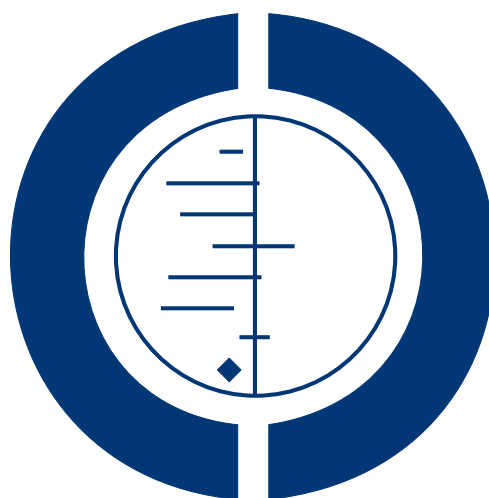


# Auricular acupuncture for cocaine dependence (Review)

Gates S, Smith LA, Foxcroft D



**THE COCHRANE  
COLLABORATION®**

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2008, Issue 3

<http://www.thecochranelibrary.com>



## TABLE OF CONTENTS

HEADER . . . . .	1
ABSTRACT . . . . .	1
PLAIN LANGUAGE SUMMARY . . . . .	2
BACKGROUND . . . . .	2
OBJECTIVES . . . . .	2
METHODS . . . . .	3
RESULTS . . . . .	4
DISCUSSION . . . . .	7
AUTHORS' CONCLUSIONS . . . . .	8
ACKNOWLEDGEMENTS . . . . .	8
REFERENCES . . . . .	8
CHARACTERISTICS OF STUDIES . . . . .	10
DATA AND ANALYSES . . . . .	16
Analysis 1.1. Comparison 1 Acupuncture versus sham acupuncture, Outcome 1 Urine positive for cocaine metabolites.	17
Analysis 1.2. Comparison 1 Acupuncture versus sham acupuncture, Outcome 2 Self-reported drug use (grammes cocaine at 6 weeks).	17
Analysis 1.3. Comparison 1 Acupuncture versus sham acupuncture, Outcome 3 Attrition.	18
Analysis 1.4. Comparison 1 Acupuncture versus sham acupuncture, Outcome 4 Cocaine craving.	18
Analysis 2.1. Comparison 2 Acupuncture versus no acupuncture, Outcome 1 Urine positive for cocaine metabolites.	19
Analysis 2.2. Comparison 2 Acupuncture versus no acupuncture, Outcome 2 Self-reported drug use.	20
Analysis 2.3. Comparison 2 Acupuncture versus no acupuncture, Outcome 3 Attrition.	20
APPENDICES . . . . .	20
WHAT'S NEW . . . . .	23
HISTORY . . . . .	23
CONTRIBUTIONS OF AUTHORS . . . . .	23
DECLARATIONS OF INTEREST . . . . .	23
SOURCES OF SUPPORT . . . . .	24
INDEX TERMS . . . . .	24

[Intervention Review]

# Auricular acupuncture for cocaine dependence

Simon Gates<sup>1</sup>, Lesley A Smith<sup>2</sup>, David Foxcroft<sup>2</sup>

<sup>1</sup>Warwick Clinical Trials Unit, University of Warwick, Coventry, UK. <sup>2</sup>School of Health and Social Care, Oxford Brookes University, Oxford, UK

Contact address: Simon Gates, Warwick Clinical Trials Unit, University of Warwick, Warwick Medical School, Coventry, CV4 7AL, UK. [s.gates@warwick.ac.uk](mailto:s.gates@warwick.ac.uk).

**Editorial group:** Cochrane Drugs and Alcohol Group.

**Publication status and date:** Edited (no change to conclusions), published in Issue 3, 2008.

**Review content assessed as up-to-date:** 27 October 2005.

**Citation:** Gates S, Smith LA, Foxcroft D. Auricular acupuncture for cocaine dependence. *Cochrane Database of Systematic Reviews* 2006, Issue 1. Art. No.: CD005192. DOI: 10.1002/14651858.CD005192.pub2.

Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## ABSTRACT

### Background

Auricular acupuncture (insertion of acupuncture into a number, usually five, of specific points in the ear) is a widely-used treatment for cocaine dependence.

### Objectives

To determine whether auricular acupuncture is an effective treatment for cocaine dependence, and to investigate whether its effectiveness is influenced by the treatment regimen.

### Search strategy

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library* Issue 3, 2004); MEDLINE (January 1966 to October 2004), EMBASE (January 1988 to October 2004); PsycInfo (1985 to October 2004); CINAHL (1982 to October 2004); SIGLE (1980 to October 2004) and reference lists of articles.

### Selection criteria

Randomised controlled trials comparing a therapeutic regimen of auricular acupuncture with sham acupuncture or no treatment for reduction of cocaine use in cocaine dependents.

### Data collection and analysis

Two authors independently extracted data from published reports and assessed study quality using the Drug and Alcohol CRG checklist. All authors were contacted for additional information; two provided data. Separate meta-analyses were conducted for studies comparing auricular acupuncture with sham acupuncture, and with no treatment. For the main cocaine use outcomes, analyses were conducted by intention to treat, assuming that missing data were treatment failures. Available case analyses, using only individuals who provided data, were also conducted.

### Main results

Seven studies with a total of 1,433 participants were included. All were of generally low methodological quality. No differences between acupuncture and sham acupuncture were found for attrition RR 1.05 (95% CI 0.89 to 1.23) or acupuncture and no acupuncture: RR 1.06 (95% CI 0.90 to 1.26) neither for any measure of cocaine or other drug use. However, the number of participants included in meta-analyses was low, and power was limited. Moderate benefit or harm is not ruled out by these results. Methodological limitations of the included studies may have also made the results open to bias.

---

**Auricular acupuncture for cocaine dependence (Review)**

Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

1

## Authors' conclusions

There is currently no evidence that auricular acupuncture is effective for the treatment of cocaine dependence. The evidence is not of high quality and is inconclusive. Further randomised trials of auricular acupuncture may be justified.

## PLAIN LANGUAGE SUMMARY

### Auricular acupuncture for cocaine dependence

There are no effective drugs for the treatment of cocaine dependence, and doctors do not agree on a best method of treatment. More than 400 substance abuse clinics in the USA and Europe offer a treatment for cocaine dependence called auricular acupuncture. In this treatment, needles are usually inserted into five specific points in the ear, but some clinics use only four or three of the points. In this Cochrane review the authors set out to discover whether auricular acupuncture is effective in treating cocaine dependence and whether the number of points used makes a difference. The authors searched the medical literature for studies called randomized controlled trials, in which one group of patients receives a treatment (such as acupuncture) and is compared with a similar group who receives a different treatment or no treatment (the control group). The authors found seven studies with a total of 1433 people. Most of the studies compared acupuncture with 'sham' acupuncture in which needles were inserted into random places in the ear but not into the specific points required for treatment. The studies used a variety of acupuncture techniques, using three, four, or five of the treatment points. The studies had a number of problems with the way their results were reported. The authors conclude that there is no evidence that any form of auricular acupuncture is effective for treating cocaine dependence. They recommend that better research be done, since it was difficult for them to draw conclusions from the few available studies.

## BACKGROUND

Cocaine use is common in North America, Europe and some other parts of the world, and cocaine dependence has become a serious public health problem, causing medical, psychological and social problems, crime, violence and spread of infectious diseases including AIDS, hepatitis and tuberculosis. There is no consensus on the best method of treatment (Carroll 1994): no effective pharmacological agent has yet been identified (Lima 2004a; Lima 2004b; Soares 2004a), but some psychological and behavioural treatments have shown promise (Soares 2004b).

Auricular (ear) acupuncture is a widely used treatment for cocaine dependence, being available in more than 400 substance abuse clinics in the USA and Europe (SAMHSA 2000). Its use was developed at the Lincoln Hospital in New York in the 1970s. The procedure developed there involves insertion of needles into five points in the ear: the "lung", "liver", "kidney", "sympathetic" and "shen men" points. The process has been codified by the (American) National Acupuncture Detoxification Association (NADA) and this treatment is often referred to as the "NADA protocol" or "five point protocol". The method is intended as a general treatment for addiction, and is not specific to cocaine.

Several variations of the standard NADA protocol have been used: for example, Margolin 2002 used a four point acupuncture protocol, while Bullock 1999 used a three point method. In addition, there are many possible variations in the way treatment is delivered: group or individual therapy, variable frequency and duration of treatment, and a variety of other interventions may be used along with acupuncture.

Methods of acupuncture other than auricular acupuncture using the NADA five point protocol or variants of it have been used for treating addiction (for example, whole body acupuncture), but studies using these methods will not be considered in this review.

## OBJECTIVES

- (1) To determine whether auricular acupuncture is effective compared with sham or no treatment for reduction of cocaine use in cocaine dependent individuals.
- (2) To determine whether variations in treatment such as modification of the NADA protocol, or additional treatments used along with acupuncture, influence its effectiveness.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Randomised controlled trials comparing auricular acupuncture with sham acupuncture or no acupuncture.

