Table des matières

1. Systematic Reviews and Meta-Analysis 1
1.1. Generic Acupuncture 1
1.1.1. Liu 2026 1
1.1.2. Su 2025 1
1.1.3. Tian 2025 - RETRACTED 2
1.1.4. Javier-Ormazábal 2022 3
1.1.5. Liao 2022 (Upper Limb) RETRACTED 3
1.1.6. Xue 2022 4
1.1.7. Rodriguez-Mansilla 2016 4
1.1.8. Li 2016 ☆ 5
1.1.9. Lim 2015 ☆ 5
1.1.10. Park 2014 ~ 6
1.1.11. Qi 2009 ~ 6
1.1.12. Li Ning 2009 7
1.2. Special Acupuncture Techniques 7
1.2.1. Comparison of Acupuncture techniques 7
1.2.1.1. Xing 2026 7
1.2.1.2. Xiong 2026 8
1.2.1.3. Wang 2025 8
1.2.1.4. Zhu 2024 9
1.2.2. Fire needle 10
1.2.2.1. Qiu 2021 10
1.2.3. Warm-needle moxibustion 11
1.2.3.1. Yang 2018 11
1.2.4. Governor Vessel Moxibustion 12
1.2.4.1. Wang 2026 12
1.2.5. Electroacupuncture 13
1.2.5.1. Liu 2025 13
1.2.5.2. Cai 2017 14
1.2.6. Acupuncture at Meridian Sinew 14
1.2.6.1. Zhang 2017 14
1.2.7. Scalp acupuncture 15
1.2.7.1. Zhong 2025 15
1.2.8. Acupoint-to-Acupoint Penetrating Acupuncture 16
1.2.8.1. Kim 2026 16
1.3. Mechanistic systematic reviews 16
1.3.1. You 2026 16
1.3.2. You 2025 17
2. Overviews of Systematic Reviews 18
2.1. Choi 2022 18
3. Clinical Practice Guidelines 19
3.1. American Academy of Physical Medicine and Rehabilitation (AAPM&R, USA) 2024 ⊕ 19
3.2. Department of Veterans Affairs and Department of Defense (VA/DoD, USA) 2024 Ø 19
3.3. Stroke Foundation (Australia, New-Zealand) 2022 ∅ 19

spasticity after stroke

Spasticité de l'hémiplégique : évaluation de l'acupuncture

Articles connexes: - spasticité - conduites thérapeutiques - pathologie - acupuncture expérimentale - qigong -

1. Systematic Reviews and Meta-Analysis

1.1. Generic Acupuncture

1.1.1. Liu 2026

Liu J, Chen R, Huang Q, Cheng H, Cai L, Liu F. Acupuncture for post-stroke spastic hemiplegia: A dual-dimensional evidence synthesis combining bibliometric and meta-analysis. J Family Med Prim Care. 2026;15(5):1873-1879. https://doi.org/10.4103/jfmpc.jfmpc_1889_25

Objective	This study systematically evaluates acupuncture for post-stroke spastic hemiplegia using a dual-dimensional approach: bibliometric analysis and meta-analysis.
Methods	Databases (PubMed, Web of Science, Embase, CNKI, Wanfang, VIP) were searched from inception to December 31, 2024. Bibliometric tools (VOSviewer, CiteSpace) were used to analyze research trends, collaborations, and keyword clusters. Meta-analysis was performed using R, RevMan, and Stata.
Results	**Forty-five RCTs** were included. Bibliometric findings show a shift from early research on “acupoint specificity” to recent hotspots including “neural mechanisms” and “multimodal efficacy evaluation.” Meta-analysis shows that acupuncture significantly improves muscle tone (Ashworth: MD = -0.64), upper-limb motor function (FMA: MD = 6.75), lower-limb motor function (FMA: MD = 3.46), and activities of daily living (Barthel index: MD = 10.87). Electroacupuncture shows superior effects, and treatment duration ≥4 weeks is more effective. China leads in research output.
Conclusion	Acupuncture, especially electroacupuncture combined with conventional rehabilitation, is effective for post-stroke spastic hemiplegia.

1.1.2. Su 2025

Su Y, Xiao M, Liu S, Ye M. Enhancing symptom relief and quality of life in patients with stroke-induced spastic hemiplegia: a comprehensive systematic review and meta-analysis of acupuncture modalities' effectiveness. Am J Transl Res. 2025 Oct 15;17(10):8187-8202. https://doi.org/10.62347/MQRK6962

Background	Stroke survivors often experience diminished quality of life due to physical, cognitive, and emotional challenges. While rehabilitative interventions are considered the cornerstone of treatment for stroke recovery, complementary therapies, such as acupuncture, herbal, or aroma therapies, have also gained recognition for their potential to enhance post-stroke recovery.

Methods	A comprehensive search of electronic databases yielded 30 studies meeting the inclusion criteria. Studies employing acupuncture and rehabilitation interventions, alone or in combination, were included. Quality assessment was performed using the JADAD and PEDro scale. Standardized mean differences (SMD) were calculated to quantify the effect sizes. Random and fixed-effects models were applied to analyze the data.
Results	The meta-analysis revealed a significant improvement in both spastic paralysis functions and quality of life following acupuncture and rehabilitation interventions. For motor function (19 studies, 1353 participants), the pooled effect size indicated a substantial positive impact (SMD = 1.15, 95% CI: [0.10; 2.20], P < 0.0001). Similarly, there were improvement on hand function (3 studies, SMD = 0.65, 95% CI: [0.19; 1.1], P = 0.006), upper limb function (3 studies, SMD = 0.53, 95% CI: [0.04; 1.03], P = 0.021), and lower limb function (4 studies, SMD = 0.52, 95% CI: [0.31; 0.74], P < 0.0001). For quality of life (20 studies, 1503 participants), the pooled effect size was also significant (SMD = 0.8379, 95% CI: [0.7306; 0.9452], P < 0.0001). The heterogeneity across studies was moderate to high (I2 = 77.7% for quality of life and I2 = 88.3% for motor function). While funnel plot analysis suggested potential publication bias for motor function outcomes, sensitivity analyses confirmed the robustness of the quality of life findings. Reported adverse events were generally mild and transient.
Conclusion	This meta-analysis provides robust evidence supporting the positive effect of acupuncture and rehabilitation interventions on both spastic paralysis functions and the quality of life among stroke survivors. The findings highlight the potential of these therapies in promoting holistic recovery and underscore the need for their integration into standard post-stroke care protocols. Healthcare providers and policymakers should consider these results in shaping comprehensive rehabilitation strategies for stroke survivors, ultimately fostering improved well-being and long-term outcomes.

1.1.3. Tian 2025 - RETRACTED

Tian Y, Yan X, Wang H, Dang C, Sun Y. Efficacy of acupuncture therapy for spastic paralysis in post-stroke patients: a systematic review and meta-analysis. Int J Neurosci. 2025 Feb;135(2):180-187. https://doi.org/10.1080/00207454.2023.2292955

Backgound	Despite the potentially good efficacy of acupuncture therapy in the management of post-stroke spastic paralysis demonstrated in previous studies, further verification through meta-analysis can be conducive to eliminating the inconclusive of treatment outcomes in prior findings. This systematic review and meta-analysis were thus performed to comprehensively investigate the effects of acupuncture on the daily living abilities, upper and lower limb motor function, and related functional indices of post-stroke patients with spastic paralysis.
Methods	We conducted a computer search to collect data from PubMed, PEDro, Clinical SportDiscus, and Scopus. The inclusion criteria followed the Population-Intervention-Comparison-Outcome (PICO) principle. Literature screening, data extraction, and quality assessment of the research articles were performed by two independent investigators. Standard mean difference and 95% confidence intervals of the data were analyzed using either a random-effects model or a fixed-effects model.
Results	Acupuncture therapy appeared to be effective in mitigating the limb pain of post-stroke patients with spastic paralysis (RR = -0.04, 95% CI: -0.26, 0.17), ameliorating their daily life ability (RR = 4.66, 95% CI: -0.74, 10.05), and improving their hand function (RR = 0.65, 95% CI: 0.40, 0.90) and lower limb function (RR = 0.35, 95% CI: 0.09, 0.62).
Conclusion	Acupuncture therapy provides more pronounced improvement in the daily life ability and limb motor function of post-stroke patients with spastic paralysis than conventional treatment regimens. Thus, acupuncture therapy can be a viable treatment option for the management of spastic paralysis following stroke.

