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Spinal Cord Injury

Traumatismes médullaires : évaluation de l'acupuncture

Articles connexes: - fractures vertébrales - Rétention urinaire des traumatismes médullaires -

1. Systematic Reviews and Meta-Analysis

1.1. Generic Acupuncture

1.1.1. Allison 2023

Allison DJ, Ahrens J, Mirkowski M, Mehta S, Loh E. The effect of neuropathic pain treatments on pain interference following spinal cord injury: A systematic review. J Spinal Cord Med. 2024 Jul;47(4):465-476. https://doi.org/10.1080/10790268.2023.2218186

Context	Neuropathic pain is a common and debilitating condition following SCI. While treatments for neuropathic pain intensity have been reviewed, the impact on pain interference has not been summarized.
Objective	To systematically review the effect of neuropathic pain interventions on pain interference in individuals with spinal cord injury.
Methods	This systematic review included randomized controlled trials and quasi-experimental (non-randomized) studies which assessed the impact of an intervention on pain interference in individuals with spinal cord injury and neuropathic pain. Articles were identified by searching MEDLINE (1996 to April 11, 2022), EMBASE (1996 to April 11, 2022), PsycInfo (1987 to April, week 2, 2022). Studies were assessed for methodologic quality using a modified GRADE approach and were given quality of evidence (QOE) scores on a 4-point scale ranging from very low to high.
Results	Twenty studies met the inclusion criteria. These studies fell into the following categories: anticonvulsants (n = 2), antidepressants (n = 1), analgesics (n = 1), antispasmodics (n = 1), **acupuncture (n = 2)**, transcranial direct current stimulation (n = 1), active cranial electrotherapy stimulation (n = 2), transcutaneous electrical nerve stimulation (n = 2), repetitive transcranial magnetic stimulation (n = 1), functional electrical stimulation (n = 1), meditation and imagery (n = 1), self-hypnosis and biofeedback (n = 1), and interdisciplinary pain programs (n = 4).
Conclusion	When considering studies of moderate to high quality, pregabalin, gabapentin, intrathecal baclofen, transcranial direct current stimulation, and transcutaneous electrical nerve stimulation (in 1 of 2 studies) were shown to have beneficial effects on pain interference. However, due to the low number of high-quality studies further research is required to confirm the efficacy of these interventions prior to recommending their use to reduce pain interference.

1.1.2. Ma 2015 ☆

Ma R, Liu X, Clark J, Williams GM , Doi SA. The Impact of Acupuncture on Neurological Recovery in Spinal Cord Injury: A Systematic Review and Meta-Analysis. J Neurotrauma. 2015;32(24):1943-57. [188518].

Objectives	Spinal cord injury (SCI) has become a significant social and economic burden for patients and their families. The effect of acupuncture on neurological recovery in individuals with SCI remains inconclusive despite previous studies and meta-analyses. The aim of the current study was to perform a more rigorous systematic review and bias-adjusted meta-analysis of studies so that the overall impact of acupuncture on neurological recovery in SCI can be determined.
Methods	Randomized controlled trials (RCTs) only were included and were searched for in seven databases through to August 2014. Four key outcomes were assessed: neurological recovery, motor function, sensory function, and functional recovery. Several statistical approaches were compared, models were tested for robustness using sensitivity analysis, and results are presented as weighted mean difference (WMD) or standardized mean difference (SMD) for continuous outcomes and relative risk (RR) for binary outcomes. The included studies' susceptibility to bias was also assessed.
Results	A total of **12 studies** were included after exclusions were applied. Heterogeneity was evident among the studies included. Pooled analyses showed that acupuncture may have a beneficial effect on neurological recovery (RRs: 1.28, 95% confidence interval [CI]: 1.12-1.50), motor function (WMD: 6.86, 95% CI: 0.41-13.31), and functional recovery (SMD: 0.88, 95% CI: 0.56-1.21) and all statistical approaches concurred. Sensitivity analyses suggested that the smaller studies (sample size <30), those with acute disease, and studies that used varying acupuncture sessions demonstrated a larger magnitude of effect. However, studies were generally of poor quality and publication bias favoring positive studies was evident
Conclusions	**Therefore, the benefit of acupuncture we report is by no means definitive and well-designed future studies are recommended to confirm this.**

