

# Acupuncture and related interventions for smoking cessation (Review)

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## TABLE OF CONTENTS

HEADER . . . . .	1
ABSTRACT . . . . .	1
PLAIN LANGUAGE SUMMARY . . . . .	2
BACKGROUND . . . . .	2
OBJECTIVES . . . . .	3
METHODS . . . . .	3
RESULTS . . . . .	5
DISCUSSION . . . . .	8
AUTHORS' CONCLUSIONS . . . . .	9
ACKNOWLEDGEMENTS . . . . .	9
REFERENCES . . . . .	9
CHARACTERISTICS OF STUDIES . . . . .	12
DATA AND ANALYSES . . . . .	29
Analysis 1.1. Comparison 1 Acupuncture vs waiting list/no intervention, Outcome 1 Smoking cessation - early. . . . .	31
Analysis 1.2. Comparison 1 Acupuncture vs waiting list/no intervention, Outcome 2 Smoking cessation - late. . . . .	31
Analysis 2.1. Comparison 2 Acupuncture vs sham acupuncture, Outcome 1 Smoking cessation - early. . . . .	32
Analysis 2.2. Comparison 2 Acupuncture vs sham acupuncture, Outcome 2 Smoking cessation - late. . . . .	33
Analysis 2.3. Comparison 2 Acupuncture vs sham acupuncture, Outcome 3 Including possibly active control interventions - early. . . . .	34
Analysis 2.4. Comparison 2 Acupuncture vs sham acupuncture, Outcome 4 Including possibly active control interventions - late. . . . .	35
Analysis 3.1. Comparison 3 Acupuncture vs other intervention, Outcome 1 NRT. . . . .	35
Analysis 3.2. Comparison 3 Acupuncture vs other intervention, Outcome 2 Counselling and psychological approaches. . . . .	36
Analysis 4.1. Comparison 4 Acupuncture as an adjunct, Outcome 1 Adjunct to NRT. . . . .	37
Analysis 4.2. Comparison 4 Acupuncture as an adjunct, Outcome 2 Adjunct to counselling and psychological approaches. . . . .	37
Analysis 11.1. Comparison 11 Acupressure vs waiting list/no intervention, Outcome 1 Smoking cessation - early. . . . .	38
Analysis 11.2. Comparison 11 Acupressure vs waiting list/no intervention, Outcome 2 Smoking cessation - late. . . . .	38
Analysis 22.1. Comparison 22 Laser therapy vs sham laser, Outcome 1 Smoking cessation - early. . . . .	39
Analysis 32.1. Comparison 32 Electrostimulation vs sham stimulation, Outcome 1 Smoking cessation - early. . . . .	39
FEEDBACK . . . . .	39
WHAT'S NEW . . . . .	41
HISTORY . . . . .	41
CONTRIBUTIONS OF AUTHORS . . . . .	42
DECLARATIONS OF INTEREST . . . . .	42
SOURCES OF SUPPORT . . . . .	42
NOTES . . . . .	43
INDEX TERMS . . . . .	43

[Intervention Review]

# Acupuncture and related interventions for smoking cessation

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## ABSTRACT

### Background

Acupuncture and related techniques are promoted as a treatment for smoking cessation in the belief that they may reduce nicotine withdrawal symptoms.

### Objectives

The objectives of this review are to determine the effectiveness of acupuncture and the related interventions of acupressure, laser therapy and electrostimulation, in smoking cessation in comparison with no intervention, sham treatment, or other interventions.

### Search strategy

We searched the Cochrane Tobacco Addiction Group specialized register, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, BIOSIS Previews, PsycINFO, Science and Social Sciences Citation Index, AMED and CISCOR. Date of last search January 2005.

### Selection criteria

Randomized trials comparing a form of acupuncture, acupressure, laser therapy or electrostimulation with either no intervention, sham treatment or another intervention for smoking cessation.

### Data collection and analysis

We extracted data in duplicate on the type of smokers recruited, the nature of the acupuncture and control procedures, the outcome measures, method of randomization, and completeness of follow up.

We assessed abstinence from smoking at the earliest time-point (before six weeks), and at the last measurement point between six months and one year. We used the most rigorous definition of abstinence for each trial, and biochemically validated rates if available. Those lost to follow up were counted as continuing smokers. Where appropriate, we performed meta-analysis using a fixed-effect model.

## Main results

We identified 24 reports of studies. The only comparison for which there were sufficient studies to combine meaningfully was acupuncture compared with sham acupuncture. The fixed-effect odds ratio (OR) for the short-term effect was 1.36 (95% confidence interval 1.07 to 1.72), but the studies are heterogeneous and the result is strongly influenced by one individual positive study. The significant short-term effect was lost with the random-effects model for pooling, or by removing the outlying study that led to heterogeneity. The long-term result shows no effect of acupuncture compared with sham acupuncture. There was no consistent evidence that acupuncture is superior to no treatment, and no evidence that the effect of acupuncture was different from that of other anti-smoking interventions, or that any particular acupuncture technique is superior to other techniques.

## Authors' conclusions

There is no consistent evidence that acupuncture, acupressure, laser therapy or electrostimulation are effective for smoking cessation, but methodological problems mean that no firm conclusions can be drawn. Further research using frequent or continuous stimulation is justified.

## PLAIN LANGUAGE SUMMARY

### Acupuncture and related therapies do not appear to help smokers who are trying to quit.

Acupuncture is a traditional Chinese therapy, generally using needles to stimulate particular points in the body. Acupuncture is used with the aim of reducing the withdrawal symptoms people experience when they try to quit smoking. Related therapies include acupressure, laser therapy and electrical stimulation. The review looked at trials comparing active acupuncture with sham acupuncture (using needles at other places in the body not thought to be useful) or other control conditions. The review did not find consistent evidence that active acupuncture or related techniques increased the number of people who could successfully quit smoking. However, acupuncture may be better than doing nothing, at least in the short term; and there is not enough evidence to dismiss the possibility that acupuncture might have an effect greater than placebo.

## BACKGROUND

Acupuncture has been used in the treatment of nicotine dependence in the West since an incidental observation in Hong Kong ([Wen 1973](#)). Opium smokers who had been given electrical stimulation to acupuncture needles (electroacupuncture) for pain relief reported that their opiate withdrawal symptoms were less severe than they expected. Since then, various techniques of needle or electrostimulation have been used as a treatment for dependence on various addictive substances, with the specific aim of reducing withdrawal symptoms and aiding cessation. For smoking cessation, two basic techniques are used: needles may be inserted for the duration of a treatment session (often lasting 15 to 20 minutes) at the time of cessation. The treatment may be repeated on the following days. Alternatively, or in addition to this intervention, specially designed indwelling needles may be inserted, usually in ear points, and held in position with surgical tape for several days. Patients are instructed to press these indwelling needles when they

become aware of withdrawal symptoms. As an alternative to indwelling needles, small seeds or beads may be attached to the ear with adhesive tape and pressed intermittently (acupressure). Descriptions also exist of the use of a surgical suture which is inserted in the ear and knotted with a bead attached ([Man 1975](#)).

Acupuncture needles are usually stimulated by hand when treating most conditions. For smoking cessation, some acupuncturists stimulate the needles electrically with the intention of stimulating more precisely the release of neurotransmitters that may be involved in suppression of withdrawal symptoms ([Clement-Jones 1979](#)). This is electroacupuncture. Other clinicians have argued that the needles are unnecessary and it is sufficient to apply the electrical stimulation through surface electrodes attached to the mastoid process or the ear. This form of treatment is variously known as neuroelectrical therapy or transcranial electrotherapy. This therapy overlaps, and has to a certain extent merged with, a

therapy known as Cranial Electrostimulation (CES) which developed separately, mainly in the former Soviet Union and Eastern Europe, as a treatment for insomnia, anxiety and depression. CES has also been used for treatment of alcohol and drug dependence (Klawansky 1995). The electric current is usually sufficient to cause a mild tingling sensation, though sometimes subthreshold currents are used. Here, we refer to all such therapies as electrostimulation. It has been argued that the precise placement of electrodes and the parameters of electrostimulation are critical for success (Boutros 1998; Patterson 1993).

As an alternative form of stimulation of acupuncture points, some practitioners use pressure alone (acupressure). Others use low level laser, which is sometimes known as 'laser acupuncture' even though it does not involve needles. Low level laser therapy produces no sensation, and there is still some uncertainty whether it has a physiological effect on normal tissue. From the researcher's point of view, laser therapy has the advantage that both patients and practitioners can remain masked to group allocation by using defunctioned laser apparatus. This also applies to subthreshold electrostimulation therapy.

Uncontrolled studies have suggested that acupuncture might reduce the symptoms of nicotine withdrawal and some high rates of initial success have been reported. For example, Fuller 1982 claimed that 95% of 194 subjects were not smoking after three treatments in one week, falling to 34% after twelve months. Choy 1983 claimed 88% success in a large study of 514 subjects but did not state the long-term results. Clearly, only randomized controlled studies can determine whether this is more than a placebo effect.

Several literature reviews of controlled trials of acupuncture for smoking cessation have been published but their conclusions are not uniform. Vincent and Richardson found that acupuncture appeared to be as effective as other methods in the initial stages of nicotine withdrawal. However there was uncertainty as to what the actual stimulation contributed and whether acupuncture helped prevent relapse (Vincent 1987). Schwartz 1988 found no evidence of a specific effect. Brewington 1994 concluded that acupuncture might be of limited assistance in withdrawal.

Ter Riet 1990 performed a criteria-based systematic review of randomized controlled trials and found that the better the quality of the study the more likely it was to be negative. He concluded that on balance there was no evidence that acupuncture was efficacious in the treatment of nicotine addiction. Lewith 1995 criticised this review and argued that trials in which the controls received needling in inappropriate sites were likely to underestimate the effects of acupuncture: the control procedure was not inactive since needling random sites could trigger the release of endorphins. He concluded that acupuncture is as effective as nicotine replacement therapy.

Law and Tang performed a meta-analysis of the trials listed in

MEDLINE, concluding that acupuncture had "little or no effect" (Law 1995). Ashenden and Silagy (Ashenden 1997) included ten studies in a systematic review looking at the long-term success of acupuncture in smoking cessation: nine of the studies could be combined in a meta-analysis which concluded that, while acupuncture appeared to be promising, there was insufficient evidence to recommend it as an effective form of therapy. A meta-analysis of 19 studies concluded that acupuncture was more effective than no or minimal intervention and than sham (Castera 2002).

We undertook a review and meta-analysis in order to evaluate the short- and long-term effects of acupuncture, acupressure, laser therapy and electrostimulation for smoking cessation.

## OBJECTIVES

Primarily, to evaluate whether acupuncture, acupressure, laser therapy and electrostimulation:

- a) are more effective than waiting list/no intervention for smoking cessation
- b) have a specific effect in smoking cessation beyond placebo effects
- c) are more effective than other interventions of known effect for smoking cessation.

Secondary objectives are:

- d) to evaluate whether these therapies have a specific effect in smoking cessation when they are used as adjuncts to another active treatment
- e) to evaluate whether any particular acupuncture approach is more effective than any other.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

All randomized controlled trials comparing acupuncture, acupressure, laser therapy or electrostimulation with either no intervention, or a sham form of the intervention, or another intervention, for smoking cessation.

#### Types of participants

Tobacco smokers of any age who wished to stop smoking.

## Types of interventions

Non-pharmacological stimulation interventions involving needle puncture or finger pressure or laser therapy in areas of the body described by the study's author as acupuncture points, which includes points on the ear, face and body, or the related intervention of electrostimulation to the head region, either through surface electrodes or through needles.

## Types of outcome measures

Complete abstinence from smoking. The review has not been limited to studies where the outcome was confirmed biochemically (see 'Methodological quality').