#### Types of participants

People with cocaine or crack cocaine dependence. Trials including patients with additional diagnoses such as opiate dependence are eligible.

#### Types of interventions

##### Experimental Interventions

Auricular acupuncture using any method

##### Control Interventions

Sham acupuncture or no acupuncture

#### Types of outcome measures

- (1) Cocaine use (biochemically validated)
- (2) Cocaine use (self-report)
- (3) Severity of dependence (measured by Addiction Severity Index or similar scale)
- (4) Side effects of treatment (pain, nausea)
- (5) Attrition from treatment programs
- (6) Cocaine craving

If studies reported outcomes over different time periods, we grouped them into short term (up to eight weeks), and long-term (more than eight weeks) and analysed these time periods separately.

#### Search methods for identification of studies

We searched Cochrane Central Register of Controlled Trials (which includes the Cochrane Drugs and Alcohol Group Register of Trials) (CENTRAL - *The Cochrane Library* Issue 1, 2005), MEDLINE (OVID January 1966 to October 2004), EMBASE (OVID- January 1988 to October 2004), CINAHL (1982 to July 2004), PsycInfo (1985 to October 2004), SIGLE (1980-October 2004). Search strategies were developed for each database, based on the search strategy developed for MEDLINE, but revised appropriately to take account of differences in controlled vocabulary and syntax rules. All searches included any language. [See Appendix 1](#); [Appendix 2](#); [Appendix 3](#); [Appendix 4](#); [Appendix 5](#); [Appendix 6](#)

#### MANUAL SEARCHES

In addition, we scanned the reference lists of retrieved studies and reviews for relevant studies. We contacted authors of included studies and experts in the field to try and locate additional published or unpublished controlled trials assessing the effectiveness of acupuncture for cocaine dependence. No language restrictions were applied.

#### Data collection and analysis

##### Study selection

One author (LS) screened the titles and abstracts of all papers identified by the electronic searches to reject studies that clearly did not meet the review's inclusion criteria. We obtained full reports of all studies identified as potentially eligible. Two authors (SG and LS) then independently evaluated whether studies should be included or excluded. In the event of any disagreement, a third author was to be consulted, but this was not necessary.

Two authors independently extracted data from eligible studies (SG and LS). These included information on the study design and quality, participant characteristics and results. Disagreements were resolved by discussion.

##### Assessment of the methodological quality

Included studies were assessed and graded for methodological quality and bias (SG and LS). Quality assessment of randomised trials included:

##### Allocation concealment

(A) Adequate allocation concealment: central randomizations (e.g. allocation by a central office unaware of subject characteristics), opaque sealed envelopes, on-site computer system combined with allocations kept in a locked unreadable computer file that can be accessed only after the characteristics of an enrolled participant have been entered or another description that guaranteed concealment.

(B) Unclear allocation concealment: when the authors either did not report an allocation concealment approach or reported an approach that did not fall in the category A or C.

(C) Inadequate allocation concealment: alternation or reference to case numbers, dates of birth, day of the week. Any procedure that is entirely transparent before allocation, such as an open list of random numbers or other description that contained elements not guaranteeing concealment.

##### Blinding of participants

- (A) yes
- (B) no
- (C) unclear

##### Blinding of outcome assessment

- A) yes
- (B) no
- (C) unclear

##### Blinding of the acupuncturist was not possible

### Attrition Bias

- (A) Loss to follow up completely recorded
- (B) Loss to follow up incompletely recorded
- (C) Unclear or not done

### Completeness of follow-up was evaluated by recording the following aspects:

- (i) Method of analysis - Intention to treat or per-protocol
- (ii) Method of imputation used for missing data
- (iii) Proportion of participants completing the full follow-up period

If participants had not all been analysed in their randomised groups, they were restored to the correct group for the review if there was sufficient information in the report to allow this.

Many published studies were analysed using techniques such as analysis of variance or analysis of covariance and were presented as statistics and p-values. Numbers of individuals with outcomes or mean values of continuous outcomes were only rarely reported. All authors of included studies were therefore contacted to request further information about study methodology and outcomes in a format suitable for inclusion in meta-analyses.

We decided whether or not to perform meta-analyses based on the similarity of the included studies. Meta analyses used a fixed effect model if the studies were considered sufficiently similar that this is reasonable (for example, evaluations of the same acupuncture method in similar populations), or a random effects model otherwise. Analyses of dichotomous outcome variables used relative risks, and continuous outcome variables used either the weighted mean difference, or standardised mean difference, if different trials measured the same outcome in different ways (for example, severity of addiction measured by different scales). We planned to perform sensitivity analysis excluding quasi-randomised trials and any other studies thought to be at high risk of bias (for example, an RCT with high loss to follow up, unevenly distributed between the groups), but there were insufficient data to allow this.

To assess heterogeneity in meta-analyses we used the  $I^2$  statistic for quantifying the inconsistency (Higgins 2002; Higgins 2003). This describes the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance). Low values (<30%) are indicative of homogeneity; greater than 30% indicates a moderate amount of heterogeneity, and greater than 50% suggests substantial heterogeneity that needs to be taken into account in the analysis. If heterogeneity was found and there were sufficient similar studies for pooling, a random effects analysis would be conducted and pre-specified subgroup analyses were performed. If the subgroup analyses did not explain the heterogeneity, random effects analysis were used if an overall summary was desired, although it may be considered inappropriate to present an overall summary if the results of individual trials were heterogeneous (Higgins 2005).

The following subgroup analyses were pre-specified:

- (1) Trial quality: low quality (quasi randomised or insecure allo-

cation concealment versus higher quality);

- (2) Trials in which all participants received additional therapy (e.g. behavioural or psychological interventions) versus those not including additional treatments;

- (3) Type of acupuncture used: e.g. NADA 5 point protocol versus 4 point versus 3 point. The exact comparison to be made will depend on the interventions used by the included trials. The interventions will be classified at the time of data extraction.

## RESULTS

### Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

See [Characteristics of included studies](#) and [Characteristics of excluded studies](#)

Eleven potentially eligible RCTs were identified.

### Excluded studies

Four were excluded: the majority of the participants were addicted to opiates in one (Wells 1994), were healthy volunteers in one (Margolin 1993), one evaluated a single acupuncture dose for treatment acceptability not addiction (Margolin 1995) and one did not evaluate drug related outcomes (Killeen 2002). Seven trials were therefore included. One report (Bullock 1997) included two randomised trials; only Trial 1 was included in the review, trial 2 was excluded as it investigated different doses of acupuncture treatment and did not have a non-acupuncture or sham acupuncture group.

### Included studies

Six studies included comparisons of a therapeutic regimen of auricular acupuncture with sham acupuncture (Avants 2000; Avants 1995; Bullock 1997; Lipton 1994; Margolin 2002; Otto 1998). Three of these had an additional treatment arm comparing acupuncture with no acupuncture (Avants 2000; Bullock 1997; Margolin 2002). In Bullock 1997, participants in both needle insertion groups also received psychosocial treatment. The remaining study (Richard 1995) was a four-arm trial, two of which were included in the review (acupuncture plus neuro behavioural treatment versus neuro behavioural treatment alone). This study did not have any needle insertion in the control group.

Four studies required participants to satisfy DSM III or IV criteria for cocaine dependence (Avants 1995; Avants 2000; Margolin 2002; Otto 1998). The other studies had less stringent entry criteria: crack cocaine addiction but no diagnostic criteria were given (Richard 1995), or self-reported cocaine use (Bullock 1997; Lipton 1994). One study excluded patients if they were addicted to other substances (Otto 1998) or were dependent on substances other

than cocaine, opiates or nicotine (Avants 2000; Margolin 2002). The remaining studies may have included participants with other substance use disorders.

The type of “active” auricular acupuncture varied between trials. All studies used acupuncture as the active treatment in some or all of the five sites specified by NADA; sympathetic, shen men, lung, liver and kidney, but they varied in the number used. All five points were used by Richard 1995 and Otto 1998. Three studies (Avants 2000; Lipton 1994; Margolin 2002) used four points, one (Bullock 1997) used three ear points, and one (Avants 1995) used three ear points and one in the hand. Three of the trial reports contained diagrams of the locations of the active points (Bullock 1997; Lipton 1994; Otto 1998), but these were not consistent; the lung, liver and kidney points were not in the same place in all three diagrams. Two studies did not specify whether acupuncture was applied to one or both ears (Bullock 1997; Richard 1995); the other studies used both ears.

The size of groups in which treatments were given varied. In Avants 1995 the treatments were given individually or in groups of two. Three studies gave treatments in groups of up to six (Lipton 1994, Avants 2000, Margolin 2002), one stated that they were given in groups but did not specify the size (Otto 1998), and one (Bullock 1997) used groups of up to 15.