1.1.3. Boldt 2014 Ø

Boldt I, Eriks-Hoogland I, Brinkhof MW, De Bie R, Joggi D, Von Elm E. Non-Pharmacological Interventions for Chronic Pain in People with Spinal Cord Injury. Cochrane Database Syst Rev. 2014. [177421].

Objectives	Chronic pain is frequent in persons living with spinal cord injury (SCI). Conventionally, the pain is treated pharmacologically, yet long-term pain medication is often refractory and associated with side effects. Non-pharmacological interventions are frequently advocated, although the benefit and harm profiles of these treatments are not well established, in part because of methodological weaknesses of available studies. OBJECTIVES: To critically appraise and synthesise available research evidence on the effects of non-pharmacological interventions for the treatment of chronic neuropathic and nociceptive pain in people living with SCI.

Methods	The search was run on the 1st March 2011. We searched the Cochrane Injuries Group's Specialised Register, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (OvidSP), Embase (OvidSP), PsycINFO (OvidSP), four other databases and clinical trials registers. In addition, we manually searched the proceedings of three major scientific conferences on SCI. We updated this search in November 2014 but these results have not yet been incorporated. SELECTION CRITERIA: Randomised controlled trials of any intervention not involving intake of medication or other active substances to treat chronic pain in people with SCI. DATA COLLECTION AND ANALYSIS: Two review authors independently extracted data and assessed risk of bias in the included studies. The primary outcome was any measure of pain intensity or pain relief. Secondary outcomes included adverse events, anxiety, depression and quality of life. When possible, meta-analyses were performed to calculate standardised mean differences for each type of intervention.
Results	We identified 16 trials involving a total of 616 participants. Eight different types of interventions were studied. Eight trials investigated the effects of electrical brain stimulation (transcranial direct current stimulation (tDCS) and cranial electrotherapy stimulation (CES); five trials) or repetitive transcranial magnetic stimulation (rTMS; three trials). Interventions in the remaining studies included exercise programmes (three trials); **acupuncture (two trials)**; self-hypnosis (one trial); transcutaneous electrical nerve stimulation (TENS) (one trial); and a cognitive behavioural programme (one trial). None of the included trials were considered to have low overall risk of bias. Twelve studies had high overall risk of bias, and in four studies risk of bias was unclear. The overall quality of the included studies was weak. Their validity was impaired by methodological weaknesses such as inappropriate choice of control groups. An additional search in November 2014 identified more recent studies that will be included in an update of this review.For tDCS the pooled mean difference between intervention and control groups in pain scores on an 11-point visual analogue scale (VAS) (0-10) was a reduction of -1.90 units (95% confidence interval (CI) -3.48 to -0.33; P value 0.02) in the short term and of -1.87 (95% CI -3.30 to -0.45; P value 0.01) in the mid term. Exercise programmes led to mean reductions in chronic shoulder pain of -1.9 score points for the Short Form (SF)-36 item for pain experience (95% CI -3.4 to -0.4; P value 0.01) and -2.8 pain VAS units (95% CI -3.77 to -1.83; P value < 0.00001); this represented the largest observed treatment effects in the included studies. **Trials using rTMS, CES, acupuncture, self-hypnosis, TENS or a cognitive behavioural programme provided no evidence that these interventions reduce chronic pain.** Ten trials examined study endpoints other than pain, including anxiety, depression and quality of life, but available data were too scarce for firm conclusions to be drawn. In four trials no side effects were reported with study interventions. Five trials reported transient mild side effects. Overall, a paucity of evidence was found on any serious or long-lasting side effects of the interventions.
Conclusions	**Evidence is insufficient to suggest that non-pharmacological treatments are effective**~ in reducing chronic pain in people living with SCI. The benefits and harms of commonly used non-pharmacological pain treatments should be investigated in randomised controlled trials with adequate sample size and study methodology.