## Search methods for identification of studies

We searched the Cochrane Tobacco Addiction Group Specialized Register in January 2005 for trials conducted on any form of acupuncture, acupressure or related laser or electrotherapy. We conducted additional searches of the Cochrane Central Register of Controlled Trials (CENTRAL) (Issue 4, 2004), MEDLINE (Webspirs, to January week 2 2005), EMBASE (Webspirs, to 2004/12), BIOSIS Biological Abstracts (Webspirs, to 2004/10), PsycINFO (Webspirs, to 2004/12), Science and Social Sciences Citation Index (ISI Web of Science updated 12/1/2005) and AMED (Webspirs to 2004/12). We last searched the CISCOM database in 2001. We searched the Medical Acupuncture Research Foundation Acubriefs website for the first time in January 2005.

The free text or keyword search strategy was (acupuncture OR acupressure OR transcranial OR transcutaneous OR electric stimulation OR electrostimulation OR electro?acupuncture OR neuro?electric therapy OR laser therapy) AND (tobacco OR smoking). We included terms other than acupuncture for the first time in 2002 and searches for these terms were retrospective to the earliest date available on all databases. In addition to these searches, we obtained relevant references from published reviews, clinical trials and conference abstracts.

## Data collection and analysis

Two authors (HR, AW) independently extracted data for smoking cessation rates from the reports. We planned to resolve disagreements by discussion but there were none. We were not blinded to the study authors or journal title. Where necessary and possible, we contacted authors to provide missing data.

We extracted data (where present in the report) for two time-points: short-term effect, i.e. the first measure after the treatment, up to a maximum of six weeks from the quit date; and long-term effect i.e. the last time-point used up to one year, but with a minimum of six months. The two time-points were selected in an attempt to identify separately the possible effects of the

intervention on a) cessation in the acute withdrawal period, and b) sustained abstinence.

Where necessary, we recalculated the published data on an intention-to-treat basis i.e. counting all drop-outs and subjects lost to follow up as continuing smokers. We preferred sustained smoking cessation to point prevalence where these figures were available.

We noted assessment of withdrawal symptoms, but we did not extract data for reported cigarette consumption and concentrations of nicotine breakdown products (carbon monoxide [CO] or cotinine).

The primary analysis included only those studies where acupuncture, acupressure, laser therapy or electrostimulation were given alone or with minimal other intervention such as brief advice. We considered different acupuncture approaches (needling of body, face, and ear) together for the primary analysis. We compared short- and long-term outcomes for acupuncture, acupressure, laser therapy and electrostimulation individually with different control procedures (i.e. no intervention, sham therapy, and other active treatment control). In each case we calculated a weighted estimate of the odds ratio (OR), with a positive outcome shown as greater than 1, using a Mantel-Haenszel fixed-effect model with 95% confidence intervals (CI). This represents a change from previous versions of this review in which the Peto method was used. Changing the method for pooling resulted in very small (<0.02) changes in odds ratios or confidence intervals. The Peto method is preferred where events are very rare; although in this review a small number of trials had zero quitters, this reflected their small size rather than uniformly low quit rates. We assessed the amount of statistical heterogeneity between trials using the  $I^2$  statistic (Higgins 2003). Values over 50% can be regarded as moderate, and values over 75% as high heterogeneity. We did not report pooled estimates where heterogeneity was high. Where heterogeneity was moderate we assessed whether the size and significance of the estimated effect was sensitive to the choice of meta-analysis method by testing the effect of pooling using a random-effects model.

Acupuncture is a highly distinctive intervention; choosing a suitable sham control for acupuncture is essential for patient blinding, but is not easy (White 2001). Two types of sham acupuncture that are commonly used are a) needling an area that is not a recognised 'point', and b) needling a point which is believed to be ineffective for the condition. It is possible that inserting a needle in any location has some general physiological activity (Lewith 1995), but we have adopted the usual convention in the literature that the effects of acupuncture are point-specific. The point that is chosen as an 'ineffective' point might have some specific effect on the condition. For example, in a review of acupuncture for asthma, points that were chosen for control groups in some studies because the researchers considered them to be ineffective for asthma were used by other groups as the active intervention (Jobst 1995). In this review, therefore, we examined the points used as controls in each study and checked these against the active points used in the other studies and in two literature reviews of studies of acupuncture for

smoking cessation (Zhang 1992, including 48 studies, and Jiang 1994, including 64 studies). Our principal analysis included only those studies with control points that are not used in other studies of smoking cessation. We then performed a subgroup analysis of all studies, i.e. including those in which the control group may have received active treatment.

To assess the effect of study quality on the outcome, we performed sensitivity analyses using only studies in which allocation was reported to be concealed at enrolment. We did not use outcome validation as a quality item; we consider that failure to validate the outcome cannot have any systematic effect in blinded studies.

We conducted a separate analysis of those studies where the acupuncture or related intervention was combined with another intervention known to be potentially effective in smoking cessation (e.g. nicotine replacement therapy, repeated intensive counselling) since the effect of the other intervention might obscure a relatively small effect of acupuncture. Finally, we analysed studies in which different acupuncture approaches (i.e. body, auricular, and facial acupuncture) were directly compared.

## RESULTS

### Description of studies

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

We found 24 reports of studies which qualified for inclusion in the review. Two studies reported short- and long-term results in separate papers (Clavel 1997; He 2001). Two studies were reported also in French (Clavel 1984; Clavel 1990). The reports by Martin 1981a and by Parker 1977a each described a four-arm trial which amounted to two parallel studies, i.e. two different intervention groups each with its own control group. In each case, we considered these as two separate studies. We were unable to interpret the data from one study (Bier 2002) which reported a significant superiority in the quit rate after the combination of education and acupuncture when compared with acupuncture alone or education alone. However there are inconsistencies in the data as presented which could not be clarified by contacting the authors, and therefore it was not possible to extract reliable data for this meta-analysis.

All studies were straightforward parallel arm design except two which were of factorial design. Clavel 1992 evaluated nicotine replacement therapy and acupuncture simultaneously in a 2x2 design: these data were interpreted as two separate comparisons, with real or placebo nicotine replacement therapy. Georgiou 1999 evaluated two modes of electrical stimulus, two locations and active/sham stimulation simultaneously in a 2x2x2 design: data for the two active groups (active stimulation at active location, using either

modulated or continuous mode) were combined and compared with the combined data from all control groups.

Research has been conducted over a long period. Four studies were published in the 1970s (Gilbey 1977; Lacroix 1977; Parker 1977a; Vibes 1977) and ten in the 1980s (Circo 1985; Clavel 1985; Cottraux 1983; Gillams 1984; Labadie 1983; Lagrue 1980; Lamontagne 1980; Martin 1981a; Steiner 1982; Vandevenne 1985). The remaining ten studies have been published since 1990. Initial group sizes for Martin 1981a and Vibes 1977 were not available in the published reports and were obtained from the authors. Results for the different arms of Clavel 1992 were obtained from the authors.

### Interventions

Five studies used facial acupuncture (Clavel 1985; Clavel 1992; Cottraux 1983; Lacroix 1977; Lagrue 1980). Ten studies used auricular acupuncture alone (Circo 1985; Gilbey 1977; Gillams 1984; Lamontagne 1980; Leung 1991; Martin 1981a; Parker 1977a; Parker 1977b; Waite 1998; White 1998). All but three of these (Lamontagne 1980; Parker 1977b; White 1998) used some form of continuous stimulation, either needle or pressure device. Six studies combined body and auricular acupuncture (Bier 2002; He 1997; Labadie 1983; Martin 1981b; Steiner 1982; Vandevenne 1985) of which two (He 1997; Martin 1981b) also used indwelling needles. Vibes 1977 used facial, body, and indwelling auricular acupuncture in different groups. The primary analysis included all forms of acupuncture (see Methods above).

Four studies used interventions related to acupuncture: Tian 1996 compared acupressure with advice, Cai 2000 compared laser and sham laser acupuncture, and two studies (Georgiou 1999; Pickworth 1997) investigated electrostimulation given over the mastoid bone.

### Control interventions

Four studies used points for the control group that were intended by the authors to be inactive but could be considered to be active (see Methods). These were excluded in a subgroup analysis. Gilbey 1977 used the auricular point 'Kidney' in the control group, which is reported in a review as used for smoking cessation (Zhang 1992). He 1997 used the point LI10 in the control group, which was used in treatment by another study (Jiang 1994). Lamontagne 1980 used body points including ST36 for relaxation as a control. The point ST36 is reported as an active treatment in the review by Zhang, and in one of the studies in this review (Vibes 1977). The control group in one arm of Martin 1981a received acupuncture at LI4 which was used as part of active treatment in three other studies (Labadie 1983; Steiner 1982; Vibes 1977).

Patients in three control arms were given interventions that are of unknown effect; these arms could not be included in any of the predefined categories of analysis. Circo 1985 compared acupuncture to medical treatment with vitamins and a herbal medicine, extract of hawthorn; Clavel 1992 compared acupuncture with a locked cigarette case controlled by a time-switch; and Labadie 1983 compared acupuncture with 'medical treatment' consisting

of advice, a benzodiazepine drug, lobeline and a 'detoxicant'. The first two studies also compared acupuncture with other controls and so those comparisons are included; but [Labadie 1983](#) did not use any other comparison arm and therefore provides no data that can be included in the review.

Four studies comprised more than one control group and therefore qualify for entry into more than one comparison table: [Cottraux 1983](#) compared acupuncture with a counselling and psychological approach and with waiting list (the comparison with placebo capsules is not suitable for inclusion in our planned analyses); [Gillams 1984](#) compared acupuncture with sham acupuncture and with group therapy; [Lamontagne 1980](#) compared acupuncture with sham body acupuncture (considered above) and with a no-treatment control arm; and [Leung 1991](#) compared acupuncture with behaviour therapy and with waiting-list control.

## Risk of bias in included studies

We considered four aspects of study design which may lead to bias in studies of smoking cessation.

### a) Randomization and concealment

Patients were randomized correctly in all but three studies: [Lagrué 1980](#) randomized subjects in groups in order to prevent individuals who were receiving different procedures from mixing together and attempting to guess their group allocation. [Labadie 1983](#) randomized subjects by alternation; and [Steiner 1982](#) used a matched pairs design. None of these methods is regarded as true randomization. Only two reports included sufficient details to be certain that an appropriate method of randomization with adequate concealment was used ([Pickworth 1997](#); [White 1998](#)).

### b) Blinding

All studies that involved some form of sham therapy designed to be indistinguishable to the participant were considered to be single-blind, even if the word 'blind' was not specifically mentioned by the author. This quality criterion is accounted for in the meta-analysis by including these single-blinded studies in the comparisons vs sham.

Achieving full double-blinding is problematic in acupuncture studies. [Lagrué 1980](#) achieved blinding of the therapist by training a novice to use the two interventions without knowing which was genuine. Double-blinding may be possible in therapies related to acupuncture: subjects and therapists were blinded in one study that used subthreshold electrostimulation ([Pickworth 1997](#)). Another study was labelled 'double-blind' by the authors because subjects and assessors, though not therapists, were blinded ([Cai 2000](#)).

Even if subjects are blinded, they may be influenced by their interaction with the practitioner. Arranging minimal or standardized interaction between therapist and patient is a recognised method of reducing this bias in acupuncture research. This procedure was mentioned in five reports of studies ([Bier 2002](#); [Gilbey 1977](#); [He 1997](#); [Lamontagne 1980](#); [White 1998](#)).

### c) Outcome measure verification

Smoking cessation was verified by biochemical testing in seven of the trials: [Cai 2000](#), [Clavel 1985](#), [Pickworth 1997](#), [Tian 1996](#) and [White 1998](#) used a carbon monoxide meter, [He 1997](#) measured serum cotinine, and [Waite 1998](#) measured urinary cotinine concentrations.

