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cerebral palsy

Paralysie cérébrale

1. Systematic Reviews and Meta-Analysis

1.1. Generic Acupuncture

1.1.1. Jaiswal 2026

Jaiswal N, Fisher L, Ciminata G, Mulholland R, Noel-Storr A, Nutton L, Orr V, Eunson P, Cooper NJ, Sutton A, Wu O, Quinn T. Pharmacological and non-pharmacological interventions for managing sleep disorders in children with cerebral palsy: A systematic review. Dev Med Child Neurol. 2026. https://doi.org/10.1111/dmcn.70435

Aim	To systematically review the effectiveness, safety, and economic evidence of pharmacological and non-pharmacological interventions for sleep disorders in children with cerebral palsy (CP).
Method	Databases including MEDLINE, Embase, CENTRAL (the Cochrane Library), International Clinical Trials Registry Platform of the World Health Organization, NHS Economic Evaluation Database, and ClinicalTrials.gov were searched up to May 2026. Randomized controlled trials and economic evaluations were eligible. Primary outcomes included sleep quality, adverse events, and tolerability. We incorporated interest holder perspectives, including clinicians and individuals with lived experience, throughout outcome prioritization and interpretation. We assessed risk of bias using the Cochrane Risk of Bias 2.0 tool and evaluated the certainty of evidence using Grades of Recommendation, Assessment, Development and Evaluation.
Results	Twelve randomized controlled trials (n = 19-142, aged 5-17 years) were included. Pharmacological (melatonin, cannabis-based medicines, baclofen, neural stem cells) and non-pharmacological interventions (massage, cranial osteopathy, music therapy, **acupuncture**, postural support) were evaluated. Melatonin improved sleep latency and duration modestly compared with placebo. Other interventions showed inconsistent or negligible effects. Adverse events were mild and tolerability acceptable. No completed economic evaluations were identified. Interest holders highlighted the multifactorial nature of sleep problems, the need for interventions addressing comorbidities, and improved reporting of equity factors.
Interpretation	Evidence for managing sleep disorders in children with CP is limited, heterogeneous, and of low certainty. Robust trials and economic evaluations are urgently needed.

1.1.2. Xu 2025

Xu Y, Zhuang D, Chen F, Ma L, Du H, Jin A, He J, Chen W, Jin L, Hu Y, Gu H, Zhu J, Li X. Nonsurgical Therapies for Spastic Cerebral Palsy: A Network Meta-Analysis. Pediatrics. 2025 Jun 11:e2024070402. https://doi.org/10.1542/peds.2024-070402

Background	Context: Spastic cerebral palsy (SCP) presents daily challenges because of spasms, impacting motor function. Although multiple nonsurgical therapies exist, their comparative efficacy remains uncertain.
Objective	To compare the effectiveness of various nonsurgical therapies for SCP. Data sources: A systematic search of PubMed, Embase, Web of Science, CINAHL, and Cochrane Library up to February 10, 2025. Study selection: Randomized controlled trials (RCTs) measuring the effectiveness of nonsurgical therapies in improving spasticity, gross motor function, walking, and living ability among patients with SCP. Data extraction: Effect sizes for outcomes were extracted and calculated through a random effects model.
Results	Of 5765 studies retrieved, 81 were included. Biofeedback, transcranial direct current stimulation, extracorporeal shockwave therapy, botulinum toxin A with cast, transcutaneous electrical nerve stimulation, cast, whole-body vibration, **acupuncture**, and 1 pharmacotherapy (botulinum toxin A) significantly reduced spasticity (standardized mean difference [SMD], -3.29 to -0.73). Hippotherapy, gaming, acupuncture, and whole-body vibration improved gross motor function (SMD, 0.91-6.75). Acupuncture significantly enhanced daily living and walking (SMDs of 0.72 and 2.04, respectively). Limitations: The limited number of RCTs supporting the top-ranked therapies, combined with small sample sizes that may overestimate treatment effects, methodological biases, and heterogeneity in key analyses, necessitates cautious interpretation of the findings in the real world.
Conclusion	Biofeedback, hippotherapy, and **acupuncture** were effective for spasticity, gross motor function, daily living, and walking abilities. Extracorporeal shockwave therapy worked across various spasticity levels. Acupuncture demonstrated consistent and significant efficacy across all outcome measures, highlighting its substantial therapeutic potential. This study provides comprehensive recommendations for optimizing treatment strategies for SCP.

1.1.3. Cheng 2024

Cheng YY, Huang YY, Yang TH, Chang YJ, Fu RH, Chen HY. Acupuncture and Acupoints for Managing Pediatric Cerebral Palsy: A Meta-Analysis of Randomized Controlled Trials. Healthcare (Basel). 2024 Sep 5;12(17):1780. https://doi.org/10.3390/healthcare12171780

