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Literature Search Results

Search request date: 5th July 2013
Search completion date: 11th July 2013
Search completed by: Alison Price

Enquiry Details

Electro stimulation therapy - effectiveness in treatment for addiction, withdrawal and adjunctive treatment of anxiety etc, in addictions.

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National Guidelines

The following guidelines and evidence overview are included for information, as none include electro stimulation therapy in their discussions and recommendations which is perhaps suggestive of the current lack of conclusive supporting evidence.

NICE: Drug misuse: opioid detoxification Clinical guidelines, CG52

<http://guidance.nice.org.uk/CG52>

Department of Health (England) and the devolved administrations (2007). Drug Misuse and Dependence: UK Guidelines on Clinical Management. London: Department of Health (England), the Scottish Government, Welsh Assembly Government and Northern Ireland Executive

http://www.nta.nhs.uk/uploads/clinical_guidelines_2007.pdf

Treating drug misuse problems: evidence of effectiveness

Michael Gossop, Kings College London. 2006

National Treatment Agency for Substance Misuse

N.B. Michael Gossop references his own paper on the clinical effectiveness of electro stimulation compared with methodone in this document, but uses the reference in relation to acupuncture rather than EST. As well as being the author of this report, he is one of three named advisors on the Drug Misuse and Dependence: UK Guidelines on Clinical Management above.

Acupuncture

Various “complementary therapies” have been used to treat drug addiction. One of the most frequently used involves acupuncture. There may be more than 400 substance abuse clinics in the United States and Europe providing some form of acupuncture treatment (Margolin et al, 2002). In a study of acupuncture for the treatment of opiate withdrawal, acupuncture was found to be less effective than a standard methadone detoxification treatment (*Gossop et al, 1984*).

Gossop M, Bradley B, Strang J, Connell P (1984). The clinical effectiveness of electrostimulation versus oral methadone in managing opiate withdrawal. *Br J Psychiatry*, 144, 203-8.

www.nta.nhs.uk/uploads/nta_treat_drug_misuse_evidence_effectiveness_2006_rb5.pdf.

The following rapid literature review was conducted for the NHS Grampian Current Evidence, Reference and Guidance on Addictions (CERGA) group in relation to drug and alcohol misuse.

NeuroElectric Therapy™ in Opiate Detoxification Fingleton and Matheson Academic Primary Care, University of Aberdeen, December 2012

Full text at: www.hi-netgrampian.net/hinet/secure_files/20130227NeuroElectric%20Therapy.doc

Review Question: *How strong is the evidence base in support of the use of NeuroElectric Therapy™ (NET™) in opiate detoxification as a component of drugs rehabilitation, to improve drug-free behaviour including abstinence, in opiate dependent people?*

Key Points

- a) Four distinct studies were identified for inclusion in the review. Two were conducted in the United Kingdom (UK) and two in the United States (US).
- b) When compared with placebo, NET™ was found to be **no** more effective at reducing withdrawal and craving in opiate detoxification.
- c) The evidence base was predominantly focussed on short-term outcomes e.g. craving and withdrawal symptoms. One study reported long-term follow-up but this was of poor methodological quality.
- d) There is insufficient evidence regarding the effectiveness of NET™ at improving drug-free behaviour and further research of good methodological quality is required.

Background

NeuroElectric Therapy™ (NET™) is a particular form of cranial electrostimulation which involves electrical stimulation delivered transcranially via adhesive surface electrodes placed behind the ear (Platt and Nelson 2012). It was developed by Patterson in 1973. Patterson was working in a hospital in Hong Kong in 1972. Her colleague, Dr Wen, was experimenting with electroacupuncture analgesia (Patterson 1979). Several of his patients were drug addicts who, according to Patterson (1973), reported that their craving for heroin disappeared and their withdrawal symptoms quickly decreased after receiving electroacupuncture. After further experimentation, Patterson concluded that the acupuncture needles were unnecessary and that only the electrical stimulation had any therapeutic significance (Patterson *et al.* 1996). Consequently, she replaced the acupuncture needles with adhesive electrodes attached behind the ear.

NET™ is claimed to rapidly reduce both acute and chronic withdrawal symptoms associated with chemical substances (Patterson *et al.* 1984). According to Patterson *et al.* (1996), NET™ is 'distinctive in its use of multiple frequencies dictated by the individual substance(s) under treatment and given at carefully timed stages of the individual treatment schedule'. There are other studies of electrostimulation without specific reference to NET™. These have been excluded from the review as they were not specified in the research question.

This brief topic review sought to identify the published literature in relation to the use of NET™ in opiate detoxification.

Methods

An electronic database search was carried out using MEDLINE and Scopus. Both databases were searched from inception to November 2012. Titles and abstracts were searched using the following terms: 'neuro electric therapy', 'neuroelectric therapy' or 'electrostimulation', and 'opiate(s)', 'opioid(s)' or 'heroin'. Only articles in the English language were included. The search of MEDLINE was also restricted to human studies.

Results

Forty unique articles were retrieved by the search. The majority did not involve humans (n=17) or pertain to opioid dependence (n=12) and were therefore excluded. Seven further articles were excluded from the review, these comprised:

- i. A report of the effects of NET™ in drug addiction; however, this was a preliminary report (Patterson 1976).
- ii. An article describing NET™; this did not report any original study data (Patterson 1979).
- iii. Two letters to the editor (Patterson 1985; Patterson 1989).
- iv. A review of cranial electrostimulation use in the detoxification of opiate-dependent patients; no previously unidentified studies specific to NET™ were referred to (Alling *et al.* 1990).
- v. An article by Patterson *et al.* (1996) referring to results of a study which they received via personal communication.
- vi. A physiology paper regarding the use of electrostimulation to block opiate abstinence syndrome; this was not specific to NET™ (Kharchenko 2001).