1.1.4. Heo 2013 ☆

Heo I, Shin BC, Kim YD, Hwang EH, Han CW, Heo KH. Acupuncture for spinal cord injury and its complications: a systematic review and meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med. 2013. [170712].

Objectives-Methods	To evaluate the evidence supporting the effectiveness of acupuncture treatment for SCI and its complications, we conducted search across 19 electronic databases to find all of the randomized controlled trials (RCTs) that used acupuncture as a treatment for SCI and its complications. The methodological quality of each RCT was assessed using the Cochrane risk of bias tool and the PEDro scale.
Results	**Sixteen RCTs, including 2 high-quality RCTs, met our inclusion criteria** (8 for functional recovery from SCI, 6 for bladder dysfunction, and 2 for pain control). The meta-analysis showed **positive results for the use of acupuncture combined with conventional treatments for the functional recovery** in terms of motor ASIA scores and total FIM scores when compared to conventional treatments alone. Positive results were also obtained for the treatment of bladder dysfunction, in terms of the total efficacy rate, when comparing acupuncture to conventional treatments. However, 2 RCTs for pain control reported conflicting results.
Conclusions	Our systematic review found encouraging albeit limited evidence for functional recovery, bladder dysfunction, and pain in SCI. However, to obtain stronger evidence without the drawbacks of trial design and the quality of studies, we recommend sham-controlled RCTs or comparative effectiveness research for each condition to test the effectiveness of acupuncture.

1.1.5. Deng 2011 ☆

Deng Zhouming, Su Jiajia, Cai Lin, Ping Ansong, Jin Wei, Wei Renxiong, Zhan Yan. Evidence-based treatment for acute spinal cord injury. Neural Regeneration Research. 2011;6(23):1791-5. [165656]

Objectives	To formulate an evidence-based treatment for one patient with acute spinal cord injury and summarize evidence for evaluating acute spinal cord injury treatment.
Methods	Studies related to the treatment for acute spinal cord injury were identified via a search of National Guideline Clearinghouse (NGC, 2000-11), the Cochrane Library (Issue 1, 2011), TRIP Database (2000-11), and PubMed (1966-2011). Treatment strategies were formulated according to three basic principles: best evidence, doctor's professional experience, and wishes of the patient.
Results	A total of **34 articles were selected, including 1 NGC guideline, 22 systematic reviews, and 11 randomized controlled trials**. Based on our review, we arrived at the following recommendations: no clinical evidence exists definitively to recommend the use of any of neuroprotective pharmaceuticals; surgery should be undertaken early; mechanical compression devices and low-molecular weight heparin should be employed to prevent thrombosis; respiratory muscle training is beneficial for pulmonary function and quality of life; and **functional electrical stimulation and acupuncture can promote functional recovery**. The patient accordingly underwent surgery 6 hours after trauma without receiving any neuroprotective pharmaceuticals; low-molecular weight heparin and intermittent pneumatic compression were applied to prevent thrombosis. He also underwent respiratory muscle training daily for 8 weeks and received functional electrical stimulation for 15 minutes and acupuncture for **30 minutes every day**. After follow-up for 3 months, the above therapeutic regimen was confirmed efficacious for acute spinal cord injury.
Conclusions	Evidence-based medicine provides an individualized treatment protocol for acute spinal cord injury, which can significantly improve the therapeutic effect and prognosis.

1.1.6. Shin 2009 ☆

Shin BC, Lee MS, Kong JC, Jang I, Park JJ. Acupuncture for spinal cord injury survivors in Chinese literature: a systematic review. Complement Ther Med. 2009;17(5-6):316-27. [187759].

