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Overactive Bladder

Vessie hyperactive

1. Systematic Reviews and Meta-Analysis

☆☆☆	Evidence for effectiveness and a specific effect of acupuncture
☆☆	Evidence for effectiveness of acupuncture
☆	Limited evidence for effectiveness of acupuncture
∅	No evidence or insufficient evidence

1.1. Bapir 2023 (overactive neurogenic bladder)

Bapir R, Bhatti KH, Eliwa A, García-Perdomo HA, Gherabi N, Hennessey D, Magri V, Mourmouris P, Ouattara A, Perletti G, Philipraj J, Stamatiou K, Trinchieri A, Buchholz N. Efficacy of overactive neurogenic bladder treatment: A systematic review of randomized controlled trials. Arch Ital Urol Androl. 2022 Dec 28;94(4):492-506. <https://doi.org/10.4081/aiua.2022.4.492>

Background	Overactive bladder (OAB) symptoms of frequency, urgency and urge incontinence are frequently associated with known neurological diseases like multiple sclerosis (MS), spinal cord injury (SCI), Parkinson's disease (PD), stroke.
Objective	The aim of our study was to review the efficacy of pharmacological and non-pharmacological treatments for neurogenic overactive bladder.
Materials and Methods	We searched two electronic databases (PubMed and EMBASE) for randomized controlled trials focusing on pharmacological and non-pharmacological medical treatments for overactive bladder symptoms associated with neurological diseases published up to 30 April 2022.
Results	A total of 157 articles were retrieved; 94 were selected by title and abstract screening; after removal of 17 duplicates, 77 records were evaluated by full-text examination. Sixty-two studies were finally selected. The articles selected for review focused on the following interventions: anticholinergics (n = 9), mirabegron (n = 5), comparison of different drugs (n = 3), cannabinoids (n = 2), intravesical instillations (n = 3), botulinum toxin (n = 16), transcutaneous tibial nerve stimulation (TTNS) (n = 6), acupuncture (n = 2) , transcutaneous electrical nerve stimulation TENS (n = 4), pelvic floor muscle training (PFMT) (n = 10), others (n = 2). Anticholinergics were more effective than placebo in decreasing the number of daily voids in patients with PD (mean difference [MD]- 1.16, 95 % CI - 1.80 to - 0.52, 2 trials, 86 patients, p < 0.004), but no significant difference from baseline was found for incontinence episodes and nocturia. Mirabegron was more effective than placebo in increasing the cystometric capacity in patients with MS (mean difference [MD] 89.89 mL, 95 % CI 29.76 to 150.01, 2 trials, 98 patients, p < 0.003) but no significant difference was observed for symptom scores and bladder diary parameters. TTNS was more effective than its sham-control in decreasing the number of nocturia episodes (MD -1.40, 95 % CI -2.39 to -0.42, 2 trials, 53 patients, p < 0.005) but no significant changes of OAB symptom scores were reported. PFMT was more effective than conservative advice in decreasing the ICIQ symptom score (MD, -1.12, 95 % CI -2.13 to -0.11, 2 trials, 91 patients, p = 0.03), although the number of incontinence episodes was not significantly different between groups.

Conclusions	The results of the meta-analysis demonstrate a moderate efficacy of all considered treatments without proving the superiority of one therapy over the others. Combination treatment using different pharmacological and non-pharmacological therapies could achieve the best clinical efficacy due to the favorable combination of the different mechanisms of action. This could be associated with fewer side effects due to drug dosage reduction. These data are only provisional and should be considered with caution, due to the few studies included in metaanalysis and to the small number of patients.
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1.2. Lee 2023

Lee JJ, Heo JW, Choi TY, Jun JH, Lee MS, Kim JI. Acupuncture for the treatment of overactive bladder: A systematic review and meta-analysis. *Front Neurol.* 2023 Jan 12;13:985288.

