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# Attention-Deficit Hyperactivity Disorder (ADHD)

# Hyperactivité et troubles de l'attention : évaluation de l'acupuncture

# **1. Systematic Reviews and Meta-Analysis**

### 1.1. Ang 2023

Ang L, Kim JT, Kim K, Lee HW, Choi JY, Kim E, Lee MS. Acupuncture for Treating Attention Deficit Hyperactivity Disorder in Children: A Systematic Review and Meta-Analysis. Medicina (Kaunas). 2023 Feb 17;59(2):392. https://doi.org/10.3390/medicina59020392.

| Background<br>and<br>Objectives | Attention-deficit hyperactivity disorder (ADHD) is a common childhood disorder characterized by inattention, hyperactivity, and impulsivity. However, it is uncertain whether the use of acupuncture (AT) in children with ADHD is supported by the current evidence. This review aims to provide updated evidence of the effectiveness of acupuncture in children with ADHD.   |
|---------------------------------|---|
| Methods                         | Nine databases were searched from their inception to 28 July 2022. Two authors independently screened potentially eligible studies. The quality assessment of the selected studies was performed using Version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). The characteristics of the included studies were presented in a tabular form, and a meta-analysis was performed on the treatment effects of AT on ADHD symptoms.  |
| Results                         | <b>Fourteen studies</b> involving <b>1185 patients</b> evaluating the efficacy of AT for ADHD treatment were included in this review. Compared to conventional medicine alone, the meta-analysis indicated that AT as an add-on to conventional medicine has a positive effect on improving conduct problems, learning problems, hyperactivity-impulsivity, and hyperactivity symptoms in ADHD patients. Similarly, AT alone was found to improve learning problems, hyperactivity-impulsivity, and hyperactivity symptoms in ADHD patients and exhibited better total treatment efficacy than conventional medicine alone. No major adverse events were reported. The risk of bias of the included studies was generally concerning. |
| Conclusions                     | Evidence on the effectiveness of AT for ADHD patients is currently too limited to provide recommendations for its usage. More studies with the proper methodology are needed for the validation of AT interventions in treating children with ADHD.   |

#### 1.2. Chen 2021 ☆☆

Chen YC, Wu LK, Lee MS, Kung YL. The Efficacy of Acupuncture Treatment for Attention Deficit Hyperactivity Disorder: A Systematic Review and Meta-Analysis. Complement Med Res. 2021 Jan 28:1-11. doi

| Background               | This study aimed to assess the efficacy of acupuncture for treating attention deficit hyperactivity disorder (ADHD) in children and adolescents.   |
|--------------------------|--|
| Patients and<br>methods: | Systematic review and meta-analysis including randomized controlled trials that<br>compared the effects of acupuncture treatment (AT) with pharmacotherapy<br>(methylphenidate hydrochloride, MPH) among patients with ADHD. A total of 12<br>electronic databases were searched from inception until February 3, 2020. The main<br>outcomes were the effective rate and post-treatment hyperactivity scores. We also<br>assessed the incidence of adverse events and follow-up course.  |
| Results                  | A total of <b>10 studies involving 876 patients were included in this study</b> . The meta-analysis revealed that AT yielded a significantly higher effective rate than MPH (odds ratio 2.239, 95% CI 1.438-3.487, $p < 0.001$ , 8 studies), and that AT can reduce the hyperactivity scores to a lesser degree than MPH (standardized mean difference = -0.882, 95% CI -1.295 to -0.469, $p < 0.001$ , 3 studies). Two studies reported no adverse events in the AT group, while one study suggested that AT can reduce adverse drug reactions. Furthermore, 3 studies concluded that the effects of AT were maintained, even after completion of treatment.  |
| Conclusion               | This study suggests that <b>AT may be more beneficial than MPH therapy for</b><br><b>ADHD patients.</b> However, the evidence may be highly limited, especially<br>considering the outcome of hyperactivity scores with the high risk of bias, very low<br>GRADE, and small number of studies. Thus, further studies of rigorous design and<br>high quality are needed to confirm and strengthen the results, especially in the<br>Western part of the world. Additionally, well-designed randomized controlled trials<br>that evaluate adverse events and include a long-term follow-up should be conducted<br>to determine the efficacy, safety, and side effects of AT for ADHD in children and<br>adolescents. |

