

Review Article

Meta-analysis of the efficacy of acupuncture in the treatment of low back fasciitis

Tao Geng^{1*}, Die Lin^{1*}, Benzhuo Fu², Huan Wang³, Jiajie Wan³

¹Department of Psychosomatic Medicine, Guang'anmen Hospital, China Academy of Chinese Medical Sciences, Beijing 100053, China; ²Department of Sports, Qinhuangdao Vocational and Technical College, Qinhuangdao 066102, Hebei, China; ³Department of Health Care, Guang'anmen Hospital, China Academy of Chinese Medical Sciences, Beijing 100053, China. *Equal contributors.

Received June 27, 2023; Accepted August 15, 2023; Epub August 15, 2023; Published August 30, 2023

Abstract: Background: Acupuncture has unique advantages in the treatment of low back fasciitis and has been paid increasing attention. At present, many studies have summarized the efficacy of acupuncture and moxibustion in the treatment of low back fasciitis, but few have been summarized from the perspective of acupuncture alone. Aim: To evaluate the clinical efficacy of acupuncture in the treatment of lumbodorsal fasciitis by meta-analysis. Methods: The randomized controlled trials (RCT) of acupuncture in the treatment of low back fasciitis were searched in Pubmed, Embase, and Cochrane Library from the data of establishment to July 2023. Two authors independently conducted document screening, data abstraction, and qualitative assessment. RevMan 5.3 software and Stata 17.0 software were used for data analysis. The quantitative data were represented by mean difference (MD). The qualitative data were represented by odds ratio (OR). Results: Finally, a total of 12 RCTs with a total sample size of 930 cases were included, of which 461 patients received simple acupuncture treatment (Group A) and 469 patients received non-simple acupuncture treatment (Group B). The results of the meta-analysis showed that: (1) Clinical total effective rate: The results of subgroup analysis showed that the clinical total effective rate of acupuncture was significantly higher than that of Western medicine [OR = 12.72, 95% CI (2.26, 71.78), $P = 0.004$]; the total effective rate of the traditional Chinese medicine therapy was significantly higher than that of acupuncture [OR = 0.35, 95% CI (0.19, 0.65), $P < 0.001$]. (2) Score of the visual analog scale (VAS) after treatment: There was no significant difference in VAS score between Group A and Group B after treatment [MD = -0.22, 95% CI (-1.56, 1.12), $P = 0.75$]. (3) Oswestry disability index after treatment: The results of subgroup analysis showed that the Oswestry disability index after treatment of acupuncture was significantly lower than that of Western medicine therapy [MD = -0.05, 95% CI (-0.10, -0.00), $P = 0.04$]; the Oswestry disability index of Chinese medicine therapy was significantly lower than that of acupuncture alone [MD = 0.10, 95% CI (0.05, 0.15), $P < 0.001$]. Conclusion: In the treatment of low back fasciitis, simple acupuncture therapy is superior to Western medicine therapy in improving treatment efficiency and low back muscle dysfunction, but slightly inferior to other traditional Chinese medicine therapies. Due to the limited efficacy of acupuncture, it is recommended to combine other therapies to improve the efficacy. Due to the small number of RCTs included and the unclear evaluation of many bias risks, high-quality, large sample randomized controlled studies are still needed to prove it.

Keywords: Low back fasciitis, acupuncture, treatment effect, meta-analysis, system evaluation, randomized controlled trials

Introduction

Lumbodorsal fasciitis, also known as lumbodorsal myofascial pain syndrome, is a common clinical lumbar disease. Its incidence is related to a variety of reasons, such as a lot of bending over for a long time, maintaining a fixed posture for a long time, and acute contusion of lumbodorsal muscles not being treated

in time [1]. The course of lumbodorsal fasciitis is long, and the nature of pain is diverse. Most patients will have increased pain when they are exposed to climate change or excessive labor, which acutely impacts the living quality of patients. Now, there are many Western medicine methods for the therapy of lumbodorsal fasciitis in the clinic, but the effect is not satisfactory with high recurrence. Traditional

The treatment of low back fasciitis

Chinese medicine treatment has the advantage of treating both symptoms and root causes. This is a hot spot in clinical research to improve the therapeutic effect of low back fasciitis utilizing traditional Chinese medicine [2].

Acupuncture is an external treatment with the characteristics of high security, little side-effect, and convenient operation. It has a significant effect on the treatment of low back fasciitis [3]. However, acupuncture is rarely used alone, making the efficacy of acupuncture blurred. The objectivity and accuracy of its conclusions are open to question. At present, there is no literature to systematically evaluate the efficacy of acupuncture on lumbodorsal fasciitis. Thus, we conducted this meta-analysis of related research, aiming to offer evidence of evidence-based medicine for acupuncture treatment of lumbar and back fasciitis.

