

Auricular acupuncture as an adjunct to treating substance use disorder

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Learning objectives

- At the end of this lesson, the reader should understand (1) why auricular acupuncture is used as an adjunctive treatment; (2) what research issues on auricular acupuncture for drug use involve; (3) why clinical praxis suggests good results; and (4) how to make an informed decision on whether to train staff and introduce auricular acupuncture into drug use treatment contexts.

Abstract

Auricular acupuncture for drug use is generally applied in a five-point protocol using short, slender disposable needles during a forty-minute treatment session. Clinical praxis from a wide range of international settings indicates auricular acupuncture increases physical and mental well-being for users of all kinds of drugs including alcohol. No extensive prior diagnosis is necessary. Research trials on auricular acupuncture have generally not clearly corroborated clinical experiences. However, clinical experiences suggest that clinic investment in auricular acupuncture greatly enhances placebo effects, aside from probable, though unproven active effects. Auricular acupuncture affords an opportunity for practitioners to non-verbally communicate care and empowerment to patients in recovery from drug use. The main psychological therapeutic benefit of auricular acupuncture is the patient's insight that it is possible to gain a sense of well-being without the help of drugs or medication.

I. Auricular acupuncture as an adjunct treatment for drug use

Auricular acupuncture is a non-verbal, simple treatment quickly administered to patients in groups. Short, slender, disposable needles are inserted just under the skin of patients' ears and the needles are left in place for approximately 40 minutes. This lesson reviews the use of

auricular acupuncture as an adjunct treatment for drug use in research and clinical settings.

The lesson consists of three sections. This first section begins with a description of auricular acupuncture treatment, followed by explanations of the treatment's working mechanisms in traditional Chinese medical terms and Western neuro-physiological terms. The second section reviews research in the area and discusses possible conclusions from this research as well as methodological research problems. The third section covers clinical issues related to auricular acupuncture in the context of addiction treatment, and concludes with a discussion on how to introduce and maintain auricular acupuncture treatment in an existing clinical context.

A brief history of auricular acupuncture

Acupuncture means to “puncture with a needle”. Acupuncture has been applied along energy channels called meridians on the body for about four thousand years to heal or relieve acute and chronic illnesses and pains, often in combination with herbal medicines. Auricular acupuncture is first mentioned for diagnosis of kidney ailments in the *Nei Jing*, the classic Chinese text on acupuncture written between 403 and 221 B.C. Later texts from China, India, Greece and Egypt indicate that auricular acupuncture has been used for treating various conditions for about 2500 years. Precise mapping of ear points did not occur, however, until the 1950s, when Paul Nogier, a French doctor practicing in Lyons, observed exact correlations between specific points on the ear and organs or areas of the body. Nogier's theory of what he termed “auriculotherapy” spread internationally after he presented an article in Germany in 1957. Nogier's work was paralleled in China by the Nanking army research unit for auricular acupuncture, which also systematically mapped ear points for use by “bare-foot doctors”¹. French and Chinese ear point maps, while similar, do not coincide exactly and should both be consulted for tailoring of individual treatment. A total of over 200 treatment points have been identified on the ear.²

In principle, ear points are “active” (meaning that they should be needled) only if they are tender when probed, as tenderness reflects an imbalance in the corresponding organ or system. Exceptions are when a point is tender due to normal variations in everyday life, e.g., when the Stomach point is tender after a person ingests a large meal, or when the Hormone point is tender in a woman who is menstruating. In contrast, the 365 body acupuncture points are consistently “active” since, according to TCM theory, they occur at openings in the 14 meridians on the body which channel the flow of *qi*, or vital energy (imbalance or blockages in the flow of *qi* are believed to lead to ill-health)¹.

The World Health Organization (WHO) has devised a nomenclature for auricular acupuncture, as well as recommendations for the treatment of various ailments and illnesses with auricular acupuncture³. A PubMed search in June 2005 using the key word “auricular acupuncture” for articles published from 2002 onward indicated applications for anxiety in connection with hospital procedures^{4,5}, reducing insomnia⁶, as a complement to analgesia in cancer pain⁷ and for regulating body weight⁸.

NADA-Acudetox treatment

Auricular acupuncture as a treatment for users of illicit drugs was introduced in the United States in 1973 as a complement to methadone treatment at what is now called the Lincoln Recovery Center at Lincoln Hospital in the Bronx, New York. The use of auricular acupuncture in the drug use treatment context followed a discovery, by Hong Kong doctor Hsiang-Lai Wen, that opium addicts who were anesthetized for an operation using acupuncture reported that opiate withdrawal symptoms were eliminated⁹. Over 30 years, the use of auricular acupuncture at Lincoln developed into a clinically effective five-point protocol now termed NADA-Acudetox and available at over 500 clinical sites in the world¹⁰.

The term NADA is an acronym for the National Acupuncture Detoxification Association, which organizes NADA-trained practitioners worldwide. At the same time, the NADA acronym reflects the insight that the clinical effects of auricular acupuncture can be achieved using virtually nothing (the word *nada* means “nothing” in Spanish). The term “Acudetox”, i.e. using *acupuncture* to achieve drug *detoxification*, refers to the original development of the NADA protocol in drug use treatment settings focusing on detoxification. However, “Acudetox” does not do complete justice to the NADA protocol since it is used in a wider variety of long-term drug treatment settings that far extend beyond initial drug detoxification.

The five points in the protocol are termed Shen Men, Sympathetic, Kidney, Liver and Lung (see Figure 1). NADA-Acudetox treatment as it is practiced and taught today consists of administering the five points by inserting them bilaterally in the patient’s ears just under the skin¹. The patient reclines comfortably in a high-backed chair. Needle insertion takes 60 seconds or less per ear and can elicit mild pain reactions in one or more points, though this by no means occurs consistently. Patients sit with the needles in their ears for at least 40 minutes. Once the minimum treatment time is over, needles can be removed by the patients themselves as they look into a small mirror. Needles are deposited directly into risk containers for disposal. After treatment, patients can continue daily activities as planned.

Insert Figure 1 about here

Treatment mechanisms

The mechanisms behind the effects of auricular acupuncture have not been conclusively elucidated. At present, the effects can be tentatively explained according to two theoretical

¹ In body acupuncture needles are inserted at varying depth, from subcutaneous to up to 2-3 cm.

models - Traditional Chinese Medicine (TCM) or Western neurophysiological empirically-based theory.

According to TCM, the insertion of acupuncture needles into any points releases blockage of *qi*, or life energy^{11,12}. This applies to acupuncture on body points as well as ear points. Each of the five ear points in the NADA-Acudetox protocol has a specific function. The Shen Men point (“Spirit Gate” in Chinese) calms the emotions and the Sympathetic balances activity in the sympathetic and parasympathetic nervous systems as well as relaxing muscle tension. The Kidney, Liver and Lung points balance the function of these specific organs. The Shen Men, Kidney and Lung points occur along a vertical line in the center of the ear, making it easy to identify their position, as well as the placement of the Liver and Sympathetic points in relation to the central vertical line (see Figure 1).

The NADA-Acudetox treatment also affects the balance between *yin* and *yang*, two opposing factors which according to TCM philosophy regulate functioning in all living organisms. NADA-Acudetox “tonifies *yin*” according to TCM, meaning that *yin* elements of darkness, humidity, and softness are strengthened. This occurs at the expense of *yang* elements of lightness, dryness and hardness. Furthermore, “empty fire” syndrome is treated, meaning that the feeling of inner emptiness typical for drug users is replaced, over several treatment sessions, with a psycho-physiological feeling of inner fullness and solidness^{1,11,13}.