Background	Acupuncture is frequently used to manage pediatric cerebral palsy (CP), yet updated evidence is needed to guide future research and clinical practice.
Methods	Seven databases were searched from 1994 to 26 June 2023. Randomized controlled trials (RCTs) involving body, scalp, or ear acupuncture for managing CP, excluding acupoint injection, catgut embedding, electro-acupuncture, or laser acupuncture, were included.
Results	Twenty RCTs with 1797 participants were analyzed. Acupuncture groups had better improvements in gross motor function measure (GMFM) scores by 5% (mean difference: 5.93, 95% CI: 3.67-8.19, $p < 0.001$, $I2 = 57\%$); a 16% higher probability to yield prominent improvement in effectiveness rate (ER) (risk ratio: 1.16, 95% CI: 1.08-1.25, $p < 0.001$, $I2 = 0\%$); and better outcomes in the Modified Ashworth Scale (MAS) (standardized mean difference [SMD]: 0.3, 95%, CI: 0.11-0.49, $p < 0.001$, $I2 = 0\%$), the Berg Balance Scale (BBS) (SMD: 2.48; 95% CI: 2.00-2.97, $p < 0.001$, $I2 = 72\%$) and ADL (SMD: 1.66; 95% CI: 1.23-2.08, $p < 0.001$, $I2 = 91\%$). Studies with eight core acupoints identified from all ninety-five acupoints had better ER.
Conclusion	Acupuncture, especially using core acupoints, may be effective for managing symptoms in children with CP.

1.1.4. Chen 2023

Chen Z, Huang Z, Li X, Deng W, Gao M, Jin M, Zhou X, Du Q. Effects of traditional Chinese medicine combined with modern rehabilitation therapies on motor function in children with cerebral palsy: A systematic review and meta-analysis. Front Neurosci. 2023 Feb 8;17:1097477. https://doi.org/10.3389/fnins.2023.1097477

Objective	Traditional Chinese Medicine (TCM) has considerable experience in the treatment of cerebral palsy (CP), but little evidence shows the effect of a combination of TCM and modern rehabilitation therapies on CP. This systematic review aims to evaluate the effect of integrated TCM and modern rehabilitation therapies on motor development in children with CP.
Methods	We systematically searched five databases up to June 2022, including PubMed, the Cumulative Index to Nursing and Allied Health, Cochrane Library, Embase, and Web of Science. Gross motor function measure (GMFM) and Peabody Development Motor Scales-II were the primary outcomes to evaluate motor development. Secondary outcomes included the joint range of motion, the Modified Ashworth scale (MAS), the Berg balance scale, and Activities of Daily living (ADL). Weighted mean differences (WMD) and 95% confidence intervals (CIs) were used to determine intergroup differences.
Results	A total of 2,211 participants from 22 trials were enrolled in this study. Among these, one study was at a low risk of bias and seven studies showed a high risk of bias. Significant improvements were found in GMFM-66 (WMD 9.33; 95% CI 0.14-18.52, $P < 0.05$, $I^2 = 92.1\%$), GMFM-88 (WMD 8.24; 95% CI 3.25-13.24, $P < 0.01$, $I^2 = 0.0\%$), Berg balance scale (WMD 4.42; 95% CI 1.21-7.63, $P < 0.01$, $I^2 = 96.7\%$), and ADL (WMD 3.78; 95% CI 2.12-5.43, $P < 0.01$, $I^2 = 58.8\%$). No adverse events were reported during the TCM intervention in the included studies. The quality of evidence was high to low.
Conclusion	Integrated TCM and modern rehabilitation therapies may be an effective and safe intervention protocol to improve gross motor function, muscle tone, and the functional independence of children with CP. However, our results should be interpreted carefully because of the heterogeneity between the included studies.

1.1.5. Yuanjie 2023

Yuanjie Y, Jianyi X, Jinyan X, Mao H, Siyang Y, Zhenjin Y. Acupuncture in the Treatment of Abnormal Muscle Tone in Children with Cerebral Palsy: A Meta-Analysis. Behav Neurol. 2023 Mar 21;2023:4662788. https://doi.org/10.1155/2023/4662788

Objective	To analyse the clinical efficacy of acupuncture and routine treatment in improving dystonia in children with cerebral palsy.
Method	The randomized controlled trials published from the establishment of the databases to August 2022 on acupuncture in the treatment of dystonia in children with cerebral palsy were collected and comprehensively searched in China national knowledge infrastructure (CNKI), weipu (VIP), Wanfang, SinoMed, PubMed, Excerpta medica database (EMBASE), and Cochrane Library. The literature was selected according to the established standards, the quality of the included studies was evaluated, the heterogeneity of the included studies was evaluated with the I2 test, and the appropriate model was selected for analysis. Sensitivity analysis was used to evaluate the reliability of the results, and a funnel plot was used to evaluate the publication bias.

Results	**Fifteen studies** were included in the meta-analysis. The control group was treated with routine treatment and acupuncture combined with routine treatment. The outcome index showed that the effect in the treatment group was better: Modified Ashworth Scale score: -0.52, 95% confidence interval (CI) (-0.62 to -0.41), $p < 0.01$. The treatment group showed reduced muscle tension to a greater extent (integral eletromyographic (iEMG) score: standard mean square deviation = -2.97, 95% CI (-4.87 to -1.06), $p < 0.01$). The effective rate in the control group was 74.2% and that in the treatment group was 91.5%, odds ratio = 3.70, 95% CI (2.02-6.78), $p < 0.01$. The funnel plot showed publication bias.
Conclusion	Acupuncture combined with routine training could improve muscle tension abnormalities and improve the efficiency of clinical treatment.

1.1.6. Li 2018 ☆

Li LX, Zhang MM, Zhang Y, He J. Acupuncture for cerebral palsy: A meta-analysis of randomized controlled trials. Neural Regen Res. 2018;13(6):1107-1117. [166442].