1.1.4. Javier-Ormazábal 2022

Javier-Ormazábal A, González-Platas M, González-Sierra E, González-Sierra M. Invasive Physiotherapy as a Treatment of Spasticity: A Systematic Review. Degener Neurol Neuromuscul Dis. 2022 Mar 3;12:23-29. https://doi.org/10.2147/DNND.S350192

Introduction	Nowadays, a set of novel physiotherapy techniques have emerged, in which the physical agent used to try to reduce spasticity is applied percutaneously, specifically, through the patient's skin. The aim of this work is to encompass all the invasive techniques used in spasticity in a single article, updating the existing bibliography.
Methodology	A systematic review was carried out between December 2020 and April 2021 in the Web of Science, Scopus and PubMed databases, selecting the clinical trials that used **acupuncture, electroacupuncture or dry needling** as a treatment for spasticity. Sixteen clinical trials were included, summarizing all the study characteristics and the outcome measures, at last the evidence was described for their results.
Results	Most of the studies find a difference of significant decrease in spasticity between the subjects of the experimental groups. Only four studies found no significant changes in spasticity. All the studies are carried out together with the conventional physiotherapy treatment in spasticity.
Conclusion	Treatment with invasive physiotherapy, combined with conventional physiotherapy, seems to have positive effects in reducing spasticity, although more studies are needed to improve the heterogeneity of the interventions and to assess their long-term effectiveness.

1.1.5. Liao 2022 (Upper Limb) RETRACTED

- Retracted: Analysis of the Efficacy of Acupuncture Combined with Rehabilitation Training in the Treatment of Upper Limb Spasm after Stroke: A Systematic Review and Meta-Analysis. Biomed Res Int. 2023 Dec 29;2023:9802958. https://doi.org/10.1155/2023/9802958
- Liao Y, Liu F, Yang J, Ma Q, Li J, Chen Y, Wu J. Analysis of the Efficacy of Acupuncture Combined with Rehabilitation Training in the Treatment of Upper Limb Spasm after Stroke: A Systematic Review and Meta-Analysis. Biomed Res Int. 2022 Aug 9;2022:8663356. https://doi.org/10.1155/2022/8663356.

Objective	Systematic evaluation of the efficacy of acupuncture combined with cognitive rehabilitation training in the treatment of upper limb spasm after cerebral apoplexy.
Methods	The data of CNKI, CBM, CQVIP, Wanfang, and the libraries of Pubmed and Cochrane were searched by computer, and the related literatures about acupuncture combined with cognitive rehabilitation training in the treatment of cognitive dysfunction after stroke were searched. The search time is from January 1, 1995 to January 1, 2022. All data segments were independently analyzed and extracted by two evaluators. After evaluating the quality of the methodology, meta-analysis was carried out by using the RevMan5.4 software.

Results	Finally, **11 studies** were included, with a total of **789 subjects**. The results of meta-analysis indicated that acupuncture combined with cognitive rehabilitation training was superior to simple cognitive rehabilitation training or drugs in the following aspects, the difference exhibited statistically significant, the total effective rate (RR = 1.58, 95% CI), latency of P300 (MD = -18.46, 95% CI), amplitude of P300 (MD = 1.23, 95% CI (0.82), P < 0.00001, 95% CI (0.31)), and activity of daily living (ADL), respectively, were significantly higher compared to the control group (P < 0.00001), and the difference was statistically significant (P < 0.05). Based on the results of systematic evaluation, the GRADE system recommendation classification method is used to evaluate the quality of evidence. The results show that the level of evidence is low and the intensity of recommendation is weak.
Conclusion	The results of this meta-analysis suggest that the curative effect of acupuncture combined with cognitive rehabilitation training is better compared to simple cognitive rehabilitation training or drugs. However, due to the low quality of the original literature, it needs to be confirmed by multicenter, high-quality, large-sample randomized blind controlled trials in the future.

1.1.6. Xue 2022

Xue C, Jiang C, Zhu Y, Liu X, Zhong D, Li Y, Zhang H, Tang W, She J, Xie C, Li J, Feng Y, Jin R. Effectiveness and safety of acupuncture for post-stroke spasticity: A systematic review and meta-analysis. Front Neurol. 2022 Aug 17;13:942597. https://doi.org/10.3389/fneur.2022.942597.

Objective	This systematic review and meta-analysis aimed to comprehensively evaluate the effectiveness and safety of acupuncture for post-stroke spasticity.
Methods	Nine electronic databases were searched from their inception to 6 June 2022, to identify randomized-controlled trials (RCTs) that investigated the effectiveness and safety of acupuncture for post-stroke spasticity. Two reviewers independently screened the studies, extracted the data, assessed the risk of bias. The reporting quality of interventions in controlled trials of acupuncture was evaluated using Revised Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA). The RevMan 5.4 and R 4.2.0 software were used for statistical analysis.
Results	A total of **88 eligible studies** were included, involving **6,431 individuals**. The pooled data demonstrated that acupuncture combined with conventional rehabilitation (CR) was superior to CR in reducing the Modified Ashworth Scale (MAS) score (standardized mean difference [SMD] = -0.73; 95% CI = -0.83 to -0.63; I 2 = 65%; low certainty of evidence). The favorable results were also observed in comparisons of acupuncture vs. CR (SMD = -0.22, 95% CI = -0.36 to -0.07; I 2 = 49%; moderate certainty of evidence). Subgroup analysis showed that acupuncture treatment with a frequency of once or twice a day was more effective than CR. In addition, the antispasmodic effect of acupuncture treatment increased with more sessions. Four studies explicitly reported slight acupuncture-related adverse events.
Conclusion	Acupuncture could be recommended as adjuvant therapy for spasticity after stroke. However, due to the high risk of bias and heterogeneity of the included studies, the effectiveness of acupuncture for post-stroke spasticity remains to be confirmed.

1.1.7. Rodriguez-Mansilla 2016

Rodriguez-Mansilla J, Espejo-Antúnez L, Bustamante-López AI. [Effectiveness of acupuncture in spasticity of the post-stroke patient. Systematic review]. Aten Primaria. 2016;48(4):226-34. [182168].

Objective	To determine the effectiveness of acupuncture for reducing spasticity in post-stroke patients.
Methods	DESIGN: Literature review. DATA SOURCE: The literature search was performed using scientific databases from January 2000 to January 2013. SELECTION OF STUDIES: Out of the 110 studies that were found, nine random and controlled trials were included. Inclusion criteria were based on clinical trials in which participants were over 18 years old, who were suffering with post-stroke spasticity, and one of the experimental groups was treated with acupuncture. DATA EXTRACTION: The variables were the passive resistance to stretching of the affected limb, and the degree of personal dependence. The variables were assessed by the Modified Ashworth Scale and Barthel Index.
Methods	The search was performed in the PUBMED, COCHRANE Library, PEDro, Dialnet, CSIC, CINAHL, databases. Search terms included the combination of keywords “acupuncture”; “muscle spasticity”; “stroke”.
Results	Passive resistance to stretching, the degree of personal dependence, and motor function of the affected limb showed statistically significant improvements in at least one study included; however, these improvements are not clinically relevant changes. Passive resistance improved in the elbow, ankle, knee, and wrist. An increased joint range was observed, except for the elbow, forearm, and thumb. Improved of the patient dependency was also observed.
Conclusions	Although improvements relative to the reduction of spasticity are shown, the results have failed to demonstrate the effectiveness of the technique for this ailment. It would take a greater number of studies to calculate the size of the reported effects with homogeneous procedures in the design as well as in the duration, frequency, and measurement tools.