Western scientific evidence for acupuncture effects on the human body and mind presently comes from animal and human studies focusing on the inhibition of pain and the release of neurotransmitter substances,¹⁴⁻¹⁸ as well as the identification of activated areas in the brain in humans.¹⁹⁻²⁴ The methodological quality of published animal studies on acupuncture varies. Available studies focus on body acupuncture^{14,17}; specific studies on actual neuro-physiological mechanisms behind auricular acupuncture are rare.^{25,26} The mechanisms behind body and auricular acupuncture, however, are assumed to be analogous

and are for both clearly multi-factorial. Based on anatomical observations, auricular acupuncture treatment evidently affects the parasympathetic nerve system with its influence on reflexes in the spine, the brainstem, hypothalamus and cerebral cortex^{27,28}. Body acupuncture is known to affect both the sympathetic and parasympathetic nerve systems, as well as the reticular system².

Acupuncture was used in the year 2000 by at least one million Americans seeking to relieve chronic pain conditions,²⁹ and the use of acupuncture appears to be on the rise. Central pain-inhibiting paths in the brain and the spine, and general systems in the hypothalamus and hypophysis affected by acupuncture involve the release of POMC (pro-opiomelanocortin) as a pro-hormone for beta-endorphins, ACTH (adenocorticotrophic hormone) and MSH (melatonin stimulating hormone). Spinal pain-inhibition has also been identified through binding of released transmitter substances to aminergic, opioid, GABA-ergic and glycinergic receptors.^{27,30} Animal studies have also shown that acupuncture-induced analgesia can actually be transmitted from a donor to recipient rabbits, although the mechanism for transmission has not been identified.³⁰⁻³² Interestingly, there is evidence that naloxone, an opiate antagonist, reduces the level of analgesia triggered by acupuncture; as pointed out in the cited review, this suggests that endorphins are involved in the analgetic process as both endorphins and naloxone bind to *mu* receptors, perhaps the most important opioid receptor type to which both endogenous and exogenous opiates bind.^{33,34} Not only endorphins are involved in the analgetic process, however; dopamine, norepinephrine and serotonin seem to be increased following administration of acupuncture treatments in rats.³²

More recent studies have turned to mapping brain activity in healthy humans in relation to acupuncture stimulation. Two studies using functional Magnetic Resonance Imaging (fMRI) have shown somewhat conflicting results. One study showed that stimulating healthy individuals

² The reticular system is a network of nerve threads that connects the spine with the brainstem, the hypothalamus, and the cerebral cortex. Stimulation of the reticular system affects muscle tone, breathing, blood pressure and alertness. Auricular acupuncture uses the reticular system as a channel.

at two body acupuncture points (LI4 and ST36) activated the hypothalamus and the nucleus accumbens, i.e, descending pain paths, and deactivated several areas in the limbic system that are connected to pain mechanisms²³. A different study, however, showed that healthy subjects stimulated at LI4 deactivated the hypothalamus, the nucleus accumbens, the ventral tegmental area and other areas, while activation occurred only in the somato-sensory cortex²⁰. A more recent study comparing sham acupuncture with active points showed that stimulation at LI4 caused specific activation at the temporal pole and deactivation in the precentral gyrus, superior temporal gyrus, pulvinar and Brodmann areas 8, 9 and 45²⁴. Interestingly, the technique of rotating needles in active body acupuncture points Liv3 and G40 appears to cause cortical neuronal activity which is absent when needles are rotated in sham points¹⁹. Other studies suggest differences in brain activation patterns among healthy subjects according to whether acupuncture is given manually or with electrical stimulation^{21,22}. Studies of brain activity among drug users are limited; one earlier study of brain activity among cocaine-dependent subjects showed that cocaine stimulation activated the nucleus accumbens and subcallosal cortex, and deactivated the amygdala, temporal pole and medial frontal cortex³⁵. Regarding the effects of auricular acupuncture on brain activity in human subjects, one study suggests effects related to weight reduction.³⁶ However, research has not been published on mapping of brain activity in following auricular acupuncture for drug use.

Evidently, knowledge about neuro-physiological and functional mechanisms that can adequately explain acupuncture effects is still limited. At the same time, TCM theory can explain acupuncture effects in ways that are intuitively accessible to clinicians observing positive effects in connection with acupuncture treatment. A wide gap thus exists between modern scientific and ancient healing paradigms, and clinically oriented research on the NADA-Acudetox protocol also shows mixed results, as detailed below.

II. Research on the NADA-Acudetox protocol

As noted above, the NADA-Acudetox protocol was originally developed at a methadone maintenance clinic in the Bronx, after the serendipitous discovery in Hong Kong that auricular acupuncture eliminated withdrawal symptoms among opiate users³⁷. The development of the protocol is described in detail elsewhere³⁸⁻⁴⁰. The NADA-Acudetox protocol is widely used today in many countries all over the world and it inspires overwhelming enthusiasm among practitioners in substance abuse treatment, psychiatry, and other treatment settings such as those for persons suffering from eating disorders, trauma survival⁴¹, homelessness or adolescent behavior problems.^{42 43} As is the case with many medical procedures that are regarded as generally effective in practice, research has not kept pace with clinical developments.

Scientific research papers concerning the NADA-Acudetox protocol have been published since 1987, ostensibly focusing on the basic research question of whether individuals treated with auricular acupuncture abstain from drugs to a greater extent than controls. Controls have been treated either with so-called “sham” acupuncture, meaning auricular points supposed to be inactive with respect to drug problems, or with “standard care” (generally varying levels of psychosocial treatment such as individual or group counseling, 12-step program participation or milieu therapy). Research on auricular acupuncture has suffered from a number of methodological problems that limit the validity of conclusions drawn from the studies. In brief, these are the problems:

- The experimental NADA points used in most randomized controlled studies have used only three or four of the five points in the NADA protocol^{13,44}.
- “Sham” acupuncture always means using points in some way active since needle insertion in the skin always produces a physiological response and the ear is furthermore dotted with active points. Thus, comparing the NADA protocol to “sham” acupuncture

means comparing to an active treatment using points not specifically chosen for drug use, rather than an inert, placebo treatment.^{2,45}

- “Standard care” or “treatment as usual” has not been clearly defined or standardized and attendance rates at treatment sessions or retention in treatment programs have sometimes not been reported for these control groups.⁴⁶⁻⁴⁸
- Double blind studies, a signature for “gold standard” clinical trials in pharmacology, are impossible to conduct when acupuncture is the treatment used: a basic requirement for effective treatment is experienced acupuncturists, who are always aware of the quality of the treatment they are administering. This means that only single-blind studies can be conducted, where only the subject is unaware of whether the treatment given is the supposedly “active” treatment or “sham”⁴⁹.
- The research setting in which acupuncture has been administered in most randomized controlled trials has differed radically from clinical settings (e.g., the acupuncturist has refrained from speaking to the patient at all, treatments have been restricted to a specified number rather than allowing patients to regulate their “dosage” themselves, and perhaps most importantly, auricular acupuncture has been offered as a stand-alone treatment rather than in combination with psychosocial support.^{45,49} This suggests that greater validity regarding findings on acupuncture as an adjunct to standard care might come from research designs covering existing clinical settings (for example Berman and Lundberg,⁵⁰ Russell, Sharp, and Gilbertson⁴⁶, Shwartz et al.,⁴⁸, Konefal, Duncan, and Clemence.⁵¹)

In view of the methodological problems involved in conducting research on auricular acupuncture, studies have in many cases not been able to answer the question of complete abstinence from drug use for treated individuals. Instead, other questions have been raised and discussed: alleviation of withdrawal symptoms and craving, alleviation of physical and

emotional negative symptoms related to drug use, and increased treatment retention. Research on auricular acupuncture can be sorted according to the main research question posed, the type of drug used by the subjects, or the recovery phase focused on in the study. Neither research questions nor recovery phases have been clearly delineated in the research. Table 1 presents a summary of research findings on auricular acupuncture, with studies sorted by the type of drug used by subjects. The discussion below looks first at drug type and then at the research questions noted above, as well as methodology.