Objective	To evaluate the efficacy and safety of acupuncture therapy for children with cerebral palsy.
Methods	Data Sources: We conducted electronic searches of PUBMED (1950/2017), EMBASE (1974/2017), ScienceDirect (1986/2017), Academic Source Premier (1887/2017), the Cochrane Library (Issue 4, April 2017), Science Citation Index Expanded (1900/2017), China National Knowledge Infrastructure (1915/2017), China Biological Medicine (1990/2017-04), WanFang (1980/2017), VIP (1989/2017), and Chinese Science Citation Database (1989/2017). Data Selection: We included randomized controlled trials that aimed to compare the effect of acupuncture plus rehabilitation training versus rehabilitation training alone. Data about functional motor abilities, daily activity/social participation, effective rate, intellectual development, and adverse effects were included. We used Revman 5.2 software for statistical analysis. Outcome Measures: The primary outcomes included functional motor abilities, daily activity, and effective rate. The secondary outcomes included intellectual development and adverse effects.
Results	**Twenty-one studies with a total of 1718 participants** met the inclusion criteria. The effect size of gross motor function (SMD = 0.64, 95% CI: 0.52 to 0.76, $P < 0.00001$; $I2 = 0\%$, $P = 0.69$; in 13 studies with 1144 patients) and the total effective rate (RR = 1.28, 95% CI: 1.20 to 1.37, $P < 0.00001$; $I2 = 18\%$, $P = 0.27$; in 12 studies with 1106 patients) suggested that acupuncture plus rehabilitation produced a significant improvement in gross motor function and a high total effective rate. The pooled fine motor function (SMD = 3.48, 95% CI: 2.62 to 4.34, $P < 0.00001$; $I2 = 64\%$, $P = 0.10$; in 2 studies with 193 patients), modified Ashworth scale scores (SMD = -0.31, 95% CI: -0.52 to -0.11, $P = 0.003$; $I2 = 74\%$, $P = 0.004$; in 5 studies with 363 patients) and activities of daily living (SMD = 1.45, 95% CI: 1.20 to 1.71, $P < 0.00001$; $I2 = 78\%$, $P = 0.004$; in 4 studies with 313 patients) also indicated improvements in children with cerebral palsy. Publication bias was not observed. Only mild adverse events related to acupuncture were reported.
Conclusion	Acupuncture plus rehabilitation training improved gross motor function, reduced muscle spasms, and enhanced daily life activities in children with cerebral palsy. However, this conclusion should be interpreted with caution due to the small number of randomized controlled trials available and the small sample sizes. More high-quality and large-scale studies are needed.

1.1.7. Xiang 2015 ☆

Xiang Juan, Xue Zhihui, Chen Guo, Long Kangsheng, Li Hongliang, Li Tielang. [meta-analysis of the

efficacy of acupuncture treatment for infantile cerebral palsy]. Chinese Medicine Modern Distance Education of China. 2015;20:78-80. [186964].

目的 系统评价针刺治疗小儿脑瘫的疗效. 方法 通过全面搜索维普、万方□CNKI等数据库中已发表的关于针刺治疗小儿脑瘫临床随机对照试验的相关文献，并手工查阅关于小儿脑瘫相关图书资料，运用系统评价方法，按照排除纳入标准筛选文献，整理资料，评价文献质量，提取文献. 并采用RevMan5. 2软件进行质量评价和Meta分析. 结果 共纳入3个随机对照试验，共含343例患者. 结果显示有效的合并效应量OR及95□CI [OR: 3. 14, 95□CI (1. 34, 7. 36), Z=2. 63]. 各研究组间无统计学异质性 (P=0. 88, I2=0□), 治疗组和对照组两组差异有显著统计学意义 (P=0. 009). 结论 说明针刺对小儿脑瘫有较好的疗效，但还需要更多高质量、规范化的临床随机对照试验进一步验证支持. [translate]

Objectif	Évaluer l'efficacité de l'acupuncture pour le traitement des enfants atteints de paralysie cérébrale.
Méthode	Recherche complète VIP, Wanfang, base de données CNKI et d'autres publications pertinentes sur l'acupuncture pour le traitement des enfants atteints d'essais cliniques de paralysie cérébrale contrôlés randomisés, et l'accès manuel aux livres pertinents sur les enfants atteints de paralysie cérébrale en utilisant la méthode d'évaluation du système en fonction d'exclure la littérature des critères d'inclusion de dépistage, la collecte d'informations, l'évaluation de la qualité, tout en extrayant la littérature et a également adopté RevMan5. 2 logiciels d'évaluation de la qualité et de méta-analyse.
Résultats	les résultats ont identifié **trois essais contrôlés randomisés, avec un total de 343 cas** de patients les résultats montrent une taille effective de l'effet combiné OU et 95% CI [OR: 3. 14, IC à 95% (1. 34, 7. 36), Z = 2 63.] parmi les groupes d'étude était aucune hétérogénéité statistique. (P = 0. 88, I2 = 0%), le groupe de traitement et le groupe témoin, la différence était statistiquement significative (P = 0. 009).
Conclusion	L'acupuncture chez les enfants atteints de paralysie cérébrale, a un bon effet, mais aussi un besoin de plus haute qualité, normalisée des essais contrôlés randomisés pour vérifier un soutien supplémentaire

1.1.8. Zhu 2012 ☆

Zhu Jing, Zhang Li-Yong, Shao Xiang-Ning. [Meta-analysis of acupuncture treatment for children with cerebral palsy]. Guiding Journal of Traditional Chinese Medicine and Pharmacology. 2013;11:62-65. [186972].