### d) Duration of smoking cessation

Since sustained cessation is the prime object of anti-smoking programmes, cessation at 12 months is considered the most important outcome in terms of health gain. Only seven of the studies reported outcomes at 12 months ([Bier 2002](#); [Clavel 1985](#); [Clavel 1992](#); [Cottraux 1983](#); [Labadie 1983](#); [Tian 1996](#); [Vandevenne 1985](#)). [Georgiou 1999](#) collected data for up to 12 months but did not present results by group. [Bier 2002](#) followed subjects for 18 months, [Clavel 1992](#) for four years, and [He 1997](#) for five years (reported in [He 2001](#)).

## Effects of interventions

### Acupuncture compared with waiting list/no intervention

#### Short-term outcomes

The results of two studies showed very marked statistical heterogeneity ( $I^2 = 88\%$ ) and therefore were not combined. Both studies used auricular acupuncture, but one used sustained treatment with indwelling studs ([Leung 1991](#)) and the other used auricular needling during treatment sessions only ([Lamontagne 1980](#)). The first, using sustained treatment, was positive whereas the second was negative, which suggests that some of the heterogeneity may be explained by clinical diversity.

#### Late outcomes

Three studies provided long-term outcome data (6 to 12 months). Combining these results does not demonstrate a significant effect of acupuncture ( $N = 393$ ; odds ratio [OR] 1.91, 95% confidence interval [CI] 0.98 to 3.70) and there was still evidence of some heterogeneity ( $I^2 = 57\%$ ).

### Acupuncture compared with sham acupuncture

#### Short-term outcomes

The 12 studies which measured short-term outcome of acupuncture compared with sham acupuncture (excluding the four studies with active points in the control group) combine to give an overall positive result (OR 1.36, 95% CI 1.07 to 1.72) but with significant heterogeneity ( $I^2 = 57\%$ ). Combining the studies using a more conservative random-effects model removed the significance of the pooled estimate (OR 1.50, 95% CI 0.98 to 2.30). One moderate sized study showed a large (OR = 7) and significant benefit ([Lacroix 1977](#)) but we cannot find any particular clinical features that might account for an exceptional result, although we note that the baseline characteristics of the groups are not reported so we cannot exclude confounding of the results by inequality between the groups in predictor variables. We ran a sensitivity analysis omitting this study. The pooled OR of the remaining 15 studies is 1.14 (95% CI 0.89 to 1.47) and there was no longer evidence of heterogeneity ( $I^2 = 0\%$ ).

Subgroup analysis of all 16 studies that compared acupuncture with sham acupuncture, including those four studies that used possibly active controls, produces a very similar OR of 1.33, 95% CI 1.07 to 1.65, Comparison 02.03), which suggests that this methodological problem has little effect. [Lacroix 1977](#) also contributed to heterogeneity in this subgroup, and excluding it again removed the finding of significant short-term benefit (OR 1.15, 95% CI 0.92 to 1.45). Sensitivity analysis excluding studies without adequate allocation concealment left only one study ([White 1998](#)) which showed no difference between acupuncture and sham acupuncture. Of the 16 studies in this group, only four ([Gilbey 1977](#); [He 1997](#); [Lamontagne 1980](#); [White 1998](#)) applied minimal interaction in the study design and only three ([He 1997](#); [Waite 1998](#); [White 1998](#)) verified the outcome biochemically.

#### **Late outcomes**

The six studies with late (6 to 12 month) comparisons of acupuncture and sham acupuncture do not show any differential effect of acupuncture compared with sham (OR 0.99, 95% CI 0.68 to 1.44), and there was no evidence of substantial heterogeneity ( $I^2 = 39\%$ ). The subgroup including possibly active controls had a similar pooled estimate.

#### **Acupuncture compared with other interventions, and acupuncture as an adjunct**

Acupuncture showed no difference of effect from either nicotine replacement therapy (one study) or counselling and psychological approaches (three studies) in either the short or long term. As an adjunctive therapy, acupuncture given in addition to nicotine gum was no more effective than sham acupuncture and nicotine gum in one study ([Clavel 1992](#)). In combination with a counselling and psychological approach, acupuncture was not superior to illustration material ([Circo 1985](#)) although one study that was reported in an uninterpretable manner reported that a combination of acupuncture and education was superior to acupuncture alone or education alone ([Bier 2002](#)).

Four different acupuncture techniques were compared with each other and with sham acupuncture in [Vibes 1977](#) (see Additional Table 1 [Table 1](#)). None of the comparisons reaches statistical significance (chi squared).

**Table 1. Comparison of acupuncture techniques**

Acupuncture type	N enrolled	N not smoking, early	(% not smoking)
traditional	45	14	(31)
nasal	48	4	(8)
auricular (Zero point)	40	11	(28)
auricular (Lung point)	35	3	(9)

**Table 1. Comparison of acupuncture techniques** (Continued)

sham control	32	2	(6)
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**Interventions related to acupuncture**

Tian 1996 used ear acupressure alone for smoking cessation, which was significantly superior to advice. Two other studies (He 1997; Waite 1998) used acupressure in combination with acupuncture or electroacupuncture and are included in previous analyses.

One study (Cai 2000), in adolescent smokers, found genuine laser therapy not to be superior to placebo laser, either at the end of treatment or after six months.

Two studies of electrostimulation ( Georgiou 1999; Pickworth 1997) found its effectiveness no different from that of placebo at the end of treatment (OR 1.23, 95% CI 0.72 to 2.09).

**DISCUSSION**

There is a lack of good quality studies on acupuncture and related interventions for smoking cessation. The evidence from combining randomized controlled trials (RCTs) suggests that acupuncture for smoking cessation may, in the short term, be more effective than either no treatment or sham acupuncture. However, both these results rely heavily on single positive studies and the choice of model for pooling, and the evidence that acupuncture has an effect is not consistent. Results from meta-analysis of studies with long-term outcomes did not detect a significant benefit of acupuncture over sham acupuncture. The results for the comparison with a waiting list control narrowly excluded a finding of significant benefit. Evidence of a long-term benefit is required before a therapy can be accepted as effective for maintaining smoking cessation.

Only a single study (Clavel 1985) compared the effects of acupuncture and nicotine replacement therapy (NRT). No difference was observed, but there are doubts whether the NRT was given in its optimal form (all smokers in the NRT group were issued with 105 x 2 mg pieces of gum on one occasion, about one week's treatment) so the interventions may have been equally ineffective. This study showed a trend in favour of NRT, and the authors suggested that the result may be subject to a type II error (failing to detect a true effect).

Acupressure was more effective than advice in Tian 1996; neither laser acupuncture nor electrostimulation were superior to sham control interventions.

The strength of much of the evidence is limited: group sizes were less than 20 in two studies (Parker 1977a; Steiner 1982) and greater than 100 in only four (Cai 2000; Cottraux 1983; Clavel 1985; Clavel 1992). The majority of studies failed to report whether allocation was concealed. The problem of study quality was noted in a previous review of acupuncture for addiction, which concluded that higher quality studies are more likely than lower quality studies to have negative results (Ter Riet 1990).

As stated in the Methods section, any study that compares acupuncture with a control intervention that involves needle penetration runs the risk of comparing two treatments that are active. This may be particularly true for auricular acupuncture where the distance between supposedly active and supposedly inactive points on the ear is small. This methodological problem means that the negative result of the comparison between acupuncture and sham acupuncture may conceal a true effect.

We considered whether the discrepancy between the study results could be due to differences in effectiveness of the various acupuncture techniques. The one clinical study which compared techniques (Vibes 1977) was too small to provide useful information, so our approach should be guided by clinical experience and the possible mechanisms of action. Clinical experience from the earliest observations suggested that treatment needs to be repeated frequently - at least once a day - for withdrawal from opioid drugs (Smith 1988; Wen 1973). Animal experiments have suggested that acupuncture might have a place in the acute withdrawal syndrome (Cheng 1980; Choy 1978; Han 1993; Ng 1975). Changes in opioid peptides accompanied these observations (Clement-Jones 1979). Recent laboratory research suggests that acupuncture may modulate dopamine release via the GABA mechanism (Yoon 2004), and that acupuncture can modify the nicotine-induced locomotor activity and neural activity in the nucleus accumbens (Chae 2004), which is known to be a site that is crucial for chemical dependence. While we await confirmation of these mechanisms and investigation of their clinical relevance, if any, they do imply that any effect of acupuncture is likely to be via release of relevant neurotransmitters, and its duration is likely to be no more than 24 hours and possibly less. There is insufficient trial evidence to show whether acupuncture given daily or continuously is effective.

Only one study used acupuncture daily (Bier 2002), and the result reported by the authors showed an effect as an adjunct to

counselling. In the studies which used acupuncture weekly, the intervention may not have been adequate. In the comparison of acupuncture with no treatment, sustained acupuncture was effective (Leung 1991) whereas weekly auricular acupuncture was not (Lamontagne 1980). Five of the sham-controlled studies that used continuous acupuncture were negative but in every study the sham treatment may have been active. Acupressure was more effective than advice (Tian 1996). This suggests that any further research into acupuncture should investigate the effectiveness of either frequent (daily) intervention or sustained stimulation.

It is not only for acupuncture that the optimal form of therapy is not known: a similar situation applies to electrostimulation, and one of the negative studies in this review (Pickworth 1997) was criticised for using incorrect treatment parameters (Boutros 1998).

In view of the number, quality and variety of the studies and the significant methodological problems in researching acupuncture and related interventions for smoking cessation, we believe the present evidence should be interpreted cautiously: there is insufficient evidence to dismiss all forms of acupuncture as ineffective for smoking cessation.

## AUTHORS' CONCLUSIONS

### Implications for practice

There is no consistent evidence whether the effectiveness of acupuncture, acupressure, laser therapy or electrostimulation for smoking cessation is any different from a placebo effect.

## Implications for research

Future studies may be justified if they investigate whether acupuncture that is repeated frequently or given by some method of continuous stimulation is superior to sham treatment. Considerable thought should be given to devising appropriate sham devices. It is relevant to continue research into acupuncture for smoking cessation since acupuncture is a safe and popular therapy.

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\* Indicates the major publication for the study

## CHARACTERISTICS OF STUDIES

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

#### Bier 2002

Methods	Country: United States Recruitment: media advertisements Randomization method: random-number table, but method of application unclear.
Participants	141 smokers aged 18 or over, at least one previous attempt to stop, no major medical condition, not taking listed drugs e.g. phenothiazines, ephedrine
Interventions	a) true acupuncture b) true acupuncture and intensive education programme c) sham acupuncture plus intensive education programme True acupuncture consisted of 5 auricular points and LI4. Sham acupuncture consisted of sham points 5mm away from real points. In both groups, needles were inserted for 30 minutes, and not stimulated. Acupuncture and sham were given in 20 sessions in 4 weeks. Educational programme was 7 x 1.5 hour sessions over 5 weeks
Outcomes	Reported smoking cessation at 1, 3, 6, 12, 15 and 18 months. Outcome not validated. Percentage decrease in cigarette consumption also reported. Depression and anxiety scores analysed, not reported in detail.
Notes	Added 2005 update

#### *Risk of bias*

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

#### Cai 2000

Methods	Country: Singapore Recruitment: not stated Randomization method: 'block randomized' but no further details
Participants	330 smokers, aged 12 to 18 smoking 3 yrs and minimum 5 cigs/day
Interventions	a) laser or b) deactivated laser to points in left ear, 12 times in 4 weeks. Patients wore blindfolded during treatment
Outcomes	Smoking cessation immediately after and 3 months later reported. Validation: expired air CO concentration taken after 6th and 11th treatments (not at the first easurement point, which was after 12th treatment) and at 3 month follow up

**Cai 2000** (Continued)

Notes	Added 2002 update Therapist not blinded: blinded assessor	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Circo 1985**