The studies that used sham acupuncture varied in the type of needle insertion used for the control group. Three different types of control were used: 1. insertion of needles into non specific points a few millimetres from the addiction-specific points used (Avants 1995; Bullock 1997); 2. insertion of needles into specific points not relevant to addiction (points relevant to back pain were used in both studies) (Lipton 1994; Otto 1998); 3. insertion of needles into zones or regions in the helix of the ear (Avants 2000; Margolin 2002).

The duration and intensity of treatment specified in the study protocol varied between studies. The duration of treatment varied from 1 month (Lipton 1994; Richard 1995) to 8 weeks (Avants 2000; Bullock 1997; Margolin 2002), and the number of sessions specified in the study protocol varied from 22 (Otto 1998) to 40 (Avants 2000; Margolin 2002).

Most studies did not perform any long-term follow-up of participants to evaluate the long-term effects of auricular acupuncture on cocaine dependence. The longest follow-up periods were those of Richard 1995 (9 months) and Margolin 2002 (6 months).

No studies published in languages other than English were identified.

## Risk of bias in included studies

### • Randomisation and allocation concealment

Three studies gave no information on the methods of randomisation and allocation concealment used (Avants 1995; Bullock 1997; Otto 1998). The authors were contacted but no information was

provided. Three studies used a computer program to allocate participants to randomised groups, and ensured that allocations were concealed (Avants 2000; Margolin 2002; Richard 1995). For the study by Lipton and colleagues (Lipton 1994), there was a discrepancy between the information in the published paper and that provided by the author, and were, therefore, rated as unclear. The report suggested that allocations were determined by social security numbers, but the author informed the authors that randomisation was performed by a central office using a random number table.

### • Blinding

Due to the nature of the interventions, it was not possible to blind the acupuncturists who delivered the intervention. Studies that compared acupuncture with sham acupuncture were able to ensure blinding of participants, and this was reported in three studies (Avants 1995; Lipton 1994; Otto 1998). In two studies (Avants 2000; Margolin 2002) blinding of participants was unclear; both reports stated that participants were informed of their allocation, but later stated that patients in the two needle insertion groups were not aware of whether or not they received real or sham acupuncture. Bullock 1997, although it was described as “single blind”, apparently did not have blinding of the participants. In Richard 1995, where there was no sham acupuncture control, blinding of participants was not mentioned, but was presumably not possible.

Five of the seven included studies stated that outcome assessment was blinded to allocation (Avants 2000; Bullock 1997; Lipton 1994; Margolin 2002; Otto 1998). The remaining two studies did not mention blinding of outcome assessment (Avants 1995; Richard 1995).

### • Post-randomisation exclusions and Intention To Treat (ITT) analysis

Five studies appeared to have no post-randomisation exclusions and adequately accounted for all randomised participants (Avants 1995; Avants 2000; Margolin 2002; Otto 1998; Richard 1995). Lipton 1994 stated that 192 patients were randomised, but 42 were subsequently excluded from the analysis for a variety of reasons. No data were presented for these 42 participants. In Bullock 1997, 236 patients were randomised, but the number in each group was not given.

Most studies presented results with participants in their randomised groups. However, much reporting of analyses used statistics and p-values rather than reporting numbers with each outcome. This was especially true where repeated measurements were taken, for example of urine samples that were screened for cocaine metabolites. This limited the data that could be included in meta-analyses.

## Effects of interventions

Although most of the studies measured one or more outcomes relevant to the review, in most cases they were not reported in a format suitable for meta-analysis. In many cases, data were analysed using methods such as analysis of variance or analysis of covariance, and results were presented as summary statistics only, rather than the numbers of participants with outcomes. All authors were therefore contacted for further information on the review's outcome measures. Only one author did not respond, even after a reminder (Bullock 1997). For four studies (Avants 1995; Avants 2000; Margolin 2002; Otto 1998) the authors responded, but did not provide any additional data. One author was unable to provide additional data because the data set had been destroyed in the terrorist attack on the World Trade Center in 2001, but was able to clarify the study's methodology (Lipton 1994). One study provided additional data that were included in the review (Richard 1995).

All studies reported high levels of missing data for self-reported and biochemically validated drug use outcomes, due to participants dropping out from the trial or being lost to follow-up. In the analyses we have assumed that missing data are treatment failures, that is, missing participants have been counted as positive for cocaine use. This means that the denominators are the number of participants randomised rather than the number with available data (ITT analysis). As the level of missing data was high, and hence assumptions had to be made about a large proportion of the participants, we also performed analyses including only participants with data (available case analysis), which are reported in the text only.

Most studies collected cocaine use outcome data. Typically, participants were asked for urine samples several times a week during the treatment period, and at specified follow-up points. This means that the outcome 'percentages of urine screens that were positive' contained non-independent data, as each participant contributed a number of screens to the analysis. The studies often analysed these data using analysis of variance or analysis of covariance, and it was unclear in some cases whether appropriate adjustments for the inclusion of non-independent data had been made. Some studies reported the results only as summary statistics, and did not include any data on the number of participants with the relevant outcomes.

We did not perform any of the pre-planned sub-group or sensitivity analyses as most analyses had too few studies. For most analyses heterogeneity was not detected; where it was detected it was noted in the text.

### (1) Cocaine use (bio chemically validated)

All included studies reported bio chemically validated cocaine use, but only four provided data in a format suitable for meta-analysis. Combining these studies showed no difference between auricular acupuncture and sham acupuncture in ITT analysis, either in the short term (three studies: Avants 2000; Avants 1995; Margolin 2002) RR 1.01 (95% CI 0.94 to 1.08) or long term (one study:

Margolin 2002) RR 0.98 (95% CI 0.89 to 1.09). When auricular acupuncture was compared with no acupuncture, no difference was found in the short term (two studies: Avants 2000; Margolin 2002) RR 0.99 (95% CI 0.92 to 1.05); heterogeneity  $I^2 = 67.9\%$ . We decided the fixed effects estimate was more appropriate as the two trials had very similar protocols. The long-term outcomes, recorded at six and nine months in the two studies with data, did not show any difference, but the upper 95% confidence limit only just exceeded one (two studies: Margolin 2002; Richard 1995) RR 0.92 (95% CI 0.84 to 1.01). Results were similar for available case analysis; no differences were found in short term or long term outcomes for acupuncture versus sham acupuncture (short term, three studies: Avants 1995; Avants 2000; Margolin 2002) RR 1.00 (95% CI 0.85 to 1.18); (long term, one study: Margolin 2002) RR 1.06 (95% CI 0.83 to 1.35) or acupuncture versus no acupuncture (short term, two studies: Avants 2000; Margolin 2002) RR 0.96 (95% CI 0.80 to 1.15); (long term, two studies: Margolin 2002; Richard 1995), RR 0.90 (95% CI 0.74 to 1.10).

Of the other three studies, Otto 1998 published no data but stated that there was no significant difference between the acupuncture and sham acupuncture groups. Bullock 1997 and Lipton 1994 gave the results as the percentages of urine screens that were positive rather than the number of participants with positive screens, and it was unclear whether these had been analysed correctly, with adjustment for inclusion of non-independent data. Three of the four studies that were included in the meta-analyses presented repeated measures analyses of variance including all urine screens collected. Margolin 2002 showed no difference between auricular acupuncture and either of the comparison groups (statistics not given); Avants 1995 found no difference between acupuncture and sham acupuncture (statistics not given); Avants 2000 found that the auricular acupuncture group were less likely to give cocaine positive urine samples than either the sham acupuncture group or the no acupuncture group, and reported odds ratios (OR), OR 2.40 (95% CI 1.00 to 5.75) and 3.41 (95% CI 1.33 to 8.72), respectively. Richard 1995 reported no significant difference between acupuncture and no acupuncture for cocaine use ( $p=0.46$ ).

### (2) Cocaine use (self report)

Data on self-reported cocaine use were available from two studies. Richard 1995 reported the number of participants using cocaine at 30 days and six months. No difference between the acupuncture and no acupuncture groups was seen in the ITT analysis (short term) RR 1.09 (95% CI 0.71 to 1.69); (long-term) RR 1.04 (95% CI 0.76 to 1.43) or available case analysis (short term) RR 1.17 (95% CI 0.67 to 2.04); (long term) RR 1.07 (95% CI 0.73 to 1.58). Avants 1995 reported the amount of cocaine used at six weeks (grams). There was no difference between the auricular acupuncture and sham acupuncture groups (mean difference 0.00, 95% CI -0.29 to +0.29).

Margolin 2002 recorded self-reported cocaine use, and stated that there was no difference between the groups (no data presented).

### (3) Severity of dependence

The Addiction Severity Index was used by five studies (Avants 1995; Avants 2000; Bullock 1997; Lipton 1994; Margolin 2002). All reported no significant difference between the acupuncture and control groups but did not present any data.