Insert Table 1 about here

Published controlled research on auricular acupuncture in addiction treatment has focused on inpatients as well as outpatients. Most studies have limited their samples to individuals abusing one particular substance, such as alcohol^{47, 52-55}, cocaine⁵⁶⁻⁵⁹ or heroin⁶⁰ and have used a non-specific acupuncture protocol as a control. Half of these studies have shown reduced intake of the substance and one or two other positive effects among participants treated with variations of the widely used NADA Acudetox protocol^{52, 54, 56, 59-61}. The remaining studies have not found any difference between the NADA protocol and the control treatment^{47, 53, 57, 58}. One study focusing on the effect of a single session of ear acupuncture on psychological and physiological measures of drug craving among cocaine users found no difference between the experimental and control protocols⁶².

The addiction medicine-oriented approach of focusing upon groups of patients abusing particular substances, an approach which has steered most of the studies summarized in Table 1, is not always applied in publicly funded social services or criminal justice settings. Instead, clients or inmates are identified as generic “drug users” and at best a differentiation is made between abuse of alcohol and abuse of drugs. Controlled studies on auricular acupuncture for

outpatients with heterogeneous drug use have shown that adding acupuncture to already existing county treatment programs for such drug users has led to more rapid abstinence from drugs⁵¹, lower re-admission rates to a city detoxification program⁴⁸ and better treatment retention among criminal justice outpatients in substance abuse treatment⁴⁶. A recently published randomized study in a prison setting showed no differences between treatment and control groups, although both improved over time, showing better physical and mental health. Nonetheless, the study demonstrated the feasibility of acupuncture treatment in prison and an absence of negative side effects to the treatment⁴⁴.

The discussion of research findings continues below according to three basic research questions: alleviation of withdrawal symptoms and craving, alleviation of physical and emotional negative symptoms and increased treatment retention.

Alleviation of withdrawal symptoms and craving

Auricular acupuncture is frequently described as an adjunct to standard addiction treatment for its purported alleviation of withdrawal symptoms as well as drug craving. Published research on this particular question in humans is, however, limited to three studies. The first study, published in 1973, described how 40 opiate users who received acupuncture anesthesia prior to undergoing surgical operation reported significant reductions in abstinence withdrawal symptoms, as well as elimination of drug craving. These changes followed 10-15 minutes treatment with auricular electroacupuncture.³⁷ The second study, published in 1993, compared 100 heroin users who were randomized to either daily detoxification treatment for 20-40 minutes with four NADA points (excluding liver) for 21 days or to treatment with four “sham” non-specific ear points. No medication was given. Although participants completed a withdrawal symptoms checklist every week of the study, no data are presented on the results. Instead, the results focus on treatment retention, showing that NADA participants attended the

clinic for significantly more days than the control participants. NADA participants were also more likely to remain in treatment after the 21 stipulated program days. Fewer than 25% of the participants in both groups remained in treatment after two weeks⁶⁰. The third study was published in 2003 and was the first to actually report on withdrawal symptoms for 48 inpatients recovering from alcohol detoxification, who were randomized to symptom-based manual auricular acupuncture, laser acupuncture or sham laser acupuncture. The withdrawal symptoms lasted for four days in the laser and sham laser groups, compared to three days for patients in the needle insertion acupuncture group. However, the parallel use of sedatives confounded the results and adjustment for sedative use eliminated the statistically significant difference in the term of withdrawal⁵⁵.

A recent synopsis of acupuncture studies notes the lack of human studies on withdrawal but cites animal studies that have supported the effects of electroacupuncture on withdrawal symptoms in morphine-dependent rats. One early study by Ng et al from 1975 indicated that electroacupuncture significantly reduced signs of naloxone-induced withdrawal, such as hyperactivity, teeth chattering, and diarrhea.⁶³ A study by Cheng et al from 1980 showed reduced morphine withdrawal in rats following electroacupuncture, as indicated by a decline in jumping behavior compared to non-addicted controls who did not show any jumping behavior.⁶⁴

Regarding craving, three studies have specifically included craving as a research variable. Only one of the studies, however, has shown a reduction in psychological drug craving; 40 active cocaine users were randomized to either active treatment with three NADA points (excluding liver and kidney) as well as one body point, LI4, or to control treatment with four needles inserted 2 mm from the active sites, and the only clear difference between the groups in effects was a greater decline in subjective craving among participants in the active treatment group. Craving was measured using a 10-point single item scale⁶¹. The one study

focusing specifically on the issue of craving compared 30 active cocaine users randomized to a single session of either NADA treatment or “sham” treatment in the helix of the ear, both with exposure to cue-elicited craving. The two groups did not differ in craving following treatment but subjective craving declined significantly for both groups. Craving was measured using the 45-item Cocaine Craving Questionnaire-Now (CCQ-Now) scale.⁶² A third study included craving as an outcome measure without identifying any significant results; this variable has most recently been measured by the Acupuncture Treatment Assessment Scale (ATAS), which measures five subjective items on 13-point scales: subjective worry, muscle tension, drug craving, physical well-being and psychological well-being.⁴⁴

Drug craving is a concept that is frequently cited as a problem in recovery from drug addiction, but which has no clear definition. According to a review of craving in alcohol addiction, craving can be explained by biochemical-receptor theories that can be analyzed to distinguish between reward, relief, or obsessive craving. Conditioning and cognitive theories also explain craving as a psychologically triggered phenomenon, e.g. in response to withdrawal symptoms, a lack of pleasure, as a conditioned response to drug cues, or as a response to “hedonic desires.” The different types of triggers for craving could imply the necessity of tailoring craving-reduction treatment individually⁶⁵. Craving can, indeed, be related to a broad spectrum of negative symptoms, both physical and psychological, some of which may be relieved by auricular acupuncture.

Alleviation of physical and psychological negative symptoms

Findings from one study on alcohol⁴⁷ as well as another on cocaine⁵⁷ show reduced anxiety following auricular acupuncture treatment. This may support a suggestion from an earlier study on methadone-dependent cocaine users that auricular acupuncture might affect aspects of emotional health that are not specifically related to drug craving but to the general

syndrome of anxiety and depression related to prolonged use of any substance⁵⁹. Two pilot studies indicating positive long-term effects such as improved treatment compliance among addiction treatment inpatients as well as reduced psychopharmacological medication among prison inmates in a psychiatric unit may also be related to this broader effect spectrum^{50, 66}. This raises the question of whether there is any research evidence supporting reduced negative symptoms following auricular acupuncture.

Several research studies have made note of findings that auricular acupuncture study participants have reported improved physical and psychological well-being following treatment but pointed out the difficulty of disentangling active acupuncture effects from non-specific or placebo effects^{44, 47, 51, 53, 56-59}. These studies compare points assumed to be “active” based on the NADA-Acudetox protocol or similar point combinations, with points assumed to be “non-specific,” “inactive,” or “placebo” for controls. Results with regard to point specificity are, however, equivocal in most studies^{44, 47, 53, 56, 57, 59, 62} and suggest that perhaps (a) there may not be much difference between the two protocols, or (b) the outcome measures used are inappropriate for measuring the actual differences, or (c) longer term treatment is required in order to show a measurable difference between the two protocols. The studies generally do not demonstrate any *specific* effect of ear acupuncture on physical and psychological well-being, muscle tension, drug craving, anxiety or a variety of psychiatric symptoms, but they generally *do* demonstrate that *something* in what is offered increases study participants’ sense of well-being in several dimensions, even to the point of eliminating some symptoms that apparently have nothing to do with drug problems, such as poor sleep or amenorrhea⁶⁷.

One possible explanation for these effects - one that does not exclude the possibility of active acupuncture effects - is that so-called *non-specific factors*, or *moderating variables*, have contributed to a healing process in the study subjects⁴⁹. Such non-specific factors could

include the acupuncturist-subject relationship, the perception of acupuncture as possessing special healing powers, the group treatment context, which offers a sense of safety and possibly hope, and the ritual character of the needle insertion and quiet sitting for 45 minutes followed by needle removal. Similar factors, such as therapeutic alliance, therapeutic competence,⁶⁸ and enhancing positive and realistic expectations,⁶⁹ are at work in a variety of psychotherapeutic approaches. Figure 2 summarizes the interplay between possible active acupuncture effects and non-specific factors.