Four articles pertaining to three distinct studies were identified for inclusion in the review. One further article was included from the grey literature; this was a company report from NET™ Device Corp. The included studies were one randomised controlled trial (RCT), one controlled trial, and two uncontrolled cohort studies. This evidence is briefly discussed below grouped according to study design.

Randomised Controlled Trial (n=1)

Gariti *et al.* 1992

This was a double-blind, placebo-controlled RCT from Philadelphia involving 18 opiate-dependent individuals between the ages of 29 and 46. Participants had used opiates for an average of 13.5 years; ten were dependent on methadone and eight on heroin. Twenty-five cocaine-dependent individuals were also involved but only the procedures and results for those dependent on opiates will be discussed here.

Simple block, random assignment without stratification used a table of random numbers, to assign participants to a treatment group. Patients were hospitalised for 12 days on secured wards and stabilised on 20-30mg/day methadone prior to starting treatment as it was believed that this would result in, at least, moderate withdrawal discomfort. Both the intervention and the placebo group wore a NET™ stimulator for seven to ten days. The intervention group received continuous electrical stimulation for six days which was progressively intermittent for the last four days. The placebo group received an electric current throughout the ten days which was lower than that received by the intervention group; it was believed that this lower current would be insufficient in producing a therapeutic effect.

Withdrawal and craving were measured twice daily using a self-report checklist. The blinded technicians administering the scales would then give an overall rating of the patients' withdrawal symptoms.

Completion was defined as completing 80% or more of the specified trial days, and a rate of 77.8% was achieved for the opiate-dependent group. Withdrawal symptoms were highest at two to four days, and then progressively decreased. The control group reported slightly greater feelings of withdrawal and craving during these days, but there were no significant differences between the intervention groups ($p > 0.10$). The findings suggest that NET™ is no more effective than placebo at reducing withdrawal and craving during opiate detoxification.

Controlled Trial (n=1)

Gossop *et al.* 1984; Gossop & Bradley 1984

Twenty-four opiate-dependent individuals were consecutively admitted to an in-patient drug dependence unit in the UK. The first twelve patients were assigned to NET™ treatment, and the remainder to methadone withdrawal (MW). There were no significant differences between the two groups in terms of age, drug dosage or length of opiate use.

Withdrawal symptoms were measured at intervals using the Opiate Withdrawal Questionnaire. Treatment with NET™ lasted for ten days, whereas the MW procedure took place over a period of 21 days. 58.3% of NET™ and 75% of MW patients completed their respective treatment periods. Only a third of patients in both groups remained ten days after completing treatment. There was no significant difference in the drop-out rate between the two groups.

The NET™ group reported high levels of withdrawal symptoms throughout the ten day period, which peaked at day three, and steadily declined thereafter. Symptoms were low ten days after treatment. In contrast, withdrawal symptoms in the MW group remained moderate or low throughout treatment, but showed no sign of decreasing, even ten days after treatment. The time by group interaction was highly significant ($p < 0.0001$). There was also a significant time effect ($p < 0.001$), which was accounted for by the steady decrease in withdrawal symptoms after day three for the NET™ group. However, there was no significant difference between the withdrawal scores of the two groups at the end of their respective treatment, or at ten days following treatment.

The results show that NET™ failed to suppress symptoms of opiate withdrawal. Those receiving NET™ experienced many symptoms in the early stages of withdrawal, which were both statistically and clinically significantly more severe than those experienced by the MW group. Patients receiving NET™ reported more severe withdrawal symptoms than those undergoing MW for the entire ten day treatment period.

The authors concluded that there were problems with both withdrawal procedures. Those receiving NET™ reported higher levels of distress in the early stages but showed a more rapid improvement. However, those receiving methadone reported less severe symptoms, but these were experienced for an extended period of time as would be expected with an opiate such as methadone that has a long half-life.

The article by Gossop & Bradley (1984) contained the same participants as in the study above, but with four additional participants admitted to the MW group. This report looked at insomnia, which is widely recognised as one of the central symptoms of opiate withdrawal syndrome (Jaffe 1968 cited in Gossop & Bradley 1984, p. 192). Sleep records were obtained by nurses throughout the night in 15 minute blocks. Patients were categorised as 'asleep', 'awake' or 'drowsing'.

Initially, there was no significant difference in the mean number of hours slept between the groups. However, those receiving NET™ experienced a marked reduction in sleep duration after the first night and, on average, slept less than three hours by the eighth night, after which the duration of sleep began to increase. Those receiving MW experienced less night to night variability in the mean amount of hours slept. The MW group slept significantly more than those in the NET™ group over the course of the three weeks, with an average of 6.6 and 5 hours sleep respectively ($p < 0.001$). Both groups were sleeping less than six hours on average thirty days after admission.

Night time awakening was also reported. For those receiving NET™, disruption was greatest in the first 2.5 weeks following admission. In contrast, MW patients experienced the greatest disruption three weeks after admission. Of those experiencing night time awakening, those in the NET™ group spent more time awake initially, but this pattern reversed at night 15. There were no significant differences between the two groups 30 days after admission.