### (4) Side effects

Side effects of treatment were not reported by any study.

### (5) Attrition

Four studies (Avants 1995; Avants 2000; Margolin 2002; Otto 1998) reported the number of participants not completing their allocated treatment. Combining data from all studies showed no difference in attrition rates between acupuncture and sham acupuncture RR 1.05 (95% CI 0.89 to 1.23), and between acupuncture and no acupuncture RR 1.06 (95% CI 0.90 to 1.26);  $I^2 = 83.2\%$ , again we decided the fixed effects estimate was more appropriate as the two trials had very similar protocols.

### (6) Cocaine craving

Only one study comparing acupuncture and sham acupuncture reported data for cocaine craving, measured on a 0-10 scale (Avants 1995). The mean difference was -2.30 (-3.78, -0.82) which suggested a reduction in craving in the acupuncture group, although there was evidence of skewness in the data and the standard deviations differed between the groups. Craving was measured by four other studies. Margolin 2002 stated that there was no significant difference between the three treatment groups (data not given); Bullock 1997 did not specify what measure was used, but there was no significant difference between the groups; Otto 1998 used the Halikas cocaine craving scale, but presented no results; Lipton 1994 used a 5 point craving scale and stated that there was no significant difference between the groups.

## DISCUSSION

The results of this review do not support the hypothesis that auricular acupuncture is effective for treating cocaine dependence, either when compared with sham acupuncture or with no acupuncture. Two other recently published reviews have reached similar conclusions (D'Albarto 2004; Mills 2005). However, the conclusions that can be drawn from the existing evidence are limited, for several reasons.

First, the reporting of the included studies was poor and did not meet the standards recommended in the CONSORT statement (CONSORT 2001). Most studies did not include important details of the methodology, including aspects such as allocation concealment, making it difficult to assess their risk of bias. We cannot be sure that many of the studies were not seriously biased. Reporting of outcomes in many cases relied only on statistics from analyses of variance or covariance rather than stating the numbers of participants who had an outcome. This limited the number of studies that provided data for meta-analysis.

All of the studies reported a high level of withdrawal, which introduces difficulties into the analysis. Either assumptions must be made about the outcomes of those who withdrew, or the sample size is reduced and there is a risk of bias from differential withdrawals between trial arms. The sample sizes of the included trials were in any case fairly small, and not sufficient to detect small treatment effects. Based on the number of trial participants, clear conclusions about the effectiveness of auricular acupuncture cannot be made.

Only a few studies performed long-term follow-up, and this was often compromised by high levels of attrition. Long-term cocaine use is probably the most important outcome, as a treatment would not be very useful if it reduced patients' cocaine use only during active treatment. A follow-up period of at least several months is therefore crucial to the assessment of the effectiveness of auricular acupuncture.

All the included studies used biochemical validation of cocaine use status, all through the use of urine tests. Similar methods were used by the studies and the same threshold for considering a urine sample to be positive was used (benzoylecgonine 300ng/ml). Biochemical validation gives the most reliable indication of cocaine use, but raises logistical problems and may contribute to reduced follow-up rates.

All included studies used as their control intervention either sham acupuncture or no acupuncture. In this review we have performed separate comparisons of "active" acupuncture with the two control groups. This is because we believe that it is reasonable to suppose that sham acupuncture might have different effects from no acupuncture. Insertion of needles into the ear into sites that are not thought to affect addiction could have physiological effects, if any exist, that are similar to those of insertion of needles into the addiction acupuncture points used in "true" acupuncture. In addition, the individual attention given by the acupuncture therapist in delivering both sham and true acupuncture might have beneficial effects that would be common to these two interventions, but not shared by the "no acupuncture" arm. Thus, it is possible that sham acupuncture may have effects that are different from no acupuncture. If any benefits of acupuncture are derived from the individual attention given to patients rather than to the specific sites into which needles are inserted, sham acupuncture could have effects that are indistinguishable from true acupuncture.

Studies that used sham acupuncture used a variety of sites for insertion of needles in the control group. Some used sites supposed to be specific for other problems such as back pain, whereas others used supposedly inactive sites. Whether there is any difference in the effects of insertion of needles into these different sites on cocaine dependence is unknown.

Supporters of acupuncture have criticised the existing trials for using an acupuncture intervention that is different from the way it is used in clinical practice (Hammerschlag 1998). However, if inser-

tion of needles into specific ear points were an effective intervention against cocaine dependence, benefit should be seen whether trials mimic clinical practice or not. The existing evidence does not exclude a beneficial effect of acupuncture, but neither does it suggest that there is a major benefit associated with this intervention. It is possible that any beneficial effects of acupuncture that practitioners see in their clinical practice may be due to their extra interactions with patients rather than insertion of needles.

## AUTHORS' CONCLUSIONS

### Implications for practice

There is no evidence that auricular acupuncture is effective as a treatment for cocaine dependence. However, the evidence is not of high quality and is not conclusive. The widespread use of acupuncture is not based on sound evidence.

### Implications for research

Further randomised trials of auricular acupuncture for cocaine dependence are warranted. These should use a sample size large enough to detect modest effects, include long-term follow up and endeavour to minimise losses to follow up. Participants who withdraw from treatment should be included in follow up. Studies should be fully reported according to the CONSORT guidelines. It is questionable whether a trial of acupuncture versus sham acupuncture is a meaningful comparison as sham acupuncture may have some treatment effects similar to true acupuncture and would not be used in clinical practice. Consideration should be given to cluster randomised designs comparing clinics providing a specified package of services for cocaine dependence including acupuncture with clinics providing a similar package without acupuncture.

## ACKNOWLEDGEMENTS

We would like to thank Doug Lipton and David Bell on behalf of Alan Richard who kindly provided further data on request.

## REFERENCES

### References to studies included in this review

#### Avants 1995 *{published data only}*

\* Avants SK, Margolin A, Chang P, Kosten TR, Birch S. Acupuncture for the treatment of cocaine addiction: Investigation of a needle puncture control. *Journal of Substance Abuse Treatment* 1995;12(3):195–205.

#### Avants 2000 *{published data only}*

\* Avants SK, Margolin A, Holford TR, Kosten TR. A randomised

controlled trial of auricular acupuncture for cocaine dependence. *Archives of Internal Medicine* 2000;160(15):2305–12.

#### Bullock 1997 *{published data only}*

\* Bullock ML, Kiresuk TJ, Pheley AM, Culliton PD, Lenz SK. Auricular acupuncture in the treatment of cocaine abuse: A study of efficacy and dosing. *Journal of Substance Abuse Treatment* 1999;16(1):31–8.

#### Lipton 1994 *{published and unpublished data}*

\* Lipton DS, Brewington V, Smith M. Acupuncture for crack-

cocaine detoxification: Experimental evaluation of efficacy. *Journal of Substance Abuse Treatment* 1994;**11**(3):205–15.

**Margolin 2002** {published data only}

Margolin A, Kleber HD, Avants AK, Konefal J, Gawin F, Stark E, et al. Acupuncture for the treatment of cocaine addiction: A randomised controlled trial. *JAMA* 2002;**287**(1):55–63.

**Otto 1998** {published data only}

Otto KC, Quinn C, Sung YF. Auricular acupuncture as an adjunctive treatment for cocaine addiction: A pilot study. *American Journal of Addiction* 1998;**7**:164–70.

**Richard 1995** {published and unpublished data}

Richard AJ, Montoya ID, Nelson R, Spence RT. Effectiveness of adjunct therapies in crack cocaine treatment. *Journal of Substance Abuse Treatment* 1995;**12**(6):401–13.

## References to studies excluded from this review

**Avants 1995b** {published data only}

Avants SK, Margolin A, Chang P, Kosten TR. Acupuncture for the treatment of cocaine abuse in HIV-positive methadone-maintained patients. NIDA Research Monograph. 1994; Vol. 14.

**Giglio 2001** {published data only}

Giglio JC, Avants SK, Margolin A, Holford TR. A randomised controlled trial of auricular acupuncture for cocaine dependence: treatment versus outcomes. *Archives Internal Medicine* 2001;**161**(6):894–5.

**Jackson 1994** {published data only}

Jackson TR, Wells EA, Diaz OR, Stanton V, Saxon AJ. Acupuncture as an adjunct to services provided at methadone treatment facilities. *NIDA Research Monograph* 1994;**153**:466.

**Killeen 2002** {published data only}

Killeen TK, Haight B, Brady K, Herman J, Michel Y, Stuart G, et al. The effect of auricular acupuncture on psychophysiological measures of cocaine craving. *Issues in Mental Health Nursing* 2002;**23**:445–59.

**Lewenburg 1987** {published data only}

Lewenburg A. Cocaine abuse treated with electroacupuncture and antidepressant in a private practice. *Advances In Therapy* 1987;**4**(4):196–201.