1.1.8. Li 2016 ☆

Li Hong-Liang, Xue Zhi-Hui, Chen Guo, Xiang Juan, Li Fei, Li Tie-Lang. [Systematic review of acupuncture plus rehabilitation for post-stroke spasm]. Shanghai Journal of Acupuncture and Moxibustion. 2016;5:612-617. [187055].

Objectives	To systematically review the therapeutic efficacy of acupuncture plus rehabilitation in treating post-stroke spasm and to summarize the commonly-used acupoints.
Methods	The randomized controlled trials and quasi-randomized trials of acupuncture plus rehabilitation for post-stroke spasm published from January 1 of 2005 to December 31 of 2014 in China were retrieved from CNKI, WanFang database, and VIP database, etc. by using computer. The eligible studies were recruited for review.
Results	Totally **15 studies** were enrolled. The Meta-analysis showed that the most commonly used acupoints in acupuncture treatment for post-stroke spasm were Quchi (LI 11), Jianyu (LI 15), Hegu (LI 4), Tianjing (TE 10), Waiguan (TE 5), Zusanli (ST 36), Sanyinjiao (SP 6), Chize (LU 5), and so on. Compared to the controls, acupuncture plus rehabilitation had significantly better effective rate [OR=3. 13, 95%CI (2. 00, 4. 89), P<0. 00001], recovery rate [OR=2. 42, 95%CI (1. 53, 3. 83), P=0. 0002], MAS score [MD=□0. 48, 95%CI (□0. 62, □0. 35), P<0. 00001], FMA score [MD=5. 58, 95%CI (4. 96, 6. 20), P<0. 00001], and NDS score [SMD=□0. 68, 95%CI (□0. 91, □0. 44), P<0. 00001].
Conclusions	**Acupuncture plus rehabilitation can effectively mitigate the post-stroke spasm** and is worth promoting in clinic; more high-quality researches are expected as the quality of the currently recruited trials is not so satisfactory.

1.1.9. Lim 2015 ☆

Lim SM, Yoo J, Lee E, Kim HJ, Shin S, Han G, Ahn HS. Acupuncture for spasticity after stroke: a

systematic review and meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med. 2015. [177749].

Objective	The aim of this systematic review was to determine how effective acupuncture or electroacupuncture (acupuncture with electrical stimulation) is in treating poststroke patients with spasticity.
Methods	We searched publications in Medline, EMBASE, and the Cochrane Library in English, 19 accredited journals in Korean, and the China Integrated Knowledge Resources Database in Chinese through to July 30, 2013. We included randomized controlled trials (RCTs) with no language restrictions that compared the effects of acupuncture or electroacupuncture with usual care or placebo acupuncture. The two investigators assessed the risk of bias and statistical analyses were performed.
Results	**Three RCTs in English, 1 in Korean, and 1 in Chinese were included**. Assessments were performed primarily with the Modified Ashworth Scale (MAS). Meta-analysis showed that acupuncture or electroacupuncture significantly decreased spasticity after stroke. A subgroup analysis showed that acupuncture significantly decreased wrist, knee, and elbow spasticity in poststroke patients. Heterogeneity could be explained by the differences in control, acupoints, and the duration after stroke occurrence.
Conclusion	In conclusion, **acupuncture could be effective in decreasing spasticity after stroke**, but long-term studies are needed to determine the longevity of treatment effects.

1.1.10. Park 2014 ~

Park SW, Yi SH, Lee JA, Hwang PW, Yoo HC, Kang KS. Acupuncture for the treatment of spasticity after stroke: a meta-analysis of randomized controlled trials. J Altern Complement Med. 2014. 20(9):672-682. [174937]

Objectives	Acupuncture has been suggested as a treatment for spasticity in patients with stroke. The available literature was reviewed in an effort to assess its efficacy in this situation.
Methods	Randomized trials assessing the effects of acupuncture for the treatment of spasticity after stroke were identified by searching the Cochrane Library, PubMed, ProQuest, EBSCOhost, SCOPUS, CINAHL, EMBASE, Alternative Medicine Database, and Chinese and Korean medical literature databases. Two reviewers independently extracted data on study characteristics, patient characteristics, and spasticity outcomes.
Results	**Eight trials with 399 patients** met all the inclusion criteria. Compared with controls without acupuncture, acupuncture had no effect on improving clinical outcomes (as measured by validated instruments such as the Modified Ashworth Scale) or physiologic outcomes (assessed by measures such as the H-reflex/M-response [H/M] ratio at the end of the treatment period). H/M ratios did decrease significantly immediately after the first acupuncture treatment. Methodologic quality of all evaluated trials was considered inadequate.
Conclusions	**The effect of acupuncture for spasticity in patients with stroke remains uncertain**, primarily because of the poor quality of the available studies. Larger and more methodologically sound trials are needed to definitively confirm or refute any effect of acupuncture as a treatment for spasticity after stroke.

1.1.11. Qi 2009 ~

Qi YZ, Fu LX, Xiong J, Wang ZL, Mou J, Lu YM.. [Systematic Evaluation of Acupuncture for Treatment of Post-Stroke Spastic Paralysis]. Chinese Acupuncture and Moxibustion. 2009;29(8):683-8. [154652]

Objectives	To evaluate the effects of acupuncture on post-stroke spastic paralysis.
Methods	A systematic evaluation including all the relavant randomized controlled trials (RCTs) or quasi-RCTs of acupuncture and moxibustion for treatment of post-stroke spastic paralysis were carried out according to the method recommended by the Cochrane Collaboration.
Results	**Nine hundred and seventy-eight patients being included in fourteen papers** met the enrolled criteria. However, their methodological quality was relatively poor. Meta-analysis of nine trials indicated that there was no significant difference between the treatment groups and the control groups in Ashworth scores, Carr-Shepherd scores, nerve defect scores and hip adductor tension scores. Whereas the Fugel-Meyer scores in one trial and the Barthel scores in three trials were better in the treatment groups than those of the control group.
Conclusions	A reliable conclusion can not be drawn from the present data because of the defects in methodological quality and insufficient numbers of trials, especially lack the long-term terminal outcomes, although **it appears a tendency that acupuncture can improve the conditions of post-stroke spastic paralysis**. Therefore, it is necessary to perform more multi-central RCTs of high quality in future.

1.1.12. Li Ning 2009

Li Ning, Zhao Yu, Wang Cheng-Wei. [Meta -analysis of study on limb spasm after stroke treated by acupuncture and moxibustion from 2000 to 2008]. Journal of Clinical Acupuncture and Moxibustion. 2009. 25(12):4. [172500] 摘 要：目的：了解针灸治疗中风后肢体痉挛研究现状和发展水平、推断研究热点、推测学科发展。方 法：检索《中国期刊全文数据库□C]NK工）2000~ 2008 年 月间的针灸治疗中风后肢体痉挛研究的全部文 献，采用文献计量学方法对文献从发表时间分布、基金资助研究情况、文献研究类型、期刊分布、省份分 布、大学单位分布和穴位处方、刺灸方案、随机对照研究的标准符合率等方面进行统计分析。 结果：2000 - 2008年月间 数据库共收录针灸治疗中风后艘体痉挛研究文献’；107 篇，文献研究呈 逐年上升趋势，其中 篇文献报道受基金资助；临床研究篇，综述等其他研究篇，无实验基础研 究；文献报道以《针灸临床杂志》等种主要针灸杂志为主；产文地区主要为广东省、黑龙江省及天津市； 张针灸处方中，上月支穴位以“肩骼、合谷、曲池、手三里、尺泽”等为主，下月支穴位以“阳陵泉、三阴交、足 三里、血海、委中”等为主；刺灸方法以传统毫针与电针为主，共计张处方提及；篇随机对照研究文 献的标准符合率较低。结论：中风后肢体痉挛的针灸研究目前正在吸引着针灸界更多的关注。针灸穴位选取、规范化的刺灸方法实施、提高临床研究的报告质量是未来临床研究的重点。 关键词：中风后肢体痉挛；文敞计量学；针灸

1.2. Special Acupuncture Techniques

1.2.1. Comparison of Acupuncture techniques

1.2.1.1. Xing 2026

Xing F, Zhang R, Guo Y, Wang Y, Guo Y, Yang L, Wang Z, Liu Z, Jiang R, Wang J, Zhao Y, Shi J, Yin L. Network meta-analysis of different acupuncture methods for post-stroke upper-limb spasticity. Front Neurol. 2026;17:1725618. https://doi.org/10.3389/fneur.2026.1725618

Introduction	Currently, acupuncture therapy is widely used for post-stroke upper-limb spasticity. However, the available evidence remains insufficient to determine the relative effectiveness of different acupuncture protocols.