Methods

Eligibility criteria

Inclusion criteria: (1) Research style: a randomized controlled trial (RCT). (2) Subjects: patients with low back fasciitis, regardless of age, gender, and race. (3) Intervention measures: the intervention measures of Group A were simple acupuncture treatment or multiple acupuncture combined treatment. The intervention measures of Group B were acupuncture combined with other therapies or non-acupuncture. Acupuncture treatment are not restrained to limitations, such as the needle materials, acupoints, manipulation, or treatment time of at least 1 course of treatment. (4) Outcome indicators: the main outcome indicators were the total clinical effective rate and the visual analog scale (VAS) score after treatment. The research literature included in the meta-analysis included at least one main outcome indicator. Exclusion criteria: (1) Literature in the form of personal experience, expert opinions, and animal experiments. (2) Literature that failed to provide that the full text or the data cannot be extracted. (3) Repetitive published literature. (4) Review, systematic review, and meta-analysis.

Information sources

Pubmed, Embase, Cochrane Library, Science, Web of Science, Springer Link, and other databases were systematically searched to July

2023. The research literature on acupuncture treatment of low back fasciitis was collected, and the relevant references were traced back to supplements.

Search strategy

English search terms included fasciitis, myofasciitis, myofascial pain syndrome, lumbar muscle strain, acupuncture, electroacupuncture, dry needling, needle knife, etc. The search strategy of subject words + free words was adopted. Taking PubMed as an example, the search strategy was: (fasciitis [Title/Abstract] OR myofasciitis [Title/Abstract] OR myofascial pain syndrome [Title/Abstract] OR lumbar muscle strain [Title/Abstract]) AND (acupuncture [Mesh Terms] OR acupuncture [All Fields] OR electroacupuncture [Title/Abstract] OR dry needling [Mesh Terms] OR needle knife [Title/Abstract] OR pricking and cupping [Title/Abstract]) AND (randomized controlled trial [Title/Abstract] OR random [Title/Abstract]).

Selection process

Wang and Fu separately screened the document. First, the title and abstract of the document were initially browsed. After excluding the unrelated literature, the full text of the abstract was further read based on the eligibility criteria to determine whether it was included. After the screening is completed, cross-checking is performed. If there was an objection, it needed to be resolved through third-party consultation.

Data collection process

Geng and Lin independently extracted data according to the unified data extraction table, including (1) Common data: title, senior author, publication date, and research type; (2) Research content: baseline data, intervention measures, grouping, outcome indicators, and outcome measurement data of the subjects; (3) Research characteristics: design scheme, inclusion and exclusion criteria, and measures to prevent bias. After the data extraction was completed, cross-checking was performed. If there were objections, they needed to be resolved through third-party consultation.

Data items

The main outcome indicators were the total effective rate and VAS score after treatment.

The treatment of low back fasciitis

The efficacy evaluation criteria used in the literature were not limited. After treatment, markedly effective, effective, and ineffective were determined. The overall effective percentage of therapy = markedly effective rate + effective rate. VAS is a method to determine the degree of pain in patients. The score range is 0-10 points. The higher the VAS score, the more severe the pain.

Secondary outcomes included the Oswestry disability index and the incidence of adverse events. Oswestry disability index is a scale used to evaluate low back pain dysfunction. The scoring method is actual score/highest score \times 100%. The higher the ratio, the more severe the dysfunction.

Study risk of bias assessment

Two authors separately employed the Cochrane bias risk assessment tool to evaluate the quality of the intake literature. The Cochrane tool evaluated the risk from six sides: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other biases. The Cochrane tool consisted of 7 items, which were estimated by "low risk", "uncertainty", and "high risk". The results were expressed by the risk of bias graph of RevMan 5.3.

Effect measures

Mean difference (MD) and odds ratio (OR) served as effect analysis statistics for quantitative data and qualitative data, respectively. A 95% confidence interval (95% CI) of each effect was provided.

Synthesis analysis

RevMan 5.3 software was used for direct comparison meta-analysis of the included literature. Based on the heterogeneity of clinical studies, subgroup analysis and sensitivity analysis were performed according to intervention measures. If the I^2 value is \leq 50% or $P \geq$ 0.05 it was considered as no statistical heterogeneity in the included literature, and the fixed-effect model was applied to the meta-analysis. I^2 value $>$ 50% or $P <$ 0.05 indicated that the included literature had statistical heterogeneity. Sensitivity analysis was used to judge the stability of the results, and the source of heterogeneity was found from clinical and method-

ological aspects. Subgroup analysis was performed according to intervention measures, treatment time, research quality, and other factors. If the source of heterogeneity could not be identified, the random effect model was used for the meta-analysis. $P <$ 0.05 was considered statistically significant.