Uncontrolled Cohort Studies (n=2)

Patterson et al. 1984

From 1973 to December 1980, 186 patients were treated for addiction with NET™ in England. Opioids were the main drug of use for 60% (n=112) of the sample. The remainder used other drugs (n=18), alcohol (n=30) and nicotine (n=26). This study presented detailed data on the immediate effects for the year 1980 only. There was a tendency for the mean abstinence syndrome ratings by both nurses and patients to worsen from days 1-2 to days 3-4 days, and then improve thereafter. The mean sleep quality rating by both nurses and patients improved from nights 3-5 to nights 9-10. The number of patients per day reporting freedom from anxiety and craving increased throughout the ten-day treatment period. However, no significance testing was carried out to determine whether these improvements were significant.

Follow-up data were presented for patients admitted from 1973 to 1980. Follow-up questionnaires were sent via post, with some non-responders being interviewed by staff instead. All those who had been admitted for drug use, as opposed to alcohol or nicotine, were grouped together regardless of the main drug used; consequently, the outcomes for those admitted for opioid dependence alone are not known. Only 51% (n=66) of those admitted for drug dependence could be followed-up due to insufficient resources. There was no indication of how patients were selected for follow-up. The majority of patients were followed-up less than 12 months after receiving NET™ (41.5%, n=22), whilst 35.9% and 22.6% were followed-up between 1-2 years and 3-8 years, respectively. Of those followed-up, 80% (n=53) were reported as being addiction-free at the time of follow-up.

Platt & Nelson 2012 (Grey Literature)

This open-label study comprised fifty-seven males who were recruited upon admission to a residential substance misuse treatment facility in Kentucky, US. Historical controls were used. However, in practice, this meant that the findings were sometimes compared to studies published between 1996 and 2009 which used methadone, buprenorphine and/or lofexidine for detoxification (n=9). These studies were not directly comparable to the current study.

The percentage of those testing positive for opiates, methadone and suboxone at intake were 68.4%, 22.8% and 10.5% respectively; there is likely to be overlap between these groups as 29.8% of patients tested positive for multiple substances. Other substances for which patients tested positive for were cocaine (26.3%) and methamphetamines (7%).

Acute withdrawal was assessed thrice daily during treatment using the Withdrawal Severity Scale (WSS). This contains, as a subset, each of the items on the Short Opiate Withdrawal Scale (SOWS). The results were analysed using the SOWS scores. Craving was measured using the Craving Questionnaire (CQ) at intake, discharge and one-month post- NET™; both are self-report measures. Multi-panel urines screens were performed at intake, discharge and one-month post- NET™.

The rate of completion was 78.9%. Completion of treatment was defined as 72 hours using NET™ or planned discharge of less than 72 hours and a final craving score of zero on the Withdrawal Severity Scale. The length of treatment ranged from 1-11 days, with an average of five days for completers and four days for non-completers. For both SOWS and CQ scores, there was a significant difference from intake to exit, as well as a significant difference between completers and non-completers at exit.

One-month follow-up interviews were completed by 52.6% (n=30). Of the 49% (n=28) who completed a urine screen at follow-up, 75% (n=21) tested negative. This meant that 36.8% were known to be abstinent one-month after treatment. There was no significant difference in CQ score between discharge and one-month follow-up.

Methodological points

All four studies were conducted in the UK (n=2) and the USA (n=2). However, the quality of the studies was generally weak and therefore the generalisability of the findings is questionable.

None of the studies reported the participation rate, i.e. the proportion of those approached who participated in the study. Only two studies used an appropriate control, i.e. placebo or MW (Gariti *et al.* 1992; Gossop *et al.* 1984). The two remaining studies used no control. Blinding was only carried out in one study comparing NET™ with a placebo.

Sample sizes were generally small. In the studies using larger sample sizes, appropriate controls were not used (Platt & Nelson 2012; Patterson *et al.* 1984). Furthermore, Patterson *et al.* (1984) presented many outcomes for the 'drugs' group as a whole, without differentiating between those treated for opioids and those treated for other drugs.

Gariti *et al.* (1992) did not report any follow-up after treatment completion and Gossop *et al.* (1984) only presented a ten-day follow-up. Whilst Platt & Nelson (2012) and Patterson *et al.* (1984) reported follow-ups of one month, and a variable follow-up ranging from less than 12 months to 3-8 years respectively, the rate of follow-up was around 50%; therefore, the rate of abstinence or 'drug-free' status may not be representative of the entire group. These studies reporting longer term follow-ups were also those that used an inappropriate or no control.

Conclusion

The evidence base for the use of NET™ in opiate detoxification is generally poor. NET™ was found to be no more effective than placebo at reducing withdrawal and craving during opiate detoxification. Unfortunately, this RCT did not report any longer term follow-up. Studies which reported long-term outcomes such as opiate abstinence were generally of poor methodological quality, and therefore the generalisability of the findings are questionable. Future research on the use of NET™ in opiate detoxification needs to make use of blinding, appropriate controls, long-term outcomes such as abstinence measured at appropriate timed follow-ups in order to make worthwhile contributions to the knowledge base.

References

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Patterson, M.A., Firth, J. & Gardiner, R. 1984, "Treatment of drug, alcohol and nicotine addiction by neuroelectric therapy: Analysis of results over 7 years", *Journal of Bioelectricity*, vol. 3, no. 1-2, pp. 193-221.

Patterson, M.A. 1989, "Neuro-electric therapy: criticisms of the 1984 Bethlem Study.", *British journal of addiction*, vol. 84, no. 7, pp. 818.

Platt, P. & Nelson, L. 2012, Assessing the Effectiveness of NeuroElectric Therapy in Reducing Craving and Acute Withdrawal Symptoms for Substance Dependent Men in Kentucky., Spalding University School of Social Work, Louisville, Kentucky.

