J Chin Med 15(1): 61-68, 2004

STRUCTURAL SPECIFICIES ARE ASSOCIATED WITH CLINICAL EFFECTIVENESS OF ACUPOINTS

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(Received 6th January 2004, accepted 19th February 2004)

Clinical observations of differences in effectiveness among the multiple acupuncture points (acupoints) used prompted the present mechanistic study. Anatomical and histological examinations indicated that clinical effectiveness was associated with concentrated neural fibrillar formation, well developed capillary network and, in particular increased mucopolysaccharides (MPS). In the connective tissues, prevalence of acidic mucopolysaccharidess with its high degrees of polymerization was also observed. These results suggest high degrees of anatomical, histological as well and biochemical specialization are associated with clinically effective acupoints and may account for the physiological basis of clinical effectiveness.

Key words: Anatomy, Histology, Acupoints, Structure, Mucolysaccharides, Nerves, Vessels, Polymerization, Connective tissue, Microscopy, Treatment.

INTRUDUCTION

Acupuncture, a main branch of Chinese medicine, has a long history of being practiced clinically. Honed by centuries of accumulated clinical experience and wisdom, it has developed into a popular medical system reportedly still being practiced in 140 countries worldwide, attracting more and more interest in research[1,2]. which has centered around the clinical applications[3-8] as well as the nature of the meridians and their collaterals. Theories expounding working of the meridians and collaterals on the bases of the central nerve system and the neural segments[4-10], the blood vessels[3,11], the neuro-humoral system, bio-electricity and the cybernetics[3,12] have been proposed. There has been also a great deal of morphological studies of acupoints. General findings reported are as follows: (1) there are very rich in fine blood vessels with well developed capillary network beneath the

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points[12-18]; (2) the points are related, in order of closeness, to the nerve, the blood vessel and, others such as lymph vessels, lymph plexuses[12-20]; (3) although no specificstructure has been found, changes in the longitudal directions of the neurovascular pathways directly underneath the loci suggests possible specificities of the loci[21]; (4) specially distributed and concentrated fine blood vessel networks in which the capillaries are arranged in parallel with the channels have been found underneath each point[3,21]; (5) stereo-constructionism" has been proposed[3]; (6) multi-mineral-element-concentrated loci and areas have been found in the stereo-structures of each point[3]; (7) the Ca^{++} density increases[3] during stimulation of the points and (8) existence of a length of 15.5 μm spontaneously shape-narrowed wave in each point[3] suggesting a radiation structure with focused energy of a particular nature.

These findings do not signal the completion of research work but rather the call for further work into the nature, constitution, function and application of this proven clinically effective but mechanistically yet unclear technique.

Clinical observations that multiple acupoints are often used in treating a single ailment with certain points yielding good results[22-24] while others are poor[8,25] prompted the present study which was aimed at first of all reconfirm the relative effectiveness of these points secondly to examine any associating factors. Accordingly we designed experiments of all to confirm the clinical effectiveness of the various acupoints and then through anatomic and histological examination of the structures of the subjacent regions corresponding to the respective points in order to correlate clinical effectiveness with specificities in structures.

MATERIALS AND METHODS

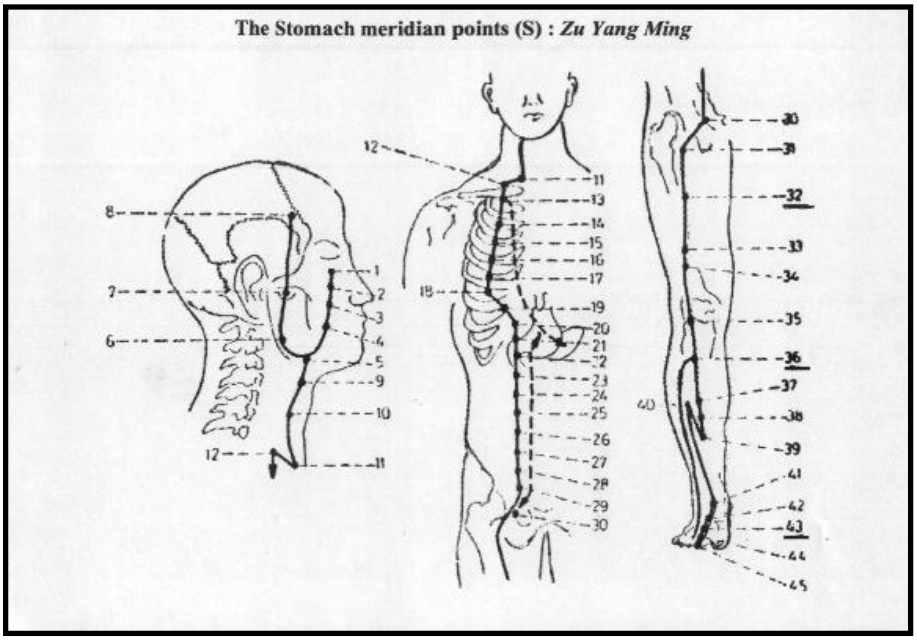
We applied the electro acupuncture method by using a Contilabo-Philips apparatus (made in France), which has the capacity of detecting the acupuncture points by a light signal lit by electricity generated by the apparatus based on the principle that when a point is properly stimulated, it emits a beam of electric energy which counters and neutralizes that emitted by the apparatus, dimming thus the light signal. The apparatus can thus perform, in dependent of the imparted intensity, dispersion equivalent to using the silver electrode or concentration equivalent to using the gold electrode on the respective points.