Reporting bias assessment

Stata 17.0 software was used to draw a comparison-correction funnel plot. Egger test $P <$ 0.05 indicated that there was publication bias, and the stability of the combined results was evaluated by the clipping method.

Results

Study selection

In the preliminary screening, a total of 346 studies were obtained. Most of the studies ($n = 292$) were excluded due to the unmatched title and abstract content. After further reading the full text of 54 studies, 42 studies were excluded mainly due to the intervention measures not meeting inclusion criteria ($n = 31$), the outcome indicators not meeting inclusion criteria ($n = 7$), and failure in obtaining original text ($n = 4$). Finally, 12 studies [4-15] were included for this Meta-analysis. The selection process is displayed in **Figure 1**.

Study characteristics

The 12 articles included were all two-arm studies with 15 to 78 cases in each study. Most of the studies listed the age, gender, and course of illness of the subjects. The included studies described 1-3 outcome indicators. The study characteristics are displayed in **Table 1**.

Risk of bias in studies

Randomization was mentioned in all 12 studies, of which 4 studies were randomly grouped by random number table method, 5 studies were randomly grouped according to the order of treatment, 1 study was randomly grouped by digital odd and even numbers, and 3 studies did not describe the method of random grouping. All included studies did not describe grouping concealment and blinding procedures, so they were considered unknown risks. All the included literature provided complete index

The treatment of low back fasciitis

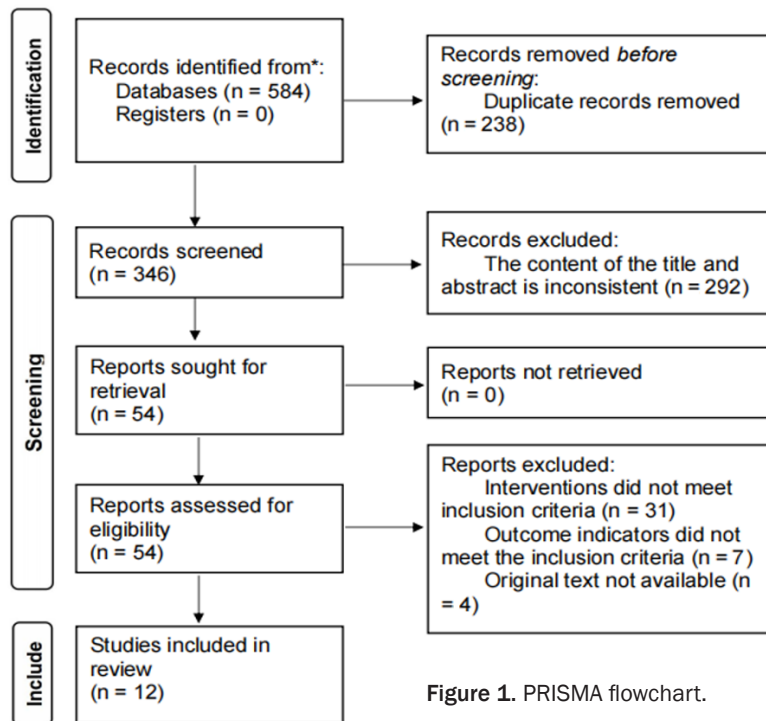


Figure 1. PRISMA flowchart.

data, and no results were reported selectively. Other risks of bias are unknown. See **Figure 2**.

Results of syntheses

Total clinical effective rate: Nine studies reported the total clinical effective rate. A total of 768 patients were included, of which 380 patients received simple acupuncture treatment and 388 patients received non-simple acupuncture treatment. After summarizing the data, the I^2 value = 57% and $P = 0.02$, suggesting that there was heterogeneity in the included literature. After eliminating the studies of Sun [6] and Hu [9] one by one in sensitivity analysis, the I^2 value and P value changed significantly. Considering that these two variables are important factors causing heterogeneity. Subgroup analysis suggested that interventions were the source of heterogeneity, and showed that the total clinical effective rate of acupuncture alone was 98.33%, which was significantly higher than 75.81% of Western medicine therapy [OR = 12.72, 95% CI (2.26, 71.78), $P = 0.004$]; the clinical effective rate of traditional Chinese medicine therapy (95.09%) was significantly higher than that of acupuncture (85.63%) [OR = 0.35, 95% CI (0.19, 0.65), $P < 0.001$]. The results are shown in **Figure 3**.