Database Search Results

The Management of Opioid Withdrawal: An Overview of Research Literature Drug and Alcohol Services Council, South Australia Research Monograph No. 9. was published in 2000. I have searched for papers involving humans published from 2000 onwards which were not included in the review which notes:

Many of the studies of electrostimulation were confounded in their design and only limited comparisons were made with standard pharmacological approaches.

Electrostimulation may have some capacity to reduce withdrawal, but probably to a lesser degree than reducing doses of methadone. The equipment requirements and doubtful value of the approach probably explain the lack of interest in it in recent years.

www.dassa.sa.gov.au/webdata/resources/files/MONOGRAPH9.pdf

The review appraises the research paper Ellison F, Ellison W, Daulouede JP, Daubech JF, Pautrizel B, Bourgeois M & Tignol J (1987). *Opiate withdrawal and electro-stimulation. Double blind experiments. Encephale, 13(4): 225-229* which is referenced in the manual used by Addaction:

Ellison et al investigated the use of electrostimulation in the management of withdrawal for four groups of heroin users (Ellison et al 1987). All participants in the study were connected to electrostimulation equipment. Two groups, one of eight and one of six, received active electrostimulation for 48 hours. For a third group the electrostimulation equipment was not activated (effectively a placebo control group), while the fourth group received active electrostimulation for 24 hours and inactive electrostimulation for 24 hours. Active electrostimulation was commenced only when withdrawal was apparent. The trial was stated as being double-blind. Withdrawal was assessed by observers using the Himmelsbach scale, which predominantly rates objective signs of withdrawal. For those participants who received 48 hours of electrostimulation, the peak withdrawal score was less than three. For 5 of 6 in the control group who received no active electrostimulation the withdrawal score increased to more than three, the blind was broken and all were given electrostimulation. For 4 of 5 participants who received only 24 hours of active electrostimulation, the withdrawal score increased once electrostimulation was ceased, although the blind was broken for only one of these participants. It is unclear from the report how many participants completed detoxification. While this study suggests that electrostimulation may be more effective than placebo in managing the signs and symptoms of heroin withdrawal, it does not provide information on the effectiveness of electrostimulation compared to standard treatment approaches.

Very little additional research appears to have been published. I have included papers on electro acupuncture and TENS for information.

Databases searched:

PsychInfo, Medline, Embase

Search Terms

ELECTRICAL STIMULATION / ELECTRIC STIMULATION THERAPY / TRANSCUTANEOUS NERVE STIMULATION
OPIATES / OPIATE DEPENDENCE / OPIATE ADDICTION
DRUG ADDICTION / DRUG REHABILITATION / DRUG DEPENDENCE
METHADONE
TRANSCUTANEOUS NERVE STIMULATION

Randomised Controlled Trials

A randomized trial of transcutaneous electric acupoint stimulation as adjunctive treatment for opioid detoxification

Journal of Substance Abuse Treatment, January 2010, vol./is. 38/1(12-21)

Meade C.S., Lukas S.E., McDonald L.J., Fitzmaurice G.M., Eldridge J.A., Merrill N., Weiss

Abstract: This [pilot study](#) tested the effectiveness of transcutaneous electric acupoint stimulation (TEAS) as an adjunctive treatment for inpatients receiving opioid detoxification with buprenorphine-naloxone at a private psychiatric hospital. Participants (N = 48) were randomly assigned to active or sham TEAS and received three 30-minute treatments daily for 3 to 4 days. In active TEAS, current was set to maximal tolerable intensity (8-15 mA); in sham TEAS, it was set to 1 mA. By 2 weeks postdischarge, participants in active TEAS were less likely to have used any drugs (35% vs. 77%, $p < .05$). They also reported greater improvements in pain interference ($F = 4.52$, $p < .05$) and physical health ($F = 4.84$, $p < .01$) over time. TEAS is an acceptable, inexpensive adjunctive treatment that is feasible to implement on an inpatient unit and may be a beneficial adjunct to pharmacological treatments for opioid detoxification.

Conclusion.

Opioid dependence is a chronic relapsing disorder, with relapse to drug use frequently occurring within a month of detoxification (Gossop et al., 2002; Ling et al., 2005). Indeed, over half of participants in this sample used drugs within 2 weeks of discharge. The need for improved treatments for opioid dependence is clear. The results of this study suggest that adjunctive TEAS may lead to improved physical health and protect against relapse. [Ongoing research is needed to further explore the potential benefits of TEAS for opioid dependence.](#)

This paper provides a good overview of some of the physiological benefits of electrostimulation which may make it suitable for the alleviation of withdrawal symptoms. The full text can be downloaded at:

www.ncbi.nlm.nih.gov/pmc/articles/PMC2789908/pdf/nihms120239.pdf

A randomized effectiveness trial of methadone, TENS and methadone plus TENS in management of opiate withdrawal symptoms.