Insert Figure 2 about here

According to Figure 2, ear acupuncture using the NADA protocol or “sham” points that are most probably active in some way, has some kind of *active effect* which has not yet been conclusively described or explained by research up until now. Whatever the nature and intensity of the active effect, the situation of administering ear acupuncture in a group setting *mediates* non-specific provider and situation effects. NADA-Acudetox treatment providers gently touch the ear in order to insert the needles, thus coming physically close to patients in a caring stance. The situation of the group setting commonly used at clinics providing auricular acupuncture means that patients relax and gain a sense of well-being at the same time as they sit with others whom they may normally perceive as untrustworthy strangers. The discovery that treatment providers are gently providing a simple intervention that usually leaves patients feeling better, and that the feeling of well-being moreover arises despite an unfamiliar group setting, potentially increases *trust* in the treatment provider, the world-at-large, as well as in the patient him- or herself. Ear acupuncture also *reinforces needle insertion effects* which are physiologically triggered (so-called DNIC, diffuse noxious inhibitory control effects) as the needles penetrate the skin. Furthermore, the ritual of inserting the needles and the comfortable

seating with no demands for any specific activity for 40 minutes in a calm atmosphere contribute to a *reinforcement of placebo* effects which any individual might feel at the opportunity to sit quietly and reflect for a short period of time, together with others. Figure 2 thus graphically displays the concept that a number of factors, active as well as placebo, may be at work in contributing to treatment retention among recipients of auricular acupuncture treatment.

Treatment retention

The issue of treatment retention is a final research question that has been addressed in a number of the studies cited above. Retention, calculated from intention-to-treat samples, has ranged between 21%⁵⁹ to 80%⁶¹ among participants receiving active treatment, and between 3%⁵² and 81%⁵⁶ among controls. Nominal differences in retention in favor of the treatment group have occurred in alcohol^{47, 52, 54}, cocaine^{57, 59, 61}, heroin⁶⁰ and multiple drug use studies⁴⁶. Differences in retention in favor of the control group have been reported in cocaine⁵⁶ and multiple drug use studies⁴⁴. Significance calculations regarding treatment retention are generally not reported.

It is unclear what factors might affect treatment retention for the participants in these studies. One possibility is that the treatment context may be crucial for achieving optimal effects using auricular acupuncture. The research context for auricular acupuncture studies varies, but may often diverge from standard clinical practice in view of the need to follow stringent research protocols and, for example, to restrict interaction between the acupuncturist and the treatment participant⁴⁵. While the restriction is essential in order to isolate the specific acupuncture effect from other situational effects, this means that the treatment context in a research study could be less welcoming than the ordinary clinical procedures. Viewed from the point of view of traditional Chinese medicine, “it may be counterproductive to

attempt to rectify disharmony within patients amid a disharmonious treatment context; this may be especially true among addicted patients whose lives are usually pervasively chaotic”⁷⁰.

In addition, the general lack of clearly structured verbal treatment focusing on general cognitive skills or specific drug abstinence coping strategies must be seen as a shortcoming. An analysis of abstinence figures from four studies of auricular acupuncture for cocaine addicts shows higher drug abstinence rates in the 8th week of treatment for participants receiving acupuncture *and* coping skills training (CST), compared to CST only, acupuncture only and methadone maintenance only (57%, 40%, 15% and 10%, respectively). These studies did not include testing of participants’ motivation for treatment, which may have differed considerably. Factors important to consider in future studies of acupuncture in conjunction with psychosocial treatment would be personal treatment preference (verbal vs. nonverbal), level of cognitive impairment (a possible obstacle to motivation and absorption of psychosocial treatment contents), level of social anxiety (which may reduce motivation for more intensive verbal psychosocial treatments), and coping style (‘avoidant’ coping style would clash with the ‘approach’ coping style that is encouraged in cognitively oriented psychosocial treatments)⁷⁰.

There is now considerable evidence from meta-analytic studies that cognitive-behavioral treatment programs that teach problem solving and coping skills contribute to reduced recidivism among drug using criminal justice offenders^{71, 72}. The isolated finding cited above that coping-skills treatment *together* with acupuncture yielded higher abstinence rates among cocaine addicts in a community setting suggests that acupuncture may be shown to have a positive adjunctive role in future research on auricular acupuncture. Recent studies suggest that the addition of acupuncture to standard detoxification or substance use treatment in fact does improve treatment program retention^{46, 48}.

A note on research methodology

The findings from the studies in natural settings that indicate better treatment retention also suggest that research design is a crucial factor influencing the conclusions drawn from auricular acupuncture studies. Clinical trials have focused on point specificity as the main question, following the paradigm of pharmacological trials. The issue of point selection can be viewed as a secondary question in view of the large number of active points in the ear, which guarantee that any point protocol that purports non-specificity for drug use will have *some* effect on the study participant, whether placebo or active. Furthermore, the choice of ear points has varied widely in the studies reviewed here, both for the NADA treatment and for the control protocol. Some studies have used three points in the NADA-Acudetox protocol with the addition of the LI4 body point^{52,61}. Others have used four points in the NADA protocol^{58,59}. Control ear points have used presumably inactive points placed 4-5 mm from NADA points⁵² or 2 mm from NADA points⁶¹. In the 1994 study of methadone-dependent cocaine users, non-specific points 4 mm from NADA points were used, but they were chosen in areas corresponding to points active for diagnoses other than drug abuse⁵⁹. Most recently, control points in the helix of the ear have been used with the purpose of attaining needle insertion in an area clearly remote from the NADA protocol points, but even so, results have not been conclusive regarding any clear advantage in favor of the NADA protocol^{44,56,58}.

Another methodological problem is the impossibility of conducting double blind studies as in pharmacological research where both treatment providers and study participants are blinded as to group randomization. Acupuncture research can only be conducted according to a single blind design, where treatment providers need to be aware of randomization in order to provide correct treatment, but study participants are still unaware of group randomization (i.e., which treatment is expected to be effective according to the research hypothesis, and which is

expected to be ineffective). Treatment provider awareness of group selection may affect treatment effectiveness, especially in view of frequent initial clinician skepticism to “sham” protocols. While such skepticism might reduce the effectiveness of the “sham” protocol, this would be incorrect procedure from a scientific point of view, since “sham” points are active (although non-specific for drug use) and should be applied with the same professional attitude as the experimental protocol.

Studies in the natural clinical setting with a randomized or a quasi-experimental design, have shown more positive and meaningful results regarding the overall effect of adding auricular acupuncture to existing programs^{46,48}. Control groups in such studies can receive “treatment as usual” without the acupuncture, where treatment groups differ from control groups only in that they have access to acupuncture⁵¹, or the control group can receive meditation instead of acupuncture⁴⁶, or else the treatment group can consist of a different type of treatment program with the same treatment goal, as when a four-month outpatient detoxification program using NADA acupuncture is compared to a week-long inpatient detoxification program⁴⁸. The purpose of such studies is not to answer the question of which point protocol is more effective, but rather to assess such issues as feasibility of treatment, treatment retention or overall drug use when NADA acupuncture is included in the treatment menu.

Missing from the literature are in-depth qualitative studies of auricular acupuncture in clinical settings, although a few studies have included case vignettes and results from participant interviews^{44,50,66}. Qualitative research could provide a complement to existing quantitative research in delineating thematic aspects of auricular acupuncture treatment that remain obscure in the research paradigms applied until now. Greater clarity about the effects of NADA-Acudetox from a phenomenological participant perspective could generate new questions that in turn could stimulate innovative research designs. For the time being,

phenomena such as anxiety relief, improvement in sleep quality and positive side effects in terms of alleviating pains not directly related to drug use all bear further exploration.