The score of VAS after treatment: Nine studies reported the score of VAS after treatment. A total of 604 patients were included, of which 301 patients received simple acupuncture treatment and 303 patients received non-simple acupuncture treatment. After summarizing the data, the I^2 value = 98% and $P < 0.001$, suggesting that there was heterogeneity in the included literature. After removing the studies one by one, we found that the I^2 value did not change significantly, and the P values all changed in the same direction, suggesting that the results were more robust. The subgroup analysis could not find the source of heterogeneity, so the random effect model was used for meta-analysis. There was

no significant difference in VAS scores between Group A and Group B after treatment [WD = -0.22, 95% CI (-1.56, 1.12), $P = 0.75$]. The results are shown in **Figure 4**.

The Oswestry disability index after treatment: Four studies reported the Oswestry disability index after treatment. A total of 216 patients were included, of which 108 patients received simple acupuncture treatment and 108 patients received non-simple acupuncture treatment. After summarizing the data, I^2 value = 87% and $P < 0.001$ suggested that there was heterogeneity in the included literature. Subgroup analysis suggested that interventions were the source of heterogeneity, and showed that the Oswestry disability index of acupuncture group was significantly lower than that of Western medicine [WD = -0.05, 95% CI (-0.10, -0.00), $P = 0.04$]; The Oswestry disability index of Chinese medicine therapy was significantly lower than that of acupuncture alone [WD = 0.10, 95% CI (0.05, 0.15), $P < 0.001$]. The results are shown in **Figure 5**.

Adverse reactions: Three studies reported adverse reactions. Two of the studies reported no adverse reactions. One study reported that the incidence of adverse reactions in the acu-

The treatment of low back fasciitis

Table 1. Basic information of the literature included in the study

Study	Country	Case (n)		Age		Gender (n, M/F)		Intervention measures		Outcome
		Group A	Group B	Group A	Group B	Group A	Group B	Group A	Group B	
Elshawi 2022	Egypt	15	15	NA	NA	NA	NA	a	d	②③
Gu 2018	China	30	30	52.3	52.3	16/14	17/13	a	g	①②
Hu 2011	China	32	32	46.2	43.6	13/19	15/17	a	j	①
Hu 2016	China	30	32	42.0	41.0	17/13	16/16	a	b	①②④
Jiang 2013	China	33	33	38.0	41.0	11/22	13/20	a	k	②③
Jiang 2016	China	33	33	NA	NA	NA	NA	a	k	②
Liang 2008	China	56	56	49.6	48.2	25/31	26/30	a	c	①
Sun 2010	China	30	30	38.0	40.0	14/16	17/13	a	b	①②③
Tao 2012	China	50	50	NA	NA	NA	NA	a	i	①②
Wang 2006	China	50	50	NA	NA	31/19	27/23	a	h	①②
Yang 2009	China	72	78	45.5	45.6	41/31	45/33	a	f	①
Zhang 2019	China	30	30	39.0	40.0	16/14	17/13	a	e	①②③

Note: a. Acupuncture; b. Western medicine; c. Acupuncture combined with tendon-muscle picking therapy; d. Traditional physical therapy; e. Acupuncture combined with distal acupoints along meridian plus exercising; f. Bee-needle therapy; g. Warm needling therapy; h. Warming acupuncture combined with scraping; i. Acupuncture combined with heart-gallbladder theory; j. Acupuncture combined with warming-promotion acupuncture; k. Point injection therapy. ① The total clinical effective rate; ② The score of visual analogue scale after treatment; ③ The Oswestry disability index after treatment; ④ Adverse reactions. NA. Missing content.

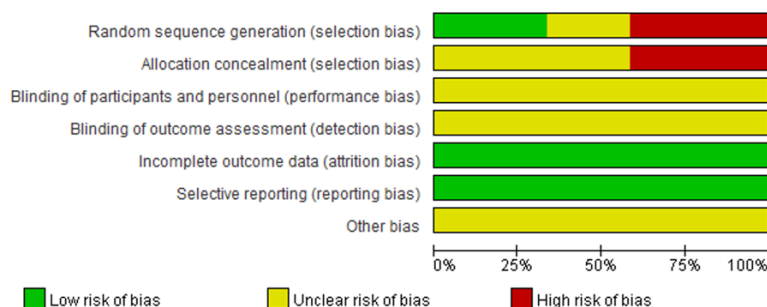


Figure 2. Risk of bias graph.

puncture group was 0, and the adverse reaction rate in the Western medicine group was 9.38%. There was no significant difference between the two groups ($P > 0.05$).

Reporting bias assessment

The funnel plot of the main outcome indicators (Figures 6, 7) were drawn. The funnel plots of all literature fall outside 95% CI, and the left and right sides are asymmetric. The Egger test of clinical total effective rate: $Z = 0.670$, $P = 0.503$. The Egger test of VAS score after treatment: $Z = -0.92$, $P = 0.358$. The results suggest that there is no publication bias and there is heterogeneity among the included literature.