Methods	This study retrieved relevant databases and systematically reviewed randomized controlled trials (RCTs) on acupuncture treatment for post-stroke upper-limb spasticity. A total of **28 trials involving 14 acupuncture treatment protocols** were included. A network meta-analysis was performed using Stata 18 software.
Results	The results indicated that the Balanced Yin-Yang Acupuncture + Rehabilitation yielded the best outcomes in improving Fugl-Meyer Assessment scores, while Luan's Three-Needle Technique combined with Meridian Sinew Cluster Needling + Rehabilitation was most effective in reducing modified Ashworth scale scores.
Discussion	A comparison of efficacy indicators across 14 different acupuncture methods combined with rehabilitation showed that Balanced Yin-Yang Acupuncture + Rehabilitation and Luan's Three-Needle Technique combined with Meridian Sinew Cluster Needling + Rehabilitation were more effective in treating post-stroke upper-limb spasticity. Owing to limitations in the current body of research, these conclusions need to be further verified by more high-quality randomized controlled trials.

1.2.1.2. Xiong 2026

Xiong Z, Dong J, Hua Y, Zhu Y, Song Y, Zhang Z, Xiao F, Ni J, Ma L, Bai J. Acupuncture therapy for post-stroke spasticity: a systematic review and exploratory network meta-analysis of clinical efficacy and dose-response relationship. Front Neurol. 2026;17:1782831.
https://doi.org/10.3389/fneur.2026.1782831

Background	Post-stroke spasticity (PSS) is a common complication after stroke. Acupuncture has shown therapeutic potential for PSS, but the optimal acupuncture modality and dose remain unclear. The study aimed to evaluate the clinical efficacy of acupuncture for PSS and to explore the optimal acupuncture type and dose-response relationship.
Methods	Systematic review and network meta-analysis of randomized controlled trials retrieved from eight databases up to December 1, 2025. Interventions included manual acupuncture (MA), warm acupuncture (WA), scalp acupuncture (SA), fire acupuncture (FA), and electroacupuncture (EA). Outcomes included Fugl-Meyer Assessment (FMA), Modified Ashworth Scale (MAS), Clinic Spasticity Index (CSI), Modified Barthel Index (MBI), and adverse events. A dose-effect relationship model was applied to identify the optimal acupuncture dose. Risk of bias was assessed with RevMan 5.3 and certainty of evidence with GRADE.
Results	**Thirty-four trials involving 3,383 patients** with post-stroke spasticity were included. Acupuncture significantly improved upper-limb motor function (FMA-U: MD = 0.87, 95% CI 0.68–1.07), lower-limb motor function (FMA-L: MD = 1.00, 95% CI 0.73–1.27), spasticity severity (MAS/CSI: SMD = −1.03, 95% CI −1.32 to −0.75), and activities of daily living (MBI: MD = 0.89, 95% CI 0.68–1.10) compared with controls. Reported adverse events were mild and included pain, nausea, and dizziness. Network meta-analysis ranked warm acupuncture as the most effective modality for reducing spasticity (SMD = −1.66, 95% CI −2.42 to −0.90; SUCRA = 94.6%). High-dose acupuncture showed the highest probability of being the optimal dose strategy (SMD = −1.11, 95% CI −1.55 to −0.68; SUCRA = 78.5%).
Conclusion	Acupuncture appears to improve spasticity, motor function, and activities of daily living in patients with post-stroke spasticity. Warm acupuncture and high-dose acupuncture showed the highest probability of being the most effective interventions, although the overall certainty of evidence remains limited.

1.2.1.3. Wang 2025

Wang X, Zhang K, Lin X, Liu Z, Wang L, Zhang F, Xiao L, Gao Y, Wen Y, Dong B. Efficacy of

acupuncture-based adjunctive therapies in alleviating spasticity and motor function in patients with post-stroke spasticity: A systematic review and network meta-analysis. Complement Ther Med. 2025 Dec;95:103282. https://doi.org/10.1016/j.ctim.2025.103282

Background	Post-stroke spasticity (PSS) is a prominent complication that severely hinders limb function recovery and diminishes quality of life in patients with stroke. Despite the widespread use of acupuncture-based adjunctive therapies, their efficacy in reducing spasticity severity, improving limb motor function, and enhancing quality of life among stroke survivors remains contentious. Therefore, a comprehensive synthesis of current evidence through evidence-based medical methodologies is essential to elucidate their clinical value.
Objective	This systematic review and network meta-analysis aimed to evaluate the efficacy of acupuncture-based adjunctive therapies in alleviating spasticity and improving motor function in individuals with PSS.
Methods	Randomized controlled trials (RCTs) investigating acupuncture for PSS were retrieved from domestic and international databases (PubMed, Web of Science, Cochrane Library, Embase, China National Knowledge Infrastructure, WanFang Data, Chinese Scientific Journal Database, and China Biomedical Literature) from inception to March 1, 2025. The risk of bias (ROB) in the included studies was assessed using the Cochrane ROB tool. Using the frequency method, relative risk (RR) was used for binary outcomes and mean difference (MD) for continuous variables, each reported with 95 % confidence intervals (CIs). Meta-analysis was performed using Stata software (version 16.0). Probability rankings were estimated using the surface under the cumulative ranking area, and subgroup analyses were conducted to validate result consistency.
Results	A total of 66 RCTs involving 6180 patients evaluated 13 effective acupuncture-based interventions. Based on changes in the Modified Ashworth Scale (MAS), fire-needle acupuncture (FN) [MD = -1.34, 95 % CI (-2.17, -0.51)], meridian-sinew acupuncture (MSA) [MD = -1.19, 95 % CI (-1.84, -0.55)], and manual acupuncture (MA) combined with rehabilitation therapy (RT) [MD = -0.63, 95 % CI (-0.82, -0.43)] were identified as the most effective interventions for reducing spasticity. Notably, FN also demonstrated the greatest improvements on the Clinical Spasticity Index (CSI) [MD = -7.34, 95 % CI (-9.83, -4.85)] and total effectiveness rate [RR = 2.02, 95 % CI (1.45, 2.81)]. The Fugl-Meyer Assessment (FMA) scores indicated that electroacupuncture (EA) [MD = 32.92, 95 % CI (20.83, 45.02)] yielded optimum efficacy in sensory and motor function recovery after stroke, followed by warm needle moxibustion and FN. Furthermore, subgroup analyses revealed that FN and MSA were most effective for MAS when the needle retention time was ≤ 30 min and the treatment duration was ≤ 4 weeks. In contrast, EA achieved optimal outcomes on the FMA when administered at a frequency ≥ 5 times per week, with needle retention time ≤ 30 min and treatment duration ≤ 4 weeks. Meanwhile, the SUCRA ranking results of interventions in the whole limb subgroup were largely consistent with those derived from the overall analysis.
Conclusion	Acupuncture-based adjunctive therapies demonstrate efficacy in PSS management. FN and MSA are relatively effective, while EA is most suitable for motor function recovery. Clinical decisions should be guided by individualized treatment strategies based on patient-specific presentations and needs.

