

# The effects of acupuncture on withdrawal symptoms in recovering substance abusers

## A literature review of randomized controlled trials

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### Abstract

**Background:** According to Stats Canada, 6 million Canadians meet the criteria for a substance use disorder. Withdrawal symptoms include any physical or psychological discomfort experienced upon cessation of substance use, such as hallucinations, seizures, mild headaches, trouble sleeping or increased agitation. There have been various anecdotal and documented benefits of the use of acupuncture to treat withdrawal symptoms, but more research is needed to explore this relationship.

**Objective:** To determine the effects of acupuncture on withdrawal symptoms in recovering substance abusers.

**Methods:** We completed a structured literature review to investigate the effects of acupuncture of withdrawal symptoms.

**Results:** Of all of the studies examined (n=16), seven studies reported that acupuncture significantly improved withdrawal symptoms compared to the control group. Nine studies reported no difference between the treatment and control groups.

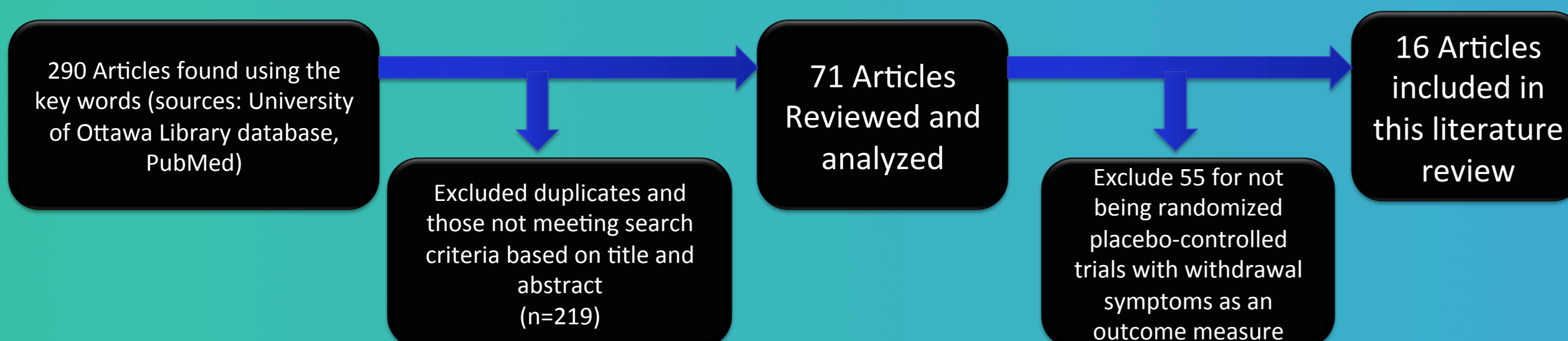
**Discussion:** Results indicate low levels of association between treatment methods and outcome measures. Several biases and confounders were inherent of the treatment methods and study population. Limitations included only searching two databases and potentially too stringent of inclusion criteria. Future studies should explore ways to increase blinding techniques, as well as select specific drugs and withdrawal symptoms to analyze.

**Conclusion:** The majority of studies indicated no difference between the experimental and control groups. The significance of these findings suggest that more research is needed, and until more compelling results emerge, acupuncture may not be considered evidence-based.

### Introduction

- Substance use disorders (SUD) have gained an increase in attention and concern in Western culture in the past few decades.
- The DSM-5 classifies SUD as a mental illness<sup>1</sup>, which have been brought into the spotlight as of late, credited for being the leading cause of disability in Canada<sup>2</sup>.
- According to Stats Canada 6 million Canadians meet the criteria for a SUD<sup>3</sup> and the prevalence of drug use has shown to be increasing in the past few years<sup>4</sup>.
- Withdrawal from such substances include a combination of both psychological and physiological symptoms including: cravings, lack of sleep, poor appetite, to headaches, flu-like symptoms, and even death<sup>5</sup>.
- The National Institute of Drug Abuse reports that the combined direct and indirect economic costs for alcohol, tobacco, and illicit drugs is estimated to exceed 700 billion<sup>6</sup>.
- Acupuncture has been credited for alleviating such symptoms in a variety of SUDs.
- Acupuncture has been a part of Traditional Chinese Medicine for over 2000 years<sup>7</sup>.
- Acupuncture refers to the insertion of needles (or in some cases heat or electricity) at certain points of the body<sup>8</sup>, which is hypothesized to increase the production of endogenous opioid peptides in the brain and balance dopamine levels<sup>9</sup>.
- As with many forms of alternative medicine, acupuncture has commonly been referred to as "pseudo-science" and lacks rigorous scientific evidence to support claims made about its benefits<sup>10</sup>.
- A number of studies have been conducted to explore and describe Acupuncture's use for treating withdrawal in substance use disorders, but more are needed to draw conclusions about its efficacy.

