new acupuncture points.² Third, anatomic correspondence in the study by Melzack et al.⁷ was defined as the acupuncture points being within 3 cm of their associated trigger points. This large radius for anatomic correlation could (and likely did) permit some of the corresponding acupuncture points and trigger points to be in different muscles. Their study did not address this issue.

Criticism of the 92% trigger-to-acupuncture point anatomic correlation in the present study may come from those who agree with a study by Birch¹² who, in reviewing the data of Melzack et al.,⁷ believed the only correspondence of trigger points and acupuncture points was probably with nonchannel Ah Shi acupuncture points. Part of Birch's criticism of the 1977 study's conclusions is that many of the correlating channel acupuncture points are not typically used for treating pain. However, almost every channel point and most of the non-channel points do have a regional pain indication, albeit not the primary (or secondary) clinical indication for those points.^{2,8,9} Acupuncture purists may criticize the present study's methods in terms of the liberalization of traditional criteria for the depth and direction of needle entry allowed, and of some of the point localizations.^{2,8} This liberalization also may lead to disagreements about whether some of this study's trigger-acupuncture point correspondences are valid. However, after having confirmed these anatomic correspondences with multiple resources, I believe that the number of points with possible discrepancies would be few (if any) and thus, would not appreciably affect the results of this study.

Myofascial purists may disagree with this study's methods in using proportional distance measurements to anatomically localize the trigger points because trigger points are described to be in a given region of a muscle. A standard for anatomic localization of the trigger points had to be chosen and that standard was Travell and Simons' point descriptions.^{5,6} Further analysis of this initial method for point correlation was performed with anatomic texts and software to confirm that the trigger point and its corresponding acupuncture point actually entered the same muscle. Liberalizing the precision for trigger point location in the present study would not change the study results and would most likely further strengthen the anatomic correlations.

The scientific basis for trigger points and their referred myofascial pain patterns is well-accepted in Western medicine. Myofascial referred-pain patterns were delineated in the 1930s and thereafter by injecting saline into a given muscle's trigger point and recording the resulting referred-pain pattern from that muscle. Acupuncturists have mechanically stimulated acupuncture points by needle manipulation to look for the spread of sensation (Qi) along the acupuncture points' meridians. This mechanical stimulation (irritation) of acupuncture points to produce the spread of the Qi sensation along meridians is mechanistically comparable to the saline chemical stimulation (irritation) of muscle trigger points to induce referred pain in myofascial pain research. It should not be surprising then that the present study found substantial agreement between the trigger points' referred-pain patterns and their anatomically corresponding acupuncture points' meridian distributions. Further, Travell and Simon's text indicates that trigger points can be deactivated just as well by dry needling of these points as by injecting the points with local anesthetic with or without corticosteroids.^{5,6}

The strong anatomic (92%), clinical (79.5%), and meridian-referred pain (76%) correspondences of trigger and acupuncture points are too strong to be explained by chance. This would suggest that the tradition of trigger point therapy for myofascial pain represents an independent rediscovery of concepts in the acupuncture tradition, at least the use of acupuncture for treating regional pain disorders. It would then follow that the scientific basis of trigger point therapy's physiologic and therapeutic mechanisms could also add to the understanding of acupuncture's mechanisms of pain relief. In the present study, acupuncture meridians were shown not only to exist conceptually but also, to be physiologic (and possibly anatomic) entities.

CONCLUSIONS

The strong correspondence between trigger point therapy and acupuncture should facilitate the increased integration of acupuncture into contemporary clinical pain management. Further research should be oriented to assist clinicians and health insurers to recognize that acupuncture may be considered as a valuable tool for trigger point therapy in specific circumstances.

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