**Margolin 1993** {published data only}

Margolin A, Chang P, Avants SK, Kosten TR. Effects of sham and real auricular needling: Implications for trials of acupuncture for cocaine addiction. *American Journal of Chinese Medicine* 1993;**XXI**(2):103–11.

**Margolin 1993b** {published data only}

Margolin A, Avants SK, Chang PC, Kosten TR. Acupuncture for the treatment of cocaine dependence in methadone-maintained patients. *American Journal of Addictions* 1993;**2**(3):194–201.

**Margolin 1995** {published data only}

Margolin A, Avants SK, Chang P, Birch S, Kosten TR. A single-blind investigation of four auricular needle puncture configurations. *American Journal of Chinese Medicine* 1995;**XXIII**(2):105–14.

**Margolin 1998** {published data only}

Margolin A, Avants SK, Kleber HD. Investigating alternative medicine therapies in randomised controlled trials. *JAMA* 1998;**280**(18):1626–8.

**Margolin 1998b** {published data only}

Margolin A, Avants SK, Kleber HD. Rationale and design of the cocaine alternative treatments study (CATS): A randomised, controlled trial of acupuncture. *The Journal of Alternative and Complementary Medicine* 1998;**4**(4):405–18.

**Margolin 1999** {published data only}

Margolin A, Avants SK. Should cocaine-abusing, buprenorphine-maintained patients receive auricular acupuncture? Findings from an acute effects study. *The Journal of Alternative and Complementary Medicine* 1999;**5**(6):567–74.

**Margolin 2002b** {published data only}

Margolin A, Avants SK, Holford TR. Interpreting conflicting findings from clinical trials of auricular acupuncture for cocaine addiction: Does treatment context influence outcome?. *The Journal of Alternative and Complementary Medicine* 2002;**8**(2):111–21.

**Oleson 2002** {published data only}

Oleson TD. Commentary on auricular acupuncture for cocaine abuse. *The Journal of Alternative and Complementary Medicine* 2002;**8**(2):123–5.

**Rossano 1992** {published data only}

Rossano NA. Crack/cocaine abuse acupuncture as an effective adjunct to therapy in current treatment programs. *International Journal of Clinical Acupuncture* 1992;**3**(4):333–8.

**Sherman 1998** {published data only}

Sherman BR. Measuring the self-efficacy of pregnant and postpartum women in recovery. *Addiction and Pregnancy*. Westport, CT, USA: Praeger Publishers, 1998.

**Stevens 2002** {published data only}

Stevens LM. Cocaine addiction. *JAMA* 2002;**287**(1):146.

**Verthein 2000** {published data only}

Verthein U, Raben R. Outpatient acupuncture treatment according to the NADA-Protocol: A longitudinal study [Ambulante Suchtakupunktur nach dem NADA-Protokoll: Eine Verlaufsuntersuchung]. *Deutsche Zeitschrift für Akupunktur* 2000;**43**(2):108–12.

**Verthein 2000b** {published data only}

Verthein U, Raben R, von Soer J. Outpatient acupuncture treatment for drug and alcohol addicts—results of a longitudinal study [Ambulante Akupunkturbehandlung bei drogen- und Alkoholabhängigen—Ergebnisse einer Verlaufsuntersuchung]. *Sucht* 2000;**46**(1):62–76.

**Verthein 2002** {published data only}

Verthein U, Haasen C, Krausz M. Auricular acupuncture as a treatment of cocaine, heroin and alcohol addiction: A pilot study. *Addiction Disorders and Their Treatment* 2002;**1**:11–6.

**Wells 1994** {published data only}

Wells EA, Jackson R, Diaz OR, Stanton V, Saxon AJ, Krupski A. Acupuncture as an adjunct to methadone treatment services. *The American Journal of Addictions* 1995;**4**(3):198–214.

## Additional references

**Bullock 1999**

Bullock ML, Kiresuk TJ, Pheley AM, Culliton PD, Lenz SK. Auricular acupuncture in the treatment of cocaine abuse. A study

- of efficacy and dosing. *Journal of Substance Abuse Treatment* 1999; **16**:31–8.
- Carroll 1994**  
Carroll KM, Rounsaville BJ, Gordon LT, Nich C, Jatlow P, Bisighini RM, et al. Psychotherapy and pharmacotherapy for cocaine abusers. *Archives of General Psychiatry* 1994; **51**:177–87.
- CONSORT 2001**  
CONSORT. [www.consort-statement.org](http://www.consort-statement.org).
- D'Alberto 2004**  
D'Alberto A. Auricular acupuncture in the treatment of cocaine/crack abuse: A review of the efficacy, the use of the national acupuncture detoxication association protocol, and the selection of sham points. *The Journal of alternative and complimentary medicine* 2004; **10**(6):985–1000.
- Hammerschlag 1998**  
Hammerschlag R. Methodological and ethical issues in clinical trials of acupuncture. *Journal of Alternative and Complementary Medicine* 1998; **4**:159–71.
- Higgins 2002**  
Higgins JPT, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat Med* 2002; **21**:1539–58.
- Higgins 2003**  
Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *British Medical Journal* 2003; **327**: 557–60.
- Higgins 2005**  
Higgins JPT, Green S, editors. *Cochrane Handbook for Systematic Reviews of Interventions* 4.2.5 [updated May 2005]. The Cochrane Library, Issue 3, 2005. Chichester, UK: John Wiley & Sons, Ltd...
- Lima 2004a**  
Lima MS, Reisser AAP, Soares BGO, Farrell M. Antidepressants for cocaine dependence. *Cochrane Database of Systematic Reviews* 2004, Issue 1. [DOI: 10.1002/14651858]
- Lima 2004b**  
Lima AR, Lima MS, Soares BGO, Farrell M. Carbamazepine for cocaine dependence. *Cochrane Database of Systematic Reviews* 2004, Issue 1. [DOI: 10.1002/14651858]
- Mills 2005**  
Mills EJ, Wu P, Gagnier JG, Ebbert JO. Efficacy of acupuncture for cocaine dependence: a systematic review and meta-analysis. *Harm Reduction Journal* 2005; **2**(1):4.
- SAMHSA 2000**  
SAMHSA. *Uniform Facility Data Set 1998*. Vol. **Publication SMA 99-3314**, Rockville, Md: Substance abuse and mental health services administration, 2000.
- Soares 2004a**  
Soares BGO, Lima MS, Reisser AAP, Farrell M. Dopamine agonists for cocaine dependence. *Cochrane Database of Systematic Reviews* 2004, Issue 1. [DOI: 10.1002/14651858]
- Soares 2004b**  
Soares BGO, Lima MS, Farrell M. Psychosocial treatments for psychostimulants dependence. *Cochrane Database of Systematic Reviews* 2004, Issue 1. [DOI: 10.1002/14651858]
- \* Indicates the major publication for the study

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies [ordered by study ID]

#### Avants 1995

Methods	Randomised controlled trial, all study personnel bar the acupuncturist were blind to treatment assignment, 6 week follow up
Participants	DSM-III-R criteria cocaine dependence, enrolled in methadone maintenance programme, n=40
Interventions	Auricular acupuncture: 3 sites bi-laterally in each ear and one site bi-laterally in each hand. Control points in the ear and body within 4mm of active sites. Needles left in place for 45 minutes, five days a week for 6 weeks, and administered by a trained acupuncturist.
Outcomes	Cocaine use by urine toxicology, cocaine use self-reported, changes on BDI, ASI and symptom checklist 90 scales, TCS, attrition, side effects
Notes	Results presented for study completers as primary analysis, some outcomes reported for intention-to-treat sample.

#### *Risk of bias*

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

#### Avants 2000

Methods	Randomised controlled trial, stratified by race, sex, HIV status, it was unclear if participants were aware of real versus sham acupuncture assignment, evaluator blind, 8 week follow up
Participants	DSM-III-R criteria cocaine dependence, enrolled in methadone maintenance programme, n=82
Interventions	Auricular acupuncture (NADA protocol) 3-5 zones; Sham acupuncture at points not associated with active sites; relaxation therapy. All treatments lasted 40 minutes, five days a week for 8 weeks, and were administered by a trained acupuncturist.
Outcomes	Cocaine use by urine toxicology, changes on ASI, treatment credibility and therapeutic alliance, attrition, side effects
Notes	

#### *Risk of bias*

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Bullock 1997**

Methods	Randomised controlled trial, data collectors blind to treatment group, 8 week follow up
Participants	Residents of a therapeutic community with cocaine dependency, n=236
Interventions	Conventional multi component residential treatment, conventional multi component residential treatment plus true acupuncture, conventional multi component residential treatment plus sham acupuncture, patients in acupuncture groups received 28 acupuncture sessions in an 8 week period lasting 45 minutes each
Outcomes	Cocaine use by urine toxicology, changes on BDI, ASI, SF-36, self-administered anxiety scale, craving, attrition
Notes	