1.2.1.4. Zhu 2024

Zhu GC, Chen KM, Belcastro F. Comparing the effects of different acupoint-stimulating therapies in mitigating post-stroke spasticity and motor dysfunction in older stroke survivors: A network meta-analysis of randomized trials. Maturitas. 2024 Sep;187:108040. https://doi.org/10.1016/j.maturitas.2024.108040

Background	Acupoint-stimulating therapies have often been used to manage stroke-related spasticity and motor dysfunction. However, the effects of different acupoint-stimulating therapies in older stroke survivors have been unclear.
Methods	This systematic review and network meta-analysis compared the effects of different acupoint-stimulating therapies in managing spasticity and motor dysfunction in older stroke survivors. The study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. We searched 7 databases for studies published up to July 2023. Inclusion criteria were: (1) older adults with strokes; (2) treatments were acupoint-stimulating therapies; (3) a control group did not receive acupoint-stimulating therapy, or the study compared different acupoint-stimulating therapies; and (4) outcomes included spasticity and motor function. Methodological quality was assessed with Risk-of-bias tool for randomized trials version 2, while R and Metainsight were used to conduct the network meta-analysis
Results	We analyzed **27 studies** and the results showed that non-invasive electroacupuncture and warm acupuncture were more effective in reducing spasticity than conventional acupuncture (standardized mean difference and 95 % confidence intervals = 1.35/1.19 [0.57; 2.13/0.54; 1.83]) and invasive electroacupuncture (standardized mean difference and 95 % confidence intervals = 0.96/0.80 [0.12; 1.80/0.08; 1.51]). Conventional acupuncture and invasive electroacupuncture were effective in improving motor function (standardized mean difference and 95 % confidence intervals = 0.99/1.41 [0.42; 1.56/0.54; 2.28]). However, there was significant inconsistency for the effects of invasive electroacupuncture between studies.
Conclusions	Our findings suggest that for older stroke survivors with spasticity, non-invasive electroacupuncture and warm acupuncture are appropriate, whereas conventional acupuncture is more appropriate for patients aiming for motor recover.

1.2.2. Fire needle

1.2.2.1. Qiu 2021

Qiu X, Gao Y, Zhang Z, Cheng S, Zhang S. Fire Acupuncture versus conventional acupuncture to treat spasticity after stroke: A systematic review and meta-analysis. PLoS One. 2021;16(4). [218451]. doi

Background	Post-stroke spasm is currently a complex clinical problem that remains to be resolved. Due to its excellent efficacy and few side effects, clinicians have used fire acupuncture to treat post-stroke spasticity in China.
Objectives	The purpose of this study was to evaluate the clinical efficacy of fire acupuncture compared with conventional acupuncture to treat post-stroke spasms and provide a detailed summary of the commonly used acupoints.
Methods	Eight databases (MEDLINE/PubMed, Web of Science, the Cochrane database, EMBASE, CBM, CNKI, WanFang, and VIP) were searched for randomized controlled trials (RCTs) published from database inception through August 30, 2020. RCTs that compared fire acupuncture with conventional acupuncture as a treatment intervention for patients with spasticity after stroke were included. Revman 5.3 software was used to calculate risk ratios (RR) and standard mean differences (SMD) with 95% confidence intervals (CI). Methodological evaluation or critical appraisal of the included articles was assessed using RoB-2.

Results	**Sixteen studies with a total of 1,118 patients** were included. Although according to the standards of the Rob 2.0 tool, most studies are considered to have some problems. Comprehensive analysis of the results revealed a consistent trend indicating several advantages of using fire needles compared to conventional acupuncture in treating post-stroke spasms, including the effective rate, recovery rate, and improvement of multiple scales represented by MAS. Concerning secondary outcomes, using the scales of FMA, BI, or NDS in this random model meta-analysis, fire acupuncture exhibited better performance compared to acupuncture [SMD = 2.27, 95%CI [1.40,3.13 (random-effects model)], [SMD = 1.46,95% CI [1.03,1.90 (random-effects model)], and [SMD = 0.90, 95%CI [0.44,1.35 (random-effects model)], respectively, with moderately high heterogeneity. When the effective rate was used as an outcome in the subgroup analysis, fire needles performed better than conventional acupuncture with respect to damage to the upper or lower limbs, and the thickness and depth of acupuncture. When the modified Ashworth scale (MAS) was used as the outcome, and the damage occurred in the lower extremity, the acupuncture depth exceeded 15mm, or the duration of stroke was longer than six months, the fire needles did not perform better than conventional acupuncture, [SMD = 0.01, 95%CI [-0.47,0.48 (fix-effects model)], [SMD = 0.21 [-0.51,0.93(random-effects model)], and [SMD = 0.76, 95%CI [-0.08,1.60 (random-effects model)], respectively. The acupoints identified with the highest frequencies in this study were Yang-meridian, including LI11-Quchi (nine times), LI4-Hegu (seven times), and ST36-Zusanli (five times). Moreover, no serious adverse effects were reported in any of the studies included in this analysis.
Conclusions	Despite several limitations, this was the first meta-analysis to focus on the treatment of post-stroke spasticity using fire needle acupuncture compared with conventional acupuncture. Our results confirmed that fire needles could provide a better clinical effect than conventional acupuncture, which will help standardize fire needle treatment strategies for post-stroke spasms.

1.2.3. Warm-needle moxibustion

1.2.3.1. Yang 2018

Yang L, Tan JY, Ma H, Zhao H, Lai J, Chen JX, Suen LKP. Warm-needle moxibustion for spasticity after stroke: A systematic review of randomized controlled trials. Int J Nurs Stud. 2018;:129-138. [115380].

Background	Spasticity is a common post-stroke complication, and it results in substantial deterioration in the quality of life of patients. Although potential positive effects of warm-needle moxibustion on spasticity after stroke have been observed, evidence on its definitive effect remains uncertain.
Objectives	This study aimed to summarize clinical evidence pertaining to therapeutic effects and safety of warm-needle moxibustion for treating spasticity after stroke. DESIGN: Randomized controlled trials were reviewed systematically on the basis of the Cochrane Handbook for Systematic Reviews of Interventions. The report follows the PRISMA statement.

Methods	Ten electronic databases (PubMed, CENTRAL, EMBASE, AMED, CINAHL, Web of Science, CBM, CNKI, WanFang, and VIP) were explored, and articles were retrieved manually from two Chinese journals (The Journal of Traditional Chinese Medicine and Zhong Guo Zhen Jiu) through retrospective search. Randomized controlled trials with warm-needle moxibustion as treatment intervention for patients with limb spasm after stroke were included in this review. The risk of bias assessment tool was utilized in accordance with Cochrane Handbook 5.1.0. All included studies reported spasm effect as primary outcome. Effect size was estimated using relative risk, standardized mean difference, or mean difference with a corresponding 95% confidence interval. Review Manager 5.3 was utilized for meta-analysis.
Results	Twelve randomized controlled trials with certain methodological flaws and risk of bias were included, and they involved a total of 878 participants. Warm-needle moxibustion was found to be superior to electroacupuncture or acupuncture in reducing spasm and in promoting motor function and daily living activities. Pooled results for spasm effect and motor function were significant when warm-needle moxibustion was compared with electroacupuncture or acupuncture. A comparison of daily living activities indicated significant differences between warm-needle moxibustion and electroacupuncture. However, no difference was observed between warm-needle moxibustion and acupuncture.
Conclusions	Warm-needle moxibustion may be a promising intervention to reduce limb spasm as well as improve motor function and daily living activities for stroke patients with spasticity. However, evidence was not conclusive. Rigorously designed randomized controlled trials with sample sizes larger than that in the included trials should be conducted for verification.