Objectives	To systematically review Chinese literature on the effectiveness of acupuncture for treating patients with spinal cord injury (SCI).
Methods	DATA SOURCES: The Chinese electronic databases (China National Knowledge Infrastructure) were searched from their inceptions to May 2008. STUDY SELECTION: Trials reporting randomized controlled trials (RCTs) where patients with SCI (with or without operation) were treated with acupuncture including electroacupuncture. DATA EXTRACTION: Methodological quality was assessed with the PEDro scale. Discrepancies were resolved through discussions and arbitration by two co-authors.
Results	The searches identified 236 potentially relevant studies, of which **7 RCTs** met the inclusion criteria. Five studies assessed functional recovery, and two bladder dysfunction. All the studies reported favourable effects of acupuncture on functional recovery or urinary function; however methodological quality of studies is poor in general. Meanwhile, pooled analysis of two trials assessing bladder dysfunction showed positive effectiveness compared with conventional treatment (n = 128, RR 1.51 [1.21, 1.90], P = 0.0004, heterogeneity Tau(2) < 0.01, Chi(2) = 0.01, P = 0.94, I(2) = 0%).
Conclusions	Based on 7 RCTs done in China, the **effectiveness of acupuncture for functional recovery and bladder dysfunction in SCI is suggestive**. With the methodological quality of the included studies on functional recovery and the small number of studies on bladder dysfunction taken into consideration, further rigorous studies prove needed.

1.1.7. Harvey 2008 ☆

Harvey LA, Lin CW, Glinsky JV, De Wolf A. The Effectiveness of Physical Interventions for People with Spinal Cord Injuries: A Systematic Review. Spinal Cord. 2008. [150142].

Objectives	Systematic review.Objectives:To provide a quantitative analysis of all randomized controlled trials designed to determine the effectiveness of physical interventions for people with spinal cord injury (SCI).
Methods	Sydney, Australia.Methods:A search was conducted for randomized controlled trials involving physical interventions for people with SCI. Two reviewers independently rated methodological quality using the PEDro scale and extracted key findings from the trials.
Results	Four thousand five hundred and forty three abstracts were identified of which 31 trials met the inclusion criteria. Trials examined the effectiveness of fitness and strength training (n=7), gait training (n=5), hand therapy (n=3), stretch (n=4), **acupuncture (n=3)**, hand splinting (n=2) and other related therapies (n=7). Six trials reported a between-group mean difference with a clearly important treatment effect on at least one outcome measure. These trials supported the use of fitness, strength and gait training as well as acupuncture.
Conclusions	There is **initial evidence supporting the effectiveness of some physical interventions for people with SCI**. However, there is a pressing need for high-quality trials to determine the effectiveness of all physical interventions commonly administered in clinical practice

1.2. Specific outcome

1.2.1. Pelvic floor

1.2.1.1. Hernández Rodríguez 2020

Hernández Rodríguez D, Pérez-de la Cruz S. [Treatment of the pelvic floor in males with incomplete

spinal cord injury: a systematic review]. An Sist Sanit Navar. 2020;43(3):381-392. [222037]. https://doi.org/10.23938/assn.0868

Objective	Pelvic floor disorders are one of the most common complications in male patients with spinal cord injury. The aim of this review was to analyse the available evidence on the efficacy of different treatments used for pelvic floor dysfunctions in men with incomplete spinal cord injuries.
Methods	The Scopus, Medline, PEDro, Web of Science, Dialnet, Pubmed and Cochrane databases were consulted for papers in Spanish and English published in the last twenty years.
Results	Fifteen articles were included, comprising a total of 706 male patients with incomplete spinal cord injury. In male patients with neurogenic bladder and erectile dysfunction, the best results were obtained with neuromodulation and combined treatments (electrotherapy or **acupuncture / electroacupuncture** with catheterization or bladder training).