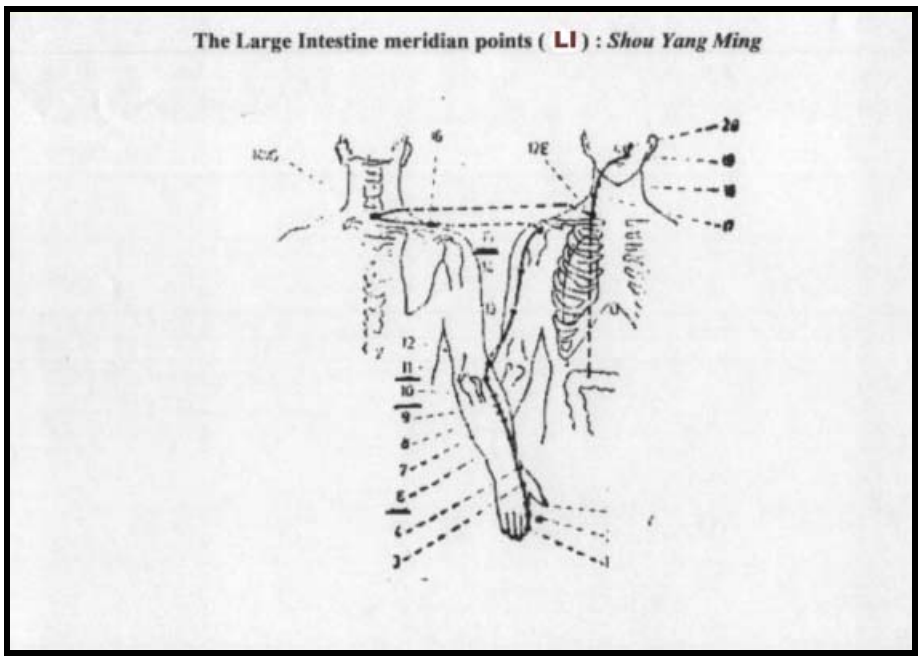
From classical anatomy, we know that some points represent agglomeration sites of neural formations and vascular ones, especially arteriolar, lymph as well as of tendinous formations or projection sites of vegetative plexuses, such as the celiac, the hypogastric and other plexuses. The density of the formations varies depending on the points, permitting a hierarchization, which we have achieved in two groups of treated patients.

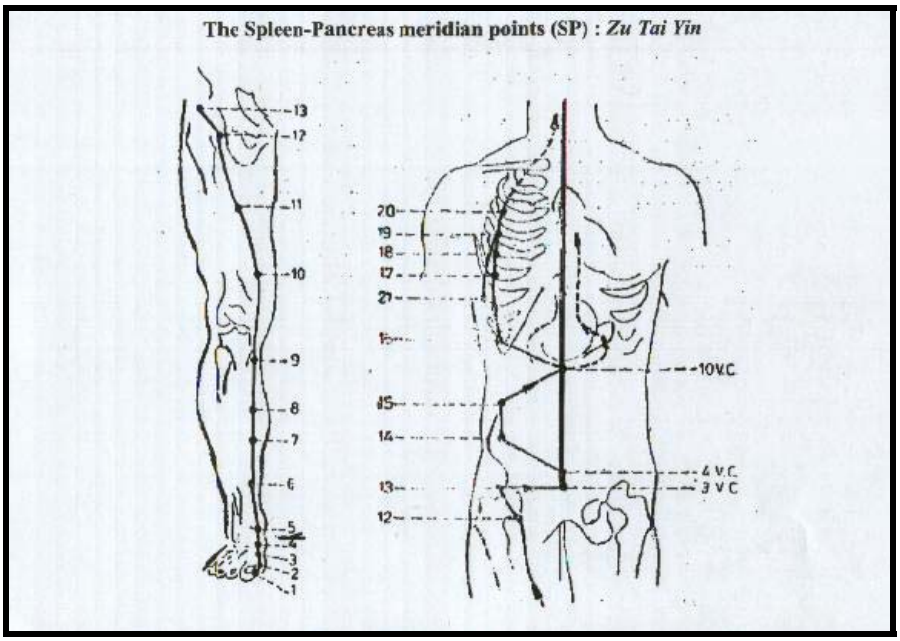
In our study were 1245 patients afflicted with various diseases were treated with electro-acupuncture using the apparatus. Of these subjects 110 were hemiplegic. In 50 % of those, whom we designated Group I we used the points