#### 1.3. Zhang 2020 ☆☆

Zhang Shanyu. [Acupuncture for Attention Deficit Hyperactivity Disorder: A Systematic Review]. World Chinese Medicine. 2020. [212950].

| Objective  | To systematically evaluate the efficacy of acupuncture for children with attention deficit hyperactivity disorder (ADHD).  |
|------------|--|
| Methods    | Papers with clinical randomized control trials (RCTs)or clinical control trials<br>(CCTs)regarding acupuncture for ADHD were searched in databases such as Chinese<br>National Knowledge Infrastructure (CNKI), VIP, Wangfang, China Biology Medicine (CBM),<br>Embase and PubMed. Meta-analysis was conducted by Rev Man 5. 3 software and stata<br>14 software.  |
| Results    | A total of <b>25 papers</b> were included, involving <b>2166 patients</b> (1165 cases in the experiment group, 1001 cases in the control group). The combined effect size in fixed effects model [RR=1. 16, 95%CI (1. 12, 1. 21), Z=7. 34, P<0. 000 01] indicated that acupuncture alone or combined with conventional pharmacotherapy or behavioral therapy had efficacy superiority for ADHD compared with conventional pharmacotherapy alone or combined with behavioral therapy. |
| Conclusion | Acupuncture alone or combined with conventional pharmacotherapy or behavioral therapy has efficacy superiority for ADHD compared with conventional pharmacotherapy alone or combined with behavioral therapy, and is worthy of promotion.  |

#### 1.4. Evans 2018 Ø

Evans S, Ling M, Hill B, Rinehart N, Austin D, Sciberras E. Systematic review of meditation-based interventions for children with ADHD. Eur Child Adolesc Psychiatry. 2018 Jan;27(1):9-27.

| Objectifs   | Meditation-based interventions such as mindfulness and yoga are commonly practiced<br>in the general community to improve mental and physical health. Parents, teachers<br>and healthcare providers are also increasingly using such interventions with children.<br>This review examines the use of meditation-based interventions in the treatment of<br>children with Attention-Deficit Hyperactivity Disorder (ADHD).  |
|-------------|--|
| Méthodes    | Electronic databases searched included PsycINFO, Medline, CINAHL, and AMED.<br>Inclusion criteria involved children (aged to 18 years) diagnosed with ADHD, delivery of<br>a meditation-based intervention to children and/or parents, and publication in a peer-<br>reviewed journal. Studies were identified and coded using standard criteria, risk of bias<br>was assessed using Risk of Bias in Non-randomised Studies- of interventions (ROBINS-<br>I), and effect sizes were calculated. A total of 16 studies were identified (8 that<br>included children in treatment, and 8 that included combined parent-child treatment). |
| Résultats   | Results indicated that risk of bias was high across studies. At this stage, no definitive conclusions can be offered regarding the utility of meditation-based interventions for children with ADHD and/or their parents, since the methodological quality of the studies reviewed is low.   |
| Conclusions | Future well designed research is needed to establish the efficacy of meditation-based<br>interventions, including commonly used practices such as mindfulness, before<br>recommendations can be made for children with ADHD and their families.  |

#### 1.5. Ni 2015 ☆☆

Ni XQ, Zhang JY, Han XM, Yin DQ. [A Meta-Analysis on Acupuncture Treatment of Attention Deficit/Hyperactivity Disorder]. Acupuncture Research. 2015;40(4):319-25. [184488].