### Methods



We conducted a structured literature review through PubMed and the University of Ottawa Library databases. The key words we used were "acupuncture", "substance abuse". We used the 'peer review' filter on the University database and the 'clinical trial' filter on the PubMed database.

**Inclusion criteria:** clinical trials looking at the effects of acupuncture on substance abuse.

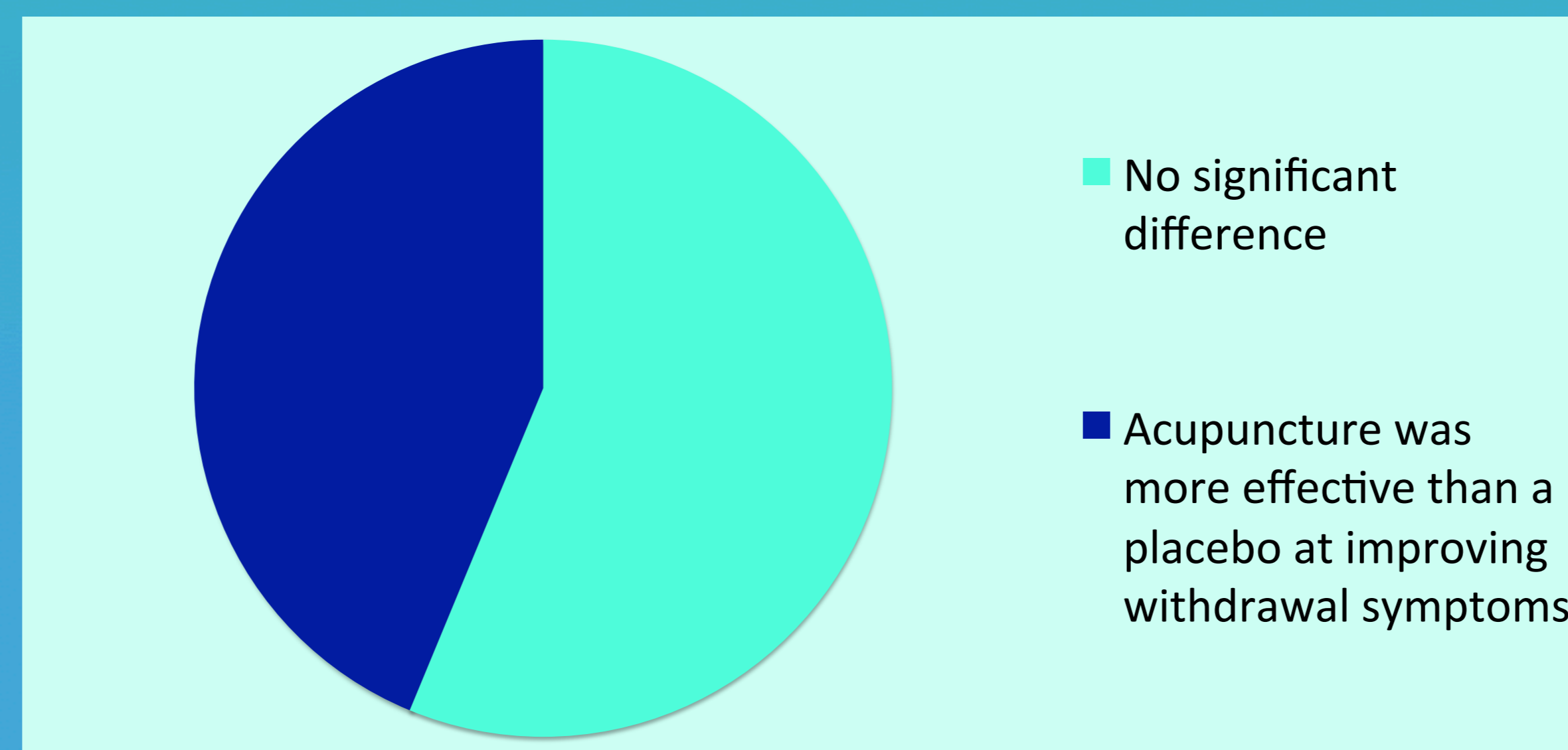
**Exclusion criteria:** trials that lacked randomization or were not placebo-controlled, articles not published in English, studies that did not have withdrawal symptoms as an outcome measure. For the purpose of this study, the term "withdrawal" includes any adverse symptoms caused by cessation of substance use (These include symptoms such as cravings, sleep disturbance, anxiety, pain, depression).