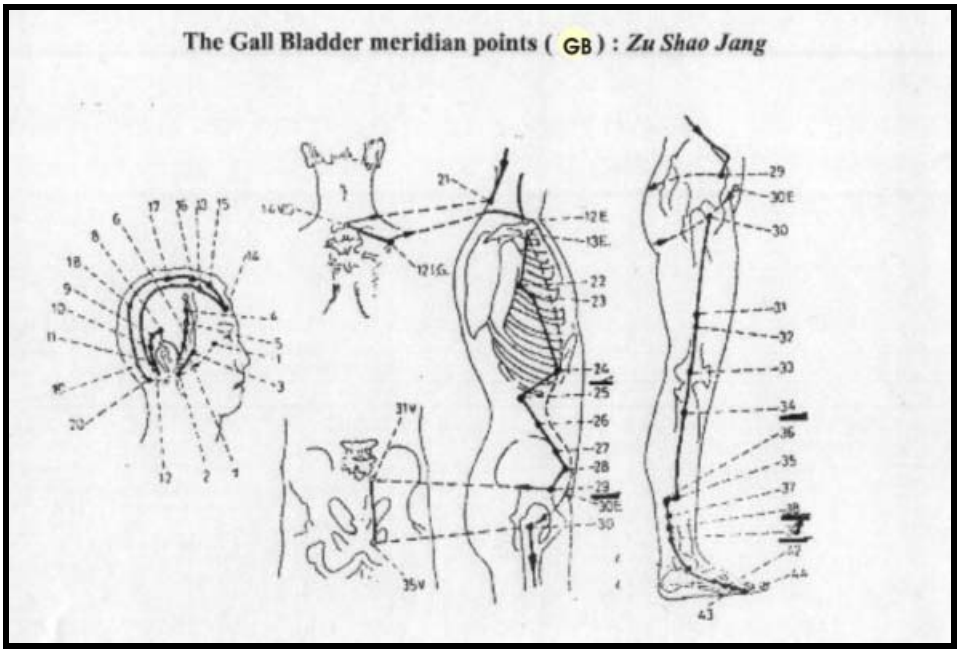
LI 11, 15, 4; S 36, 43; SP 5; GB 34, 39; whose subjacent regions are rich in the formations of nerves, vessels, lymph nodes, tendons etc., In the other half, or Group II, the points chosen, namely, LI 8, 10; S 32; SP 8; GB 38. (P.S. LI - the large intestine meridian; S - the stomach meridian; SP - the spleen-pancreas meridian; GB - the gallbladder meridian) (See figures as follows), had less positive agglomeration.

The biopsis samples were taken from the acupoints mentioned above, fixed in 10 % formalin and stained by HEX and PAS.









RESULTS

The results shown up are comparisons of patients in Groups I and II:

Firstly, treatments in patients in Group I were more effective then those in Group II.

Secondly, stratigraphic-topographic anatomy and histology indicated the points employed for treatment of Group I patients had high density of agglomerations of fine nerve fibers, small blood vessels, lymph nodes, tendons, etc.; while points used in Group II, were associated with atrophic small nerve fibers and perinervous edema. (See Figs. 1-6)

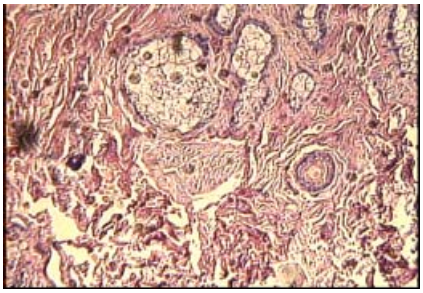


Fig. 1. G 1 – Increased Nerve Small Fibers (H.E. × 20)

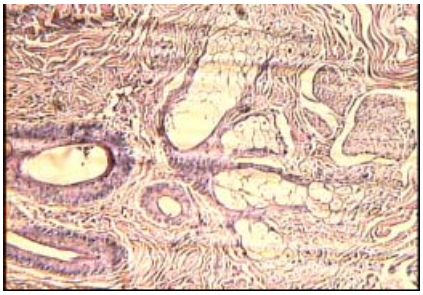


Fig. 4. G 2 – Perinervous Edema (H.E. × 20)