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Lipton 1994**

Methods	Randomised controlled trial, there was a discrepancy between the method of randomisation reported in the published paper and information provided by the author, randomisation reported as systematic (social security numbers), authors informed reviewers that a central office using random number tables was used, outcome assessor and patient blind to treatment group, 30 and 90 day follow up
Participants	People with crack cocaine or cocaine dependency seeking treatment, acupuncture naive, n=192
Interventions	Auricular acupuncture bi-laterally at 4 sites related to detox (shen men, liver, lung, sympathetic); sham auricular acupuncture bilaterally at 4 sites unrelated to detox within 5mm of active sites (sciatic, knee, elbow, shoulder), sessions lasted 45 minutes, up to 2 per day, six times a week for one month
Outcomes	Cocaine use by urine toxicology, ASI, cocaine craving
Notes	

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Margolin 2002**

Methods	Randomised controlled trial, stratified by sex, outcome assessor blind, 8 week follow up
Participants	Cocaine dependence according to SCID criteria, n=208 maintained on methadone due to opiate dependence, n=620
Interventions	Auricular acupuncture bi-laterally at 4 points (sheen men, lung, liver, sypathetic); sham auricular acupuncture bi-laterally at 3 points not related to detox; relaxation therapy. All treatments given for 40 minutes per day, six days a week for 8 weeks. Acupuncturist trained and licensed in NADA protocol. Adjunct drug counselling offered to all participants
Outcomes	Cocaine use by urine toxicology, self-reported cocaine use, ASI, cocaine craving, attrition
Notes	SCID=structured clinical interview for diagnostic and statistical manual of mental disorders, fourth edition

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Otto 1998**

Methods	Randomised controlled trial, study personnel and patient blind, 1 year follow up
Participants	Men with DSM-III-R criteria cocaine dependence, in-patients substance abuse treatment unit, n=36
Interventions	Auricular acupuncture bi-laterally at 5 points (shen men, lung, liver, sympathetic, kidney); sham auricular acupuncture at 5 points close to detox sites (knee, sciatic nerve, lumbosacral, dorsal and cervical). Phase I: 30-45 minutes 5 times week for 2 weeks; Phase II: three times weekly for 2 weeks; Phase III: once wekly for 8 weeks as an outpatient. Additional treatments as needed. Acupuncture delivered by trained acupuncturist
Outcomes	SCL-90 self-assessment scale, Hamilton Depression and anxiety scale, Halikas Cocaine Craving Scale, urine toxicology
Notes	

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Richard 1995**

Methods	Randomised controlled trial, attempts at blinding not reported, nine month follow up	
Participants	Crack cocaine addiction according to a state-certified admissions counsellor, n=227	
Interventions	Auricular acupuncture (5 NADA points, daily for 10 days the thrice weekly for 10 days) plus neurobehavioral treatment; neurobehavioral treatment only	
Outcomes	Urine toxicology, self-reported drug use	
Notes		
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

ASI=Addiction Severity Index;

DSM-III-R= Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association Washington DC;

BDI= Beck Depression Inventory;

SF-36= Short Form 36

SCID=structured clinical interview for diagnostic and statistical manual of mental disorders, fourth edition;

SCL-90 = Symptoms Check List 90 items

TCS: Therapeutic Collaboration Scale

**Characteristics of excluded studies [ordered by study ID]**

Avants 1995b	Duplicate Avants 1995 study, abstract
Giglio 2001	Letter regarding Avants 2000
Jackson 1994	Duplicate Wells 1995; cocaine not substance of addiction
Killeen 2002	No outcomes of interest: skin conductance activity and response to cue elicited craving
Lewenburg 1987	Individual case reports
Margolin 1993	Participants were healthy volunteers
Margolin 1993b	Prospective study with historical control group
Margolin 1995	Evaluation of a single acupuncture dose for acceptability, not effects on addiction

(Continued)

Margolin 1998	Not a primary study: discussion of methodological considerations
Margolin 1998b	Not a primary study; discussion of methodological considerations of RCTs of acupuncture
Margolin 1999	Prospective comparative study evaluating acute effects of a single acupuncture session; not evaluating addiction
Margolin 2002b	Review of two RCTs
Oleson 2002	Not primary study, critique of acupuncture studies
Rossano 1992	Not RCT, before and after study
Sherman 1998	Not RCT, longitudinal study of cocaine addicts
Stevens 2002	Patient drug information
Verthein 2000	Not RCT, longitudinal study
Verthein 2000b	Not RCT, longitudinal study
Verthein 2002	Not RCT, longitudinal study
Wells 1994	Participants with mainly opiate addiction not cocaine addiction

## DATA AND ANALYSES

### Comparison 1. Acupuncture versus sham acupuncture

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Urine positive for cocaine metabolites	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Short term (less than 8 weeks)	3	520	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.94, 1.08]
1.2 Long term (more than 8 weeks)	1	425	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.89, 1.09]
2 Self-reported drug use (grammes cocaine at 6 weeks)	1	30	Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Attrition	4	556	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.89, 1.23]
4 Cocaine craving	1	30	Mean Difference (IV, Fixed, 95% CI)	-2.30 [-3.78, -0.82]

### Comparison 2. Acupuncture versus no acupuncture

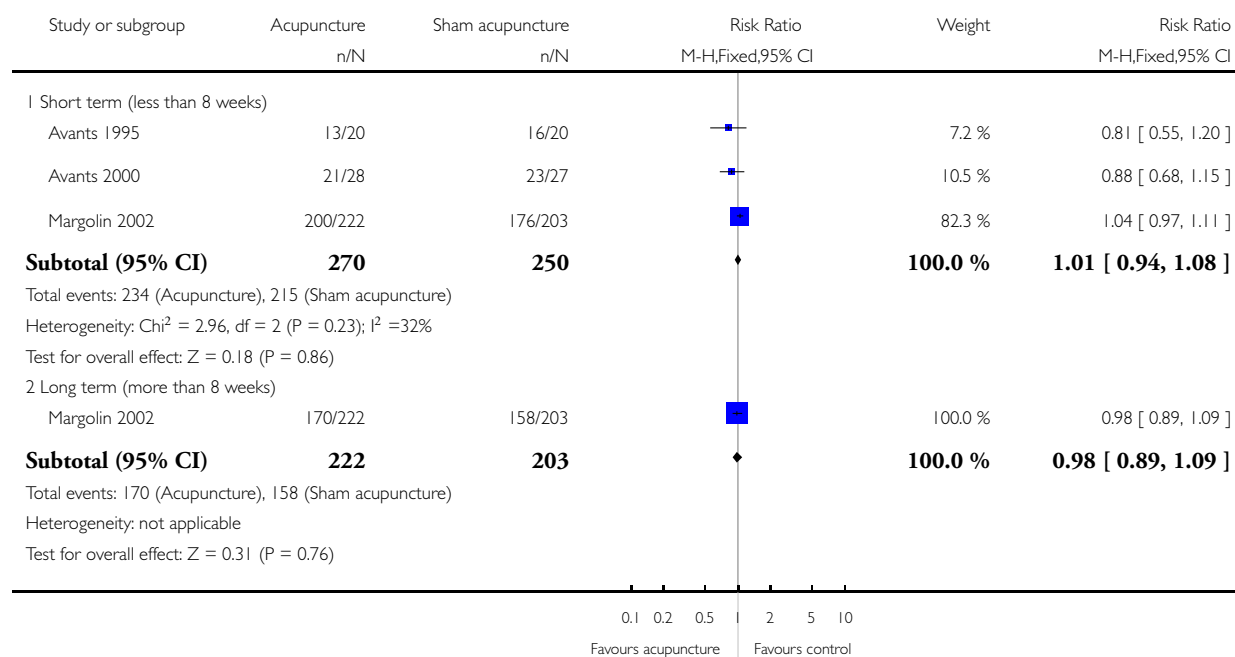
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Urine positive for cocaine metabolites	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Short term (less than 8 weeks)	2	472	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.92, 1.05]
1.2 Long term (more than 8 weeks)	2	522	Risk Ratio (M-H, Fixed, 95% CI)	0.92 [0.84, 1.01]
2 Self-reported drug use	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Short term (less than 8 weeks)	1	105	Risk Ratio (M-H, Fixed, 95% CI)	1.09 [0.71, 1.68]
2.2 Long term (more than 8 weeks)	1	105	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.76, 1.43]
3 Attrition	2	472	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.90, 1.26]

### Analysis 1.1. Comparison 1 Acupuncture versus sham acupuncture, Outcome 1 Urine positive for cocaine metabolites.

Review: Auricular acupuncture for cocaine dependence

Comparison: 1 Acupuncture versus sham acupuncture

Outcome: 1 Urine positive for cocaine metabolites

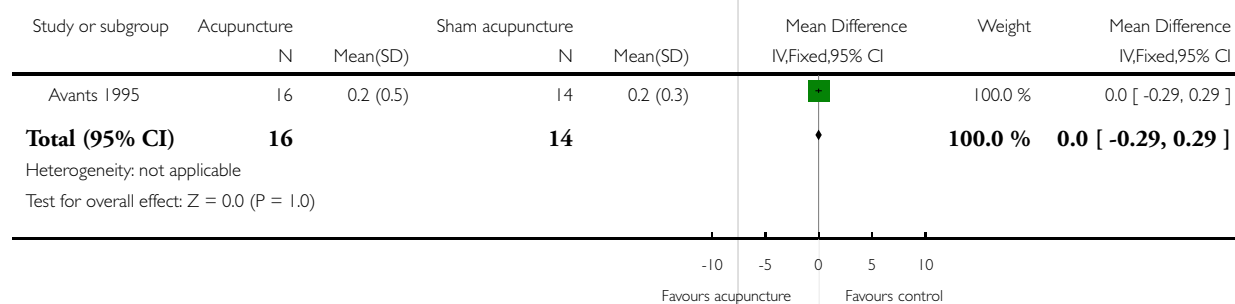


### Analysis 1.2. Comparison 1 Acupuncture versus sham acupuncture, Outcome 2 Self-reported drug use (grammes cocaine at 6 weeks).