Objective	To discuss the clinical curative effect of acupuncture treatment of infantile cerebral palsy and provide evidence -based medical evidence for clinical practice.
Methods	Comprehensively search CNKI (1989 -2012), VIP (1989-2012), ten thousand (1989-2012), such as database, collect clinical randomized controlled trials of acupuncture in the treatment of children with cerebral palsy. After screening, finally included in the standard 12 articles as a Meta-analysis object. Using Review Manage5. 0 specialized software Cochrane provided free for statistical analysis.
Results	**12 researches** by Meta-analysis combined, the results showed that 12 studies homogeneity test results, Chi square is 3. 12, degrees of freedom is 11 (P=0. 99) (P>0. 1), and 12 studies have homogeneity, so use the fixed effects model to analysis, calculation and summary statistics. OR checked by Z test: Z=7. 11 (P<0. 00001), suggested that acupuncture treatment compared with other treatments, clinical curative effect of the difference has statistical significance.

Conclusion	Current clinical evidence suggested that **the curative effect of acupuncture treatment of cerebral palsy curative better than simple rehabilitation or medication.** But with this research low methodological quality, limited sample size, it needs more large sample of reasonable design, execution, strict, scientific and standardized, high quality clinical randomized controlled trials to further verify its effectiveness.

1.1.9. Wang 2011 ☆

Wang Xu, Du Yuan-Hao, Xiong Jun, Zhang Yi-Yuan. [Acupuncture versus rehabilitation therapy for cerebral palsy: a systematic review]. Liaoning Journal of Traditional Chinese Medicine. 2011;3:408-413. [187033].

Objective	To assess the efficacy of acupuncture versus rehabilitation therapy in the treatment of cerebral palsy.
Methods	Randomized controlled trials (RCTs)involving acupuncture versus rehabilitation therapy in the treatment of cerebral palsy were identified from CBM (1978 to 2009), VIP (1989 to 2009), WF Database (1998 to 2009), CNKI (1979 to 2009), Pubmed (1966 to 2009), Embase (1980 to 2009)and Cochrane Library (Issue 4, 2009). We also hand searched relevant journals from Tianjin university of TCM. Data were extracted and evaluated by two reviewers independently with a specially designed extraction form. The Cochrane Collaboration’s RevMan5. 0. 10 software was used for data analyses.
Results	A total of **18 trials involving 2087 patients** were included. Meta-analyses showed the outcomes as follow (1)The cerebral palsy appraisal standard in the acupuncture group was not similar when compared with control group. (2) As for Handicapped children synthesis function measure, no significant difference was notedat 2m, but showing differenceat 3m. (3) In terms of GMFM, no significant difference was noted. (4)Gesell developmentmental scale: As for total development quotient and motor development quotient, significant difference were noted at 2m. When it came to Gesell language development quotient, it also has significant difference at 3m. And there were also have significant differences in gross motor development quotient and fine motor development quotient respectively at 12m.
Conclusion	**Acupuncture combined with rehabilitation is superior to rehabilitation therapy**. However, because of the low statistical power, further large-scale trials are required to define the role of acupuncture in the treatment of cerebral palsy.

1.1.10. Liao 2011 ☆

Liao Cong, Zhou Jiang-Bao. [Meta-analysis on Acupuncture in Treatment of Cerebral Palsy]. Chinese General Practice. 2011;11:1229-123. [186936].

Objective	To assess the therapeutic effect of acupuncture on cerebral palsy.
Methods	Medical electronic databases, including PubMed, Ovid, FMJS, CNKI, wanfangdata and vip were searched according to inclusion and exclusion criteria. The quality of included studies were critically evaluated and the data were analyzed by using the RevMan 4. 2 software.
Results	**8 articles** were included. Meta-analysis showed that the acupuncture plus rehabilitation group were significantly better than the rehabilitation group on improving independence ability (OR=3. 61, 95%CI (1. 78, 7. 34), P=0. 0004), muscle spasm (WMD=-0. 67, 95%CI (-1. 05, -0. 30), P=0. 0005)and ability of daily life (SMD=1. 28, 95%CI (1. 00, 1. 56), P<0. 00001).

Conclusion	**Acupuncture therapy is effective on cerebral palsy**. However, most trials included in the review are of low quality, so higher quality controlled trials are needed to confirm the result.

1.1.11. Zhang 2010 (enfants) ☆

Zhang Y, Liu J, Wang J, He Q. Traditional chinese medicine for treatment of cerebral palsy in children: a systematic review of randomized clinical trials. J Altern Complement Med. 2010;16(4):375-95. [160230]