<https://doi.org/10.3389/fneur.2022.985288>

Background	Acupuncture (AT) successfully regulates overactive bladder (OAB) symptoms. However, previous systematic reviews and meta-analyses have not provided sufficient evidence. This review presents the current evidence of the efficacy of AT in the management of OAB symptoms.
Methods and analyses	A total of 12 databases were searched from their inception: PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), and AMED databases; five Korean medical databases; and three Chinese medical databases. Study selection, data extraction, and assessment were independently performed by two researchers. The risk of bias was assessed using the Cochrane risk of bias assessment tool. RevMan 5.4.1 software was used for data aggregation, and the Grades of Recommendations, Assessment, Development and Evaluation (GRADE) assessment was used to evaluate the quality of the study outcomes.
Results	A total of 30 studies were included in this review. Compared with the sham AT group, the AT group exhibited significant effects in reducing overactive bladder symptom scores (OABSS) [mean difference (MD): -1.13, 95% confidence interval (CI): -2.01 to -0.26, $p = 0.01$ $I^2 = 67\%$] and urinary frequency [standardized mean difference (SMD): -0.35, 95% CI: -0.62 to -0.08, $I^2 = 0\%$]. The AT group showed an equivalent effect as drug therapy in reducing OABSS (MD: -0.39, 95% CI: -1.92 to 1.13, $p = 0.61$, $I^2 = 94\%$) and urinary frequency (MD: 0.74, 95% CI: -0.00 to 1.48, $p = 0.05$, $I^2 = 71\%$) with fewer adverse events [risk ratio (RR): 0.38, 95% CI: 0.16-0.92, $p = 0.03$, $I^2 = 58\%$]. The AT plus drug therapy group had a more favorable effect than drug therapy alone for reducing OABSS (MD: -2.28, 95% CI: -3.25 to -1.31, $p < 0.00001$, $I^2 = 84\%$) and urinary frequency (MD: -2.34, 95% CI: -3.29 to -1.38, $p < 0.00001$, $I^2 = 88\%$). The GRADE assessment demonstrated that the level of evidence was mostly low or very low given the high risk of bias and small sample sizes.
Conclusion	AT had more favorable effects than sham AT in reducing OAB symptoms. AT improved OAB symptoms as effectively as conventional drug therapy, and the combination of AT and drug therapy had more favorable effects than drug therapy alone. However, more rigorous studies are needed to enhance the level of evidence.

1.1. Hargreaves 2022

Hargreaves E, Baker K, Barry G, Harding C, Zhang Y, Kandala NB, Zhang X, Kernohan A, Clarkson CE. Acupuncture for treating overactive bladder in adults. *Cochrane Database Syst Rev.* 2022 Sep 23;9:CD013519. <https://doi.org/10.1002/14651858.CD013519>

Background	Overactive bladder is a common, long-term symptom complex, which includes frequency of micturition, urgency with or without associated incontinence and nocturia. Around 11% of the population have symptoms, with this figure increasing with age. Symptoms can be linked to social anxiety and adaptive behavioural change. The cost of treating overactive bladder is considerable, with current treatments varying in effectiveness and being associated with side effects. Acupuncture has been suggested as an alternative treatment.
Objectives	To assess the effects of acupuncture for treating overactive bladder in adults, and to summarise the principal findings of relevant economic evaluations.
Methods	<p>Search methods: We searched the Cochrane Incontinence Specialised Register, which contains trials identified from the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (including In-Process, Epub Ahead of Print, Daily), ClinicalTrials.gov and WHO ICTRP (searched 14 May 2022). We also searched the Allied and Complementary Medicine database (AMED) and bibliographic databases where knowledge of the Chinese language was necessary: China National Knowledge Infrastructure (CNKI); Chinese Science and Technology Periodical Database (VIP) and WANFANG (China Online Journals), as well as the reference lists of relevant articles.</p> <p>SELECTION CRITERIA: We included randomised controlled trials (RCTs), quasi-RCTs and cross-over RCTs assessing the effects of acupuncture for treating overactive bladder in adults. Data collection and analysis: Four review authors formed pairs to assess study eligibility and extract data. Both pairs used Covidence software to perform screening and data extraction. We assessed risk of bias using Cochrane's risk of bias tool and assessed heterogeneity using the Chi² test and I² statistic generated within the meta-analyses. We used a fixed-effect model within the meta-analyses unless there was a moderate or high level of heterogeneity, where we employed a random-effects model. We used the GRADE approach to assess the certainty of evidence.</p>

Main results

We included **15 studies involving 1395 participants** in this review (14 RCTs and one quasi-RCT). All included studies raised some concerns regarding risk of bias. Blinding of participants to treatment group was only achieved in 20% of studies, we considered blinding of outcome assessors and allocation concealment to be low risk in only 25% of the studies, and random sequence generation to be either unclear or high risk in more than 50% of the studies.