Due to the limited number of studies available, we did not use date published in the inclusion/exclusion criteria. Jadad scores were used to assess the methodological quality of each study.

### Research Question: Is acupuncture more effective than a placebo at reducing withdrawal symptoms experienced by recovering substance abusers?



### Results



**Figure 1. Overall outcomes of the studies (n=16) considered in this literature review.** Nine studies found acupuncture to be no more effective than a placebo. Seven studies found acupuncture significantly improved one or more withdrawal symptoms.

**Table 1. The substance, population, and Jadad score of the 16 studies included in this literature review.** Substances studied include smoking, alcohol, cocaine, opioids, and psychoactive drugs. Populations ranged from 29 to 236 participants. Jadad scores ranged from 1 to 4.

	Karst, et al., (2002).	Kerr, et al., (2008).	Chae, et al., (2011).	White, et al., (1998).	Bullock, et al., (1999).	Sapir-Weise, et al., (1999).	Otto, et al., (1998).	Killeen, et al., (2002).	Trumpler, et al., (2003).	Bearn, et al., (2009).	Lipton, et al., (1994).	Georgiou, et al., (1999).	Avants, et al., (1995).	Meade, et al., (2010).	Black, et al., (2011).	Chan, et al., (2014).
<b>Substance</b>	Alcohol	Smoking	Smoking	Smoking	Cocaine	Alcohol	Cocaine	Cocaine	Alcohol	Opioids	Cocaine	Smoking	Cocaine	Opioids	Psychoactive drugs	Heroin
<b>Population</b>	34	38	29	76	236	72	36	30	48	83	150	216	40	48	101	60
<b>Jahad Score</b>	1	4	2	3	2	3	2	1	3	3	3	3	2	3	3	3

**Table 2. Results of acupuncture on various withdrawal symptoms.** Sixteen studies collectively looked at 10 withdrawal symptoms. Seven studies found acupuncture to significantly improve (SI) at least one of the symptoms that they measured. Nine studies found no significant difference (NS) between the acupuncture group and the control group with respect to withdrawal symptoms.

	Karst, et al., (2002).	Kerr, et al., (2008).	Chae, et al., (2011).	White, et al., (1998).	Bullock, et al., (1999).	Sapir-Weise, et al., (1999).	Otto, et al., (1998).	Killeen, et al., (2002).	Trumpler, et al., (2003).	Bearn, et al., (2009).	Lipton, et al., (1994).	Georgiou, et al., (1999).	Avants, et al., (1995).	Meade, et al., (2010).	Black, et al., (2011).	Chan, et al., (2014).
<b>Cravings</b>		SI	NS	NS	NS	NS	NS	NS		NS	NS	NS	SI	NS		NS
<b>Irritability</b>			SI	NS								NS		NS		
<b>Concentration</b>			SI	NS												
<b>Appetite</b>			NS	NS								NS				
<b>Sleep quality</b>			SI							NS				NS		
<b>Depression</b>	NS		NS	NS	NS		NS						NS			SI
<b>Anxiety</b>	NS			NS	NS	SI (Women)	NS					NS			NS	
<b>Pain</b>														SI		
<b>Physical health</b>														SI		
<b>Unspecified</b>	SI						NS	NS			NS	NS				SI

### Discussion

#### Interpretation of results:

The structured literature review conducted yielded 16 total articles in which an RCT was used to measure an association between SUD withdrawal (such substances included were found to be nicotine [n=5], cocaine [n=6], opiates [n=3], alcohol [n=3], and cannabis [n=1]) and acupuncture therapy. The limited number of RCTs available is representative of the lack of research into acupuncture's potential benefits regarding SUD treatment.