1.2.4. Governor Vessel Moxibustion

1.2.4.1. Wang 2026

Wang JX, Hu ZH, Song YY, Zhong JS, He M. New Perspectives on the Efficacy of Governor Vessel Moxibustion Combined With Rehabilitation Training for Poststroke Muscle Spasticity: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Brain Behav. 2026;16(4):e71346. https://doi.org/10.1002/brb3.71346

Background	Muscle spasticity, a prevalent motor impairment after stroke, substantially diminishes patients' quality of life. Governor Vessel moxibustion (GVM), a significant complementary therapy, shows promise, yet the current evidence remains inadequate.
Objective	This study aimed to evaluate the efficacy of GVM with routine rehabilitation training in alleviating poststroke spasticity (PSS).
Methods	We searched PubMed, Cochrane Library, Embase, Web of Science, four Chinese databases, and clinical trials registry for randomized controlled trials (RCTs) of PSS patients who mainly received GVM treatment alongside conventional rehabilitation. Statistical evaluations were conducted using Review Manager 5.4 and R Studio. For assessing bias in the included studies, the Cochrane risk of bias tool (RoB 2.0) was used to evaluate RCTs.

Results	**Eleven studies involving 859 PSS** patients were included. Meta-analysis demonstrated that when combined with routine rehabilitation training, GVM effectively alleviated muscle spasticity, as measured by the modified Ashworth scale (MD, -0.65 [95% CI, -0.84 to -0.47], $p < 0.01$) and the composite spasticity index (MD, -1.82 [95% CI, -2.25 to -1.39], $p < 0.01$). The treatment time and frequency could potentially be the main contributors to heterogeneity. Results suggested that a treatment regimen consisting of 60-min sessions conducted once-weekly and lasting for at least 8 weeks was the most effective, providing evidence for optimizing clinical application of GVM combined with rehabilitation training in PSS management.
Conclusion	GVM serves as an effective complementary therapy to routine rehabilitation for PSS patients, with generally mild adverse events. However, before formulating evidence-based and definitive recommendations, more rigorously designed and in-depth research is warranted.

1.2.5. Electroacupuncture

1.2.5.1. Liu 2025

Liu J, Meng X, He Y, Jiang H, Zhang J, Shi J, Zhang J, Zhang M, Cai F, Deng S, Shi J, Meng Z. Clinical efficacy of electroacupuncture antagonistic muscles combined with rehabilitation training in the treatment of spastic hemiplegia after stroke: a systematic review and meta-analysis of randomized controlled trials. Front Neurol. 2025 Aug 8;16:1634845. https://doi.org/10.3389/fneur.2025.1634845

Objective	Antagonistic muscles rehabilitation training has been extensively utilized in the rehabilitation of patients with spastic hemiplegia. With the increasing acceptance and application of acupuncture, numerous scholars have discovered that incorporating electroacupuncture combined with antagonistic muscles rehabilitation training can enhance the treatment for spastic hemiplegia after stroke. The objective of this study is quantify the clinical efficacy of electroacupuncture in treating spastic hemiplegia after stroke on the basis of antagonistic muscles rehabilitation training, provide insights for future clinical treatments and scientific investigations related to spastic hemiplegia.
Methods	We searched eight Chinese and English databases to identify clinical randomized controlled trials investigating the efficacy of electroacupuncture antagonistic muscles combined with rehabilitation training for the treatment of spastic hemiplegia after stroke. The search period extended from the inception of each database up to April 4, 2025. Two researchers independently reviewed the literatures, extracted relevant data, and assessed the risk of bias using the Cochrane Risk of Bias Tool.
Results	A total of 8 literatures were selected from an initial pool of 1,680 for the purpose of meta-analysis. The findings indicated that the combination of electroacupuncture antagonistic muscles with rehabilitation training significantly alleviates muscle spasms in hemiplegic limbs [MD = -0.52,95%CI (-0.91, -0.13), $p = 0.36$, $I^2 = 0\%$, $Z = 2.6$, $p < 0.05$], enhances daily living capabilities [MD = 6.31,95%CI (3.91,8.71), $p = 0.02$, $I^2 = 59\%$, $Z = 5.15$, $p < 0.05$], improve motor function [MD = 9.9,95%CI (8.25,11.55), $p = 0.2$, $I^2 = 33\%$, $Z = 11.75$, $p < 0.05$]. Furthermore, we discovered that when the wave type and frequency of electroacupuncture are low frequency intermittent waves, electroacupuncture antagonistic muscles combined with rehabilitation training can effectively improve the lower limb motor function of hemiplegic patients. [MD = 10.52,95%CI (8.66,12.37), $p = 0.89$, $I^2 = 0\%$, $Z = 11.11$, $p < 0.05$], and electroacupuncture combined with Bobath technique is better than combined with conventional rehabilitation training.
Conclusion	The integration of electroacupuncture treatment with antagonist muscle rehabilitation training can effectively alleviate muscle spasms, reduce muscle tension, and enhance lower limb motor function as well as daily living abilities.

1.2.5.2. Cai 2017

Cai Y, Zhang CS, Liu S, Wen Z, Zhang AL, Guo X, Lu C, Xue CC. Electroacupuncture for Poststroke Spasticity: A Systematic Review and Meta-Analysis. Arch Phys Med Rehabil. 2017;98(12):2578-2589. [42608].

Objective	To evaluate the effects and safety of electroacupuncture (EA) for stroke patients with spasticity.
Methods	DATA SOURCES: Five English databases (PubMed, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials, Allied and Complementary Medicine Database) and 4 Chinese databases (Chinese Biomedical Database, Chinese National Knowledge Infrastructure, Chongqing VIP Database, Wanfang Database) were searched from their inception to September 2016. STUDY SELECTION: Randomized controlled trials were included if they measured spasticity with the Modified Ashworth Scale (MAS) in stroke patients and investigated the add-on effects of electroacupuncture to routine pharmacotherapy and rehabilitation therapies. DATA EXTRACTION: Information on patients, study design, treatment details and outcomes assessing spasticity severity, motor function, and activities of daily living was extracted.
Data synthesis	In total, 22 trials involving 1425 participants met the search criteria and were included. The estimated add-on effects of EA to reduce spasticity in the upper limbs as measured by the MAS (standardized mean difference [SMD]=-.57; 95% confidence interval [CI], -.84 to -.29), and to improve overall motor function as measured by the Fugl-Meyer Assessment of Sensorimotor Recovery (mean difference [MD]=10.60; 95% CI, 8.67-12.53) were significant. Significant add-on effects of EA were also shown for spasticity in the lower limbs, lower-limb motor function, and activities of daily living ([SMD=-.88; 95% CI, -1.42 to -.35;], [MD=4.42; 95% CI, .06-8.78], and [MD=6.85; 95% CI, 3.64-10.05], respectively), although with high heterogeneity. For upper-limb motor function, no significant add-on effects of EA were found.
Conclusions	EA combined with conventional routine care has the potential of reducing spasticity in the upper and lower limbs and improving overall and lower extremity motor function and activities of daily living for patients with spasticity, within 180 days poststroke. Further studies of high methodological and reporting quality are needed to confirm the effects and safety of EA, and to explore the adequate and optimal protocol of EA for poststroke spasticity, incorporating a group of comprehensive outcome measures in different populations.

1.2.6. Acupuncture at Meridian Sinew

1.2.6.1. Zhang 2017

Zhang Y, Ma TM, Bai ZH, Sun BW, Zhao HY. [Meta-analysis on the Therapeutic Effect of Acupuncture at Meridian Sinew for Spastic Paralysis After Stroke]. Zhen Ci Yan Jiu. 2017; 42(2): 178-82. [184444].