Objective	The objective of this study was to systematically evaluate the effects of Traditional Chinese Medicine (TCM) therapy including acupuncture, tu'ina, oral herbal medicine, herbal bathing, and collateral-channels conduct therapy for treating children with cerebral palsy (CP).
Methods	We included randomized controlled trials (RCTs) on TCM for children with CP. We searched the China National Knowledge Infrastructure, Database for Chinese Technical Periodicals, Chinese Biomedical Literature Database, databases of Chinese biomedical journals/Chinese Medical Current Contents, Wan Fang Data, PubMed, MEDLINE, Embase, and the Cochrane Library until the end of July 2009, and searched the reference list of retrieved papers. Data were extracted by 1 author and checked for validation by another author, and data were analyzed using RevMan 4.3.2. Only one meta-analysis was performed due to the heterogeneity among the trials.
Results	**Thirty-five (35) RCTs involving 3286 children** with CP using TCM therapy and conventional therapy (CT) including physical, occupational, and speech therapy, hyperbaric oxygen, cranial nerves nutrition agents, or any combination of above were included. The methodological quality was generally low in terms of allocation concealment, blinding, and intention-to-treat analysis. Meta-analysis showed acupuncture combine with CT improved activities of daily living (mean difference: 6.38, 95% confidence interval 5.15-7.61; $p < 0.00001$, $n = 160$) compared with CT alone. Acupuncture plus tuina, or plus herbal medicine and CT showed significant beneficial effects on comprehensive function in terms of both physical and mental aspects, independence, and verbal function compared with CT alone. The combination of radix Astragali injection with CT showed significant benefit on gross motor function and social behavior adaptation comparing with CT. There are six trials reported adverse events that were not associated with acupuncture, tu'ina, and/or herbal medicine.
Conclusions	**Acupuncture with or without CT or other conventional therapy, tu'ina, herbal medicine, and collateral channels conduct treatment combined with CT may have benefit in children with CP**. However, due to insufficient evidence, further rigorous trials are warranted.

1.2. Special outcome

1.2.1. Sleep disorders

1.2.1.1. Jaiswal 2026

Jaiswal N, Fisher L, Ciminata G, Mulholland R, Noel-Storr A, Nutton L, Orr V, Eunson P, Cooper NJ, Sutton A, Wu O, Quinn T. Pharmacological and non-pharmacological interventions for managing sleep disorders in children with cerebral palsy: A systematic review. Dev Med Child Neurol. 2026. https://doi.org/10.1111/dmcn.70435

Aim	To systematically review the effectiveness, safety, and economic evidence of pharmacological and non-pharmacological interventions for sleep disorders in children with cerebral palsy (CP).
Method	Databases including MEDLINE, Embase, CENTRAL (the Cochrane Library), International Clinical Trials Registry Platform of the World Health Organization, NHS Economic Evaluation Database, and ClinicalTrials.gov were searched up to May 2026. Randomized controlled trials and economic evaluations were eligible. Primary outcomes included sleep quality, adverse events, and tolerability. We incorporated interest holder perspectives, including clinicians and individuals with lived experience, throughout outcome prioritization and interpretation. We assessed risk of bias using the Cochrane Risk of Bias 2.0 tool and evaluated the certainty of evidence using Grades of Recommendation, Assessment, Development and Evaluation.
Results	Twelve randomized controlled trials (n = 19-142, aged 5-17 years) were included. Pharmacological (melatonin, cannabis-based medicines, baclofen, neural stem cells) and non-pharmacological interventions (massage, cranial osteopathy, music therapy, **acupuncture**, postural support) were evaluated. Melatonin improved sleep latency and duration modestly compared with placebo. Other interventions showed inconsistent or negligible effects. Adverse events were mild and tolerability acceptable. No completed economic evaluations were identified. Interest holders highlighted the multifactorial nature of sleep problems, the need for interventions addressing comorbidities, and improved reporting of equity factors.
Interpretation	Evidence for managing sleep disorders in children with CP is limited, heterogeneous, and of low certainty. Robust trials and economic evaluations are urgently needed.

1.2.2. Drooling

1.2.2.1. Walshe 2012

Walshe M, Smith M, Pennington L. Interventions for drooling in children with cerebral palsy. Cochrane Database Syst Rev. 2012;11:CD008624. [166990].

Background	Drooling is a common problem for children with cerebral palsy (CP). This can be distressing for these children as well as for their parents and caregivers. The consequences of drooling include risk of social rejection, damp and soiled clothing, unpleasant odour, irritated chapped skin, mouth infections, dehydration, interference with speech, damage to books, communication aids, computers, and the risk of social isolation (Blasco 1992; Van der Burg 2006). A range of interventions exist that aim to reduce or eliminate drooling. There is a lack of consensus regarding which interventions are most effective for children with CP.
Objectives	(1) To evaluate the effectiveness and safety of interventions aimed at reducing or eliminating drooling in children with cerebral palsy. (2) To provide the best available evidence to inform clinical practice. (3) To assist with future research planning.
Search Methods	We searched the following databases from inception to December 2010 : Cochrane Central Register of Controlled Trials (CENTRAL); Medline via Ovid; EMBASE; CINAHL; ERIC; Psych INFO; Web of Science; Web of Knowledge; AMED; SCOPUS; Dissertation Abstracts.We searched for ongoing clinical trials in the Clinical Trials web site (http://clinicaltrials.gov.) and in the Current Controlled Trials web site (http://www.controlled-trials.com/). We hand searched a range of relevant journals and conference proceeding abstracts. Selection Criteria: Only randomised controlled trials (RCTs) and controlled clinical trials (CCTs) were included.Data Collection And Analysis: Data were extracted independently by MW, MS and LP and differences resolved throughdiscussion.

Main Results	**Six studies** were eligible for inclusion in the review. Four of these studies were trials using botulinum toxin-A (BoNT-A) and two were trials on the pharmacological interventions, benztropine and glycopyrrolate. No RCTs or CCTs were retrieved on surgery, physical, oro-motor and oro-sensory therapies, behavioural interventions, intra-oral appliances or acupuncture. In the studies eligible for review, there was considerable heterogeneity within and across interventions and a meta-analysis was not possible. A descriptive summary of each study is provided. All studies showed some statistically significant change for treatment groups up to 1 month post intervention. However, there were methodological flaws associated with all six studies.
Authors' Conclusions	It was not possible to reach a conclusion on the effectiveness and safety of either BoNT-A or the pharmaceutical interventions, benztropine and glycopyrrolate. **There is insufficient evidence to inform clinical practice on interventions for drooling in children with CP**. Directions for future research are provided.