III. Clinical issues regarding NADA-Acudetox treatment

This section briefly discusses clinical issues regarding NADA treatment, both in order to understand why clinical praxis suggest good results, as well as in order to offer an information base for clinical decisions on introducing ear acupuncture into existing drug use treatment contexts.

A clinical paradigm for NADA treatment has been developed at the Lincoln Recovery Center in the Bronx, New York. The auricular acupuncture is administered in a calm atmosphere following a minimal intake procedure. Needles are left in place for at least 40 minutes but can remain in place for much longer according to patient need. Patients swab their ears with sterile alcohol pads before treatment, and after treatment they remove the needles themselves, looking into a small mirror. The needles are deposited directly into risk disposal containers. Since needles are inserted just under the skin, some loosen during treatment and fall on clothing or onto the seat. Patients search for fallen needles themselves so that treatment providers do not risk puncturing themselves with needles. Slight bleeding can occur upon removal of needles and bleeding is stopped with Q-tips or by giving the patient a cotton wad and directing the patient's hand to the bleeding spot in order to apply pressure⁴⁰. In treatment settings where there is a security risk (e.g., in high-security prisons) needles are assiduously collected, sometimes by a specially appointed guard, to completely eliminate the possibility of using them for infection or assault. Although standard ear acupuncture needles measure 0.20 by 13 mm, they could theoretically be used to puncture another person's skin⁷³.

Patients who are hesitant to submit to needle insertion are invited to sit quietly in the large room where the acupuncture is given. Patients who only wish to receive acupuncture are

welcome to do so, but all are encouraged to participate in 12-step meetings. Individual counseling is available for those who indicate interest and need. Acupuncture is offered for eight hours daily at Lincoln, but many other treatment programs with limited staffing offer the acupuncture during set two-hour periods two to five times a week. The treatments appear to initiate a “balancing, centering process,” whereby patients discover that they can remain relaxed in a group setting and that they can feel alert at the same time. They observe that their thoughts are focused and clear, and that earlier fears of permanent brain damage due to drug use may have been unfounded. Patients begin to believe that they may be able to function autonomously, both emotionally and physically^{40, 74}.

The recovery process can stretch out for several years, and a recent study on the nature of this process has identified repeated cycles as follows⁷⁵:

- drug using in the community, followed by
- incarceration, followed by
- treatment, followed by
- community living without drug using, followed by
- relapse into drug use and beginning the cycle anew.

In fact, the recovery process among 1271 mostly African-American, inner city residents who participated in publicly funded treatment programs in a large metropolitan area lasted for a median time of 27 years from first use to last use (with abstinence for at least one year)⁷⁶.

Acupuncture has not been systematically investigated in longitudinal studies over various stages of the recovery process, but clinical experts point out that acupuncture helps the patient build an inner foundation which facilitates receptiveness to more traditional psycho-social treatment. The patient identifies an inner need for help and is able to act on that need, either through self-help groups or counseling^{40, 77}. Once the person has entered a more stable situation where abstinence from drugs is more common than relapse into drug use,

acupuncture can serve as a support in that it offers a reminder that the person has an inner source of well-being. This experience fosters a sense of autonomy and can be seen as increasing a sense of self-efficacy in being able to withstand the temptations to use drugs ⁷⁸. The importance of long-term access to acupuncture should not be underestimated, in view of the changes in life situation and identity that frequently accompany the abandonment of drug use as a regular facet of life ⁷⁹. Since auricular acupuncture can be given throughout the recovery process without negative side effects, the treatment can serve as a type of security object in the personal transformation that recovery often implies.

Another important aspect of NADA-Acudetox treatment is that it is non-verbal. A confrontation with treatment providers is unnecessary since nothing is required of the patient other than sitting quietly, even without needle insertion if there is resistance. A safe, reassuring environment is provided, and the patient does not need to engage in guesswork regarding the behavior expected of him or her based on verbal cues from treatment providers. Furthermore, the treatment is not dependent on prior diagnosis. In fact, it is much more appropriate to initiate diagnostic procedures (if necessary) following auricular acupuncture treatment, as the patient will by that time be amenable and cooperative if he or she perceives the diagnostic procedure as meaningful from an individual perspective. Since acupuncture creates a setting where patients are able to listen to themselves to a greater extent, they are also more willing, after some time, to listen to others. The relinquishing of control, at least for a 40-minute duration, to the simple needle insertion treatment conveys a message of trust in health-enhancing processes not steered by the individual ⁸⁰.

The National Acupuncture Detoxification Association asserts that acupuncture treatments point the way to changes in the “dominant paradigm” in addiction medicine (seen as the authoritative, confrontative, perhaps coercive and even judgmental treatment provider), in that the patient’s phenomenological experience points the way to steps in recovery, at the same

time that physical and emotional support for both the crisis of recovery as well as the patient's striving towards wellness are given simultaneously.⁴³ What appears to make NADA-Acudetox unique is the attention given to stimulating the patient's innate healing resources already in the midst of the crisis of detoxification and recovery, rather than, as is often the case in more traditional medical settings, waiting until the body has eliminated the drug completely and behavior has changed enough to secure complete abstinence from drugs. NADA treatment takes place in a setting under conditions that are transparent to users, facilitating trust and flexibility to individual needs. Treatment is also the same for all forms of drug addiction – alcohol, cocaine, heroin, cannabis, sedatives, and inhalants as well as multiple drug use. In addition, treatment is the same, whatever an individual's social, physical or emotional status.. In addition, the treatment alleviates psychiatric symptoms such as anxiety and depression, as well as, perhaps, symptoms of psychoticism⁴⁴. In addition, psycho-social problems not subsumed under psychiatric diagnoses can also be alleviated; for example, shame, grief and family violence can be addressed after a relatively small number of sessions, frequently for the first time. NADA is now used in refugee camps in several countries and was welcomed by survivors of the September 11th, 2001 terrorist attacks in New York City^{41, 43}.

In an organizational context, the treatment is easily available to staff on a wide range of educational levels, since prerequisites for training are not based on years of formal education or medical education but rather on experience and knowledge about drug addiction processes. Generally, staff members working closely with patients are able to administer the treatment; professional backgrounds range from alcohol and drug therapists, social workers, field workers and volunteers to psychologists, acupuncturists, nurses and physicians. However, legal restrictions on practitioners vary between U.S. states as well as between countries; in cases where only certain professionals such as physicians or licensed acupuncturists can

administer the treatment, solutions can involve regular supervision by an approved professional of “addiction detoxification specialists (ADS)” trained in NADA acupuncture. A further advantage of the treatment is that staff members themselves can receive treatment for reduction of stress and burnout symptoms.

Finally, the NADA-Acudetox protocol has been accepted in a wide range of cultures as the simple, non-verbal, health-enhancing treatment that patients and clinicians soon recognize as valuable.^{43, 74, 77, 80} The protocol is easily taught in training workshops of between 30 to 70 hours. Costs for the treatment itself are relatively low, requiring staff time, needles (approximately 0.60\$ or 0.50€ per treatment), alcohol pads and risk disposal containers. The treatment can often be integrated into treatment settings without undue reorganization; a room with several comfortable, preferably high-backed chairs is needed, as well as easy access. The accepting spirit in which NADA-Acudetox treatments are given furthermore parallels the personal choice agenda of Motivational Interviewing (MI), a counseling method that has spread widely over the past decade and is now used clinically in hundreds of addiction treatment settings worldwide as well as in multiple ongoing and already published research studies⁸¹.