Acupuncture versus no treatment One study compared acupuncture to no treatment. The evidence is very uncertain regarding the effect of acupuncture compared to no treatment in curing or improving overactive bladder symptoms and on the number of minor adverse events (both very low-certainty evidence). The study report explicitly stated that no major adverse events occurred. The study did not report on the presence or absence of urinary urgency, episodes of urinary incontinence, daytime urinary frequency or episodes of nocturia.

Acupuncture versus sham acupuncture Five studies compared acupuncture with sham acupuncture. The evidence is very uncertain about the effect of acupuncture on curing or improving overactive bladder symptoms compared to sham acupuncture (standardised mean difference (SMD) -0.36, 95% confidence interval (CI) -1.03 to 0.31; 3 studies; 151 participants; $I^2 = 65\%$; very low-certainty evidence). All five studies explicitly stated that there were no major adverse events observed during the study. Moderate-certainty evidence suggests that acupuncture probably makes no difference to the incidence of minor adverse events compared to sham acupuncture (risk ratio (RR) 1.28, 95% CI 0.30 to 5.36; 4 studies; 222 participants; $I^2 = 0\%$). Only one small study reported data for the presence or absence of urgency and for episodes of nocturia. The evidence is of very low certainty for both of these outcomes and in both cases the lower confidence interval is implausible. Moderate-certainty evidence suggests there is probably little or no difference in episodes of urinary incontinence between acupuncture and sham acupuncture (mean difference (MD) 0.55, 95% CI -1.51 to 2.60; 2 studies; 121 participants; $I^2 = 57\%$). Two studies recorded data regarding daytime urinary frequency but we could not combine them in a meta-analysis due to differences in methodologies (very low-certainty evidence).

Acupuncture versus medication Eleven studies compared acupuncture with medication. Low-certainty evidence suggests that acupuncture may slightly increase how many people's overactive bladder symptoms are cured or improved compared to medication (RR 1.25, 95% CI 1.10 to 1.43; 5 studies; 258 participants; $I^2 = 19\%$). Low-certainty evidence suggests that acupuncture may reduce the incidence of minor adverse events when compared to medication (RR 0.34, 95% CI 0.26 to 0.45; 8 studies; 1004 participants; $I^2 = 51\%$). The evidence is uncertain regarding the effect of acupuncture on the presence or absence of urinary urgency (MD -0.40, 95% CI -0.56 to -0.24; 2 studies; 80 participants; $I^2 = 0\%$; very low-certainty evidence) and episodes of urinary incontinence (MD -0.33, 95% CI -2.75 to 2.09; 1 study; 20 participants; very low-certainty evidence) compared to medication. Low-certainty evidence suggests there may be little to no effect of acupuncture compared to medication in terms of daytime urinary frequency (MD 0.73, 95% CI -0.39 to 1.85; 4 studies; 360 participants; $I^2 = 28\%$). Acupuncture may slightly reduce the number of nocturia episodes compared to medication (MD -0.50, 95% CI -0.65 to -0.36; 2 studies; 80 participants; $I^2 = 0\%$, low-certainty evidence). There were no incidences of major adverse events in any of the included studies. However, major adverse events are rare in acupuncture trials and the numbers included in this review may be insufficient to detect these events.

Authors' conclusions	The evidence is very uncertain about the effect acupuncture has on cure or improvement of overactive bladder symptoms compared to no treatment. It is uncertain if there is any difference between acupuncture and sham acupuncture in cure or improvement of overactive bladder symptoms. This review provides low-certainty evidence that acupuncture may result in a slight increase in cure or improvement of overactive bladder symptoms when compared with medication and may reduce the incidence of minor adverse events. These conclusions must remain tentative until the completion of larger, higher-quality studies that use relevant, comparable outcomes. Timing and frequency of treatment, point selection, application and long-term follow-up are other areas relevant for research.
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1.2. Mak 2019

Mak TC, Chen HY, Cho WC. Acupuncture for overactive bladder in adults: a systematic review and meta-analysis. *Acupuncture in Medicine*. 2019;37(6):321-331. [205556]. [DOI](#)