1.2.3. Aphasia

1.2.3.1. Liu 2025

Liu S, Li Y, Chang J, Shi J, Zhao L. Acupuncture combined with language training for aphasia in children with cerebral palsy: a systematic review with meta-analysis and trial sequential analysis. Front Neurol. 2025 Mar 12;16:1502023. https://doi.org/10.3389/fneur.2025.1502023

Objective	The aim of this study was to comprehensively evaluate the efficacy of acupuncture combined with language training in the treatment of aphasia in children with cerebral palsy (CP).
Methods	We searched eight electronic databases from their inceptions to July 1, 2024 for randomized controlled trials (RCTs) of acupuncture for aphasia in children with CP. The evaluation of methodological quality for RCTs incorporated in this study adhered to the guidelines provided by the Cochrane risk-of-bias tool (ROB2). The Grading of Recommendations Assessment, Development and Evaluation Approach (GRADE) was used to evaluate the certainty of evidence of each outcome. The heterogeneity of the included literature was tested using Review Manager 5.4 software, while publication bias was estimated using funnel plots and Egger's tests by STATA15.1. A trial sequential analysis (TSA) was performed to test the robustness of the conclusiveness of our results.
Results	In this study, we encompassed a total of 56 randomised controlled trials encompassing 4,683 participants. The majority of these trials were characterized by either a high or uncertain risk of bias, predominantly due to the omission of blinding within their experimental setups. Meta-analysis showed that acupuncture combined with language training was significantly better than language training alone in improving the clinical efficiency (RR: 1.25; 95% CI: 1.21, 1.29; $p < 0.00001$). A subgroup analysis of the different types of acupuncture revealed that acupuncture, electroacupuncture, scalp acupuncture, and auricular point seed-pressing all showed a significant improvement in aphasia in children with CP. Acupuncture combined with language training could significantly improve the adaptive behaviour (MD: 7.46; 95% CI: 3.67, 11.26; $p = 0.0001$), verbal behaviour (MD: 7.79; 95% CI: 5.66, 9.92; $p < 0.00001$), fine motor behaviour (MD: 4.66; 95% CI: 1.28, 8.03; $p = 0.007$), and personal social behaviour (MD: 6.47; 95% CI: 2.38, 10.55; $p = 0.002$); it was also significantly more effective in improving the language comprehension developmental quotient (SMD: 2.02; 95% CI: 1.54, 2.50; $p < 0.00001$), the expressive language development quotient (SMD: 2.40; 95% CI: 1.76, 3.03; $p < 0.00001$), assessment of dysarthria (MD: 0.40; 95% CI: 0.11, 0.69; $p = 0.007$), and oral motor function (SMD: 2.63; 95% CI: 1.36, 3.90; $p < 0.0001$).

Conclusion	Acupuncture combined with language training could be an effective treatment for aphasia in children with CP. Due to low or very low certainty of evidence and high heterogeneity, more rigorous RCTs are needed to verify the effect of acupuncture in the management of CP.

1.3. Special Acupuncture Techniques

1.3.1. Kang 2024

Kang X, Huang Y, Zheng Y, Zhang Q, Gong R, Tan J, Ma L, Chen S, Lv X, Shi S. Meta-analysis of the efficacy of Jingjin acupuncture therapy in the treatment of spastic cerebral palsy. Front Neurol. 2024 May 9;15:1358732. https://doi.org/10.3389/fneur.2024.1358732

Background	This study aimed to systematically evaluate the clinical efficacy of Jingjin (muscle region of the meridian, sinew/tendon/fascia) acupuncture therapy for the treatment of spastic cerebral palsy.
Methods	Computer searches of the Cochrane Library, Web of Science, PubMed, Embase, Chinese Biomedical Literature (CBM) Database, Wanfang database, Wipu (VIP) database, and China National Knowledge Infrastructure (CNKI) database for published randomized controlled trial (RCT) studies on Jingjin acupuncture treatment of cerebral palsy from the beginning of the database construction until 30 November 2023 were performed, and the quality of the papers was assessed through independent data extraction by two individuals and then meta-analyzed using RevMan5.4 software. A total of 20 RCTs involving 1,453 patients were included.
Results	The overall effective rate of Jingjin acupuncture therapy was better than that of conventional therapy, with a combined odds ratio (OR) of 4.70 and a 95% confidence interval (CI) of [3.05, 7.24]. The Modified Ashworth Spasticity (MAS) Scale, Gross Motor Function Measure (GMFM), Fine Motor Function Measure (FMFM), and Comprehensive Spasticity Scale (CSS) scores are superior to conventional therapy.
Conclusion	Jingjin acupuncture therapy is effective in treating spastic cerebral palsy and has better overall efficacy than conventional therapy. Due to the low quality of some of the literature in this study type, more high-quality, well-designed clinical studies are needed to validate it.

1.3.2. Acupotomy

1.3.2.1. Kwon 2019

Kwon CY , Lee B , Chang GT , Yoon SH. Efficacy of acupotomy for cerebral palsy: A systematic review and meta-analysis. Medicine (Baltimore). 2019;98(4). [192806].