Methods	Country: Italy Recruitment: from patients with cardiovascular disorders, method of recruitment unclear Randomization method: not stated	
Participants	90 adults, no inclusion or exclusion criteria reported	
Interventions	All participants received information and personalized advice, in addition to: a) illustration material b) medical treatment combining vitamins with herbal extract (hawthorn), for 30 days c) acupuncture to 9 ear points ('Nogier' anti-smoking) given 6 hours after stopping smoking; repeated after 4 days and a further 7 days; combined with 3 indwelling needles for 15 days	
Outcomes	Reported cessation, time-point unspecified (we assume end-of-treatment) Validation: none	
Notes	Added 2001 update	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Clavel 1985**

Methods	Country: France Recruitment: Community volunteers, per advertisement Randomization method: not stated	
Participants	651 adults smoking >5 cigs/day	
Interventions	a) facial acupuncture, single session b) nicotine gum - 105 pieces of 2mg gum c) cigarette case with lock controlled by time-switch All groups also received 3 one-hour sessions of group therapy in first month	

**Clavel 1985** (Continued)

Outcomes	Sustained cessation at 1 and 13 months Validation: none at 1 month; at 13 months, expired air CO concentration was tested in half of those claiming success (method of selection not reported)	
Notes		
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Clavel 1992**

Methods	Country: France Recruitment: Community volunteers responding to circulated leaflet Randomization method: not stated 2x2 factorial design (Smokers in this study who were randomized to active nicotine gum are represented by the study labelled 'Clavel 1992 +NG')	
Participants	515 adults aged over 18, smoking >10 cigs/day	
Interventions	a) facial acupuncture, with placebo nicotine gum b) sham acupuncture (wrong points), with placebo nicotine gum Acupuncture given on days 0, 7 and 28	
Outcomes	Sustained abstinence at 1 and 13 months. (Outcome at 4 years reported in Clavel 1997) 'Need for cigarette' estimated weekly for 1 month Validation: nil	
Notes	This study was first reported in French as Clavel 1990	
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Clavel 1992 +NG**

Methods	Country: France Recruitment: Community volunteers responding to circulated leaflet Randomization method: not stated 2x2 factorial design (Smokers in this study who were randomized to placebo nicotine gum are represented by the study labelled 'Clavel 1992')
Participants	481 adults aged over 18, smoking >10 cigs/day
Interventions	a) facial acupuncture, with active nicotine gum (2mg dose, up to 30 pieces/day, during first 6 months) b) sham acupuncture (wrong points), with active nicotine gum (administration as above) Acupuncture given on days 0, 7 and 28
Outcomes	Sustained abstinence at 1 and 13 months. (Outcome at 4 years reported in another publication) 'Need for cigarette' estimated weekly for 1 month Validation: nil

Notes

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

**Cottraux 1983**

Methods	Country: France Recruitment: Community volunteers responding to TV and radio adverts Randomization method: not stated
Participants	558 French citizens, aged 18-50, smoking >10 cigs/day for 2 years
Interventions	a) behaviour therapy, weekly for 3 weeks b) facial acupuncture, 3 weekly sessions c) placebo capsules prescribed at 2 consultations d) waiting-list control (assessed at 12 months only)
Outcomes	Sustained abstinence at 2 weeks, and 3, 6, 9 and 12 months. Validation: none

Notes

***Risk of bias***

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

**Georgiou 1999**

Methods	Country: England Recruitment: general public, nursing staff, government employees Randomization method: table of random numbers, method of use not described 2x2x2 factorial design
Participants	265 adults smoking at least 10 cigs/day for 1 year
Interventions	Either electrical stimulation or sham (control) stimulation with either continuous 10Hz or modulated 7-14Hz current (both active) in either mastoid or upper back (control). Total of 8 groups. Active groups: a) modulated current to mastoid process b) continuous current to mastoid Control groups: c) modulated current to back d) continuous current to back. e) sham modulated current to mastoid f) sham modulated current to back g) sham continuous current to mastoid h) sham continuous current to back. After initial stimulation, home use as required for 7 days
Outcomes	Smoking cessation at end of treatment, validated by expired air CO. Withdrawal symptoms by VAS. Follow-up data were collected for up to 12 months, but data are not presented by group.
Notes	18% dropouts, numbers in each group are unknown. Follow-up data given as aggregate only. No significant differences.

***Risk of bias***

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

**Gilbey 1977**

Methods	Country: Canada Recruitment: Community volunteers responding to newspaper adverts Randomization method: not stated
Participants	92 subjects aged 30-39 who smoked >15 cigs/day for 3 years
Interventions	a) indwelling needle in active auricular point ('Lung') for 1 week b) indwelling needle in inactive auricular point ('Kidney') for 1 week
Outcomes	Sustained abstinence at 1 week, 1 month and 3 months Validation: none
Notes	Some authors regard 'Kidney' point (used as a control) as an effective treatment for dependency

***Risk of bias***

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

**Gillams 1984**

Methods	Country: UK Recruitment: volunteers responding to poster in health centre Randomization: sealed envelopes	
Participants	81 adults smoking >50 cigs/week for 5 years	
Interventions	a) indwelling needle in active auricular point ('Lung') for 4 weeks b) indwelling needle in inactive auricular point (as far from 'Lung' as possible) for 4 weeks c) group therapy sessions, one hour/ week for 4 weeks	
Outcomes	Sustained abstinence at 4 weeks, 3 months, and 6 months Validation: none	
Notes		
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**He 1997**

Methods	Country: Norway Recruitment: employees recruited through internal advertisement through occupational health service Randomization: drawing lots with replacement	
Participants	46 adults smoking for at least 5 years, daily average of 10-30 cigarettes in the last year; no other form of treatment for smoking cessation: no current acupuncture Exclusions: diabetes, coronary heart disease, pregnancy, breast-feeding	
Interventions	Both groups received a combination of body electroacupuncture, ear acupuncture and ear acupressure: a) using genuine points described for smoking cessation b) using sham points described for treating musculoskeletal conditions 6 treatments over 3 weeks Manual and electrical stimulation were the same in the 2 groups In addition, 6 plant seeds were placed on either a) 'correct' or b) 'incorrect' points in the ear, according to group, and retained in place with adhesive tape: subjects were instructed to press on each seed 100 times on 4 occasions each day	
Outcomes	Abstinence at 1 week and 8 months after the last acupuncture treatment (sustained at each previous point). Outcomes at 5 years are also reported. Validation: cessation confirmed by serum cotinine and thiocyanate concentrations. (Serum concentrations of fibrinogen and lipid peroxide were also measured) Daily cigarette consumption, taste for tobacco and desire to smoke were assessed by questionnaire	
Notes	Standardized interaction 8 month data used in 6 month meta-analysis. 5 yr data used in 1 yr + comparison does not include participants lost to follow up due to change of address etc	

He 1997 (Continued)

<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

### Labadie 1983

Methods	Country: France Recruitment: Community volunteers attending anti-smoking clinic Randomization method: by alternation	
Participants	130 smokers (criteria not specified)	
Interventions	a) acupuncture to auricular and body points; not stated whether repeated b) medical treatment (advice plus benzodiazepine, lobeline and a 'detoxicant') Both groups followed up weekly for 1 month, fortnightly for 3 months, monthly for a year	
Outcomes	Abstinence and reduction of smoking at 8 weeks and 1 yr. Validation: none	
Notes	No control data suitable for inclusion in meta-analysis	

<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

### Lacroix 1977

Methods	Country: France Recruitment: not stated Randomization method: not stated	
Participants	117 smokers; the only inclusion criterion was the wish to stop	
Interventions	a) facial acupuncture, bilateral, weekly for 3 weeks b) sham acupuncture, bilateral, weekly for 3 weeks	
Outcomes	Abstinence at 3 weeks Validation: none	
Notes		

<i>Risk of bias</i>		
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**Lacroix 1977** (Continued)

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

**Lagrue 1980**

Methods	Country: France Recruitment: not stated Randomization: allocated by group
Participants	154 smokers (criteria not specified)
Interventions	a) facial acupuncture, repeated after 1 week b) sham acupuncture, repeated after 1 week
Outcomes	Abstinence and 80% reduction in consumption at 1 week Validation: none
Notes	Practitioner specially trained to give both treatments without knowing which was active (ie a truly double-blind study)

*Risk of bias*

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

**Lamontagne 1980**

Methods	Country: Canada Recruitment: Community volunteers responding to newspaper advert Randomization method: not stated
Participants	75 subjects aged 20-50, smoking between 15 and 50 cigs/day, not taking drugs, and in good health
Interventions	a) acupuncture to auricular points ('Zero' and 'Lung') b) acupuncture to body points used for 'relaxation' c) self-monitor and report back All subjects given 2 appointments 1 week apart
Outcomes	Abstinence at 2 weeks, 3 months, and 6 months; mean smoking rates for 14 day periods during study Validation: none
Notes	Poor choice of acupuncture control procedure, since anti-smoking effect of 'relaxation' treatment cannot be ruled out

*Risk of bias*

**Lamontagne 1980** (Continued)

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

**Leung 1991**

Methods	Country: Hong Kong Recruitment: Community volunteers responding to newspaper and radio adverts Randomization method: not stated
Participants	95 subjects who had smoked for at least 1 year and were motivated to stop
Interventions	a) 10 daily sessions of behaviour therapy lasting 1.5 hours b) Indwelling needles in auricular points ('Shenmen' and 'Lung') for 7 days or until they became uncomfortable; 10 attendances in total, for supervision of the needles c) waiting-list control
Outcomes	Abstinence and percentage reduction in consumption immediately after treatment and at 1, 3, and 6 months.
Notes	

***Risk of bias***

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

**Martin 1981a**

Methods	Country: New Zealand Recruitment: Community volunteers Randomization: in groups, method not stated
Participants	126 smokers (criteria not specified)
Interventions	a) indwelling needles to effective auricular points ('Lung' and 'hunger') for 3 weeks b) indwelling needles to ineffective auricular points ('elbow' and 'eye') Other groups with needling in the ankle or with cut-off studs were not conducted in parallel with the above and have been excluded from the review
Outcomes	Abstinence and reduction in cigarette consumption at 3 weeks, 3 months and 6 months Validation: nil
Notes	Some authors would consider 'elbow' and 'eye' points (used as controls) as possibly effective, since innervated by the vagus nerve

**Martin 1981a** (Continued)

<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Martin 1981b**

Methods	Country: New Zealand Recruitment: Community volunteers Randomization: in groups, method not stated
Participants	134 smokers (unspecified)
Interventions	a) indwelling needles to effective auricular points ('Lung' and 'hunger') for 3 weeks plus electroacupuncture for 20 minutes to LI4 in the hand and Tongue the ear at the second attendance b) indwelling needles to ineffective auricular points ('elbow' and 'eye') plus electroacupuncture for 20 minutes to LI4 in the hand and Tongue in the ear at the second attendance Other groups with needling in the ankle or with cut-off studs were not conducted in parallel with the above and have been excluded from the review
Outcomes	Abstinence and reduction in cigarette consumption at 3 weeks, 3 months and 6 months Validation: nil
Notes	Some authors would consider 'elbow' and 'eye' points (used as controls) as possibly effective, since innervated by the vagus nerve

*Risk of bias*

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

**Parker 1977a**

Methods	Country: USA Recruitment: Volunteers from hospital employees Randomization method: not stated
Participants	18 smokers (unspecified)
Interventions	a) indwelling needles placed in effective auricular points ('Shenmen' and 'Lung') b) indwelling needles placed in points considered inactive ('Shoulder' and 'Eye') Needles replaced in both groups twice weekly for 3 weeks
Outcomes	Abstinence and reduction in consumption at 6 weeks Validation: none

**Parker 1977a** (Continued)

Notes	Some authors would not agree that 'shoulder' and 'eye' points are 'inactive'	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Parker 1977b**

Methods	Country: USA Recruitment: Volunteers from hospital employees Randomization method: not stated	
Participants	23 smokers (unspecified)	
Interventions	a) electrical stimulation to effective auricular points ('Shenmen' and 'Lung') b) electrical stimulation to points considered inactive ('Shoulder' and 'Eye') Both groups treated for 20 minutes twice weekly for 3 weeks	
Outcomes	Abstinence and reduction in consumption at 6 weeks Validation: none	
Notes	Some authors would not agree that 'shoulder' and 'eye' points are 'inactive'	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Pickworth 1997**

Methods	Country: USA Recruitment: 'from community' Randomization method: the instrument manufacturer 'prepared sealed envelopes containing a cartridge and an insert that was randomly assigned to each subject'	
Participants	121, aged over 21 yrs, smoking >20/day for at least 1 yrs, no psychoactive medications; without pregnancy, drug history, medical condition, implanted device, history of seizures or migraine	
Interventions	5 consecutive days of 60 min of a) electrostimulation, 10Hz 2 msec pulse, 30 uamp to mastoid, or b) sham electrostimulation	
Outcomes	Abstinence after 5 days and 1 month, verified by exhaled CO. Withdrawal symptoms.	