Once introduced, the sustainability of auricular acupuncture programs depends on several organizational factors, among them support from the organization’s leadership and general staff, adequate staff for provision of treatments at regular hours several times a week, appropriate facilities for receiving varying numbers of clients, adequate funding for needles and other accessories, and integration with counseling, education and mutual help groups^{77, 82}. A decision to introduce NADA should therefore be preceded by careful reflection about the process about to be initiated in the clinic. Time and space need to be allocated. Provisions need to be made for documenting treatments – how many, who receives them and for how long – to allow feedback to treatment providers, leaders in the organization as well as budget

providers. Ideally, an outcome variable suitable to the clinic context should be identified and followed up. Examples of suitable outcome variables could be more visits by patient groups not reached by the clinic prior to NADA introduction, increased frequency of visits by patients already receiving treatment, greater adherence to other treatment provided at the clinic, improved physical and/or psychological symptoms, as well as a greater number of negative urine tests. In view of the wide variation in treatment retention figures, a high dropout rate should be tolerated, but factors contributing to dropout should be analyzed to identify who drops out and why. Access to the treatment should be simple and low-threshold. A final issue that needs to be addressed is how to engage staff on all levels in the establishment of such a treatment program, a factor crucial to providing the treatment in a reliable, continuous, stable context⁸³.

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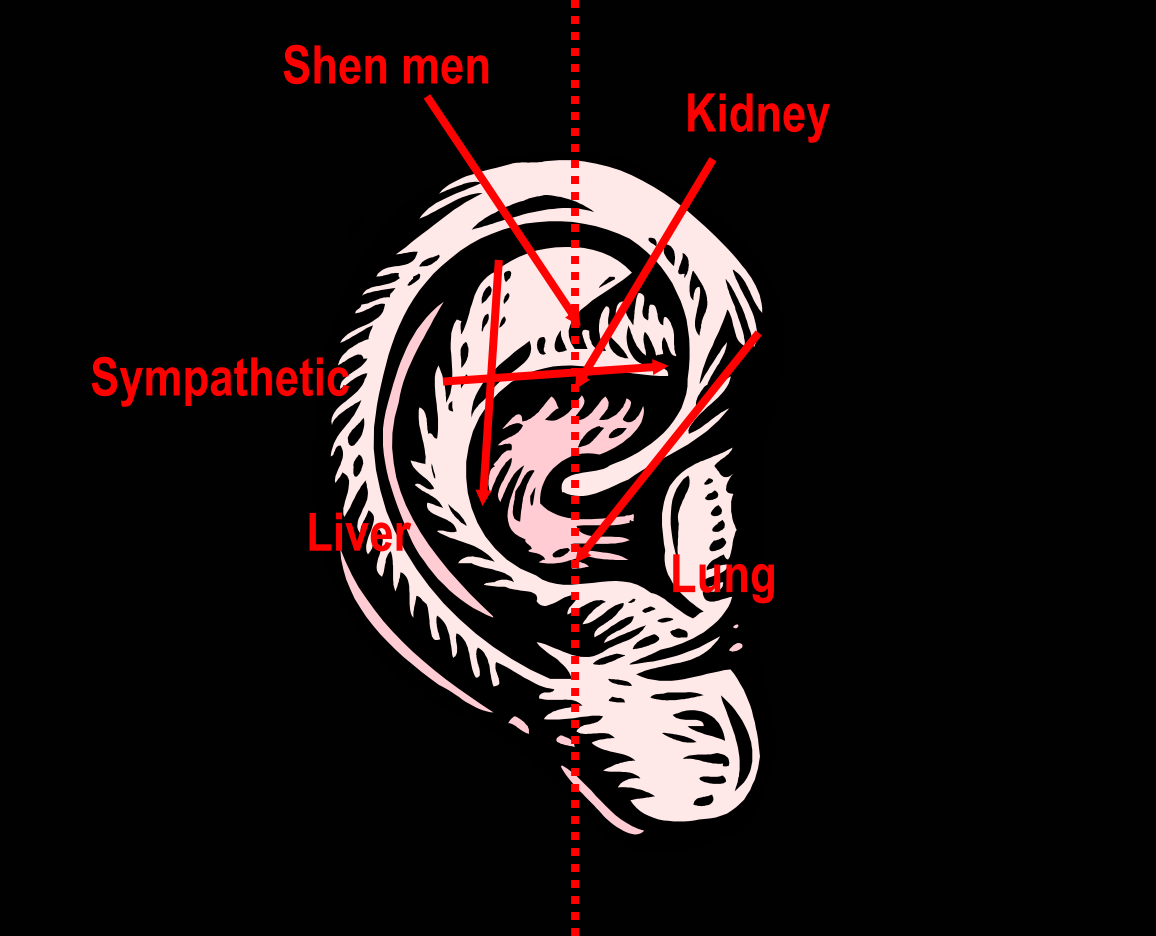
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Table and figure captions, Berman Lesson

Figure 1: The five points in the NADA-Acudetox protocol.

Figure 2: Possible interaction between ear acupuncture and non-specific factors, showing mediation of treatment provider and situational effects, as well as reinforcement of needle insertion and placebo effects.

Table 1: Summary of research findings on the NADA-Acudetox protocol.



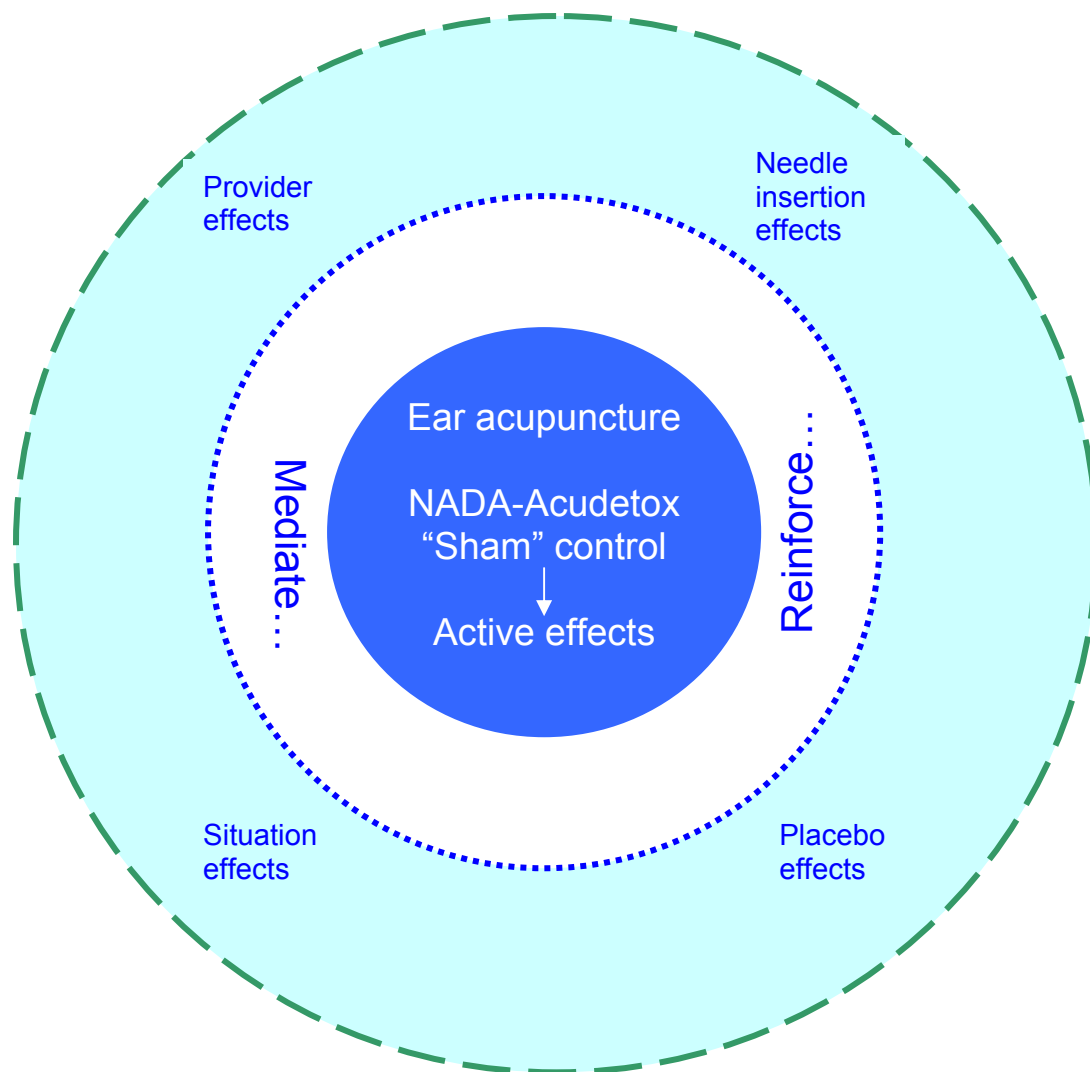


Figure 2 Possible interactions between ear acupuncture and non-specific factors, showing mediation of treatment provider and situational effects as well as reinforcement of needle insertion and placebo effects.