Background	In children, cerebral palsy (CP) is one of the most common causes of irreversible neurological sequelae. Acupotomy, a modernized acupuncture form combining the effects of microsurgery and conventional acupuncture, may show specific benefits in the treatment of CP, especially with respect to spasticity. The aim of this review was to evaluate the efficacy of acupotomy for CP.

Methods	Eleven databases were comprehensively searched from their inception dates to November 27, 2018. Randomized controlled trials (RCTs) or quasi-RCTs evaluating acupotomy as a monotherapy or as adjunctive therapy to rehabilitation treatment for CP were included. The methodological quality of included studies was assessed using the risk of bias tool. The quality of evidence for each main outcome was evaluated using the Grading of Recommendations Assessment, Development, and Evaluation approach. Meta-analysis was performed, and the pooled data were presented as mean difference (MD) with 95% confidence interval (CI) for continuous outcomes and as risk ratio (RR) with 95% CI for dichotomous outcomes.
Results	**Eight studies involving 530 participants** were included. In 1 study, acupotomy was associated with significantly higher total effective rate (TER) compared with Bobath ($P<.01$). Acupotomy combined with rehabilitation was associated with significantly higher TER (RR 1.24, 95% CI 1.01-1.52, $I=77\%$) and gross motor function measure score (MD 12.62, 95% CI 11.75-13.49, $I=54\%$), and significantly lower muscle tone of gastrocnemius measured by the Ashworth scale or the modified Ashworth scale (MD -0.97, 95% CI -1.07 to -0.88, $I=0\%$) compared with rehabilitation alone. No studies reported the incidence of adverse events. The methodological quality of the included studies and quality of evidence for the main finding were generally low.
Conclusion:	Current evidence shows that acupotomy as a monotherapy or as adjunctive therapy to rehabilitation treatment might have benefits in the treatment of CP. However, due to the small number of studies included, the lack of sample size, poor methodological qualities, and low quality of evidence, the findings of this review should be interpreted with caution. Larger and more rigorous, high-quality RCTs should be performed on this topic.

1.3.3. Scalp Acupuncture

1.3.3.1. Xue 2022

Xue Y, Shi S, Zheng S, Yang Z, Xu J, Gong F. Therapeutic effect of scalp-based acupuncture and moxibustion as an adjunctive treatment on children with cerebral palsy comparing to conventional rehabilitation therapy: a systematic review and meta-analysis of randomized controlled trials. Transl Pediatr. 2022 May;11(5):631-641. https://doi.org/10.21037/tp-22-85

Background	Cerebral palsy (CP) in children is a predominantly congenital developmental disease with complex causes and diverse symptoms. Chinese medicine mainly uses acupuncture for the treatment of CP; as the disease site is in the brain, emphasis is placed on scalp acupuncture therapy. There were studies about the treatment but different studies had very different results. In this study, we performed a systematic review and meta-analysis of the recent reports on scalp acupuncture in the treatment of CP in children, providing evidence for clinical diagnosis and treatment.
Methods	The databases of PubMed, Chinese Biomedical Literature (CBM), China National Knowledge Infrastructure (CNKI), and VIP were searched for randomized controlled trials (RCTs) on scalp acupuncture treatment of pediatric CP published from January 2000 to December 2021. The inclusion criteria of studies were made according to the Participants, Intervention, Control, Outcomes, Study design (PICOS) principles. The Cochrane risk of bias 2.0 was used to evaluate the bias of the included literature. Meta-analysis was performed using the effective rate, Mental Development Index (MDI), Psychological Development Index (PDI), and Gross Motor Function Measure (GMFM-88 scale) as outcome indicators for the efficacy, and the safety of scalp acupuncture was assessed.

Results	Initially, 332 articles were retrieved; after screening, **11 articles** were included in the selection, including a total of **731 children**, with 369 and 362 children for the experimental group and control group respectively. Meta-analysis showed that scalp acupuncture significantly improved the symptoms of children with CP [odds ratio (OR) =3.73, 95% confidence interval (CI): 2.49-5.58, Z=6.41, P<0.00001], could significantly improve their mental development [mean difference (MD) =15.58, 95% CI: 11.74-19.43, Z=7.95, P<0.00001] and psychological development (MD =13.23, 95% CI: 6.17-20.28, Z=3.67, P=0.0002) of children, and significantly improved the motor ability of CP children (MD =17.45, 95% CI: 8.19-26.72, Z=3.69, P=0.0002).
Discussion	The curative effect of scalp acupuncture is better than that of conventional rehabilitation. Scalp-based acupuncture therapy can effectively improve the symptoms of pediatric CP, promote the mental and psychological development of children, and improve their gross motor function, the treatment is safe.

1.3.3.2. Niu 2014 ☆☆

Niu Xianglai, Ma Junhu, Zhou Wei, Fang Lina, Tian Lijuan, Zhou Yu. [Meta-analysis for clinical efficacy of head needle treatment in children with cerebral palsy]. Chinese Journal of Integrated Traditional and Western Medicine in Intensive and Critical Care. 2015;4:347-350. [186955].