- Agreement among researchers:** The kappa score ( $\kappa$ ) was determined to be 0.96. This indicates a high level of agreement between researchers.
- Of the 16 articles obtained, only 7 (44%) demonstrated statistically significant outcomes in the experimental group. These results suggest that there is no strong association between acupuncture and the alleviation of withdrawal symptoms among the drug-user population. These results are consistent with several systematic reviews that also found no strong evidence for the efficacy of acupuncture to treat substance abuse<sup>12, 13, 14</sup>.

#### Quality of included studies:

Jadad scores were used to assess RCT quality. The Jaded scores ranged from a low of 1 to a high of 4. This suggests that the studies were on average lower quality in regards to what an ideal RCT should score. The most notable reasons for low Jadad scores was due to lack of double-blinding.

#### Bias and Confounders

- An area of bias for this study was due to the high attrition rate<sup>20</sup>; this may be an inherent factor of the population as there is a high likelihood that these individuals are unstable.
  - The bias that is inherent in studies with high attrition rates is due to the expectations of the participants that remain in the study potentially influencing the outcomes
- Presence of confounding variables was reoccurring. Seven of the studies were using concurrent treatments for managing withdrawal symptoms<sup>15, 16, 17, 18, 19, 20, 21</sup>.
- Confounders variables that five of the included studies highlighted is that the sham acupuncture control techniques may actually provide some sort of active effect<sup>19, 24, 25, 27, 30</sup>. It is speculated that this is because sham acupuncture points may also induce the release of endogenous opioid peptides, at similar levels of real acupuncture<sup>9</sup>.
- One study mitigated the possibility of this by using real acupuncture points with a sham needle (instead of sham acupuncture points with a real needle)<sup>21</sup>.

#### Strengths:

- The inclusion criteria being that of only RCTs presents a strength of the conducted literature review. RCTs (besides a multicenter studies and systematic reviews) provide the highest form of evidence of all study designs<sup>22</sup>.
- The search conducted was rigorous and systematic through use of consistent search terms to identify included studies. Furthermore, the search was conducted three times to ensure minimal human error in data collection.

#### Limitations:

- Only two databases were searched (Pubmed, University of Ottawa Library). There are likely quality studies that were not identified within other databases or in grey literature.
- Inclusion criteria may have been too stringent regarding the inclusion of only RCT trails; there is likely quality information to be gained from both cohort and case-control studies
- Inclusion of only English studies is a major area of weakness since acupuncture is a Chinese medicine; therefore, there is likely a plethora of valuable research in other languages (in particular, Chinese) that were not accessed.
- The differing nature of included substances and their associated mechanisms and withdrawal symptoms makes comparability of studies difficult.
- The nature of acupuncture as a Chinese medicine may prove to be inherently difficult to analyze through the framework of an RCT; This was evident through the lack of ability to blind the acupuncturists and the challenges of finding an appropriate placebo control.

#### Recommendations:

- Future studies should explore ways to address the intrinsic difficulty in control methods and blinding that are characteristic of acupuncture treatments. Accuracy of results may be increased as potential identified biases may then be accounted for.
- An increase the sample sizes of the population to increase statistical accuracy, and potentially address the concern of the high attrition rates.
- Standardized methods of measurements should be included to avoid ambiguity and improve the ability to compare to results with that of other studies
- Future literature reviews should consider narrowing the definition of withdrawal symptoms in order to increase comparability of results amongst the studies. Acupuncture may show more promising results amongst particular substances or withdrawal symptoms.

### Conclusion

**Conclusion:** Due to the low number of studies presenting statistically significant relationships between treatment exposure and outcome variables, combined with the inherent biases of the studies, our results from this literature review would suggest that it is doubtful that acupuncture could be effectively utilized in the treatment and management of withdrawal symptoms in the SUD population. However, as the results were not overwhelmingly toward the null hypothesis, this would indicate that acupuncture may prove beneficial as adjunctive to current forms of withdrawal therapy. Further research is required to reach conclusiveness about acupunctures potential benefits in this regard.