| Objectives | To assess the efficacy and safety of acupuncture in treating attention-<br>deficit/hyperactivity disorder (ADHD) children.   |
|------------|--|
| Methods    | A literature search was conducted to retrieve randomized cotrolled clinical trials of<br>acupuncture in treating ADHD covering the period of the years of establishment of the<br>databases to January 2014 from database of CBM, CNKI, PubMed, Cochrane Library by<br>using key words "attention deficit hyperactivity disorder" "hyperactivity""minimal brain<br>dysfunction" "acupuncture". Two independent researchers extracted data from located<br>articles in a pre-defined structured way, and consulted the third researcher if<br>necessary.  |
| Results    | <b>Thirteen original trials including 1304 cases of children</b> with ADHD were obtained in this study according to our included criteria and excluded criteria. In these trials, acupuncture intervention alone, or acupuncture plus pharmacotherapy (methylphenidate, haloperidol) or acupuncture plus behavioral therapy were compared with simple pharmacotherapy or behavioral therapy alone. Results of Meta-analysis indicated that the total effective rate and Conners' index of hyperactivity (CIH) score-reduction rate in the acupuncture group were significantly superior to those of the other treatment groups [OR = 2.22, 95% CI (1.65, 3.00), <i>Z</i> = 5.22, P < 0.00001] [SMD = -0.94, 95% CI (-1.41, -0.47), <i>Z</i> = 3.89, P < 0.0001]. Acupuncture treatment is more effective than haloperidol in reducing the score of Conners' Rating Scale for ADHD [SMD = -7.28, 95% CI (-8.32, -6.23), <i>Z</i> = 13.62, P < 0.00001]. Acupuncture is similarly effective as Methylphenidate (Ritalin) in improving the Chinese medicine syndrome (liver-kidney yin hypoactivity) of children with ADHD [SMD = -1.14, 95% CI (-2.53, 0.25), <i>Z</i> = 1.60, P = 0.11]. Less severe adverse effects were reported with acupuncture therapy than the pharmacotherapy (poor appetite, dry mouth, nausea and constipation). These effects were not likely due to publication bias (approximately symmetry funnel plot, Egger's test P > 0.1). |

Acupuncture is an effective and safe therapy in treating ADHD, combined administration of acupuncture and pharmacotherapy or behavioral therapy is more effective than the pharmacotherapy or behavioral therapy alone. However, more rigorously designed and high-quality RCTs are needed to confirm the above conclusion.

#### 1.6. Lee 2011 🕸

Lee MS, Choi TY, Kim JI, Kim L, Ernst E. Acupuncture for Treating Attention Deficit Hyperactivity Disorder: A Systematic Review and Meta-Analysis. Chinese Journal of Integrated Medicine. 2011;17(4):257-60. [158608].

| Objectives  | To assess the effectiveness of acupuncture as a treatment option for attention deficit hyperactivity disorder (ADHD).   |
|-------------|---|
| Methods     | The literatures were searched using 15 databases, including MEDLINE, AMED, CINAHL,<br>EMBASE, PsycInfo, the Cochrane Central Register of Controlled Trials, the Cochrane<br>Database of Systematic Reviews, six Korean medical databases and two Chinese<br>databases without language restritions. Prospective controlled clinical studies of any<br>type of acupuncture therapy for ADHD autistic patients were included. Trials in which<br>acupuncture was part of a complex intervention were also included. All articles were<br>read by two independent reviewers, who extracted data from the articles according to<br>predefined criteria. Risk of bias was assessed using the Cochrane risk of bias tool. |
| Results     | Of 114 articles, only <b>three randomized clinical trials (RCTs) met our inclusion</b><br><b>criteria</b> . One RCT found that electroacupuncture (EA) plus behavioural treatment was<br>superior to sham EA plus behavioural treatment. Two RCTs reported a significant<br>benefit of acupuncture or auricular acupuncture over conventional drug therapies.   |
| Conclusions | Limited evidence exists for the effectiveness of acupuncture as a symptomatic treatment of ADHD. Given that the risk of bias of the included studies was high, firm conclusions cannot be drawn.  |

#### 1.7. Li 2011 Ø

Li S, Yu B, Zhou D, He C, Kang L, Wang X, Jiang S, Chen X. Acupuncture for attention deficit hyperactivity disorder (ADHD) in children and adolescents. Cochrane Database Syst Rev. 2011. [156347].