Discussion

In recent years, due to the popularity of electronic devices, the age of onset of low back fasciitis has gradually become younger [16]. Lumbo-dorsal fasciitis due to cold, damp, acute and chronic strain and other causes is a common clinical refractory disease [17, 18]. If not treated promptly, the condition is pro-

longed and the pain is recurrent, which seriously affects the patient's life treatment. Clinically, non-steroidal anti-inflammatory drugs are often used for treatment. Although they can alleviate the pain symptoms of patients to a certain extent, they often lead to cardiovascular and gastrointestinal adverse reactions in some patients [19].

Although the name low back fasciitis has not appeared in the ancient books of traditional Chinese medicine, it can be classified as the scope of "Bi syndrome" in traditional Chinese medicine according to its etiology, pathogenesis, and symptoms. "Bi syndrome" is mentioned in a large number of ancient books, which is

The treatment of low back fasciitis

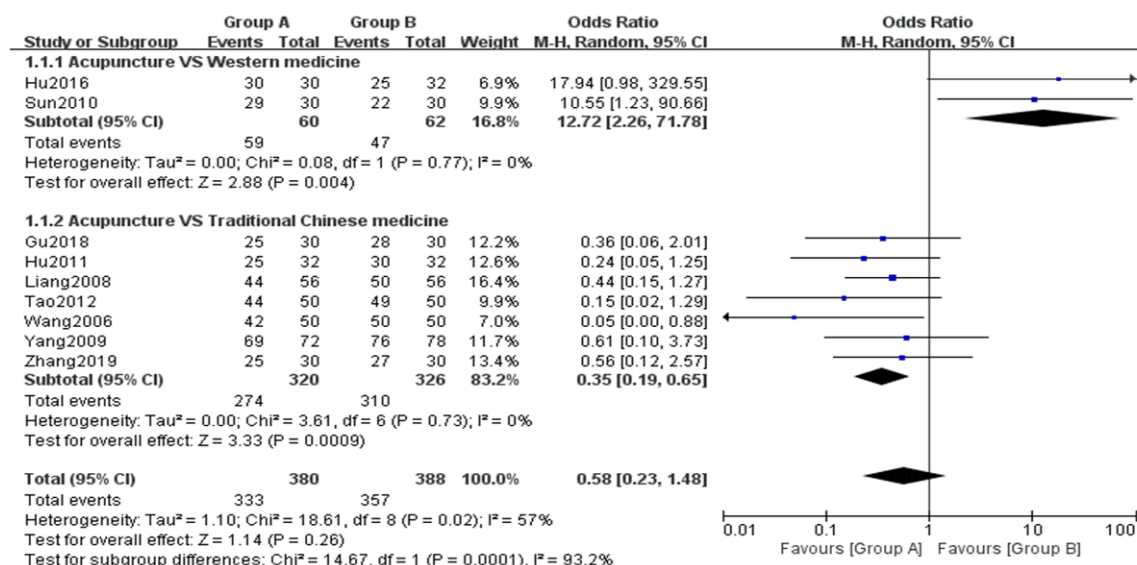


Figure 3. Forest plot of the clinical total effective rate.

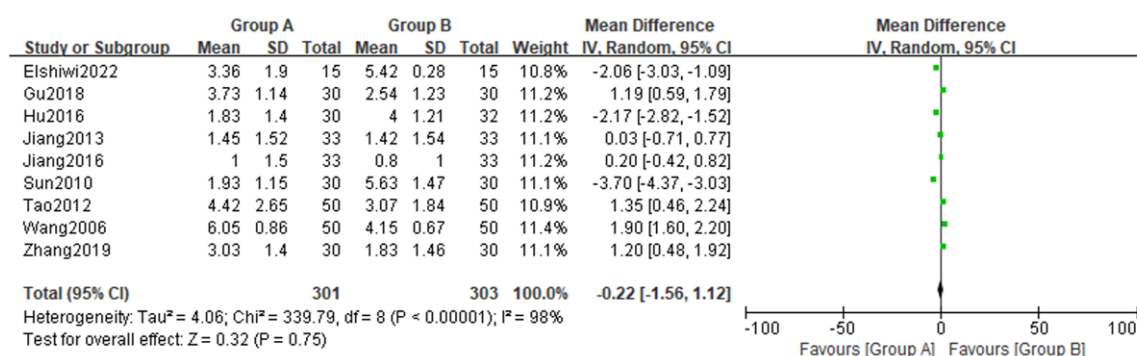


Figure 4. Forest plot of the visual analog scale score.