JPMA - Journal of the Pakistan Medical Association, December 2008, vol./is. 58/12(667-71), Bakhshani NM, Lashkaripour K, Sadjadi SA

Abstract: **OBJECTIVE:** To compare effectiveness of methadone, TENS (Transcutaneous Electrical Nerve Stimulation) and methadone+ TENS in management of opiate withdrawal symptoms. **METHODS:** The study was conducted in Zahedan Psychiatric center in 2005. Forty five opiate addicted men meeting DSM-IV criteria for substance dependency disorder participated in the study after informed consent. The subjects were randomly assigned to 3 treatment groups. Patients of first group were given 20-60 mg methadone daily, tapered over a period of 2 weeks. Patients of second group received daily 10-30 mg methadone, tapered similar to first group in combination with TENS treatment. The other 15 patients (third group) experienced low frequency (2 Hz) TENS for two weeks. **RESULTS:** There was no statistically significant difference in severity and number of withdrawal symptoms between the 3 groups prior to the start of treatments. But, severity and number of symptoms were significantly higher in TENS group (third group) in third day. In addition, 10 patients of TENS-group left the treatment programme after 5 days. The results showed that methadone only and Methadone plus TENS for the management of opioid detoxification were effective treatments. The comparison of number and severity of withdrawal symptoms in the methadone group and methadone+TENS group by seventh day didn't show significant differences. But, number and severity of withdrawal symptoms in methadone+TENS group were significantly lower than methadone group during tenth and fourteenth days. **CONCLUSION:** The results provide support for the use of methadone alone and methadone plus TENS for managing opiate withdrawal, but [TENS by itself has no significant effect on withdrawal symptoms](#). However, TENS in combination with a moderate dose of methadone could reduce severity of withdrawal symptoms effectively.

Non-randomised Research

Clinical observation of physiological and psychological reactions to electric stimulation of the amygdaloid nucleus and the nucleus accumbens in heroin addicts after detoxification.

Chinese Medical Journal, January 2012, vol./is. 125/1(63-6)

Fang J, Gu JW, Yang WT, Qin XY, Hu YH

BACKGROUND: Stereotactic surgery has been used to treat heroin abstinence in China since 2000 by ablating the amygdaloid nucleus (AMY) and the nucleus accumbens (NAc), which also provides opportunity to identify the relationship between these nuclei and addiction. Our study aimed to explore the physiological and psychological effects of electrically stimulating the AMY and the NAc in heroin addicts after detoxification by observing changes of heart rate, arterial pressure and occurrence of euphoria similar to heroin induced euphoria.

METHODS: A total of 70 heroin addicts after detoxification were recruited, and 61 of them were eligible to be given stereotactic surgery for heroin abstinence. The operation was carried out after determining the coordinates of all target nucleuses, and stimulation was performed at the AMY and the NAc solely or jointly. Heart rate, arterial pressure and occurrence of euphoria similar to heroin induced euphoria were recorded and analysed.

RESULTS: The average heart rate was (66 +/- 10) beats/min before electric stimulation, and significantly increased to (84 +/- 14) beats/min during stimulation, and changed to (73 +/- 12) beats/min 10 minutes after stimulation. There was a significant elevation of the average arterial pressure from 83 mmHg before stimulation to 98 mmHg during the stimulation, and it then decreased to 90 mmHg after stimulation. Forty-three of the 61 patients showed intense euphoria similar to heroin induced euphoria. The largest number (118/186) of euphoric responses occurred when the AMY and the NAc were stimulated at the same time. Odds ratio was 5.4 (95%CI: 2.4 - 11.9, P < 0.0001) to quantify the association. Results from a Logistic regression model showed a positive correlation between unilateral stimulation of either the AMY or NAC and induction of euphoria (OR > 1), especially when the left AMY or left NAc was stimulated (P < 0.05).

CONCLUSIONS: Our data are consistent with existing results that the AMY and the NAc are related to addiction. Different roles in drug dependence would be suggested according to the location of the AMY and NAc.

Evidence-Based Complementary and Alternative Medicine Volume 2012 (2012),

Acupuncture for the Treatment of Opiate Addiction

Jaung-Geng Lin,¹ Yuan-Yu Chan,^{2,3} and Yi-Hung Chen⁴

Acupuncture is an accepted treatment worldwide for various clinical conditions, and the effects of acupuncture on opiate addiction have been investigated in many clinical trials. The present review systematically analyzed data from randomized clinical trials published in Chinese and English since 1970. We found that the majority agreed on the efficacy of acupuncture as a strategy for the treatment of opiate addiction. However, some of the methods in several included trials have been criticized for their poor quality. This review summarizes the quality of the study design, the types of acupuncture applied, the commonly selected acupoints or sites of the body, the effectiveness of the treatment, and the possible mechanism underlying the effectiveness of acupuncture in these trials.

Conclusion

This review covered a wide body of Chinese and English research investigations into the use of acupuncture for the treatment of opiate dependence from the early 1970s up to 2011. After 35 years of active research by both Asian and Western scientists, this review cannot be used to establish the efficacy of acupuncture in the treatment of opiate addiction because the majority of these studies were classified as having low quality. Although this review may provide a basis for clinicians and future research, future well-designed RCT studies are needed to confirm the efficacy of acupuncture in the treatment of opiate addiction.

<http://www.hindawi.com/journals/ecam/2012/739045/>

Penetar et al. Chinese Medicine 2012, 7:14

Effects of transcutaneous electric acupoint stimulation on drug use and responses to cue-induced craving: a pilot study

Background: Transcutaneous electric acupoint stimulation (TEAS) avoids the use of needles, and instead delivers a mild electric current at traditional acupoints. This technique has been used for treating heroin addiction, but has not been systematically tested for other drugs of abuse. This study aims to investigate the effects of TEAS on drug addiction.