Review: Auricular acupuncture for cocaine dependence

Comparison: 1 Acupuncture versus sham acupuncture

Outcome: 2 Self-reported drug use (grammes cocaine at 6 weeks)

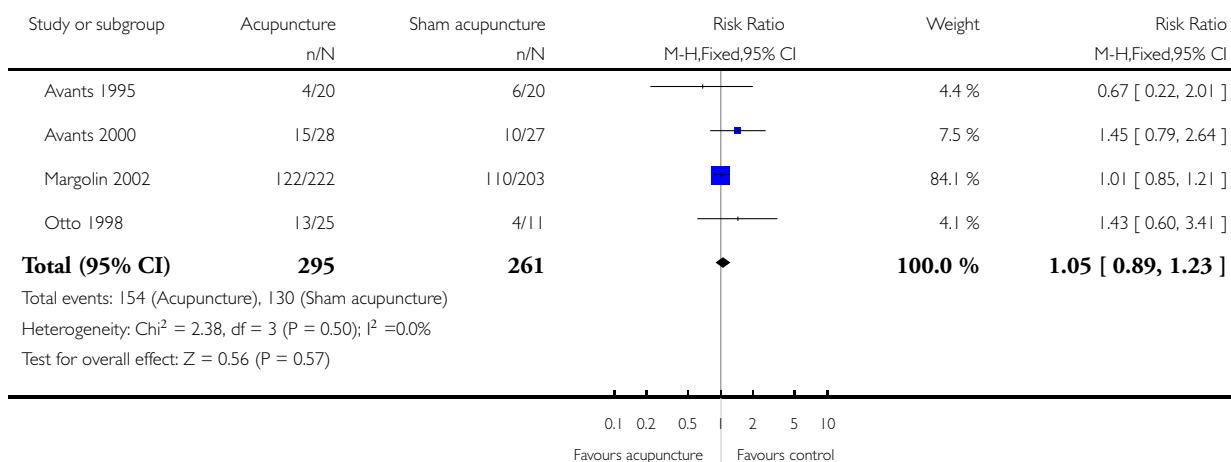


### Analysis I.3. Comparison I Acupuncture versus sham acupuncture, Outcome 3 Attrition.

Review: Auricular acupuncture for cocaine dependence

Comparison: I Acupuncture versus sham acupuncture

Outcome: 3 Attrition

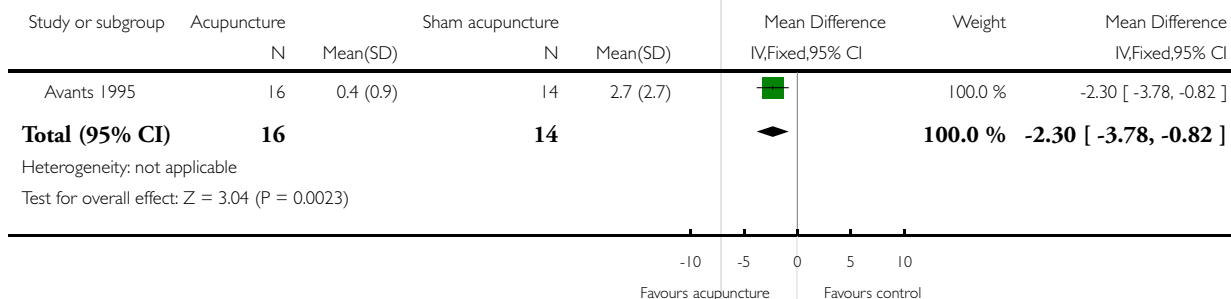


### Analysis I.4. Comparison I Acupuncture versus sham acupuncture, Outcome 4 Cocaine craving.

Review: Auricular acupuncture for cocaine dependence

Comparison: I Acupuncture versus sham acupuncture

Outcome: 4 Cocaine craving

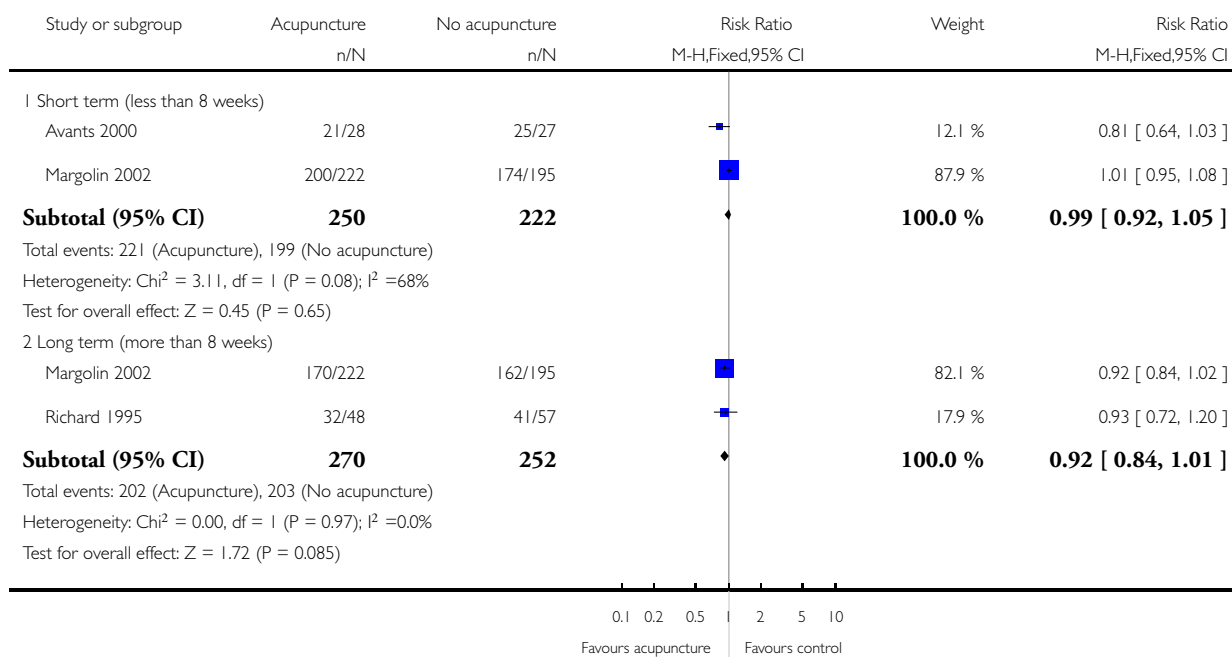


## Analysis 2.1. Comparison 2 Acupuncture versus no acupuncture, Outcome 1 Urine positive for cocaine metabolites.

Review: Auricular acupuncture for cocaine dependence

Comparison: 2 Acupuncture versus no acupuncture

Outcome: 1 Urine positive for cocaine metabolites

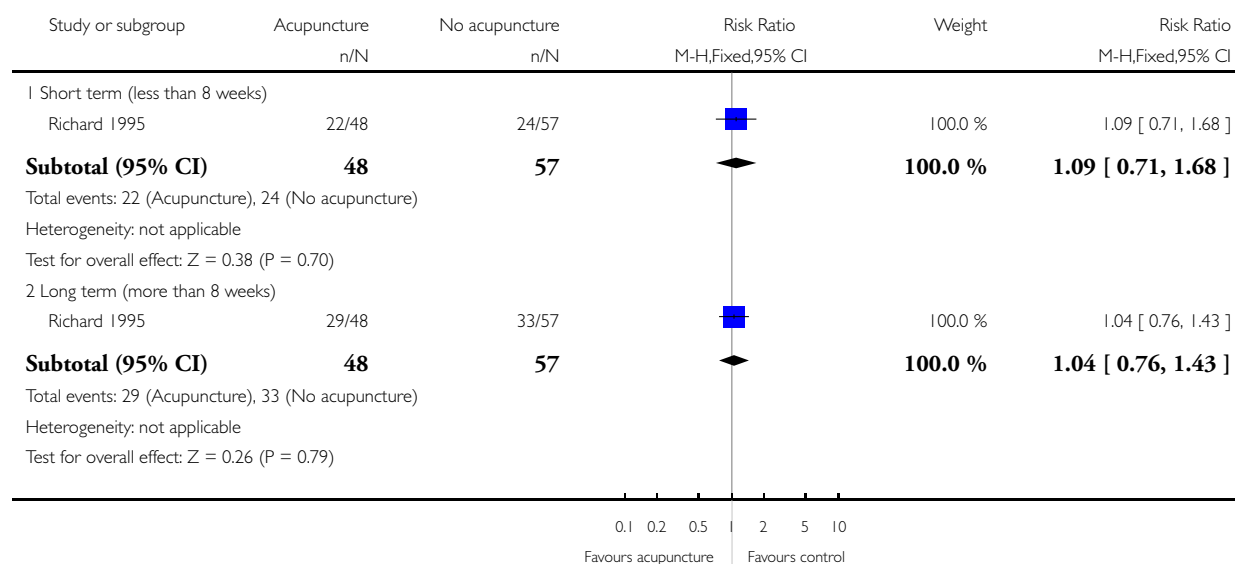


## Analysis 2.2. Comparison 2 Acupuncture versus no acupuncture, Outcome 2 Self-reported drug use.

Review: Auricular acupuncture for cocaine dependence

Comparison: 2 Acupuncture versus no acupuncture

Outcome: 2 Self-reported drug use

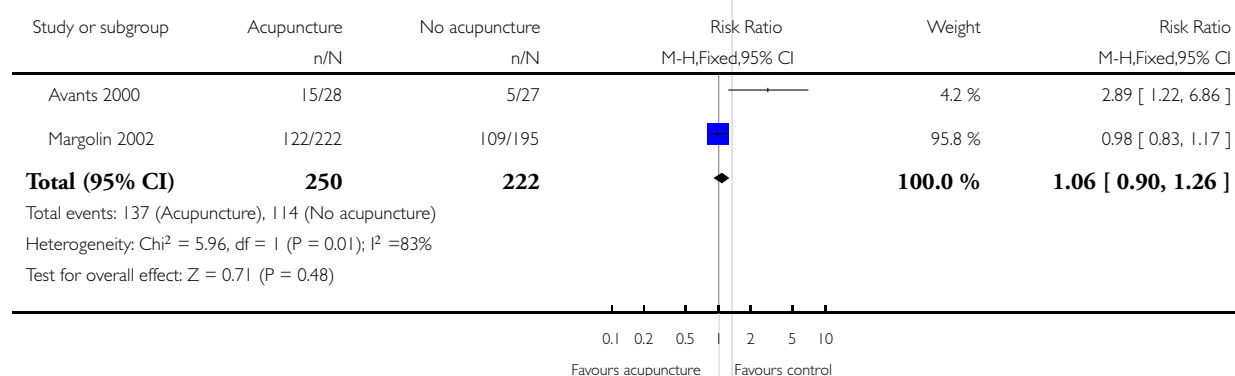


## Analysis 2.3. Comparison 2 Acupuncture versus no acupuncture, Outcome 3 Attrition.

Review: Auricular acupuncture for cocaine dependence

Comparison: 2 Acupuncture versus no acupuncture

Outcome: 3 Attrition



## APPENDICES

### Appendix 1. CENTRAL search strategy

- 1.COCAINE-RELATED DISORDERS:ME
- 2.(drug\* or substance)
- 3.(addict\* or misuse\* or depend\*)
- 4.#2 and #3
- 5.1 or 4
- 6.COCAINE:ME
- 7.cocaine
- 8.#5 or #6
- 9.ACUPUNCTURE THERAPY:ME
- 10.Acupun\*
11. #8 or #9
12. 5 and 8 and 11

### Appendix 2. MEDLINE search strategy

1. exp cocaine-related disorders/
2. (drug or substance) adj2 (abuse\$ or dependence\$ or use\$ or disorder\$ or addict\$).tw
3. 1 or 2
4. exp cocaine/
5. cocaine.tw
6. 4 or 5
7. exp acupuncture therapy
8. exp acupuncture, ear/
9. acupuncture.tw
10. 7 or 8 or 9
11. 3 and 6 and 10

Combined with the phases 1 & 2 of the Cochrane Sensitive Search Strategy for the identification of RCTs as published in Appendix 5b2, Cochrane Handbook for Systematic Reviews of Interventions:

12. randomized controlled trial.pt.
13. randomized controlled trials/
14. controlled clinical trial.pt.
15. random allocation/
16. double blind method/
17. single blind method/
18. 13 or 14 or 15 or 16 or 17 or 18
19. clinical trial.pt.
20. exp clinical trials/
21. (clin\$ adj trial\$).ab,ti.
22. ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj (blind\$ or mask\$)).ab,ti
23. exp PLACEBOS/
24. placebo\$.ab,ti
25. random\$.ab,ti
26. exp Research Design/
27. 20 or 21 or 22 or 23 or 24 or 24 or 26 or 27
28. 18 or 27
29. limit 28 to human
30. 11 and 29

### Appendix 3. EMBASE search strategy

1. exp cocaine dependence
