Abstract

**Background:** Lateral elbow pain (LEP) is one of the most common musculoskeletal pains of the upper limbs. There is no substantial evidence of efficacy, particularly in the long-term use, of current conservative treatment options, many of which also carry considerable side effects. Finding a safe and effective treatment for LEP is therefore of high significance. Acupuncture is a popular form of complementary and alternative medicine for treating pain and dysfunction associated with musculoskeletal conditions, including LEP. Multi-center acupuncture randomized controlled trials (RCTs) are still relatively novel. However, they have methodological advantages over single-center RCTs, which lead to an enhanced external validity and generalizability of their results. On the other hand, pattern diagnosis, which is the basis for individualized treatment in Traditional Chinese Medicine (TCM), has been used in the treatment of LEP clinically, but such practice has not been standardized and its basis not understood. Study of pattern diagnosis in LEP may provide a better understanding of the nature of LEP and lead to better treatment outcomes in future clinical trials.

We set out to (1) review the current evidence of efficacy for acupuncture treatment of LEP; (2) to obtain evidence of efficacy for acupuncture treatment of LEP; (3) to review the diagnostic methods of Chinese medicine in the treatment of LEP; (4) to improve the diagnostic methods of Chinese medicine for the treatment of LEP; and (5) to determine if different TCM patterns are each associated with distinct, objective physiological changes in LEP.

**Methods:** (1) A systematic review of acupuncture for LEP that included Chinese language studies and that used revised STRICTA criteria to appraise acupuncture procedures would first be performed. Based on the findings of the first study we then would (2) conduct an international, collaborative multi-center RCT of acupuncture for LEP; (3) systematically review TCM patterns for LEP; (4) conduct a Delphi study to create a LEP pattern questionnaire; and (5) investigate if distinct temperature profiles were associated with LEP patterns, using the LEP pattern questionnaire developed prior.

**Results:** The main findings are as follows: (1) results from previous acupuncture RCTs for LEP were inconclusive due to low methodological quality; (2) compared to sham laser, acupuncture showed a medium effect size (d = 0.48) in improvement of functional impairment of the elbow; (3) four major LEP patterns, that had unique features with distinct bio-physiological correlations were identified; (4) an LEP pattern questionnaire to assist and standardize LEP pattern diagnosis was
created; and (5) we found for the first time that different TCM patterns had distinct skin temperature profiles, and such profiles might reflect different pathophysiological processes amongst LEP sufferers.

**Conclusion:** Our findings suggest that acupuncture is effective and safe in the treatment of LEP. Further international multi-center RCTs are suggested to investigate the long-term (3-6 months post-treatment) efficacy as well as the effect of individualized, pattern-based acupuncture (and moxibustion) for LEP. The subtypes of LEP discovered by the combined use of TCM pattern diagnosis and thermal imaging may be important in the understanding of LEP and may also be used to improve individualized treatment approach for this and other musculoskeletal disorders.
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