considered to be the result of the interaction of internal and external factors. In general, most of the internal causes are due to excessive strain, long-term illness, and physical weakness; the external cause is due to the invasion of evils such as wind, cold, and dampness. Therefore, dredging meridians and collaterals, promoting blood circulation, and removing blood stasis is the key to the treatment of low back fasciitis in traditional Chinese medicine. It was recorded that ancient doctors often used acupuncture to relieve pain in patients when treating arthralgia syndrome. Modern studies [20, 21] have also shown that acupuncture can relieve pain by expediting the liberation of endogenous opioid peptides, arresting the generation of endogenous pain-induced substances, and regulating the expression of ion channel-related pain receptors.

Acupuncture therapy is one of the commonly used methods for the treatment of low back fasciitis. Acupuncture at related acupoints or lesion sites stimulates meridian qi and blood and adjusts the overall function to treat the disease. Due to the long course of treatment of low back fasciitis in traditional Chinese medicine, most clinical doctors combine acupuncture with other treatment methods. Acupuncture is rarely used alone, and it is often combined with two or more therapies. The objectivity and accuracy of its conclusions are open to question. Therefore, this study collected relevant literature to explore the clinical efficacy of acupuncture in the treatment of low back fasciitis.

Finally, 12 RCTs involving 930 subjects were included in this study. The combined effect size analysis of the three clinical indicators showed

The treatment of low back fasciitis

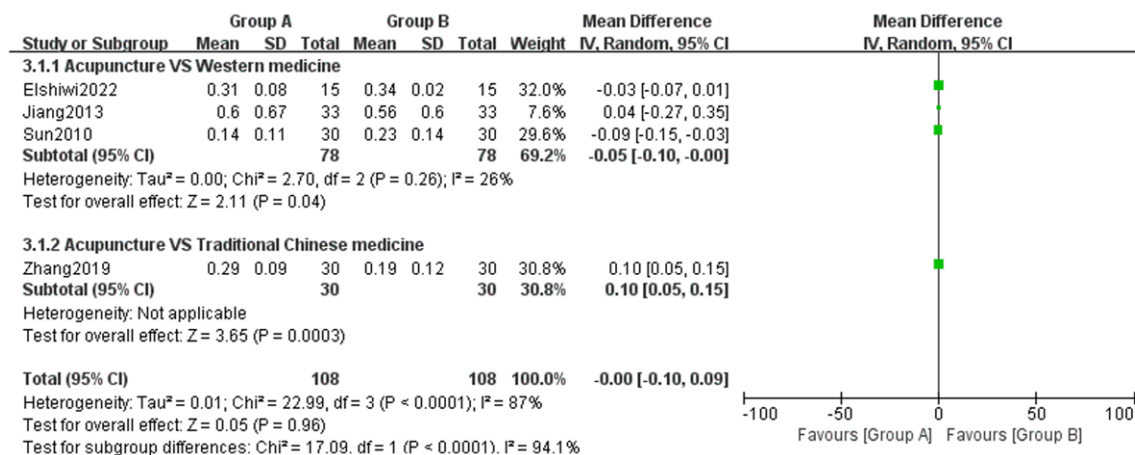


Figure 5. Forest plot of the Oswestry disability index.

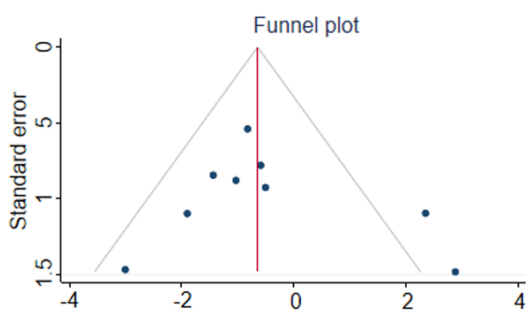


Figure 6. Funnel plot of the included studies regarding clinical total effective rate.

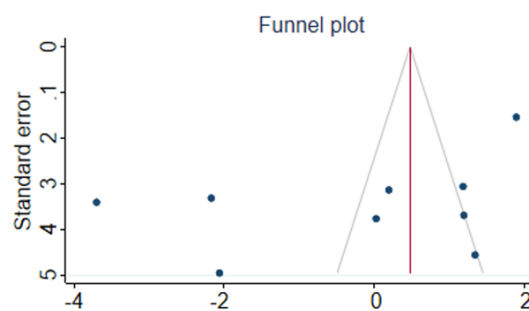


Figure 7. Funnel plot of the included studies regarding visual analog scale score.

that the heterogeneity between the included studies was large. In the analysis of the total clinical effective rate and the Oswestry disability index after treatment, the intervention measures of Group B were divided into Western medicine therapy and traditional Chinese medicine therapy for subgroup analysis. The results suggested that it may be one of the sources of heterogeneity. In the combined analysis of the VAS score after treatment, the source of heterogeneity has not been found, and the sensitivity analysis suggests that the results are more robust. The results of the meta-analysis showed that compared with acupuncture alone, traditional Chinese medicine could significantly improve the treatment efficiency, low back muscle pain, and dysfunction, while Western medicine had no significant advantage. There is not enough evidence for the evaluation of adverse reactions.