**Pickworth 1997** (Continued)

Notes	Stimulation parameters were criticised by Boutros 1998	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

**Steiner 1982**

Methods	Country: USA Recruitment: Community volunteers responding to newspaper and radio adverts Randomization: matched pairs, one of each pair randomly assigned, method not stated	
Participants	32 subjects over 21, smoking over 20 cigs/day for 2 consecutive years, not pregnant and not on chronic pain medication or mood-altering drugs Selected from 82 volunteers, matched according to age, sex, and cigarette consumption	
Interventions	a) acupuncture to genuine body and ear points; needle sensation achieved. b) sham acupuncture to nearby areas without needling sensation Both interventions given twice weekly for 2 weeks	
Outcomes	Abstinence and cigarette consumption at 4 weeks Validation: none	
Notes	Subjects were not advised to stop smoking at any particular time, but to 'follow your motivation and appetite to the best of your ability'	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Tian 1996**

Methods	Country: China Recruitment: not stated Randomization method: not stated	
Participants	120 smokers over 20 yrs old, regularly smoking >10 cigs/day, exhaled CO>10ppm, and 'likely to attend follow up for 1 year'	
Interventions	a) acupressure, 'Ear Point Seed Pressing' method: seed fixed to 4 points in one ear, treatment changed to alternate ear twice/wk for course of 1 month, repeated for 2 or 3 months. Seeds to be pressed by smoker 6 times daily b) advice: no description given	

**Tian 1996** (Continued)

Outcomes	Abstinence at 1 month and 1 yr, confirmed by CO measurement	
Notes	Added 2002 update Report lacks details (eg, randomization, advice given, baseline characteristics) Error in results table: figures at 1 month do not reach correct total of 60	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Vandevenne 1985**

Methods	Country: France Recruitment: volunteers attending anti-smoking clinic Randomization: random number table (not stated to be concealed)	
Participants	200 self-referred smokers, no criteria stated	
Interventions	a) acupuncture to 3 auricular and 2 body points b) sham acupuncture to nearby areas both interventions given on days 1, 4, 10 and 20	
Outcomes	Abstinence (point-prevalence) at 6 weeks, 6 months and 1 year Not validated	
Notes		
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**Vibes 1977**

Methods	Country: France Recruitment: not stated Randomization: method not stated	
Participants	Smokers of at least 20 cigs /day; already tried to reduce their consumption; no previous acupuncture; not using any other therapy for smoking cessation	
Interventions	6 treatment sessions 3 times a week for groups a) b) e). Indwelling needle for groups c) and d) a) 3 or 4 traditional acupuncture points for cessation b) two nasal points	

Vibes 1977 (Continued)

	c) auricular point Zero d) auricular point Lung e) control group: 2 points on hands/feet	
Outcomes	Smoking cessation at 14 days (not validated); reduction in cigarette consumption	
Notes	Added in 2005 update	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

Waite 1998

Methods	Country: UK Recruitment: community volunteers recruited by advertisements in on-line news pages, posters in hospital and word of mouth. Randomization method: not stated. Stratified by gender	
Participants	78 adults over 18 years old who were smoking at least 10 cigs/day. Exclusions: cardiac pacemaker, previous acupuncture	
Interventions	Both groups received one 20-minute session of acupuncture with electrical stimulation followed by placement of a seed on the needle site held in place with adhesive tape. Participants were instructed to keep the seed in place as long as they found it helpful and press it when they experienced the desire to smoke Points used were: a) active group, lung point in ear b) control group, medial aspect of the patella, not on recognised acupuncture point	
Outcomes	Cessation at 2 weeks, and 2, 4 and 6 months (point prevalence) Validation at 6 months only: urinary cotinine	
Notes		
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Unclear	B - Unclear

**White 1998**

Methods	Country: UK Recruitment: community volunteers from media invitation Randomization method: sealed opaque envelopes, opened immediately before intervention	
Participants	76 adults over 21 years smoking at least 15 cigs/day Exclusions: previous acupuncture, pregnancy, breast-feeding, cardiac pacemaker, known bleeding tendency	
Interventions	a) acupuncture with electrical stimulation to lung point in both ears b) sham acupuncture consisting of either needle or carbon pad placed over the mastoid bone attached to sham (inactivated) stimulator Interventions were given on day 1, 3 and 7 of the smoking cessation	
Outcomes	Sustained cessation at 2 weeks Validation: expired air CO concentration Withdrawal symptoms assessed by Visual Analogue Scale Reported cessation at 9 months (not validated)	
Notes	Credibility of interventions tested by questionnaire Standardized, minimal interaction by acupuncturist All counselling by blinded nurse	
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

cigs/day: cigarettes per day

CO: carbon monoxide

yr: year

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

Boureau, 1978	This study compared 2 groups who both received identical acupuncture following an injection: one group were injected with saline, the other with naloxone. Therefore, 2 hypotheses are tested simultaneously: does acupuncture help smoking cessation by releasing endogenous opioid peptides?
Boutros 1998	This letter in response to the study of Pickworth commented on the stimulus parameters used in the study, but included no original data
Fang 1983	The report is incomplete: numbers of smokers allocated to control and intervention groups cannot be extracted, so the study cannot be interpreted
MacHovec 1978	This study does not specify that the subjects were randomized

*(Continued)*

Man 1975	Subjects were allocated by place of residence, not randomly
Tan 1987	Not described as randomized: complete abstinence not reported.

## DATA AND ANALYSES

### Comparison 1. Acupuncture vs waiting list/no intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation - early	2		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Smoking cessation - late	3	393	Odds Ratio (M-H, Fixed, 95% CI)	1.91 [0.98, 3.70]

### Comparison 2. Acupuncture vs sham acupuncture

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation - early	12	1594	Odds Ratio (M-H, Fixed, 95% CI)	1.36 [1.07, 1.72]
2 Smoking cessation - late	6	1050	Odds Ratio (M-H, Fixed, 95% CI)	0.99 [0.68, 1.44]
3 Including possibly active control interventions - early	16	1916	Odds Ratio (M-H, Fixed, 95% CI)	1.33 [1.07, 1.65]
4 Including possibly active control interventions - late	9	1280	Odds Ratio (M-H, Fixed, 95% CI)	1.08 [0.76, 1.53]

### Comparison 3. Acupuncture vs other intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 NRT	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Smoking cessation - early	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
1.2 Smoking cessation - late	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
2 Counselling and psychological approaches	3		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Smoking cessation - early	3	396	Odds Ratio (M-H, Fixed, 95% CI)	0.93 [0.59, 1.44]
2.2 Smoking cessation - late	3	396	Odds Ratio (M-H, Fixed, 95% CI)	1.39 [0.77, 2.51]

#### Comparison 4. Acupuncture as an adjunct

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Adjunct to NRT	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Smoking cessation - early	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
1.2 Smoking cessation - late	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
2 Adjunct to counselling and psychological approaches	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Smoking cessation - early	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 Smoking cessation - late	0		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable

#### Comparison 11. Acupressure vs waiting list/no intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation - early	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Smoking cessation - late	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected

#### Comparison 22. Laser therapy vs sham laser

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation - early	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Smoking cessation - late	0		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected

#### Comparison 32. Electrostimulation vs sham stimulation

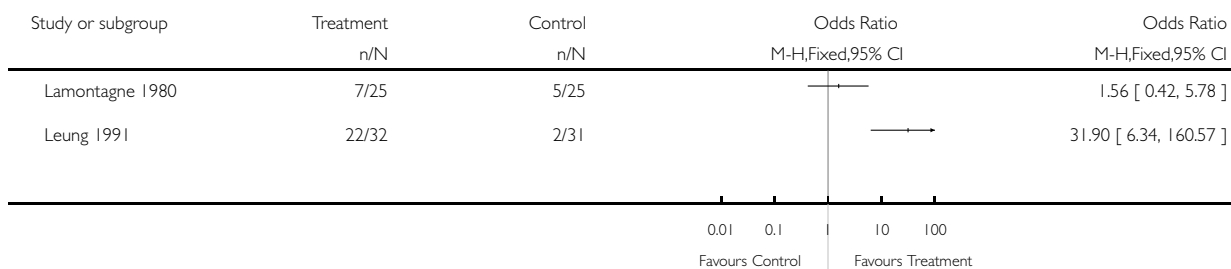
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation - early	2	317	Odds Ratio (M-H, Fixed, 95% CI)	1.23 [0.72, 2.09]

### Analysis 1.1. Comparison 1 Acupuncture vs waiting list/no intervention, Outcome 1 Smoking cessation - early.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 1 Acupuncture vs waiting list/no intervention

Outcome: 1 Smoking cessation - early

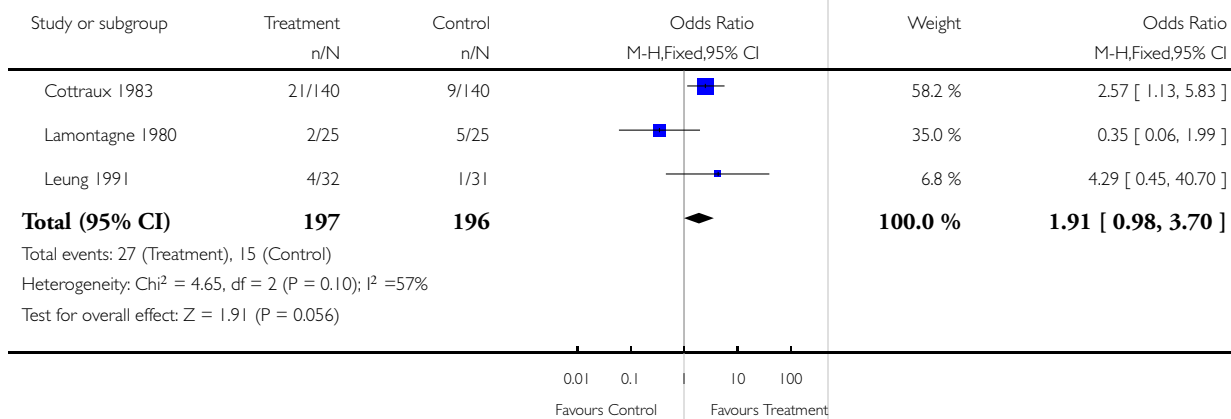


### Analysis 1.2. Comparison 1 Acupuncture vs waiting list/no intervention, Outcome 2 Smoking cessation - late.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 1 Acupuncture vs waiting list/no intervention