2. exp Substance abuse/
3. (drug or substance) adj2 (abuse\$ or use\$ or misuse or depend\$ or addict\$).tw
4. 1 or 2 or 3
5. exp Cocaine/
6. \*Cocaine derivative/
7. cocaine.ti,ab
8. 5 or 6 or 7
9. 4 and 8
10. random\$.ab,ti
11. placebo.ab,ti
12. (singl\$ or doubl\$ or trebl\$ or tripl\$) and (blind\$ or mask\$).mp
13. (cross-over\$ or crossover\$).tw
14. randomized controlled trial/
15. phase-2-clinical-trial/
16. phase-3-clinical-trial/
17. double blind procedure/
18. single blind procedure/
19. crossover procedure/
20. Latin square design/
21. exp PLACEBOS/
22. multicenter study/
23. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
29. 12 and 28
30. limit 29 to human

### Appendix 4. CINAHL search strategy

1. exp substance-related disorders/
2. (drug or substance) adj2 (abuse\$ or misuse or depend\$ or addict\$).tw
3. 1 or 2
4. exp cocaine/
5. cocaine.ti,ab
6. 4 or 5
7. exp acupuncture
8. (acupunture adj2 therapy).ti,ab
9. 7 or 8
10. 3 or 6 or 9
11. randomi\$.tw.
12. clini\$.tw.
13. trial\$.tw.
14. (clin\$ adj2 trial\$).tw.
15. (singl\$ or doubl\$ or tripl\$ or trebl\$).mp. and (mask\$ or blind\$).tw. [mp=title, subject heading word, abstract, instrumentation]
16. crossover.tw.
17. random\$.tw.
18. allocate\$.tw.
19. assign\$.tw.
20. (random\$ adj2 (allocate\$ or assign\$)).tw.
21. exp Random Assignment/
22. 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21
23. 22 and 10

## Appendix 5. PsycInfo search strategy

PsycInfo (1985 to October 2004)

#1 exp drug addiction

#2 (addict\$ or abus\$ or dependen\$).ti,ab,sh.

#3 1 or 2

#4 cocaine.mp. or exp COCAINE

#5 3 and 4

#6 Acupun\$

#7 5 and 6

## Appendix 6. SIGLE search strategy

#1 Acupun\$

## WHAT'S NEW

Last assessed as up-to-date: 27 October 2005.

---

21 March 2008	Amended	Converted to new review format.
---------------	---------	---------------------------------

---

## HISTORY

Protocol first published: Issue 2, 2005

Review first published: Issue 1, 2006

---

28 October 2005	New citation required and conclusions have changed	Substantive amendment
-----------------	--	-----------------------

---

## CONTRIBUTIONS OF AUTHORS

Simon Gates wrote the protocol, was involved with selection of studies, data extraction, data analysis and drafting the review. Lesley Smith reviewed the protocol, conducted searches, was involved with selection of studies, data extraction and data analysis, and drafted the review. David Foxcroft reviewed the protocol and made comments on drafts of the review.

## **DECLARATIONS OF INTEREST**

None

## **SOURCES OF SUPPORT**

### **Internal sources**

- No sources of support supplied

### **External sources**

- EDAP Project (Evidence for Drugs and Alcohol Policy) sponsored by the European Community- Directorate Public Health (Grant Agreement SPC.2002454), Not specified.

## **INDEX TERMS**

### **Medical Subject Headings (MeSH)**

\*Acupuncture, Ear; Cocaine-Related Disorders [\*therapy]; Randomized Controlled Trials as Topic

### **MeSH check words**

Humans