The author found that in the RCT included, acupuncture is mostly conventional usage, including filiform needle, electroacupuncture, prick-

ing, and various classical acupuncture methods, while special needles are less used. However, only four RCTs combined with other traditional Chinese medicine techniques based on simple acupuncture, so the results need to be carefully discussed and analyzed. The RCT included oral drugs, local drug blocks, and conventional physiotherapy. The therapy was relatively simple, and there was no study on acupuncture combined with Western medicine in the treatment of lumbar and back fasciitis. At present, there are many systematic reviews on dry needles (DN). Study of Hu [22] included patients with low back pain, including patients with fasciitis, and the results showed that dry acupuncture was superior to sham acupuncture in relieving pain and dysfunction in patients with low back pain, but whether the efficacy of dry acupuncture was superior to other treatments was still uncertain. They believe that the operation methods of dry acupuncture at this stage are not yet uniform and vary greatly, making it difficult to evaluate the true efficacy of dry acupuncture. Meta-analysis of Liu [2] and Lara-

The treatment of low back fasciitis

Palomo [23] showed that dry acupuncture combined with other therapies can effectively relieve the pain intensity of low back pain. Based on the results of the meta-analysis, the combination of two traditional Chinese medicine techniques can be preliminarily considered for patients with low back fasciitis with priority.

There are some drawbacks in this study: (1) The number of RCTs included is small, and most of them are small sample-size studies, which will lead to the 'false positives' in comparison and ranking results. (2) The overall quality of the included studies is not high, including random methods, allocation concealment, and unclear implementation of blind methods, which reduced the evidence strength of this study. (3) The data included in the study are mainly in a single area, so the applicability of the conclusions obtained is poor. (4) Few adverse reactions were reported in the included studies, and quantitative analysis was not yet possible. (5) At present, there are few studies on various classical acupuncture methods, acupuncture techniques, and special needles, and the research on the combined application of various acupuncture methods is minimal, which may lead to the underestimation of acupuncture efficacy to a certain extent.

In summary, in the treatment of low back fasciitis, acupuncture was ranked lower in improving the total clinical effective rate and Oswestry disability index after treatment. Due to the limited efficacy of acupuncture, it is recommended to combine other therapies to improve the efficacy. In the future, RCTs with larger sample sizes and more rigorous research programs are still needed to provide more reliable evidence-based medical evidence.

Acknowledgements

This work was supported by Scientific and technological innovation project of China Academy of Chinese Medical Sciences (CI2021A03004).

Disclosure of conflict of interest

None.

Address correspondence to: Huan Wang and Jiajie Wan, Department of Health Care, Guang'anmen Hospital, China Academy of Chinese Medical Sciences, No. 5, Beixiangge, Xicheng District, Beijing

100053, China. Tel: +86-010-88001858; E-mail: huanermix@163.com (HW); 1943447284@qq.com (JJW)