Summary of research on the NADA-Acudetox protocol for drug users

Drug	Study	Design	Research questions	Findings	Discussion points
Alcohol	Bullock et al., 1987 Alcoholism: Clinical & Experimental Research [54]	RCT 54 inpatient alcoholic recidivists T:27 (Ac) C:27 (SAC) No gender information given.	1) Could sobriety be achieved? 2) Decreased drinking episodes or detox admissions?	Retention: T: 37%, C: 7% 1)T participants expressed less need for alcohol, as well as less desire to drink 2)T participants had fewer drinking episodes and fewer detox admissions	Better results for NADA – better protocol.
Alcohol	Bullock et al., 1989 The Lancet [52]	RCT 80 inpatient alcoholic recidivists T:40 (Ac) C:40 (SAC) 75 men; 5 women. No gender analyses.	1)Would beneficial acupuncture effects persist for 6 months?	Retention: T: 53%, C: 3% 1) Fewer detox admissions for T after 6 months + other indicators.	Better results for NADA – better protocol.
Alcohol	Sapir-Weise et al., 1999 Alcohol & Alcoholism [47]	RCT 72 outpatient alcoholics. T:36, M/W: 25/11 (Ac) C:36, M/W:26/10 (SAC) Gender analyzed.	Did T participants have better: 1) compliance 2) less craving 3) less drinking	1) T male retention > C males 2) No differences 3) No differences Extra: T women had significantly less anxiety than C women in first month.	Gender differences identified. “Other psycho-social treatment” not standardized. Future studies should confirm gender differences and standardize “other” care.
Alcohol	Bullock et al., 2002 J of Substance Abuse Treatment [53]	RCT 503 inpatient alcoholics T: 132, M/W: 67/65 (Ac) C ₁ : 133, M/W: 67/66 (SAC) C ₂ : 104, M/W: 52/52 (TCM Ac) C ₃ : 134, M/W: 67/67 (TaU) 50% men, 50% women No gender analysis.	Is alcohol use affected differently by different treatment modules?	No, except for TCM acupuncture, where a delayed significant effect occurred after 12 months – better than other treatment assignments.	Placebo & non-specific effects difficult to disentangle. Questions about Ac as a sole treatment modality and the paradox of staff/patient perceptions of benefit in contrast to inconclusive research.
Alcohol	Trumpler et al., 2003 Alcohol & Alcoholism [55]	RCT 48 inpatient alcoholics in withdrawal T: 15 (AurAc) C ₁ : 17 (LasAc) C ₂ : 16 (SAC, laser) No gender information given.	Do withdrawal symptoms last for a shorter duration when acupuncture is used?	For subjects with needle stimulation (AurAc) withdrawal lasted 3 days instead of 4 compared to LasAc and laser SAC but this difference became insignificant after adjustment for sedatives.	Study power was limited by baseline differences and possible biases. A larger parallel trial is recommended.
Cocaine	Lipton et al., 1994 Journal of Substance Abuse Treatment [59]	RCT 150 outpatient cocaine users T: 73, M/W 51/22 (Ac) C: 77, M/W 57/20 (SAC) No gender analysis.	Does Ac alleviate withdrawal symptoms, craving & consumption?	Retention: T: 21%, C: 19% T subjects in treatment 2 weeks or longer had more clean urines than C subjects (based on urine metabolite analyses).	Suggestion that all drug users have generally similar anxiety/depressions symptoms & that poly-substance abuse patients should be studied.
Cocaine	Avants et al., 1995 Journal of Substance Abuse Treatment [61]	RCT 40 cocaine outpatients, M/W 22/18 T: 20 (Ac) C: 20 (SAC) No gender analysis.	Would a specific SAC serve as an adequate needle puncture control compared to Ac in future, larger trials?	Retention: T: 80%, C: 70% T participants experienced a greater reduction in craving compared to C participants. Cocaine use declined for both T and C.	Suggestion that the control protocol is too near NADA points. A better SAC would be one with points on Helix. Suggest study acupuncturists should be of the highest caliber.

Cocaine	Bullock et al., 1998 Journal of Substance Abuse Treatment [57]	RCT; two studies, I and II I 236 inpatient cocaine users T: 78 (Ac + TaU) C ₁ : 78 (SAC + TaU) C ₂ : 79 (TaU – psychosocial T) II 202 outpatient cocaine users T ₁ : 67 (28 Ac sessions/8 wks) T ₂ : 67 (16 Ac sessions/8 wks) T ₃ : 68 (8 Ac sessions/8 wks) M/W 70%/30% No gender analysis.	1) Does Ac have an effect beyond psycho-social treatment? 2) Does location of Ac needles make a difference? 3) How many treatments are needed for an effect?	Retention: I: 41%, II: 32% (n.s.) 1) No. 2) No. 3) Doesn't matter.	Perplexing contrast between practitioners', clients' & administrators' enthusiasm & research results. Do context and the constriction of the research paradigm nullify Ac effects? Interesting better effect over time during first 2 weeks of study, suggests better effect during detox.
Cocaine	Avants et al., 2000 Archives of Internal Medicine [56]	RCT 82 cocaine users w/methadone T: 28 (Ac) M/W 16/12 C ₁ : 27 (SAC) M/W 15/12 C ₂ : 27 (Relaxation) M/W 16/11 No gender analysis.	Is Ac superior to SAC and a relaxation control in reducing cocaine use?	Retention: T: 46%, C ₁ : 63%, C ₂ : 81% Yes, T participants were more likely to provide cocaine-negative urine samples than C ₁ and C ₂ participants.	Larger studies are needed to distinguish placebo effects of needle insertion from active NADA effects. Differential treatment retention is unexplained. Positive results regarding NADA.
Cocaine	Margolin et al., 2001 JAMA [58]	RCT 620 cocaine users (208 w/methadone) T: 222 (Ac) M/W 156/66 C ₁ : 203 (SAC) M/W 144/59 C ₂ : 195 (Relaxation) M/W 129/66 No gender analysis.	Is Ac superior to SAC and relaxation control in: 1) Retention 2) Negative urine tests for cocaine 3) Other outcome measures	1) No. 2) No. 3) No. Improvements for all 3 conditions over time on severity of drug, psychiatric, legal, family & alcohol problems (including follow-up at 3 & 6 mos.) but not medical, employment problems or readiness for treatment.	Perplexing results. Research setting differs from clinical setting. E.g., in research setting patients are treated in small groups or alone instead of in large groups as is common at NADA clinical sites.
Cocaine	Killeen et al., 2002 Issues in Mental Health Nursing [62]	RCT 30 cocaine users T: 15 (Ac) C: 15 (SAC)	Does Ac reduce drug craving as measured by skin conductance measures and subjective measures better than SAC?	No.	Reduced subjective craving for both Ac & SAC groups. Questions efficacy of point specificity in ear acupuncture. Difficult to control for confounding variables.
Heroin	Washburn et al., 1993 Journal of Substance Abuse Treatment [60]	RCT 100 outpatient heroin users who volunteered for drug-free, Ac-assisted detoxification T: 55 (Ac) M/W 63%/37% C: 45 (SAC) M/W 73%/27% Gender analyses performed.	Does Ac have a better effect on treatment retention than SAC?	Yes. T participants attended the clinic for significantly more days than C participants. T participants were also more likely than C participants to continue treatment after 21 days. No negative side effects were noted other than occasional mild nausea and dizziness, relieved upon needle removal, as well as slight bleeding at site of needle insertion.	Lighter heroin users (once a day or less) attended the Ac clinic more days and for longer than those with heavier habits. Limitations: Very high attrition rate for both T and C groups (<25% remained after 2 weeks), possibly due to high monetary payment on first study day. Further research suggested on Ac for lighter heroin users or those who do not wish substitution treatment.
Multiple	Konefal, Duncan & Clemence, 1994 Journal of Addictive Diseases [51]	RCT 568 outpatient drug users T: 186 (TaU + Ac) M/W 99/87 C ₁ : 188 (TaU + urine) M/W 96/92 C ₂ : 194 (TaU) M/W 105/89 Gender analyses performed.	Can Ac introduced in a public county-operated program be useful in the substance abuse treatment process? (Despite requiring clients to spend an extra 45-60 minutes per clinic visit).	Yes. Retention: 54% (304) completed ≥1 session No difference between T and C ₁ . However, T group with Ac achieved reduction in rates of positive urine tests in less time, requiring 57% of the time. Clearer Ac effect during beginning of treatment. Significantly more negative urines	Clearly possible to implement an Ac program in outpatient treatment setting. Ac helped clients become "cleaner" faster. Men generally responded better than women. However, there were organizational problems: - counselor resistance - unclear criteria for attendance