Methods: Volunteers who were either cocaine-dependent (n = 9) or cannabis-dependent (n = 11) but were not seeking treatment for their dependence participated in a within-subject, single-blind study. Treatment consisted of twice daily 30-minute sessions of TEAS or sham stimulation for 3.5 days. The active TEAS levels were individually adjusted to produce a distinct twitching response in the fingers, while the sham stimulation involved 2 minutes of stimulation at threshold levels followed by 28 minutes of stimulation below the detection levels. The participants recorded their drug use and drug cravings daily. At 1 hour after the last morning session of TEAS or sham stimulation, a cue-induced craving EEG evaluation was conducted. Event-related P300 potentials (ERPs) were recorded, sorted, and analyzed for specific image types (neutral objects, non-drug-related arousing images, or drug-related images). **Results:** TEAS treatment did not significantly reduce the drug use or drug cravings, or significantly alter the ERP peak voltage or latency to peak response. However, the TEAS treatment did significantly modulate several self-reported measures of mood and anxiety.

Conclusion: The results of this pilot study with a limited sample size suggest that the acupoint stimulation techniques and protocol used in this trial alone do not significantly reduce cravings for or use of cocaine or cannabis. The findings that TEAS modulates mood and anxiety suggest that TEAS could be used as an adjunct in a multimodal therapy program to treat cocaine and cannabis dependence if confirmed in a full randomized controlled clinical trial.

Alternative strategies involve application of **electrical stimulation to needles inserted into traditional acupuncture points or simply application of electrical stimulation via electroconductive pads on the skin at these acupoints**. These techniques have been found to be effective in reducing the severity of heroin withdrawal symptoms [10] and relapse [11]. Evidence for the possible effectiveness of these techniques for cocaine dependence may be inferred from an animal study, which showed that cocaine-induced conditioned place preference in rats was blocked by application of electroacupuncture at 100 Hz, but not at 2 Hz [12]. Neither traditional needle insertion nor electrical stimulation has been assessed in cocaine- and cannabis-dependent individuals.

10. Han JS, Wu LZ, Cui CL: Heroin addicts treated with transcutaneous electrical nerve stimulation of identified frequencies. *Regulatory Peptides* 1994, 54:115–116.

11. Wu LZ, Cui CL, Han JS: Han's acupoint nerve stimulator for the treatment of opiate withdrawal syndrome. *Chinese Journal of Pain Medicine* 1995, 1:30–38.

<http://www.cmjournal.org/content/7/1/14>

Trials of acupuncture for drug dependence: a recommendation for hypotheses based on the literature *Acupunct Med* doi:10.1136/acupmed-2012-010277

Dr Adrian White

Objectives; After initial promising research into acupuncture for withdrawal from drugs of dependence, two large negative trials were published in 2002 and the use of acupuncture in US rehabilitation facilities fell. However, subsequently it has been maintained, despite a lack of support from systematic reviews. This suggests a mismatch between research and clinical observation, which could be due to the acupuncture technique used, choice of controls or outcome measures. This study aims to explore the mismatch.

Methods; An exploratory review of all 48 clinical trials on alcohol, cocaine, nicotine or opioid dependence included in current reviews.

Results; Studies with sham controls (that could be active) were less likely to be positive (33%) than those with non-acupuncture controls (75%). Positive results were more likely when measuring craving (56%) or withdrawal symptoms (58%) than when measuring abstinence (31%) or attrition (31%). Three treatment variables appeared to be associated with positive results: (1) body acupuncture, used in 13 studies, was associated with positive outcomes for craving and withdrawal symptoms but not for abstinence or attrition; (2) **electroacupuncture**, used in seven studies, was associated with positive results with all four outcomes; and (3) bilateral needling in 20 studies was associated with effects on abstinence, craving and withdrawal symptoms.

Conclusions; The current evidence suggests that acupuncture may have some effects on drug dependence that have been missed because of choice of outcome in many previous studies, and future studies should use outcomes suggested by clinical experience. Body points and electroacupuncture, used in the original clinical observation, justify further research.

Acupuncture-related techniques for the treatment of opiate addiction: a case of translational medicine *Front. Med.* 2011, 5(2): 141–150

Jisheng Han (✉)^{1,2,3,4}, Cailian Cui^{1,2,3,4}, Liuzhen Wu^{1,2,3,4}

Abstract Drug addiction is a chronic brain disorder characterized by withdrawal symptoms that occur during drug abstinence and a high tendency of relapse. Compared with the currently available pharmacological interventions, acupuncture therapy has the potential to help drug addicts stay away from drugs without major adverse side effects. It has taken decades of research to optimize the parameters of electrical acupoint stimulation for detoxification and for relapse prevention, as well as to establish a safe and easy procedure by which drug addicts can use it on themselves. The discovery that acupuncture can trigger the release of opioid substances from the brain in the 1970s provided the inspiration.

Following this, basic research on animals made it possible to understand the mechanisms of action and establish the procedure for treating drug addictions. This article reviews the past, present, and foreseeable future regarding the use of acupuncture-related technique for the treatment of opiate addiction from the perspective of translational medicine.

<http://nri.bjmu.edu.cn/html/2011publish/1103.pdf>

Effect of electro-acupuncture intervention on cognition attention bias in heroin addiction abstinence-a dot-probe-based event-related potential study.

Chin J Integr Med. 2011 Apr;17(4):267-71

Jiang YP, Liu H, Xu P, Wang Y, Lu GH.

OBJECTIVE: To study the changes of cognitive attention-related brain function in the heroin addicts before and after electro-acupuncture (EA) intervention for exploring the concerned neuro-mechanism of addictive relapse and the central action role of EA intervention.

METHODS: Adopting event-related potential (ERP) technique, the ERP at 64 electrode spots in 10 heroin addicts (test group) were recorded before and after EA intervention with dot-probe experimental form during implementing cognitive task on positive emotional clue (PEC), negative emotional clues (NEC), and heroin-related clue (HRC). The P200 amplitude components on the selected observation points (Fz, Cz, and Pz) were analyzed and compared with those obtained from 10 healthy subjects as the control.