1.2.2. Neuropathic Pain

1.2.2.1. Ge 2025

Ge SY, Hu MM, Li KP, Wu CQ, Xu GH, Dong L. Comparative efficacy of common rehabilitation treatments for patients with neuropathic pain after spinal cord injury: a systematic review and network meta-analysis. Neurol Sci. 2025 Aug;46(8):3547-3557. https://doi.org/10.1007/s10072-025-08120-y

Background	Neuropathic pain is a prevalent complication following spinal cord injury, imposing severe physical and psychological burdens on affected individuals. It often hinders complete physical and mental recovery. Despite numerous rehabilitation interventions being explored and implemented, the optimal treatment strategy for neuropathic pain post-spinal cord injury remains a subject of ongoing debate. To address this uncertainty, a comprehensive network meta-analysis is imperative. This analysis aims to compare the effectiveness of various rehabilitation interventions and guide clinical staff in selecting the most efficacious treatment to alleviate patients' physical and psychological distress.
Methods	Embase, PubMed, Scopus, Web of Science, CNKI, Wan Fang, Vip Journal Integration Platform and Sinomed were searched from the establishment of the database to 13 June 2024. Employing ROB 2.0 and Stata 18.0 for literature selection, quality evaluation and meta-analysis, the effectiveness of various rehabilitation interventions was assessed. These interventions were evaluated using network-level and cumulative level surface under the cumulative ranking area analysis.
Results	The review included 31 studies involving 1820 patients. According to the cumulative ranking area ranking of 17 therapies, the best three interventions for reducing pain are repetitive transcranial magnetic stimulation, **acupuncture**, and intermittent theta burst stimulation.
Conclusions	The intermittent theta burst stimulation treatment demonstrated superior efficacy in managing pain after spinal cord injury, closely followed by **acupuncture** and repetitive transcranial magnetic stimulation. This analysis provides a solid foundation for clinical staff to select the appropriate therapeutic approaches.

1.2.2.2. He 2022 ☆

He K, Hu R, Huang Y, Qiu B, Chen Q, Ma R. Effects of Acupuncture on Neuropathic Pain Induced by

Spinal Cord Injury: A Systematic Review and Meta-Analysis. Evid Based Complement Alternat Med. 2022 Aug 19;2022:6297484. https://doi.org/10.1155/2022/6297484.

Introduction	Neuropathic pain is a commonly seen symptom and one of the most intractable comorbidities following spinal cord injury (SCI). Acupuncture has been widely used for neuropathic pain after SCI in clinical settings. There is no systematic review or meta-analysis evaluating the efficacy of acupuncture in the treatment of SCI-induced neuropathic pain. Thus, this study aimed to conduct a systematic review and meta-analysis to assess the efficacy of acupuncture on SCI-induced neuropathic pain.
Methods	Seven databases were comprehensively searched, including PubMed, the Cochrane Library, the Web of Science, the China National Knowledge Infrastructure (CNKI), the Chinese Biomedical Literature Service System (SinoMed), the Wanfang Database, and the Chinese Scientific Journals Database (VIP) from their inception to 30 September 2021. Two independent reviewers evaluated the eligibility of the data retrieved based on the pre-established eligibility criteria and assessed the methodological quality of the included studies using the Cochrane Risk of Bias Tool. The outcome indexes in this study included the visual analogue scale, the numeric rating scale, the present pain intensity, and the pain region index. Sensitivity and subgroup analyses were also performed to specifically evaluate the intervention effects. In addition, publication bias was analyzed.
Results	**Six randomized controlled trials** (145 participants in the experimental groups and 141 participants in the control groups) were identified that evaluated the application of acupuncture for neuropathic pain after SCI and were included in this study. The results of our study revealed that acupuncture had a positive effect on the pain severity (standardized mean difference (SMD): -1.40, 95% confidence interval (CI): -2.23; -0.57), the present pain intensity (MD = -0.61, 95% CIs = -0.98; -0.23), and the pain region index (MD = -3.04, 95% CI = -3.98; -2.11). In addition, sensitivity analyses showed that these results were robust and stable. Subgroup analyses indicated that electroacupuncture (EA) had better effects on SCI-induced neuropathic pain. However, a publication bias was observed.
Conclusion	Available evidence appears to suggest that acupuncture may have a role in SCI-induced neuropathic pain management, but this remains to be determined.