Objective	To review systematically the clinical effects of spastic paralysis after stroke treated with acupuncture at meridian sinew (“Jingjin”, musculotendon).
Methods	“Meridian sinew” “stroke” and “spasm” were taken as the key words to retrieve from the Chinese National Knowledge Infrastracture Database (CNKI), Chongqing VIP Chinese Science and Technology Periodical Database (VIP), Chinese Biomedical Library (CBM), Wanfang Data, PubMed and the Cochrane Library. The Cochrane“risk of bias” tool was used to conduct the methodological quality evaluation to the literature. RevMan 5.3 software was adopted for Meta-analysis.

Results	Totally, **13 papers were included, with 820 patients involved.** In reference to Cochrane Reviewers' Handbook 5.0.2, the randomized controlled trial (RCT) risk of bias was assessed and it was unclear for all of the 13 papers. The results of Meta-analysis showed that the clinical effect was improved with acupuncture at meridian sinew as compared with normal acupuncture technique[①total effective rate:OR=3.86, 95% CI (2.67,5.57), Z=7.20, P<0.00001; ②modified Ashworth spasm scale:OR=4.54, 95% CI (2.91,7.10), Z=6.64, P<0.00001; ③evaluation of limb motor function with Fugl-Meyer score:MD=4.18, 95% CI (-0.59,8.94), Z=1.72, P=0.09>0.05]. The publication bias of included papers was not obvious and therefore it could be neglected in the impact on the combined effect size.
Conclusions	**Acupuncture at meridian sinew is effective in the treatment of spastic paralysis after stroke**. The total clinical effect and the improvement in muscular tone with acupuncture at meridian sinew are better than those with normal acupuncture technique. The quality of the included literature is not high generally. Hence, it is necessary to have more clinical studies with high-quality and strict design.

1.2.7. Scalp acupuncture

1.2.7.1. Zhong 2025

Zhong JS, Li F, Wang JX, Zhang YW, Shao TY, Lucas-Mthethwa-Mangono Mabena, Shi JY, Zhang SQ, Yang C. Novel efficacy evidence and mechanistic explorations of motion-style scalp acupuncture in post-stroke muscle spasticity management: Systematic review and meta-analysis of randomized controlled trials. Neuroscience. 2025;15(12):ePub ahead of print.
https://doi.org/10.1016/j.neuroscience.2025.10.030

Background	Motion-style scalp acupuncture (MSSA), integrating concurrent scalp acupuncture (SA) and motor rehabilitation (MR), has emerged as a promising intervention for post-stroke spasticity (PSS). This systematic review and meta-analysis was designed to evaluate its efficacy, safety, and potential antispastic mechanisms.
Methods	Adhering to PRISMA guidelines, we systematically searched eight databases for relevant RCTs up to August 2025. The primary outcome was spasticity severity (modified Ashworth scale). Risk of bias were assessed using Cochrane RoB 2.0. Meta-analyses were performed using Stata, RevMan, and R software.
Results	**Nineteen RCTs (n = 1648 participants)** were included. Meta-analysis revealed that MSSA significantly reduced spasticity versus standalone SA/MR (95 % CI [-0.71, -0.47]), with concurrent improvements in motor function [0.54, 1.05], balance function [6.17, 12.35], and activities of daily living [0.85, 1.68]. Furthermore, MSSA was superior to sequential SA + MR for motor function recovery [0.48, 1.0] and daily living improvement [0.30, 0.90]. Subgroup analysis preliminarily identified 30-minute needle retention [-1.55, -0.81] and 24-week duration [-1.55, -0.81] as potential determinants of optimal anti-spasticity outcomes. Mechanistic synthesis suggests MSSA may alleviate spasticity through enhanced cerebral perfusion, suppressed neuroinflammatory responses, and reduced spinal hyperexcitability, thereby promoting motor coordination.
Conclusion	MSSA demonstrates superior efficacy in improving PSS and associated motor dysfunction compared to standard therapies, with a favorable safety profile. Future high-quality RCTs are needed to confirm long-term benefits. The employment of advanced assessments (e.g., fMRI-based functional brain connectivity, muscle ultrasound) illuminates MSSA's antispastic mechanisms across central-peripheral perspectives, furnishing robust evidence for protocol optimization.

1.2.8. Acupoint-to-Acupoint Penetrating Acupuncture

1.2.8.1. Kim 2026

Kim M, Yoon SG, Han CH. Acupoint-to-Acupoint Penetrating Acupuncture as an Add-on to Conventional Care for Post-Stroke Spasticity: A Systematic Review and Meta-Analysis. Healthcare (Basel). 2026;14(14):2163. https://doi.org/10.3390/healthcare14142163

Background/Objectives	Post-stroke spasticity is a common and disabling complication that impairs functional recovery. Acupuncture is used as a complementary intervention in stroke rehabilitation, but evidence for specific techniques, including acupoint-to-acupoint penetrating acupuncture (AAPA), remains limited. This study evaluated the adjunctive effects and safety of AAPA applied to limb acupoints in patients with post-stroke spasticity receiving conventional care.
Methods	A systematic review and meta-analysis of randomized controlled trials was conducted. Nine databases and five clinical trial registries were searched from inception to June 2026. Trials compared AAPA plus conventional care with conventional care alone. The primary outcome was post-treatment spasticity severity. Risk of bias was assessed using RoB 2, and evidence certainty using GRADE.
Results	**Sixteen studies involving 1170 participants** were included. Adjunctive AAPA significantly reduced Modified Ashworth Scale scores (SMD = -0.91, 95% CI: -1.23 to -0.59). Motor function, gait, balance, activities of daily living, and neurological deficits were also improved. However, most studies had a high overall risk of bias, no trial used a sham acupuncture comparator, and substantial heterogeneity was observed for several outcomes. The certainty of evidence for all GRADE-assessed clinical outcomes was very low.
Conclusions	The findings suggest possible add-on benefits of AAPA when used with conventional post-stroke care, but the current evidence should be interpreted cautiously and is insufficient to support definitive clinical recommendations. Rigorous multicenter trials in diverse rehabilitation settings with standardized outcomes, systematic safety assessment, and longer follow-up are needed.

1.3. Mechanistic systematic reviews

1.3.1. You 2026

You L, Hu M, Li J, Tan J, Guo F, Kong Y. The mechanism of electroacupuncture treatment for post-stroke spasticity: A systematic review and meta-analysis. Behav Brain Res. 2026 Feb 4;497:115873. https://doi.org/10.1016/j.bbr.2025.115873

Objective	This study assesses whether electroacupuncture (EA) is an effective treatment for post-stroke spasticity (PSS) and examines the mechanisms by which it modulates PSS. Clinical and mechanistic evidence are analyzed to clarify its therapeutic value and biological basis.