Objective	To evaluate the clinical curative effect of acupuncture and moxibustion treatment for children with cerebral palsy by Meta-analysis.
Methods	The Chinese biomedical literature database (CBM), CNKI and Wanfang data, Weipu data, PubMed, Embase and Cochrane central registration of controlled clinical trials were searched. All the randomized controlled trials (RCTs) of acupuncture and other conventional treatment for infantile cerebral palsy before December 2013 were retrieved. Meta-analysis was conducted with Review Manage 5. 2 software.
Results	Finally, **11 reports of RCT were enrolled in the study, including 979 patients**. Meta-analysis showed that the total effective rate of acupuncture treatment for infantile cerebral palsy was significantly higher than that in the control group [odds ratio (OR) = 4. 08, 95% confidence interval (95%CI) = 2. 86 - 5. 83, P < 0. 000 01]. Funnel chart analysis showed no publication bias in the chosen literature.
Conclusion	**The therapeutic effect of acupuncture combined with rehabilitation therapy is superior to that of other conventional treatment** for children with cerebral palsy.

1.3.3.3. Li 2014 ☆

Li Lan-Ya, Liu Zhen-Huan, Xie Qiao-Ling. Meta-Analysis on scalp acupuncture based therapy in treating children cerebral palsy World Journal Of Acupuncture- Moxibustion. 2014;24(3):49. [176445].

Objective	To explore the effectiveness of applying scalp acupuncture in treating child cerebral palsy
Method	Computer was adopt to retrieve relevant literature about scalp acupuncture based therapy in treating children cerebral palsy published during 1999-2014 in PubMed, China National Knowledge Infrastructure (CNKI), China Biology Medicine Disc (CBM), VIP database, Wanfang database, Longyuan Electronic Journal and People's University Copying Periodical Resources Full-Text Database. The quality of literature about scalp acupuncture based therapy in treating children cerebral palsy was systematically evaluated and Meta analysis was conducted for integrated data by adopting evidence-based medicine and bibliometrics and through RevMan 5.2 statistical software.

Results	Two hundred and thirty-four literature were retrieved in total, within which, **7 of them were included. There were 796 cases** in included literature, which were divided into a treatment group (416 cases) and a control group (380 cases). The total effective cases in the treatment group was 378, with the total effective rate of 90.9%, and the total effective cases of the control group was 281, with the total effective rate of 73.9%, which could provide evidence for the fact that the treatment of scalp acupuncture has increased the effective rate of child cerebral palsy by 17%. It is shown by Meta analysis that: OR is 0.16, 95% CI is (0.11, 0.21) and combined effect test is Z=6.27, P<0.01, indicating that the combined effect size of several studies included is of statistical significance, and the difference between the control group and the treatment group is statistically significant.
Conclusion	**The total effective rate of scalp acupuncture based therapy in treating children cerebral palsy is higher than that of modern medicine comprehensive rehabilitation treatment**, and the treatment method of scalp acupuncture could be widely applied to clinic; but since articles about scalp acupuncture based therapy in treating children cerebral palsy published domestically are not qualified enough, only a few literature are included, hence, more power and strong evidences shall be verified by literature with higher quality.

2. Overview of Systematic Reviews and Meta-Analysis

2.1. Lu 2023

Lu XF, Tao YW, Liu F, Xu YQ, Gong MQ, Yang ZX. [Re-evaluation of systematic reviews of acupuncture and moxibustion for children with cerebral palsy]. Zhongguo Zhen Jiu. 2023 Oct 12;43(10):1209-16.

Objective	To assess the methodological quality, report quality and evidence quality of the Meta-analysis and systematic reviews of acupuncture and moxibustion for children with cerebral palsy, aiming to provide decision-making basis for clinical treatment.
Methods	The systematic reviews and Meta-analysis of acupuncture and moxibustion for children with cerebral palsy were searched in CNKI, Wanfang, VIP, SinoMed, Cochrane Library, PubMed and EMbase. The retrieval time was from the database establishment to June 30th, 2022. AMSTAR 2 (a measurement tool to assess systematic reviews) was used to evaluate the methodological quality and PRISMA (preferred reporting items for systematic reviews and Meta-analyses) was used to evaluate the report quality, and GRADE was used to evaluate the quality of evidence.
Results	A total of **14 systematic reviews** were included, including 37 primary outcome indexes. According to AMSTAR 2 evaluation results, there were 4 low quality studies, 10 very low quality studies, and low scores on items 2, 4, 7, 10 and 16. PRISMA scores ranged from 15 to 25, and the main reporting problems reflected in structured abstracts, program and registration, retrieval, and funding sources, etc. According to the GRADE classification results, there were 3 high quality evidences, 7 medium quality evidences, 10 low quality evidences and 17 very low quality evidences. The main downgrading factors were limitations, imprecision and publication bias.
Conclusion	Acupuncture and moxibustion has a certain effect for cerebral palsy in children, but the quality of methodology, reporting and evidence in the included literature is poor, and the comparison of curative effect between different acupuncture and moxibustion methods is unclear.

3. Clinical Practice Guidelines

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

3.1. Haute Autorité de Santé (HAS, France) 2021 ⊕

Rééducation et réadaptation de la fonction motrice de l'appareil locomoteur des personnes diagnostiquées de paralysie cérébrale. Saint-Denis La Plaine: Haute Autorité de Santé (HAS). 2021:28P. [223625]. URL

L'acupuncture, comparativement à l'utilisation d'un plâtre pour le membre inférieur ou la thérapie neurodéveloppementale selon le cadre conceptuel de Bobath, peut être proposée aux enfants et aux adolescents marchants diagnostiqués de paralysie cérébrale dans le but d'améliorer la fonction motrice globale et le tonus musculaire des gastrocnémiens.
L'état des connaissances est insuffisant pour recommander l'acupuncture pour améliorer la fonction motrice globale des adultes diagnostiqués de paralysie cérébrale.

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