RESULTS: Before EA, the ERP of attention on HRC in the test group was higher than that on PEC and NEC ($P < 0.05$) and significantly higher than that in the control group ($P < 0.05$); after EA, the P200 amplitude of attention on HRC at Cz and Pz was significantly lowered ($P < 0.05$) and that on PEC at Fz was significantly elevated ($P < 0.05$). After EA, the P200 amplitude at Pz was ranked as NEC > PEC > HRC, but in the control group, it showed PEC > HRC at all three observation points and PEC > NEC at Pz.

CONCLUSION: Heroin addicts show attention bias to HRC, which could be significantly reduced by EA intervention, illustrating that EA could effectively inhibit the attention bias to heroin and so might have potential for lowering the relapse rate.

[Effect of electroacupuncture at Jiaji (EX-B 2) on drug craving of heroin addicts and beta-EP and Dyn-A in plasma]. Mu JP, Liu L, Fang W, Cheng JM, Zhao L.

Zhongguo Zhen Jiu. 2010 Nov;30(11):881-5.

[\[Article in Chinese\]](#)

OBJECTIVE: To explore the clinical effect and mechanism of electroacupuncture at Jiaji (EX-B 2) on drug craving of heroin addicts.**METHODS:** One hundred and twenty cases of heroin addicts were randomly divided into 4 groups, 30 cases in each. In acupuncture group 1, the Jiaji (EX-B 2) points of T5-T7 and Shenshu (BL 23) were selected with electroacupuncture; in acupuncture group 2, Neiguan (PC 6), Shenmen (HT 7) and Zusanli (ST 36) etc. were selected with electroacupuncture; in simulation group, Zusanli (ST 36) and Sanyinjiao (SP 6) were selected with analog electrical stimulation, and in blank group no any therapy was applied. The changes of drug craving were evaluated by Visual Analogue Scale (VAS) and the changes of beta-EP and Dyn-A in plasma before and after treatment were tested by radioimmunoassay.**RESULTS:** The relapse rate of 77.3% (17/22) in acupuncture group 1 was lower than those of 88.5% (23/26) in acupuncture group 2, 90.5% (19/21) in simulation group and 95.7% (22/23) in blank group (all $P < 0.05$). At the 8th and 10th week of treatment, the VAS scores in acupuncture group 1 and 2 were much lower than those in blank group and simulation group (all $P < 0.01$); in which, it was lower in acupuncture group 1 than that in acupuncture group 2 ($P < 0.05$), and lower in simulation group than that in blank group. After 10 weeks of treatment, compared with the status before treatment, beta-EP and Dyn-A in plasma were increased in acupuncture group 1 and 2 ($P < 0.05$, $P < 0.01$), Dyn-A was decreased in both simulation and blank groups (both $P < 0.01$) which was less obvious than those in both acupuncture groups (both $P < 0.01$) and superior in acupuncture group 1 than that in group 2 ($P < 0.05$).**CONCLUSION:** Electroacupuncture at Jiaji (EX-B 2) can suppress the drug craving and reduce the relapse rate, and the mechanism may be related with the content of beta-EP, especially the increase of Dyn-A in plasma.

Prospective study of Han's acupoint nerve stimulator for preventing relapse of detoxified heroin addicts Fang J., Ma D., Zhong J., Zhu B., Ding G.-H., Fu L.-M

National Medical Journal of China, June 2010, vol./is. 90/21(1472-1476)

Language: Chinese

Abstract: Objective: To assess the efficacy of transcutaneous electrical acupoint stimulation (TEAS) in preventing the relapse of detoxified heroin users in a period of 12 months.

Methods: A total of 164 rehabilitating heroin users in Shanghai area were recruited after compulsory detoxification treatment for a period ranging from 3 months to 3 years. The TEAS was executed by the device named Han's acupoint nerve stimulator (HANS). The patients were treated with HANS for at least 3 months. All the subjects were then followed up for one year and relapse was monitored by monthly heroin/morphine urinalysis. Results: Of 164 rehabilitating former heroin addicts, 53 remained drug-free at the end of 12 months observation period as judged by negative urinalysis while 35 become relapsed as documented by positive urine tests. The rest 76 dropped off due to various reasons and were all counted into the category of "relapsed". Thus, our data indicated 32.3% rehabilitating heroin users could stay sober for at least one year, which is significantly higher than the existing reports that less than 5% detoxified abusers would stay drug free for one year with no further intervention. No obvious correlation was found between the susceptibility of relapse and the duration of compulsory detoxification.

Conclusion: Compared to the existing literatures, our results indicate that HANS could produce a marked decrease of the relapse rate of rehabilitating heroin users after compulsory detoxification.

Suppression of cue-induced heroin craving and cue-reactivity by single-trial transcutaneous electrical nerve stimulation at 2 Hz

Addiction Biology, June 2006, vol./is. 11/2(184-189), 1355-6215;1369-1600 (June 2006)

Zhong F., Wu L.-Z., Han J.-S.