| Background | Attention Deficit Hyperactivity Disorder (ADHD) is a common childhood psychiatric<br>disorder with features of inattention, hyperactivity and impulsivity. There is<br>increasing interest in complementary and alternative therapies such as acupuncture;<br>however, it remains unclear whether the use of acupuncture in children and<br>adolescents with ADHD is supported by the existing evidence. |
|------------|--|
| Objectives | To assess the efficacy and safety of acupuncture as a treatment for ADHD in children and adolescents.  |

| Methods                 | Search strategy: We searched CENTRAL (The Cochrane Library 2010, Issue 2);<br>MEDLINE (21 May 2010); CINAHL (21 May 2010); EMBASE (21 May 2010); ERIC (21<br>May 2010); PsycINFO (21 May 2010), Chinese Biological Medicine Database (10 May<br>2010); Chinese Scientific Periodical Database of VIP INFORMATION (10 May 2010);<br>China Periodical in China National Knowledge Infrastructure (10 May 2010); and<br>Chinese Evidence-Based Medicine Database (10 May 2010). We handsearched<br>Chinese language journals and conference proceedings. Selection criteria:<br>Randomised controlled trials and quasi-randomised controlled trials comparing<br>acupuncture with placebo or sham acupuncture, or conventional treatment.<br>Participants under the age of 18 years with any type of ADHD were included. Papers<br>in any language were included. Data collection and analysis: Two review authors (S<br>Li, B Yu) independently determined the studies to be included in the review based on<br>inclusion and exclusion criteria and extracted the data using pre-developed<br>extraction forms. The risk of bias within the trials was assessed by the same review<br>authors in relation to allocation concealment, blinding and withdrawals. The<br>measures of ADHD outcomes were extracted from core symptoms rating scales and<br>additional secondary outcomes were considered. |
|-------------------------|--|
| Main results            | No studies met the inclusion criteria for this review.   |
| Authors'<br>conclusions | A comprehensive search showed that there is no evidence base of randomised or<br>quasi-randomised controlled trials to support the use of acupuncture as a treatment<br>for ADHD in children and adolescents. Due to the lack of trials, we cannot reach any<br>conclusions about the efficacy and safety of acupuncture for ADHD in children and<br>adolescents. This review highlights the need for further research in this area in the<br>form of high quality, large scale, randomised controlled trials.   |

# 2. Clinical Practice Guidelines

 $\oplus$  positive recommendation (regardless of the level of evidence reported)  $\emptyset$  negative recommendation (or lack of evidence)

#### 2.1. Haute Autorité de Santé (HAS, France) 2024 Ø

Haute Autorité de Santé. Trouble du neurodéveloppement/TDAH : Diagnostic et interventions thérapeutiques auprès des enfants et adolescents. Argumentaire. Saint-Denis La Plaine: HAS; 2024. https://www.has-sante.fr/jcms/p\_3542494/fr/trouble-du-neurodeveloppement/-tdah-diagnostic-et-inter ventions-therapeutiques-aupres-des-enfants-et-adolescents-argumentaire

Acupuncture : Une revue systématique et une méta-analyse de Ang et al. de 2023 (407), incluant 14 études portant sur 1 185 patients, ont évalué l'efficacité de l'acupuncture pour le traitement du TDAH chez l'enfant, seule ou en complément de la médecine conventionnelle. Malgré plusieurs effets sur l'amélioration des symptômes, d'importants biais méthodologiques ont été relevés dans l'ensemble des études incluses. Les données probantes sur l'efficacité de l'acupuncture pour les patients atteints de TDAH sont actuellement trop limitées pour fournir des recommandations sur son utilisation (408).

#### 2.2. Haute Autorité de Santé (HAS, France) 2014 Ø

HAS. Conduite à tenir en médecine de premier recours devant un enfant ou un adolescent susceptible d'avoir un trouble déficit de l'attention avec ou sans hyperactivité Paris: Haute Autorité de Santé (HAS). 2014;:41P. [167921].

Autres interventions non pharmacologiques. En 2011, il n'y avait donc pas de preuve de l'intérêt de l'acupuncture comme traitement du TDAH chez les enfants et adolescents.

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