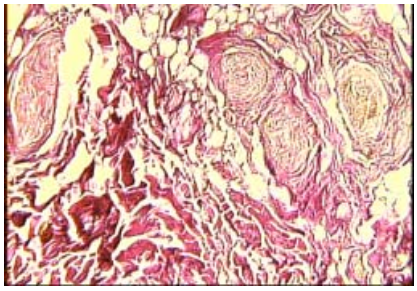


Fig. 2. High Density of MPS (PAS × 20)

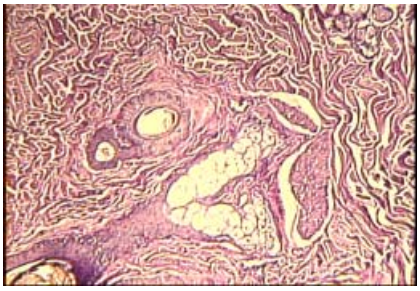


Fig. 5. G 2 – Atrophic Nerve Small Fibers (H.E. × 20)

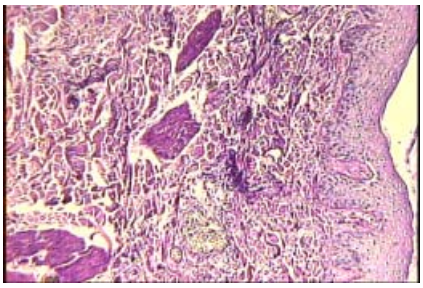


Fig. 3. G 1 – More Nerve Small Fibers & MPS (PAS × 20)

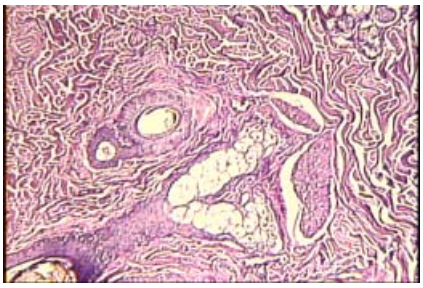


Fig. 6. G 2 – Atrophic Nerve Small Fibers (PAS × 20)

Thirdly, bioptic-structural study of relevant dermal regions using the staining methods (PAS, H.E. and Ritter-Oleson) for the fibrillar component and ground substance of the connective tissue showed that in Group I the level of the dermis corresponding to the points had high densities of acid mucopolysaccharides (MPS) which were highly polymerized. (Figs. 2-3 above).

DISCUSSION

The theory and practice of oriental medicine, for instance, Traditional Chinese Medicine involving acupuncture, has been refined by thousands of years of clinical experience and practice. Chinese acupuncturists practice acupuncture according to the holistic theory involving kings, ministers, assistants and messengers. In general, they choose a king point, one or two minister-points and a couple of assistants during each practice. However, little is known in the identification and assignment of king-points, minister-points and assistant-points.

In Western medicine, the physiological roles and functions of nerves, blood vessels, the lymph nodes, etc. are clearly defined. The fact that in treating the same disease some acupoints function better than others[21,22] prompted search for underlying physiological mechanisms.

Anatomical and histological studies indicated that indeed clinically effective acupoints used to treat patients in Group I had dense small nerve fibers, rich nerve endings, fine blood vessels, lymph nodes and tendons while those in Group II, which had much less clinical effectiveness, also had much less concentrations of those tissues. Cross-over studies by switching the acupoints used in Groups I and II yielded the same results.

Consistent with expectations, higher density of concentration of mucopolysacchrides (MPS), along with high degrees of polymerization, was observed in the points used for Group I patients than those used for patients in Group II. These results suggest special anatomical, histological and biochemical features are associated with clinical effectiveness of acupoints.

Therefore, we gave following summary: 1. The acupuncture points may be objectively defined based on the anatomical and histological distribution of nerves, vessels and lymph node formation which are concentrated around the clinically effective points. 2. Concentration of acidic mucopolyasscarides was observed in the dermis with high degrees of polymerization in the epidermis of the clinically effective acupoints. Functional significance awaits further work. 3. The present findings may contribute to better understanding and clinica application of acupuncture, moxibustion and therapeutic massage.

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J Chin Med 15(1): 61-68, 2004

結構之專屬特異性與針灸點之臨床效益具相關性

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(2004 年 1 月 6 日受理，2004 年 2 月 19 日接受刊載)

多重針灸點於臨床上使用並產生不同程度之效果啓發了本針對機轉之研究。解剖與組織學研究顯示，刺激不同針灸點所產生之臨床效果與密集之神經結構，發育良好之微血管網及高濃度之粘多糖（MPS），特別地於結締組織中發現高濃度之酸性 MPS 及其高度聚合有關。此等結果顯示高度之解剖，組織與生化之專屬特異性可能可提供針灸點臨床效果之生理基礎。

關鍵詞：解剖，組織學，針灸點，結構，粘多糖，神經，血管，聚合，結締組織，顯微鏡技術，治療。

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