Background	Overactive bladder is prevalent in adults over 40 years of age and its prevalence increases with age. The use of acupuncture in adults with overactive bladder is increasing globally. However, its effectiveness/efficacy and safety have not yet been confirmed.
Objective	To determine the effectiveness/efficacy and safety of acupuncture and to identify the pattern of commonly used traditional acupuncture points in the management of overactive bladder in adults.
Methods	Ten electronic English and Chinese language databases were systematically searched and two English together with four Chinese journals relevant to acupuncture were manually searched in libraries for randomised controlled trials (RCTs) of acupuncture for overactive bladder in adults from their inception to March 2017. The Cochrane risk of bias tool was used to assess the methodological quality of the RCTs. RevMan v.5.3 software was employed for data analysis.
Results	Seven eligible trials involving 695 participants were included. Meta-analysis showed that acupuncture was comparable to drugs (tolterodine tartrate/solifenacin) in the reduction of micturition episodes over 24 hours (pooled standardised mean difference (SMD) 0.36, 95% CI -0.23 to 0.95; I ² =83%), increase in voided volume of each micturition episode (pooled SMD -0.15, 95% CI -0.36 to 0.05; I ² =0%), and reduction of overactive bladder symptom score (pooled SMD -0.23, 95% CI -1.30 to 0.85; I ² =91%). In addition, acupuncture was not significantly different compared with placebo in the reduction of overactive bladder symptom score (pooled SMD -2.36, 95% CI -5.64 to 0.93; I ² =97%). No serious adverse events were reported.
Conclusions	No significant differences in effectiveness or efficacy were found between acupuncture and drug or between verum and sham acupuncture, respectively. Further high-quality studies are required.

1.3. Zhao 2018 ☆

Zhao Y, Zhou J, Mo Q, Wang Y, Yu J, Liu Z. Acupuncture for adults with overactive bladder: A systematic review and meta-analysis of randomized controlled trials. *Medicine (Baltimore)*. 2018;97(8). [100461].

Background	Overactive bladder is stated as the occurrence of urinary urgency which will cause negative impacts and decrease patients' health-related quality of life. The aim of this systematic review is to assess the efficiency and safety of acupuncture for adults with overactive bladder (OAB) comparing with sham-acupuncture, drugs, and acupuncture plus drugs.
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Methods	We independently searched 9 databases from beginning to August 15, 2017. Two writers extracted data at the same time independently. Study outcomes were calculated by standardized mean differences (SMD) with 95% confidence intervals (Cis) and mean difference (MD) with 95% Cis.
Results	Ten randomized controlled trials (RCTs) with 794 patients were included in this systematic review. The combined results showed that electroacupuncture (EA) may be more effective than sham electroacupuncture (sham EA) in improving the 24-hour nocturia episodes and EA may enhance tolterodine for relieving voiding symptoms and enhancing patients' quality of life. However, more trials with high quality and larger sample sizes will be needed in the future to provide sufficient evidence. Only 15 of 794 OAB patients from the included studies reported mild adverse reactions related to EA, therefore, acupuncture is safe for treating OAB.
Conclusion	Acupuncture might have effect in decreasing the number of micturition episodes, incontinence episodes, and nocturia episodes. However, the evidence is insufficient to show the effect using acupuncture alone or the additional effect to drugs in treating OAB.

1.4. Olivera 2016 ☆☆

Olivera CK, Meriwether K, El-Nashar S, Grimes CL, Chen CC, Orejuela F, Antosh D, Gleason J8, Kim-Fine S, Wheeler T, McFadden B, Balk EM, Murphy M. Nonantimuscarinic treatment for overactive bladder: a systematic review. Am J Obstet Gynecol. 2016;215(1):34-57. [194982].

Objectives	The purpose of the study was to determine the efficacy and safety of nonantimuscarinic treatments for overactive bladder.
Methods	Medline, Cochrane, and other databases (inception to April 2, 2014) were used. We included any study design in which there were 2 arms and an n > 100, if at least 1 of the arms was a nonantimuscarinic therapy or any comparative trial, regardless of number, if at least 2 arms were nonantimuscarinic therapies for overactive bladder. Eleven reviewers double-screened citations and extracted eligible studies for study: population, intervention, outcome, effects on outcome categories, and quality.
Results	The body of evidence for categories of interventions were summarized and assessed for strength. Ninety-nine comparative studies met inclusion criteria. Interventions effective to improve subjective overactive bladder symptoms include exercise with heat and steam generating sheets (1 study), diaphragmatic (1 study), deep abdominal (1 study), and pelvic floor muscle training exercises (2 studies). Pelvic floor exercises are more effective in subjective and objective outcomes with biofeedback or verbal feedback. Weight loss with diet and exercise, caffeine reduction, 25-50% reduction in fluid intake, and pelvic floor muscle exercises with verbal instruction and or biofeedback were all efficacious. Botulinum toxin A improves urge incontinence episodes, urgency, frequency, quality of life, nocturia, and urodynamic testing parameters. Acupuncture improves quality of life and urodynamic testing parameters. Extracorporeal magnetic stimulation improves urodynamic parameters. Mirabegron improves daily incontinence episodes, nocturia, number of daily voids, and urine volume per void, whereas solabegron improves daily incontinence episodes. Short-term posterior tibial nerve stimulation is more efficacious than pelvic floor muscle training exercises and behavioral therapy for improving: urgency, urinary incontinence episodes, daily voids, volume per void, and overall quality of life. Sacral neuromodulation is more efficacious than antimuscarinic treatment for subjective improvement of overactive bladder and quality of life. Transvaginal electrical stimulation demonstrates subjective improvement in overactive bladder symptoms and urodynamic parameters.