Outcome: 2 Smoking cessation - late

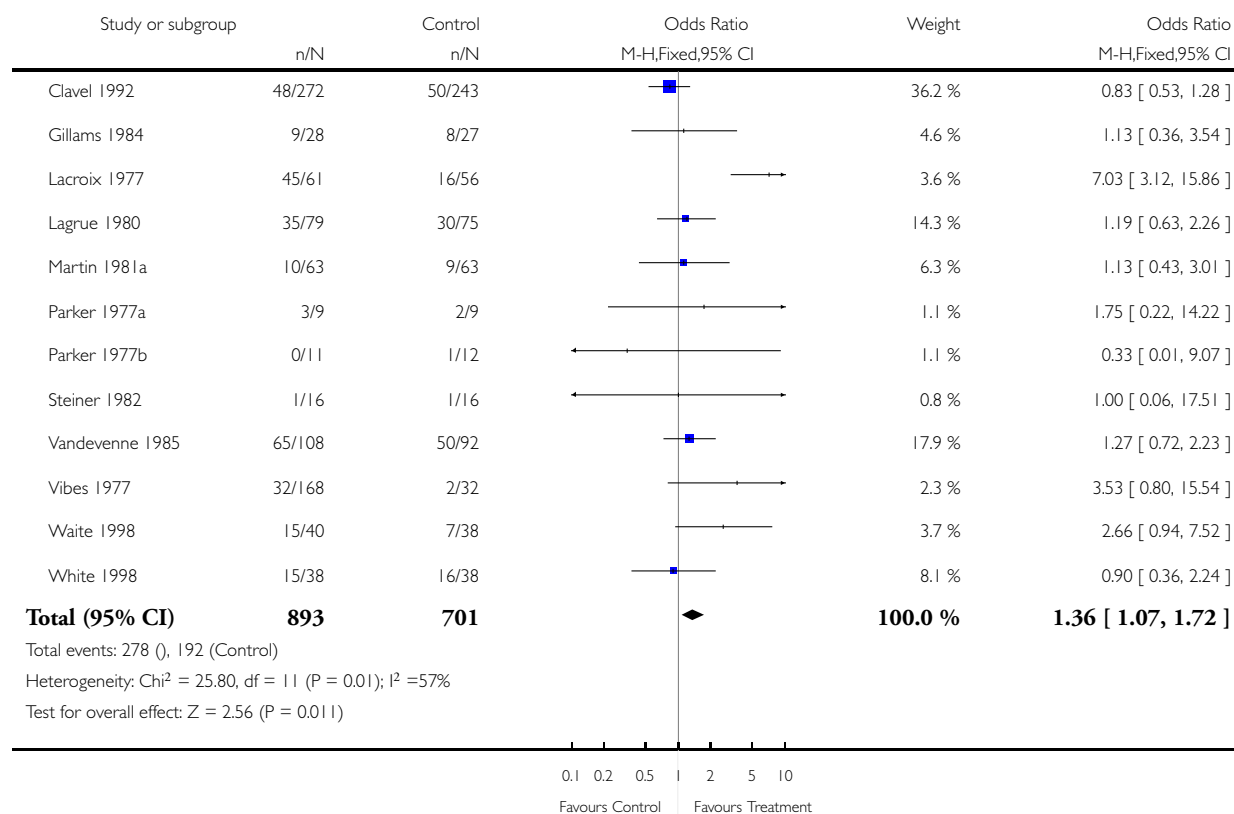


## Analysis 2.1. Comparison 2 Acupuncture vs sham acupuncture, Outcome 1 Smoking cessation - early.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 2 Acupuncture vs sham acupuncture

Outcome: 1 Smoking cessation - early

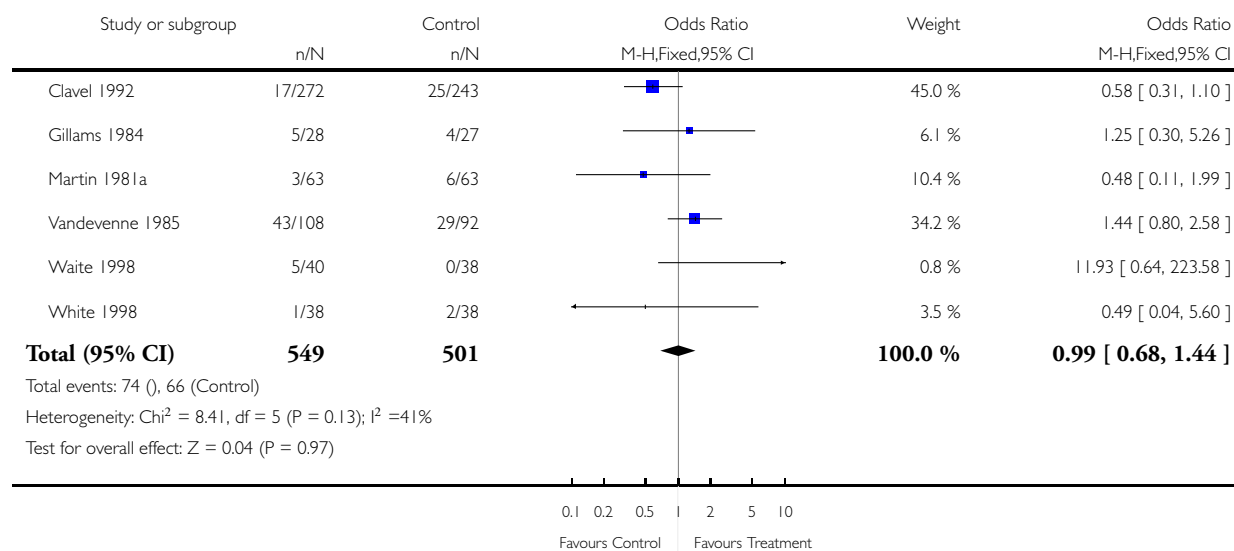


## Analysis 2.2. Comparison 2 Acupuncture vs sham acupuncture, Outcome 2 Smoking cessation - late.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 2 Acupuncture vs sham acupuncture

Outcome: 2 Smoking cessation - late

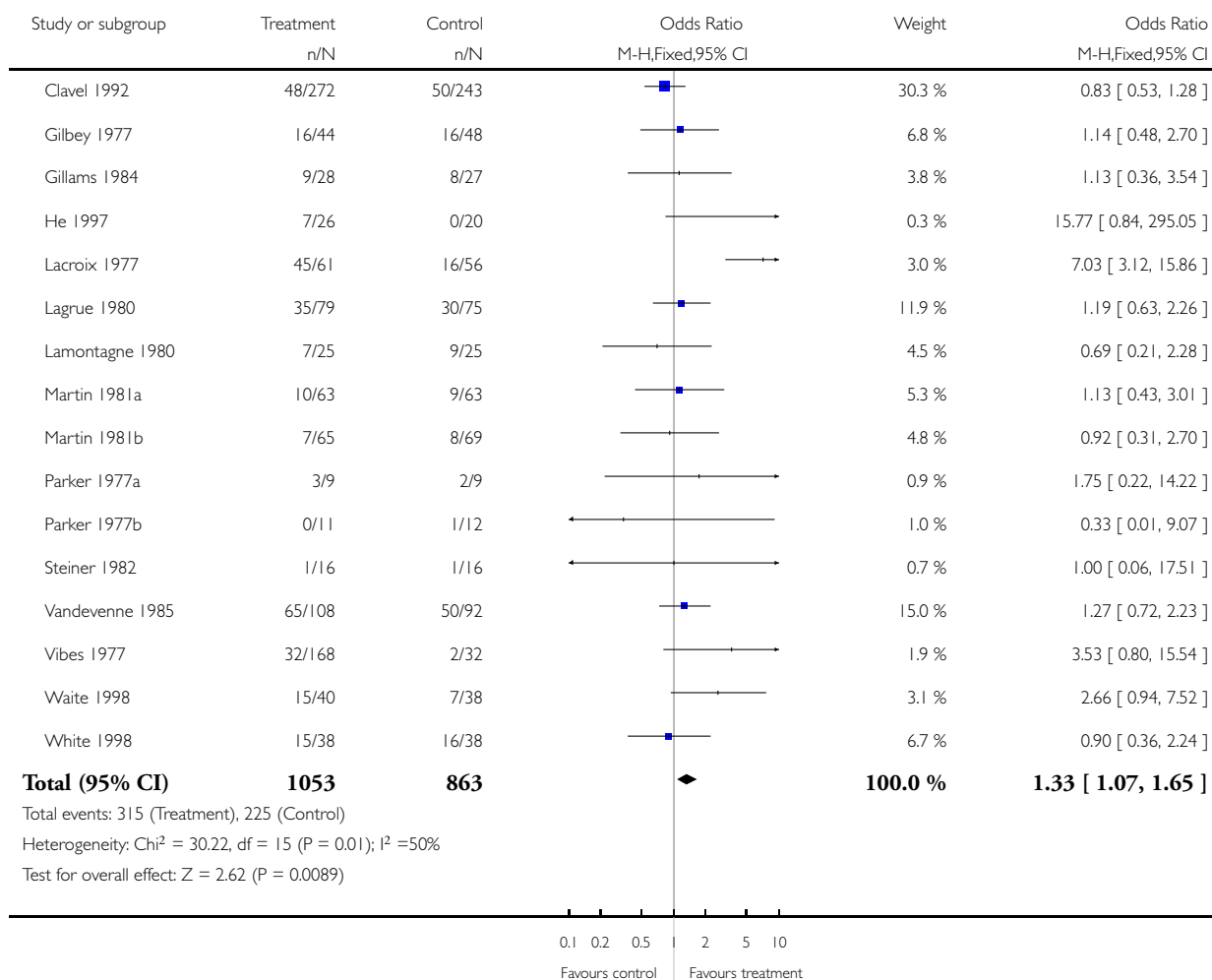


### Analysis 2.3. Comparison 2 Acupuncture vs sham acupuncture, Outcome 3 Including possibly active control interventions - early.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 2 Acupuncture vs sham acupuncture

Outcome: 3 Including possibly active control interventions - early

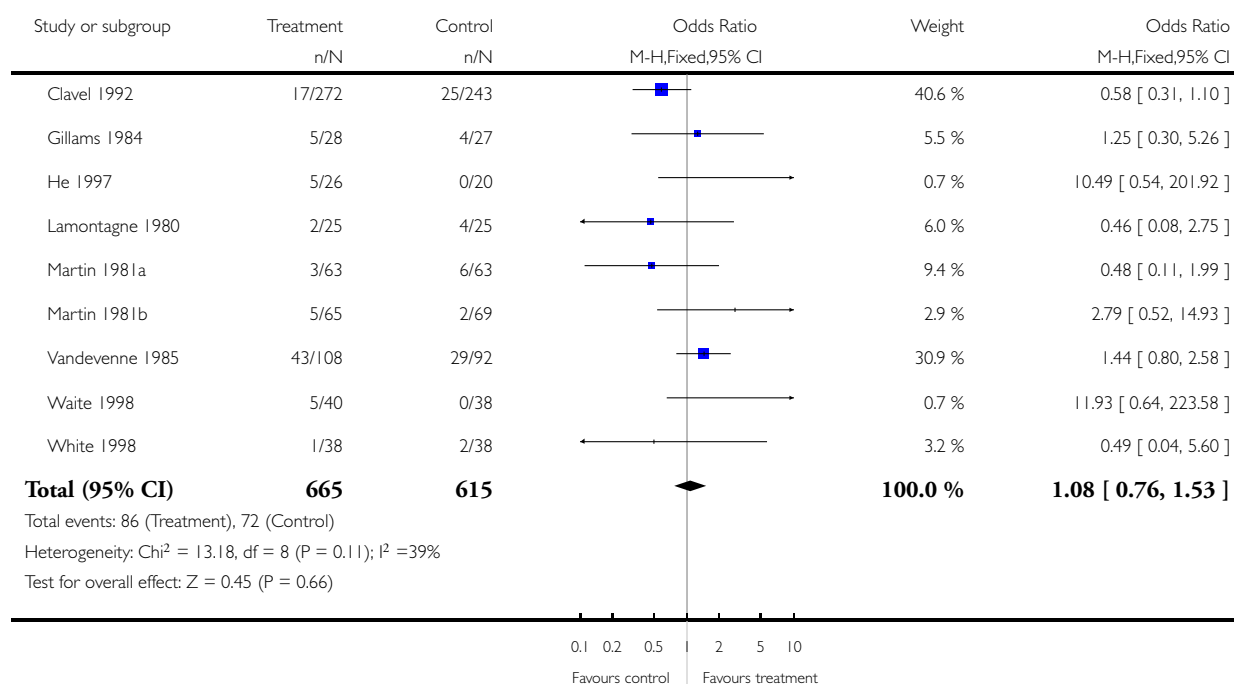


### Analysis 2.4. Comparison 2 Acupuncture vs sham acupuncture, Outcome 4 Including possibly active control interventions - late.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 2 Acupuncture vs sham acupuncture