				in T group for male cocaine users (not for marijuana, crack & other self-reported primary drug of choice). Significantly more negative urines among women users of "other" drugs in T group (not marijuana, cocaine or crack). For both genders, significantly more negative urines for cocaine and other users in T group.	- difficulty in following up - high dropout rate.
Multiple	Shwartz et al., 1999 Journal of Substance Abuse Treatment [48]	Quasi-experimental retrospective cohort study. 8011 drug users in detox T: 1104 (Ac outpatient program) C: 6907 (TaU residential program) Significant differences in several variables showing T group more favored. A second analysis was performed on a sub-sample (a) with equivalence in demographic variables. T _a : 740 (Ac outpatient program) C _a : 740 (TaU residential program)	Does Ac outpatient detox (4 months, 5Ac/week for 2 weeks, thereafter 3 Ac/week for several months) compared to inpatient detox (1 week TaU) reduce the odds of being re-admitted to detox within 6 months?	Retention: No figures given. Yes. In the sub-sample with equivalence in demographic variables the odds of an Ac case (T _a) being readmitted to detox in 6 months were 0.61 of the odds of a residential case (C _a) being readmitted (95% CI 0.39-0.94). Acupuncture appears particularly effective for primary alcohol users as well as those with ≥2 detox admissions in the year preceding admission.	Detox history is the best predictor of readmission into detox. Outpatient Ac services last much longer (4 months) than residential detox services (1 week) and cost about the same. However, outpatient services can easily be expanded whereas inpatient services cannot. Limitations: Clinical judgment affected referral. Study focus is outpatient detox programs using Ac, not Ac itself.
Multiple	Russell et al., 2000 Journal of Substance Abuse Treatment [46]	Quasi-experimental retrospective cohort study 86 drug users in probation T: 37 (Ac) M/W 29/8 C: 49 (TaU; meditation) M/W 35/14 No gender analyses.	Does Ac 1) Increase treatment retention? 2) Reduce number of arrests? 3) Lead to fewer positive urine tests? 4) Decrease days needed for patients to progress in program?	Retention: No exact figures given. More T than C retained at 30, 60, 90, 120 and 150 days of program. 1) Yes. 2) No. (n.s.) 3) No. (n.s.) 4) No. (n.s.)	Pilot study with limitations. However, Ac element significantly increased patient retention in program. Trends towards fewer arrests, fewer positive urine tests as well as fewer days needed to progress.
Multiple	Berman et al., 2004 Journal of Substance Abuse Treatment [44]	RCT 158 drug users in prison T: 82 (Ac) M/W 50/32 C: 76 (SAC) M/W 46/30 Gender analyses performed.	1) Is Ac a viable treatment in prison? 2) Any difference on outcomes measures in methods? 3) Any negative side effects?	Retention (≥10 of 14 treatments): T: 43%; C: 63% 1) Yes. Positive effects for both collapsed groups over time. 2) Confidence over time in Ac increased for T participants compared to C participants. 3) No negative side effects. Apparent positive side effect for sleep quality among participants in both groups, but more pronounced in T participants.	Placebo and non-specific effects difficult to disentangle from possible active Ac effects. Future research should abandon the "sham" point paradigm for control and include non-invasive controls. Sleep effects should be further studied.

Definitions:

Ac Acupuncture with 3-5 NADA points, sometimes with addition of body points

AurAc Auricular acupuncture with symptom-based point selection

C Control

LasAc Laser acupuncture with symptom-based point selection

M Men

NADA National Acupuncture Detoxification Association (NADA) protocol for auricular acupuncture in drug treatment settings

n.s.	Non-significant, statistically
RCT	Randomized controlled trial
SAC	Sham control with “non-specific” acupuncture points
T	Treatment
TaU	Treatment as usual/standard care/”other” care
TCM	Traditional Chinese Medicine, i.e., symptom-based individual treatment with ear and/or body points
W	Women

Lesson questions: Auricular acupuncture as an adjunct to treating substance use disorder

1. How is auricular acupuncture most widely used as an adjunct treatment for drug use?

- A. Acupuncturists treat patients with ear and body points on an individual basis, following diagnosis according to Traditional Chinese Medicine.
- B. Group treatment with a five-point bilateral auricular protocol called NADA-Acudetox is offered to in- and outpatients in detoxification and later stages of recovery from drug abuse and dependence.
- C. Auricular acupuncture with two or more points that are electrically stimulated is the standard treatment.
- D. Laser acupuncture is used with NADA-Acudetox or other points for patients undergoing detoxification for alcohol abuse.

2. What does current research say about the evidence base for auricular acupuncture for drug use?

- A. Documented negative side effects for auricular acupuncture, if any, are transitory: local pain, bleeding upon needle removal and occasional mild dizziness or nausea.
- B. The evidence for the effects of auricular acupuncture on drug use is equivocal, depending on the study design and context as well as the research questions posed.
- C. It is difficult to disentangle auricular acupuncture effects from placebo effects but post-treatment measurements for both active and non-specific auricular acupuncture treatment in some cases suggest improvements in psychiatric as well as drug and alcohol-related physical problems.
- D. A, B, and C.

3. How is auricular acupuncture for drug use used clinically?

- A. The NADA-Acudetox protocol is administered bilaterally to sitting patients in groups with consecutive open admission. Treatment lasts 40 minutes or more and patients remove needles themselves. Treatments can be given as an adjunct during all stages of the recovery process, from detoxification to relapse prevention.
- B. Auricular acupuncture is clinically effective only when active withdrawal symptoms are present.
- C. Thorough patient diagnosis is necessary before administering auricular acupuncture as an adjunctive treatment for drug users.
- D. Only licensed medical doctors or certified acupuncturists can administer auricular acupuncture treatments.

4. Which organizational conditions will enhance permanent establishment of auricular acupuncture as a complementary clinical treatment in addiction treatment settings?

- A. One or two staff members are very enthusiastic about the treatment and have obtained certified training.
- B. The local clinical director decides that auricular acupuncture would be a good complement to existing psychosocial treatment and sends two or three key staff members for training.
- C. The staff and management experience the treatment themselves at a conference or a clinic, plan a strategy for introducing the treatment at the clinic in terms of training, staffing, scheduling and budget resources, and plan for measuring patient outcomes on a regular basis.
- D. A budget is set aside for staff training and implementing auricular acupuncture treatment in the clinical setting.