References

- [1] De Oliveira Paes Leme M, Yuan SLK, Oliveira Magalhães M, Ferreira de Meneses SR and Marques AP. Pain and quality of life in knee osteoarthritis, chronic low back pain and fibromyalgia: a comparative cross-sectional study. *Reumatismo* 2019; 71: 68-74.
- [2] Liu L, Huang QM, Liu QG, Thitham N, Li LH, Ma YT and Zhao JM. Evidence for dry needling in the management of myofascial trigger points associated with low back pain: a systematic review and meta-analysis. *Arch Phys Med Rehabil* 2018; 99: 144-152, e2.
- [3] Tian X, Li W, Zhou B, Zhang B, Wang X, Yin Y, Yu J, Wu X, Sun X and Meng C. Influence of physicians' seniority on efficacy of silver needle therapy for low back fasciitis: a prospective, cohort study. *Medicine (Baltimore)* 2023; 102: e33862.
- [4] Elshawi AMF, Mohammed AMY, Al-hakamiMA, Al-Malwy SA and Koura GMR. Effect of acupuncture dry needle versus traditional physical therapy in treatment of patients with lower back myofascial pain syndrome: a randomized clinical trial. *Journal of Positive School Psychology* 2022; 6: 3045-3060.
- [5] Gu FF, Zhu GF and Luo KT. Observation on clinical efficacy of warm needling therapy for chronic lumbar strain. *Journal of Acupuncture and Tuina Science* 2018; 16: 176-179.
- [6] Hu ML and Zhang RP. Clinical observation on warming-promotion acupuncture for lumbar muscle strain. *Zhongguo Zhen Jiu* 2011; 31: 622-4.
- [7] Hu XY, Mu JP, Chen JM, Zhou LZ, Ao JB, Fang W, Fu Q and Wang LS. Therapeutic observation of thermal electroacupuncture therapy for lumbodorsal myofasciitis. *Shanghai Journal of Acupuncture and Moxibustion* 2016; 35: 574-576.
- [8] Jiang GM, Lin MD and Wang LY. Comparative study on effect of acupuncture and lidocaine block for lumbar myofascial pain syndrome. *Zhongguo Zhen Jiu* 2013; 33: 223-6.
- [9] Jiang G, Jia C and Lin M. Effect of bloodletting therapy at local myofascial trigger points and acupuncture at Jiaji (EX-B 2) points on upper back myofascial pain syndrome: a randomized controlled trial. *J Tradit Chin Med* 2016; 36: 26-31.
- [10] Liang SY. Observation on therapeutic effect of tendon-muscle picking therapy on myofasciitis of back. *Zhongguo Zhen Jiu* 2008; 28: 621-2.
- [11] Sun YZ and Li DY. Observation on lower back myofasciitis treated with penetration needling

The treatment of low back fasciitis

- on yang meridians of the back and electroacupuncture as compared with Western medication. *Zhongguo Zhen Jiu* 2010; 30: 816-8.
- [12] Yu T, Bao K, Xie C, Sun J, Jiang L and Fu WB. Clinical observation of the heart-gallbladder acupuncture treatment in the blood stasis type lumbar muscle strain. *IEEE International Conference on Bioinformatics and Biomedicine Workshop* 2012; 389-391.
- [13] Wang LQ. Observation on therapeutic effects of scraping therapy and warming acupuncture-moxibustion on 50 cases of fasciitis of back muscles. *Zhongguo Zhen Jiu* 2006; 26: 478-80.
- [14] Yang YX, Wang GJ and Yao HC. Observation on therapeutic effect of bee needle therapy on chronic lumbar muscle strain. *Zhongguo Zhen Jiu* 2009; 29: 332-4.
- [15] Zhang M, Nie WT, Guo Y and Ding Y. Clinical observation of mild to moderate lumbodorsal fasciitis treated with distal acupoints along meridian plus exercising combined with penetration needling on yang meridians of back. *Zhongguo Zhen Jiu* 2019; 39: 817-20.
- [16] Minghelli B. Musculoskeletal spine pain in adolescents: epidemiology of non-specific neck and low back pain and risk factors. *J Orthop Sci* 2020; 25: 776-780.
- [17] Zhao H. Clinical observation on therapeutic effect of cupping combined with acupuncture stimulation at trigger points for lumbar myofascial pain syndrome. *Zhen Ci Yan Jiu* 2014; 39: 324-8.
- [18] Mahdy MAA. Skeletal muscle fibrosis: an overview. *Cell Tissue Res* 2019; 375: 575-588.
- [19] Monteiro C, Silvestre S, Duarte AP and Alves G. Safety of non-steroidal anti-inflammatory drugs in the elderly: an analysis of published literature and reports sent to the portuguese pharmacovigilance system. *Int J Environ Res Public Health* 2022; 19: 3541.
- [20] Lim TK, Ma Y, Berger F and Litscher G. Acupuncture and neural mechanism in the management of low back pain-an update. *Medicines (Basel)* 2018; 5: 63.
- [21] Hu X, Dong S, Zhang B, Wang X, Yin Y, Liu C, Yu J, Wu X, Xu F and Meng C. Efficacy of silver needle therapy for the treatment of chronic nonspecific low back pain: a prospective, single-center, randomized, parallel-controlled clinical trial. *Trials* 2021; 22: 75.
- [22] Hu HT, Gao H, Ma RJ, Zhao XF, Tian HF and Li L. Is dry needling effective for low back pain?: a systematic review and PRISMA-compliant meta-analysis. *Medicine (Baltimore)* 2018; 97: e11225.
- [23] Lara-Palomo IC, Gil-Martínez E, López-Fernández MD, González LM, Querol-Zaldívar MLÁ and Castro-Sánchez AM. Efficacy of dry needling for chronic low back pain: a systematic review and meta-analysis of randomized controlled trials. *Altern Ther Health Med* 2022; AT7480.