Outcome: 4 Including possibly active control interventions - late

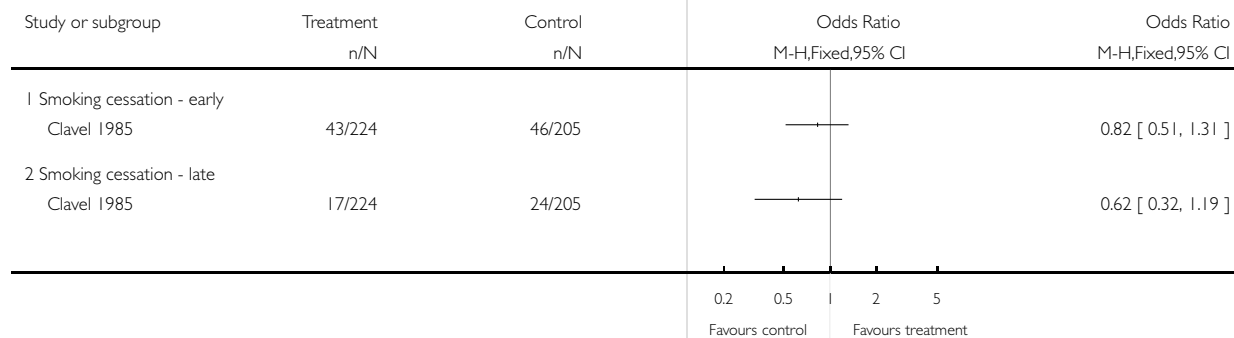


### Analysis 3.1. Comparison 3 Acupuncture vs other intervention, Outcome 1 NRT.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 3 Acupuncture vs other intervention

Outcome: 1 NRT

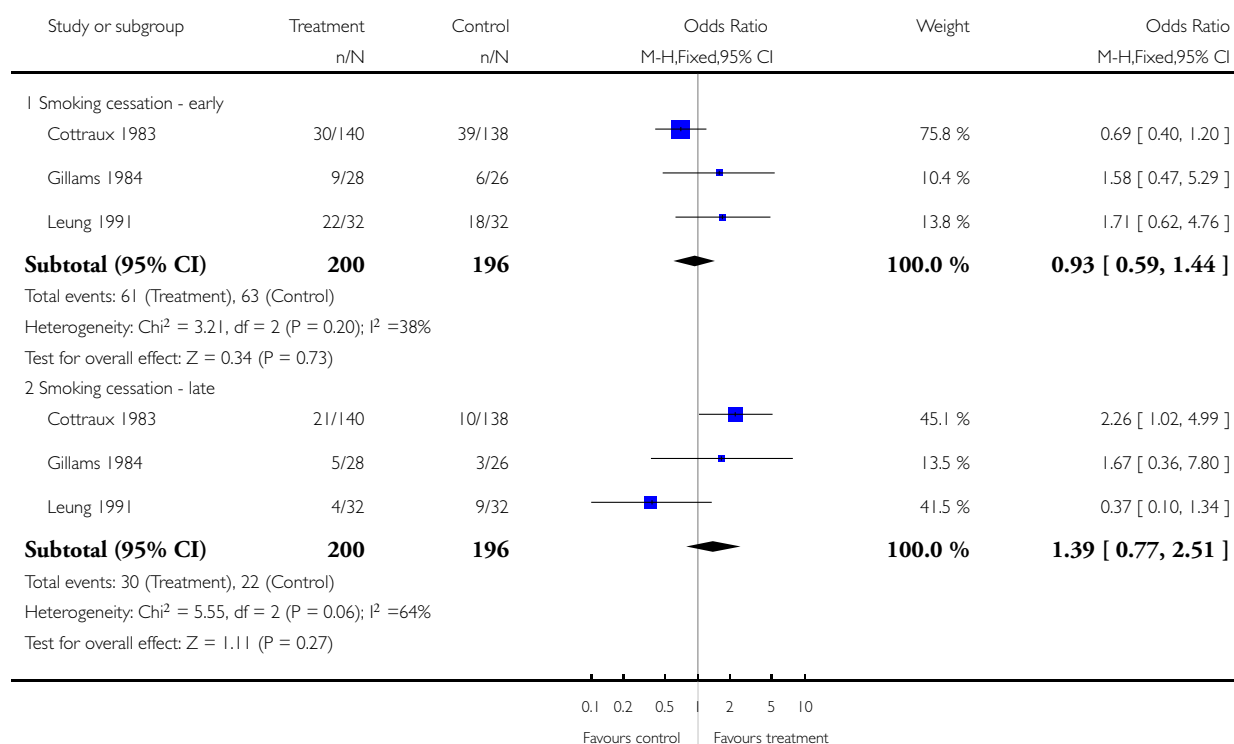


### Analysis 3.2. Comparison 3 Acupuncture vs other intervention, Outcome 2 Counselling and psychological approaches.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 3 Acupuncture vs other intervention

Outcome: 2 Counselling and psychological approaches

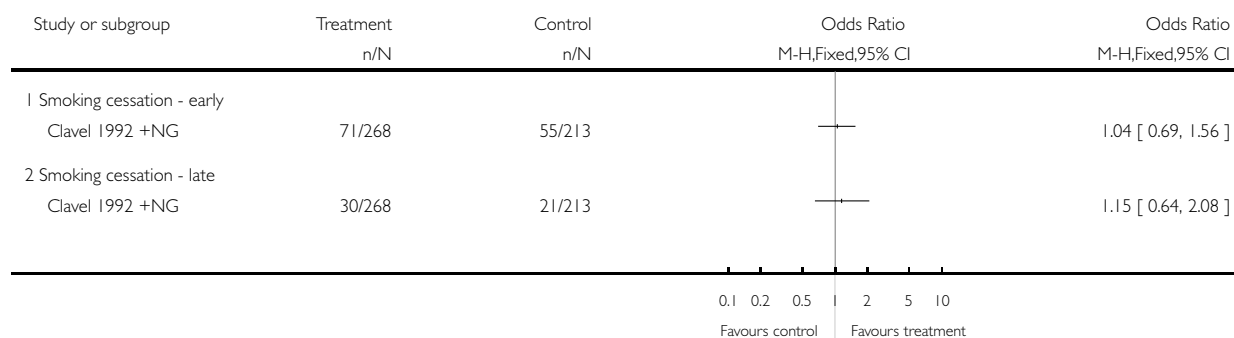


### Analysis 4.1. Comparison 4 Acupuncture as an adjunct, Outcome 1 Adjunct to NRT.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 4 Acupuncture as an adjunct

Outcome: 1 Adjunct to NRT

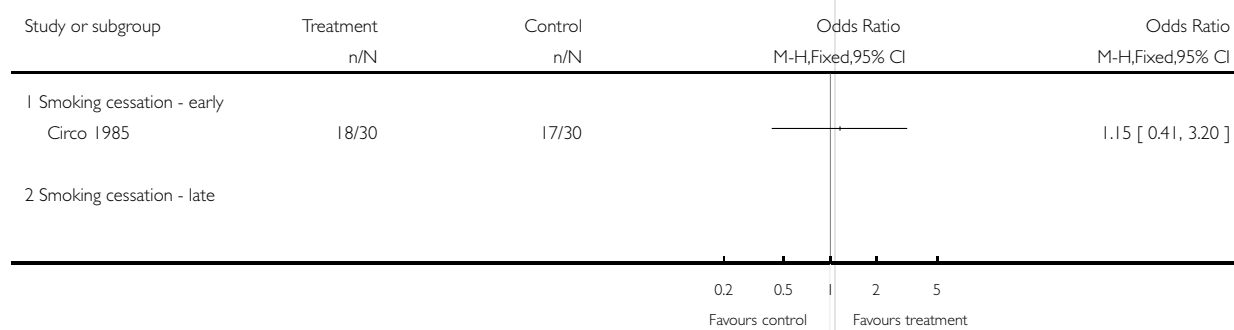


### Analysis 4.2. Comparison 4 Acupuncture as an adjunct, Outcome 2 Adjunct to counselling and psychological approaches.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 4 Acupuncture as an adjunct

Outcome: 2 Adjunct to counselling and psychological approaches

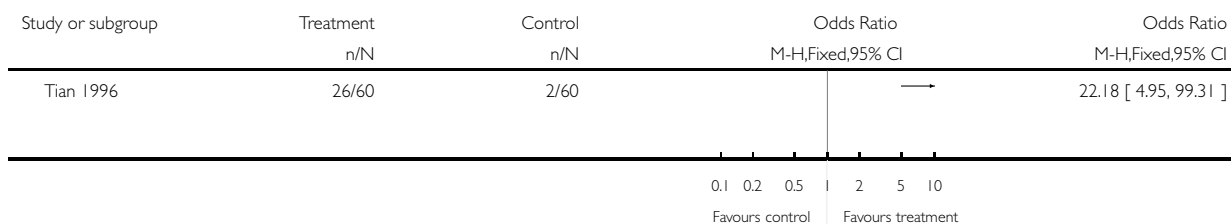


**Analysis 11.1. Comparison 11 Acupressure vs waiting list/no intervention, Outcome 1 Smoking cessation - early.**

Review: Acupuncture and related interventions for smoking cessation

Comparison: 11 Acupressure vs waiting list/no intervention

Outcome: 1 Smoking cessation - early

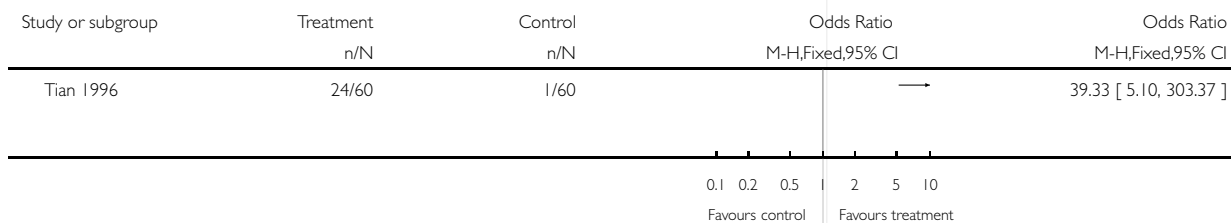


**Analysis 11.2. Comparison 11 Acupressure vs waiting list/no intervention, Outcome 2 Smoking cessation - late.**

Review: Acupuncture and related interventions for smoking cessation

Comparison: 11 Acupressure vs waiting list/no intervention

Outcome: 2 Smoking cessation - late

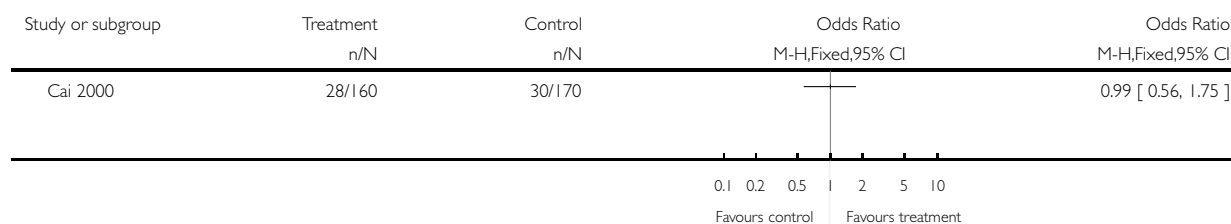


### Analysis 22.1. Comparison 22 Laser therapy vs sham laser, Outcome 1 Smoking cessation - early.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 22 Laser therapy vs sham laser