Methods	A literature search was conducted in databases including PubMed Web of Science (WOS) Embase Medline and SinoMed. The quality was evaluated by the Systematic Review Centre for Laboratory Animal Experimentation (SYRCLE) bias risk assessment tool and Collaborative Approach to Meta-analysis and Review of Animal Data from Experimental Studies (CAMARADES) checklist. Meta-analyses were performed using Stata 15.0 and Rstudio software.
Results	**Twenty studies involving 388 animals** were included with quality scores ranging from 4 to 8 (mean: 6.1). Zea Longa and Modified Ashworth Scale (MAS) were selected as primary outcomes while secondary outcomes included Bederson score electrophysiological tracing balance beam walking cerebral water content cerebral infarction degree Interleukin-6 (IL-6) tumor necrosis factor-α (TNF-α) malondialdehyde (MDA) gamma-aminobutyric acid (GABA) glutamate (Glu) gamma-aminobutyric acid transaminase (GABA-T) glutamate decarboxylase 67 (GAD67) brain-derived neurotrophic factor (BDNF) tropomyosin receptor kinase B (TrkB) BDNF messenger RNA (BDNF mRNA) TrkB messenger RNA (TrkB mRNA) glutathione (GSH) solute carrier family 7 member 11 (SLC7A11) glutathione peroxidase 4 (GPX4) SLC7A11 messenger RNA (SLC7A11 mRNA) and GPX4 messenger RNA (GPX4 mRNA). Meta-analysis demonstrated significant improvements in primary outcomes: Zea Longa score [MD = -1.05 95% CI (-1.30 -0.80) P < 0.001] MAS score [MD = -1.06 95% CI (-1.43 -0.69) P < 0.001]. EA therapy demonstrated significant efficacy in enhancing neurological recovery alleviating limb spasticity and improving postural balance. Furthermore it effectively reduced cerebral infarct volume mitigated cerebral edema severity and modulated biochemical markers by decreasing serum levels of IL-6 TNF-α MDA Glu and GABA-T (P < 0.05). Concurrently therapeutic intervention upregulated multiple neuroprotective indicators including GSH GABA SLC7A11 mRNA GPX4 (with its mRNA expression) GAD67 BDNF TrkB (and its mRNA) along with enhancing GPX4 activity (P < 0.05). Heterogeneity analysis revealed publication bias in MAS assessments while heterogeneity in intervention protocols (waveform parameters acupoint selection or treatment duration) potentially contributed to elevated heterogeneity across other outcome measures.
Conclusion	EA modulates neurotransmitter levels and associated enzymatic while concurrently suppressing microglia-mediated neuroinflammatory responses. This intervention mitigates oxidative stress byproducts maintains tissue redox homeostasis and enhances synaptic plasticity while promoting neuronal development. Collectively our findings underscore EA's therapeutic potential in PSS management necessitating further mechanistic investigations and optimization of clinical protocols.

1.3.2. You 2025

You L, Hu M, Li J, Tan J, Guo F, Kong Y. The mechanism of electroacupuncture treatment for post-stroke spasticity: A systematic review and meta-analysis. Behav Brain Res. 2025 Oct 14:115873. https://doi.org/10.1016/j.bbr.2025.115873

Objective	To assess whether electroacupuncture (EA) is an effective treatment for post-stroke spasticity (PSS) and to examine the mechanisms by which it modulates PSS, combining clinical and mechanistic evidence to clarify its therapeutic value and biological basis.
Methods	Databases searched included PubMed, Web of Science, Embase, Medline, and SinoMed. Study quality was assessed using the SYRCLE bias risk assessment tool and CAMARADES checklist. Meta-analyses were performed with Stata 15.0 and Rstudio. Primary outcomes were Zea Longa and Modified Ashworth Scale (MAS) scores; secondary outcomes included Bederson score, electrophysiological measures, cerebral infarction and edema, and biomarkers such as IL-6, TNF-α, MDA, GABA, Glu, GABA-T, GAD67, BDNF, TrkB, GPX4, GSH, and related mRNA indicators.

Results	Twenty animal studies (n = 388) were included, with quality scores ranging from 4 to 8 (mean 6.1). Meta-analysis showed significant improvement in Zea Longa score (MD = –1.05, 95% CI –1.30 to –0.80, P < 0.001) and MAS score (MD = –1.06, 95% CI –1.43 to –0.69, P < 0.001). EA significantly enhanced neurological recovery, reduced limb spasticity, improved balance, and decreased infarct size and edema. It downregulated IL-6, TNF-α, MDA, Glu, and GABA-T, while upregulating GSH, GABA, GAD67, BDNF, TrkB, GPX4, SLC7A11, and their corresponding mRNA levels. Publication bias was detected for MAS, and protocol heterogeneity (waveform, acupoints, duration) contributed to variability.
Conclusion	EA alleviates PSS through modulation of neurotransmitters, suppression of microglia-mediated neuroinflammation, reduction of oxidative stress, and enhancement of synaptic plasticity and neuronal development. These findings support EA's therapeutic potential for PSS, warranting further high-quality mechanistic and clinical studies.

2. Overviews of Systematic Reviews

2.1. Choi 2022

Choi TY, Jun JH, Lee HW, Yun JM, Joo MC, Lee MS. Traditional Chinese Medicine Interventions in the Rehabilitation of Cognitive and Motor Function in Patients With Stroke: An Overview and Evidence Map. Front Neurol. 2022 May 17;13:885095. https://doi.org/10.3389/fneur.2022.885095

Objective	Evidence mapping of systematic reviews (SRs) systematically and comprehensively identifies, organizes, and summarizes the distribution of scientific evidence in a field. The aim of this evidence map is to provide a synopsis of the best clinical practices and interventions in stroke rehabilitative care and to identify areas with a paucity of evidence to guide future research.
Methods	PubMed, EMBASE, CDSR, six Korean databases, and two Chinese databases were searched for SRs evaluating the effectiveness of any stroke rehabilitation intervention through October 2021. The quality of the SRs was assessed using AMSTAR 2. A bubble plot was used to graphically display clinical topics, the number of articles, the number of patients included, confidence, and effectiveness.
Results	In total, ninety-five SRs were identified; however, after methodological analysis, only 48 had sufficient quality to be included. In total, forty-eight SRs were included in the evidence mapping. The overall search identified SRs from 2015 to 2021. A total of four SRs focused on post-stroke cognitive impairment, whereas the other forty-four SRs focused on post-stroke motor function. In total, nineteen different traditional Chinese medicine (TCM) intervention modalities were included. Acupuncture was the most commonly used treatment. Overall, the quality of the included SRs was low or very low. Most SRs concluded that TCM interventions may have potential benefits in stroke rehabilitation. The results were more promising when acupuncture was used for shoulder-hand syndrome.
Conclusions	However, the identified reviews cautioned that firm conclusions cannot be drawn. The evidence map provides a visual overview of the research volume and content involving TCM interventions in stroke rehabilitation. Evidence mapping can facilitate the process of knowledge translation from scientific findings to researchers and policymakers and possibly reduce waste in research.
	Spaticity, hand spasms, spastic hemiplegia.

3. Clinical Practice Guidelines

⊕ positive recommendation (regardless of the level of evidence reported)
Ø negative recommendation (or lack of evidence)

3.1. American Academy of Physical Medicine and Rehabilitation (AAPM&R, USA) 2024 ⊕

Verduzco-Gutierrez M, Raghavan P, Pruente J, Moon D, List CM, Hornyak JE, Gul F, Deshpande S, Biffl S, Al Lawati Z, Alfaro A. AAPM&R consensus guidance on spasticity assessment and management. PM R. 2024 Aug;16(8):864-887. https://doi.org/10.1002/pmrj.13211

Acupuncture, including electro-acupuncture. Moderate level evidence for electro-acupuncture combined with conventional routine care (pharmacological and rehabilitation) in reduction in upper-limb and lower-limb spasticity, improved overall motor function, activities of daily living. It is proposed that acupuncture works by decreasing the pain-spasm cycle, spinal motor neuron regulation, and neurochemical regulation, though exact mechanisms are not clear.

3.2. Department of Veterans Affairs and Department of Defense (VA/DoD, USA) 2024 Ø

VA/DoD Clinical Practice Guideline for Management of Stroke Rehabilitation. Department of Veterans Affairs and Department of Defense. Washington, DC: U.S. Government Printing Office. 2024. https://www.healthquality.va.gov/guidelines/Rehab/stroke/VADoD-2024-Stroke-Rehab-CPG-Full-CPG_final_508.pdf

25. There is insufficient evidence to recommend for or against the use of acupuncture or dry needling for **spasticity management**. (Neither for nor against / Reviewed, New-added)

3.3. Stroke Foundation (Australia, New-Zealand) 2022 Ø

Australian and New Zealand Clinical Guidelines for Stroke Management. Chapter 6: Managing complications. https://app.magicapp.org/#/guideline/WE8wOn

For stroke survivors with **spasticity**, acupuncture should not be used for treatment of spasticity in routine practice other than as part of a research study. (Lim et al 2015) [Weak recommendation against].

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