Conclusions	Multiple therapies, including physical therapy, behavioral therapy, botulinum toxin A, acupuncture , magnetic stimulation, mirabegron, posterior tibial nerve stimulation, sacral neuromodulation, and transvaginal electrical stimulation, are efficacious in the treatment of overactive bladder .
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2. Clinical Practice Guidelines

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

2.1. National Institute for Health and Care Excellence (NICE, UK) 2019 ∅

NICE guideline: Urinary incontinence and pelvic organ prolapse in women: management, National Institute for Health and Care Excellence (NICE). 2019. 74p. [201953]. [URL](#)

1.4.13 Do not offer transcutaneous sacral nerve stimulation (surface electrodes placed above the sacrum, often known as transcutaneous electrical nerve stimulation [TENS]) to treat overactive bladder in women. [2013]
 1.4.14 Do not offer transcutaneous posterior tibial nerve stimulation for overactive bladder. [2013]
 1.4.15 Do not offer percutaneous posterior tibial nerve stimulation (needles inserted close to the posterior tibial nerve) for overactive bladder unless: there has been a local MDT review and non-surgical management including overactive bladder medicine treatment has not worked adequately and the woman does not want botulinum toxin type A[2] or percutaneous sacral nerve stimulation. [2013, amended 2019].

2.2. Agency for Healthcare Research and Quality (AHRQ, USA) 2018 ⊕

Balk E, Adam GP, Kimmel H, Rofeberg V, Saeed I, Jeppson P, Trikalinos T. Nonsurgical Treatments for Urinary Incontinence in Women: A Systematic Review Update, Comparative Effectiveness Review No. 212. Rockville, MD: Agency for Healthcare Research and Quality (AHRQ publication). 2018. 643p. [196362].

Balk E, Adam GP, Kimmel H, Rofeberg V, Saeed I, Jeppson P, Trikalinos T. Pharmacologic and Nonpharmacologic Treatments for Urinary Incontinence in Women: A Systematic Review and Network Meta-analysis of Clinical Outcomes. *Ann Intern Med*. 2019;;170(7):465-479. [201826]. [URL](#)

Neuromodulation: Electroacupuncture, InterStim™, magnetic stimulation, TENS.
Stress UI: Neuromodulation is more effective than no treatment for cure, improvement, and satisfaction (risk of bias: low, Consistency: consistent, Precision: precise, Directness: direct; Overall SoE: High).
Urgency UI: BTX and neuromodulation more effective than no therapy for cure, improvement, and satisfaction (risk of bias: low, Consistency: consistent, Precision: precise, Directness: direct; Overall SoE: High); (moderate or low SoE for improvement or satisfaction due to sparseness, indirectness, and nonsignificance).
Mixed UI: Neuromodulation has sparse evidence of greater UI improvement compared with no treatment. Consistent with overall network meta-analysis (risk of bias: low, Consistency: consistent, Precision: imprecise, Directness: direct; Overall SoE: low),
Quality of life: Neuromodulation better than sham interventions (risk of bias: low, Consistency: consistent, Precision: precise, Directness: direct; Overall SoE: low).

2.3. Japanese Continence Society (JCS, Japan) 2015 ⊕

The Japanese Continence Society. Clinical Guidelines for Overactive Bladder Syndrome . 2nd ed. Tokyo: RichHill Medical Inc; 2015 [in Japanese] . *Cited by* Okawa Y, Yamashita H, Masuyama S, Fukazawa Y, Wakayama I. Quality assessment of Japanese clinical practice guidelines including recommendations for acupuncture. Integr Med Res. 2022 Sep;11(3):100838.
<https://doi.org/10.1016/j.imr.2022.100838>

Overactive Bladder Syndrome. No firm evidence, but recommend. Grade C1 (out of A to D and I).

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