Abstract: The purpose of the present study was to investigate the efficacy of 2 Hz transcutaneous electrical nerve stimulation (TENS) to reduce cue-induced heroin craving and the corresponding cardiovascular responses. Seventy heroin addicts with at least 1 month of abstinence were enrolled and randomly divided into two groups of 35, to receive single-trial 2 Hz TENS (TENS group) or mock TENS (mock group) during experimental procedure, respectively. They were required to express their degree of craving by visual analog scale before and after the presentation of a video-cue, and after TENS treatment, which lasted for 30 minutes. Heart rate and arterial blood pressure were simultaneously monitored in 56 cases, with 28 in each group. Results show that in mock group, video-cue induced a dramatic increase of craving score, which did not return to baseline in 150 minutes, whereas in the TENS group, 2 Hz TENS treatment produced a significant decrease of craving, reaching baseline in 90 minutes. Video-cue induced a significant increase of heart rate and systolic and diastolic blood pressure, which remained elevated for at least 60 minutes in the mock group; whereas in the TENS group, they returned to baseline immediately after the termination of TENS. These results indicate that the craving induced by a heroin-related cue can be immediately and significantly suppressed, and the cardiovascular activation totally abolished by a single-trial 2 Hz TENS for 30 minutes 2006

Treatment of 121 heroin addicts with Han's acupoint nerve stimulator

Zhongguo Zhong xi yi jie he za zhi Zhongguo Zhongxiyi jiehe zazhi = Chinese journal of integrated traditional and Western medicine / Zhongguo Zhong xi yi jie he xue hui, Zhongguo Zhong yi yan jiu yuan zhu ban, August 2000, vol./is. 20/8(593-595), 1003-5370 (Aug 2000)
Zhang B., Luo F., Liu C.

Language: Chinese

Abstract: OBJECTIVE: To observe the Han's Acupoint Nerve Stimulator (HANS) for the treatment of heroin addicts. METHODS: One hundred and eighty-one cases of heroin addiction with obvious withdrawal syndrome were selected. Among them, 121 cases were randomly assigned to be treated with HANS, and the other 60 cases were taken as the control group. In the HANS group, patients were treated with HANS from the second day of their admission in the treatment center (when the withdrawal symptoms were obvious), they were given 4 treatments (30 min each) a day at the first 3 days, twice a day for 3 more days, and once a day 7 days later. The total treatment lasted 15 days. The acupoints selected were Hegu (LI4) and Laogong (PC 8) on one hand, Neiguan (PC 6) and Waiguan (SJ 5) on the other hand, and Zusanli (ST 36), Sanyinjiao (SP 6) on both legs. The frequency was 2/100 Hz, the intensities of the stimulations were 12-16 mA on arms and 16-26 mA on legs. All the manipulations in the control group were the same as in the HANS group, except that electrodes were placed at the acupoints without any electrical stimulation. RESULTS: There was no significant difference ($P < 0.05$) on the 8 indices (heart rate, body weight, sleeping time, chilling, pain, anxiety, catarrh and craving) observed between the 2 groups before treatment. After the HANS treatment, all the 8 indices improved significantly as compared with those observed before treatment ($P < 0.01$), while in the control group only a moderate improvement was observed. CONCLUSION: HANS is obviously effective in relieving the withdrawal syndrome in heroin addicts.

I am including this item with the caveat that it is taken from the Quackometer website which is not related to any evidence-based or NHS resources. The author writes:

The Quackometer and blog are experiments in critical thinking. If you read what I am writing, I very rarely venture past using a basic understanding of science. Most of the time, what I am doing is spotting common errors of thinking and argument, such as post hoc thinking, magical thinking, selective thinking and appeals to authority. As such, examining the claims of alleged quacks rarely relies on detailed medical knowledge. As such, being critical of health claims rarely needs detailed medical knowledge and, as such I hope this is something we can all take part in and debate.

It does however examine the exact question under review:

Can “Neuro-Electric Therapy” Treat Drug Addiction?

by Andy Lewis • November 16, 2010

I have been sent an email where a recruitment consultant was looking for someone to train as a ‘drug worker’ using a technique called Neuro-Electric Therapy (NET) to work on a Scottish substance misuse programme. The idea appears to be that by passing small electrical currents through someone in a specific pattern you could help people overcome drug addictions.

It is quite a remarkable claim. Drug addiction is a complex problem. It cannot just be simplistically reduced to biological causes with corresponding direct treatments. Drug addiction sits within much wider psychological and sociological framework and there are no magic bullets. Even within a wider treatment regime, it would appear remarkable that electric shocks can play any role.

The technique has some high profile supporters. In 2007, the Scottish First Minister, Jack McConnell, was reported to be calling for “a radical shake-up in Scotland’s drug rehabilitation policy after witnessing a controversial new heroin addiction treatment in action.” He had visited a trial of the technique that had apparently been invented by a Scottish neurosurgeon, Dr Meg Patterson. (We shall come on to the quality results of those trials in time). McConnell was convinced and said “We’re at the stage in Scotland where we need to have open minds and be willing to try new things”.

Is Neuro-Electric Therapy a plausible and worthwhile approach to drug addiction, or just wishful thinking and quackery? In order to gain some insight into this question, let us go back two-hundred and fifty years to the time when electricity was first being experimented with – the full overview of published research can be viewed below:

www.quackometer.net/blog/2010/11/can-neuro-electric-therapy-treat-drug-addiction.html

Related news item:

McConnell calls for new therapy treatment to help heroin users 14 February 2007

Jack McConnell has called for a radical shake-up in Scotland's drug rehabilitation policy after witnessing a controversial new heroin addiction treatment in action.

His comments came after he visited a trial of neuro-electric therapy (Net), a drug-free addiction treatment, invented by a Scottish neurosurgeon, Dr Meg Patterson.

www.heraldscotland.com/mcconnell-calls-for-new-therapy-treatment-to-help-heroin-users-1.852683