1.3. Comparison of acupuncture techniques

1.3.1. Xiong 2019

Xiong F, Fu C, Zhang Q, Peng L, Liang Z, Chen L, He C, Wei Q. The Effect of Different Acupuncture Therapies on Neurological Recovery in Spinal Cord Injury: A Systematic Review and Network Meta-Analysis of Randomized Controlled Trials. Evid Based Complement Alternat Med. 2019. [203379]. -DOI-

Background	Many acupuncture therapies were used to treat spinal cord injury (SCI) and its complications. The difference in efficacy among these therapies has not been assessed.
Methods	To compare the efficacy of different acupuncture therapies for SCI, we searched databases (PubMed, Embase, Cochrane Library, CNKI, and WanFang) for relevant RCTs in both English and Chinese before June 2019 that reported the association between acupuncture therapies and SCI. The RCTs were categorized according to the location of the acupoints used in them. The neural function was assessed by American Spinal Injury Association (ASIA) motor score, and daily living ability was accessed by Modified Barthel Index (MBI) after SCI.

Results	In total, 22 trials involving 1644 participants were included. The pairwise meta-analysis and random effects model network meta-analysis were conducted. The results indicated that exercise combined with electro-acupuncture (EA) is superior to exercise without acupuncture in improving the ASIA motor score. EA was associated with a significantly higher improvement in the MBI score than exercise alone, except for EA of head + limbs and limbs. Additionally, EA on the head + back and back + front (chest and abdomen) rank the top in both increasing the ASIA motor score and the MBI score. Acupuncture can significantly increase motor function and daily living ability of individuals who suffer from SCI, especially acupuncture of the back + front or the head + back.
Conclusion	The evidence supports acupuncture of the back + front or the head + back as an effective treatment for SCI.

2. Clinical Practice Guidelines

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

2.1. CanPain SCI clinical practice guidelines (Canada) 2022 Ø

Loh E, Mirkowski M, Agudelo AR, et al. The CanPain SCI clinical practice guidelines for rehabilitation management of neuropathic pain after spinal cord injury: 2021 update. Spinal Cord. 2022. [222875]. https://www.nature.com/articles/s41393-021-00744-z

The WG voted on a possible recommendation for acupuncture. A slight majority (56%) agreed that acupuncture should be a recommendation, but this did not reach threshold for inclusion (75%).

2.2. CanPain SCI clinical practice guidelines (Canada) 2016 Ø

Guy SD, Mehta S, Casalino A, Côté I, Kras-Dupuis A, Moulin DE, Parrent AG, Potter P, Short C, Teasell R, Bradbury CL, Bryce TN, Craven BC, Finnerup NB, Harvey D, Hitzig SL, Lau B, Middleton JW, O'Connell C, Orenczuk S et al. The CanPain SCI Clinical Practice Guidelines for Rehabilitation Management of Neuropathic Pain after Spinal Cord: Recommendations for treatment. Spinal Cord. 2016;54 (Suppl 1):S14-23. [223624]. https://doi.org/10.1038/sc.2016.90

Studies of acupuncture suffer from a lack of standardization of process or procedure delivery and practice principles, and evidence for effectiveness is inconclusive. Additional studies are needed to clarify the benefit of using this modality.

2.2.1. Paralyzed Veterans of America (PVA, USA) 2005 Ø

Paralyzed Veterans of America (PVA). Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health-Care Professionals. J Spinal Cord Med. 2005;28(5):443-70. [175869].

The only CAM technique that has been evaluated in the SCI population is acupuncture, although the studies do not provide conclusive evidence of effectiveness.

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