Outcome: 1 Smoking cessation - early

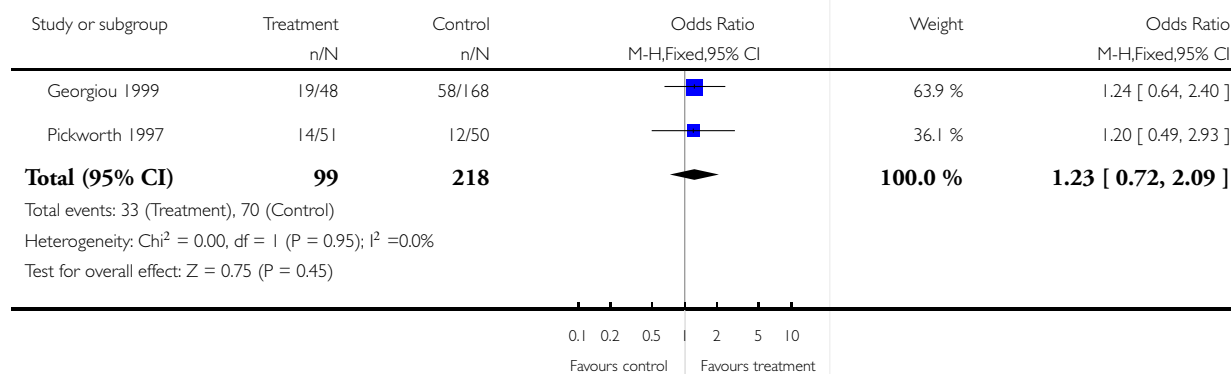


### Analysis 32.1. Comparison 32 Electrostimulation vs sham stimulation, Outcome 1 Smoking cessation - early.

Review: Acupuncture and related interventions for smoking cessation

Comparison: 32 Electrostimulation vs sham stimulation

Outcome: 1 Smoking cessation - early



## FEEDBACK

## Comment from Nguyen and colleagues (August 2002)

### Summary

1. We wish to inform you of a randomized controlled trial (RCT) eligible in the review : Vibes J. Essai thérapeutique sur le rôle de l'acupuncture dans la lutte contre le tabagisme. *Acupunct* 1977;51:13-20.

2. Three studies included in the comparison "acupuncture versus sham acupuncture" set methodological problems :

a. Gilbey 1977 should be excluded. Not only because "some authors regard kidney point (used as a control) as an effective treatment for dependency", but above all because kidney ear point is used in several clinical studies for smoking cessation. For instance, in Cui review on acupuncture for smoking abstinence [1], three studies used kidney ear point [2-4].

b. Lamontagne 1980 should also be excluded. "Acupuncture therapy for relaxation" as control cannot be considered as sham acupuncture. That intervention uses point ST36, also used in one study of Cui review [5] and in one RCT [6] included in the meta-analysis. Vibes RCT tests ST36, LV3, LI4 GB8, presented as "equilibrating and/or antitoxic general acting intervention". That acupuncture intervention revealed to be superior to sham acupuncture.

c. In Martin 1981(a), there is discrepancy between the control group (and the total size) in the table "characteristics of included studies" and the data used in the graph : the selected control group is in fact the group "P + stimulation" of the original study. This group includes electro-acupuncture at LI4 and "tongue" ear point. For the same motives as in the two previous studies, this control group cannot be chosen as sham acupuncture. LI4 is used in two studies in Cui review [5,7], in two RCT included in the meta-analysis [8,9] and in Vibes study.

From a general point of view, it seems inadequate to select as sham acupuncture interventions using points employed in clinical studies dealing with the same disease. This criterion (a practical and effective use of a point) is stronger than the theoretical expert opinion, and should lead to exclude these studies in a comparison acupuncture versus sham acupuncture.

3. In the comparison "acupuncture versus sham acupuncture-early", Waite 1998 trial is omitted without explanation. This trial has data non biochemically validated available at two weeks, that seem to meet the criteria of the review.

4. We also draw your attention to the problematic data following :

a. in Parker 1977(a) and (b), the data to be selected for the size of groups seem to be the concordant ones appearing in the text and figure 1 (Parker (a) 18 patients: 9 for acupuncture, 9 for sham; Parker (b) 23 patients: 11 for acupuncture, 12 for sham) and not data in table 1.

b. In the comparison "01 -Acupuncture versus sham acupuncture, 01 -smoking cessation early": He 1997 8/26 in acupuncture group, not 7/26.

5. In references, Lagrue 1977 is in fact Lagrue 1980.

6. Pickworth 1997 trial uses "the application of electrical currents from surface electrode...placed on each mastoid process". The authors don't identify any acupuncture points, never use the word "acupuncture" and don't mention any acupuncture study in bibliography. For that motives, including this type of studies in a review "Acupuncture for smoking cessation" seems inadequate.

From remarks 1-4, comparison "acupuncture versus sham acupuncture" should be reconsidered.

1- Cui M. Advances in studies on acupuncture abstinence. *J Trad Chin Med* 1995;15(4):301-7.

2- Cai ZM. [Ear points arousing propagated sensation for stopping smoking in Senegal]. *Fujian J Trad Chin Med* 1986;17(5):22-4.

3- Li GJ. [33 cases of smoking cessation treated with ear point pressure]. *Jianxi J Trad Chin Med* 1990;21(4):40.

4- Requena Y, Michel D, Fabre J, Pernice C, Nguyen J. Smoking withdrawal therapy by acupuncture. *Am J Acupunct* 1980;8(1):57-63.

5- Sacks LL. Drug addiction, alcoholism, smoking, obesity treated by auricular staplepuncture. *Am J Acupunct* 1975;3(2):147-151.

6- Vandevenne A, Rempp M, Burghard G, Kuntzmann Y, Jung F. Etude de l'action spécifique de l'acupuncture dans la cure de sevrage tabagique. *Sem H<sup>p</sup> Paris* 1985;61(29):2155-60.

7- Cheung CKT. Acupuncture treatment and the preventive applications for cigarette smokers. in: *Compilation of the abstracts of acupuncture and moxibustion papers. Proceedings of the 1st World Conference on Acupuncture-Moxibustion. 1987 Nov 22-26:Beijing,China. p.76-7.*

8- Steiner RP, Hay DI, Davis AW. Acupuncture therapy for the treatment of tobacco smoking addiction. *Am J Chin Med* 1982;10(1-4):107-21.

9- Labadie JC, Dones JP, Gachie JP, Freour P, Perchoc S, Huynh-Van-Thao JP. Désintoxication tabagique : acupuncture et traitement médical. Résultats comparés à 1 an sur 130 cas. *Gaz Med Fr* 1983;90(29):2741-7.

I certify that I have no affiliations with or involvement in any organisation or entity with a direct financial interest in the subject matter of my criticisms.

## Reply

We are grateful to Dr Nguyen for his detailed comments.

1. Thank you for information about this trial of which we were unaware. We shall consider it for inclusion in the next review.

2. The question of appropriate and inappropriate controls runs through the whole of acupuncture research and will not be satisfactorily solved until 'Phase I & II' type studies are conducted. Without hard data, therefore, we took the pragmatic decision to accept each original author's view of what was an acceptable control. We feel it would be wrong to overturn the author's view of the sham, often very well considered and referenced, without strong reason to do so. We acknowledge that this might result in reducing the effect size for acupuncture. However, there are other biases affecting the same issue, such as the psychological equivalence of the sham control (e.g. do acupuncture studs placed in the knee have an equal psychological effect to those in the ear?). The question of whether 'acupuncture for relaxation' was an inactive control was problematic; however, there are many ways of producing 'relaxation' none of which is known to have any benefit in smoking cessation. On balance, then, we decided to keep this group in the analysis.

3. Thank you for pointing out the review omits some data reported in the Waite trial at 2 weeks. I have checked our extraction records and find that neither of the reviewers involved extracted these data, and I guess this is probably because they are only referred to very indirectly in the text, in comparison to the validated data. We therefore did not discuss whether these data are admissible. We note that they were obtained by telephone, and subsequently in the same trial, 2 out of 7 who claimed on the telephone to have stopped smoking actually were still smoking. It seems probable that all verbal reports of smoking are subject to error, but those made face-to-face may be more reliable than those made over the telephone; we shall discuss whether to include the latter in the next revision.

4.a) there is a clear discrepancy in group sizes in the report by Parker. We shall reconsider these extracted data at the next revision.

b) In the report by He, although 8 subjects reported smoking cessation, only 7 were confirmed biochemically (see 'Tobacco consumption versus cotinine concentration').

5. Thank you, we shall correct this in the next revision.

6. At the time of our 2nd revision conducted earlier this year, the Cochrane Group recommended including other stimulation techniques, on the basis that they should be reviewed and did not have any other natural home. We did not consider changing the review's title, but will consider this for the next revision. Thank you for the suggestion.

A R White, H Rampes, E Ernst

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## WHAT'S NEW

Last assessed as up-to-date: 23 October 2005.

17 June 2008	Amended	Converted to new review format.
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## HISTORY

Protocol first published: Issue 1, 1997

Review first published: Issue 1, 1997

24 October 2005	New citation required but conclusions have not changed	<p>Title changed to include techniques related to acupuncture. Two newly discovered study included (Bier 2002; Vibes 1977). Outcome time-points now limited to two: immediately after treatment, and last from 6 months up to one year.</p> <p>Studies in which acupuncture is used as an adjunct (to NRT or counselling) are now analysed separately.</p> <p>Comparisons modified: acupuncture now compared to other effective interventions (NRT, counselling) separately, and no longer compared with interventions of no known effect.</p> <p>The Mantel-Haenzel method now used for primary method for combining studies.</p> <p>Subgroup analyses performed excluding studies in which the control intervention included points used as active in other studies. Analysis comparing the effectiveness of different styles of intervention is now limited to direct comparisons.</p>
18 February 2002	New citation required but conclusions have not changed	<p>Inclusion criteria for studies have been widened to cover acupressure, laser therapy, and cranial electrostimulation; which are stimulation therapies related to acupuncture and used for smoking cessation. The age limit for study participants has been removed to increase the relevance of the review.</p>

## CONTRIBUTIONS OF AUTHORS

AW & HR extracted data. AW drafted the review with intellectual contributions and textual revisions by HR and JC.

## DECLARATIONS OF INTEREST

AW is author of a trial included in this review, and is in part-time private acupuncture practice; he received no financial support from any commercial entity.

HR has not received any sponsorship for this study.

JC has no conflict of interest.

## **SOURCES OF SUPPORT**

### **Internal sources**

- General Practice & Primary Care, Peninsula Medical School, Universities of Exeter and Plymouth, UK.

### **External sources**

- NHS Research and Development National Cancer Programme, England, UK.
- Adrian White is supported by the DH National Coordinating Centre for Research Capacity Development, UK.

## **NOTES**

Comments were received from Dr Nguyen and colleagues 5/8/2002; these, together with the authors' response, are included in the feedback section of the review. All consequent changes have been incorporated in the current update (2006, Issue 1).

Two new trials were added for the 2005 update, but conclusions remained unchanged.

## **INDEX TERMS**

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

\*Acupuncture Therapy; Acupressure; Electric Stimulation Therapy; Laser Therapy; Randomized Controlled Trials as Topic; Smoking [\*therapy]; Smoking Cessation [\*methods]

### **MeSH check words**

Humans