

## Cost-Effectiveness Of Auricular Acupuncture For Treating Substance Abuse In An HMO Setting: A Pilot Study

Ronald P. Santasiero, MD

Greg Neussle, CSW-R

### ABSTRACT

**Background** Auricular acupuncture has been used as adjunctive therapy for the treatment of chemical dependency for more than 25 years. Use of adjunctive auricular acupuncture has been shown to relieve withdrawal symptoms and improve retention of patients in a voluntary outpatient detoxification treatment program. Little information is available about its use and cost-effectiveness in a managed care setting.

**Objective** To determine if auricular acupuncture used in an outpatient health maintenance organization (HMO) chemical dependency program could be a cost-saving modality.

**Design, Patients, and Setting** Forty-four patients were in the study: 22 in the intervention group and 22 in the control group. The setting was an outpatient HMO clinic chemical dependency program.

**Interventions** Both groups received a treatment protocol including individual sessions, group therapy which included educational sessions, supportive therapy, and Alcoholics Anonymous 12-step therapy. The intervention group was treated at 5 auricular points, including Shen Men, Sympathetic, Kidney, Liver, and Lung. Both ears were treated. The average number of acupuncture sessions was 22 in the study group; sessions occurred 5 days a week.

**Main Outcome Measures** Percentage of patients completing the chemical dependency program, rates of hospitalization, drug-free urine screens, and possible cost savings.

**Results** At 6 months of follow-up, the acupuncture-treated group had higher program completion rates (74% vs 44%), higher rates of negative urine screens (96% vs 85%), fewer inpatient rehabilitation days (39 vs 57 days), fewer inpatient psychiatric days (0 vs 3 days), and fewer outpatient detoxification episodes (0 vs 2) compared with the control group. The costs incurred in this study were \$15,580.00 for acupuncture and \$17,890.00 for control.

**Conclusions** Auricular acupuncture when used as adjunctive therapy in an outpatient HMO chemical dependency treatment program is associated with better patient outcomes and can result in cost savings.

### KEY WORDS

Auricular Acupuncture, Substance Abuse Detoxification, Health Maintenance Organization (HMO)

### INTRODUCTION

In recent years, the success of auricular acupuncture in substance abuse clinics has received much attention from popular news media. The first study of acupuncture in addiction treatment was published in 1973 by a neurosurgeon in Hong Kong studying acupuncture for surgical anesthesia. Subjects volunteering for the anesthesia noted that their cravings for addictive substances (opium, heroin, morphine, nicotine, and alcohol) had been attenuated during the preoperative period when they were receiving acupuncture treatments.<sup>1</sup> Since 1979, Dr Michael Smith has reported successful results in outpatient treatment of addicts at the Lincoln Hospital in the Bronx, New York.<sup>2</sup> On the strength of these outcome studies, programs organized following Dr Smith's protocol have been developed in many metropolitan clinics and in criminal justice systems around the United States.<sup>3</sup> Dr Smith was instrumental in developing the National Acupuncture Detoxification Association (NADA) protocol. Use of adjunctive auricular acupuncture has been shown to relieve withdrawal symptoms and improve retention of patients in a voluntary outpatient detoxification treatment program.<sup>4</sup> Acupuncture detoxification has also been shown to have better treatment retention and less positive toxicology screens in a heroin detoxification program in a study done at the University of California at San Francisco in 1993.<sup>5</sup>

There is very little published data on using acupuncture detoxification in a managed care setting. The purpose of this study was to look at this issue in an acupuncture-treated population and a control group, and to assess outcome measures that would relate to significant cost savings with acupuncture.

## METHODS

### Patients

Patient consent was obtained through the chemical dependency department of LifeTime Health, in West Seneca, New York, where the study was done. Forty-four patients were selected for the study. All patients met the criteria for substance dependency or substance abuse. Both groups had matching sex/diagnoses. The 22 patients in the treated group received at least 10 acupuncture sessions and were actively in treatment. The 22 patients in the control group were evaluated from retrospective chart review.

The substance abuse conditions are detailed in Table 1.

### Treatment Protocol

Both groups received a treatment protocol including individual sessions, group therapy which included educational sessions, supportive therapy, and Alcoholic Anonymous (AA) 12-step therapy.<sup>11</sup> "The Twelve Steps of AA "require a willingness to look at oneself and change to become a 'healthier' human being who can live harmoniously with others."<sup>6</sup> Both groups were treated with the same group of therapists including certified alcohol and substance abuse counselors, and individuals with master's of social work degrees.

### Acupuncture Treatment

The acupuncture-treated group was treated using the NADA protocol of 5 auricular points including Shen Men, Sympathetic, Kidney, Liver, and Lung. Both ears were treated. Patients cleaned their external ears with prepackaged alcohol pads prior to needle insertion. Needles (Seirin No. 1, Tokyo, Japan) were inserted to a depth of 2 to 3 mm. The needles were not rotated or stimulated after insertion. The needles were inserted by NADA-certified acupuncture detoxification specialists in a designated room in the HMO clinic, and were removed after 45 minutes. Patients were treated in a group setting, seated in semi-reclining chairs in a relaxed environment. A New York state-certified or licensed acupuncturist supervised the acupuncture. Two of the acupuncture supervisors were medical acupuncturists trained at the UCLA Medical Acupuncture for Physicians program.

Occasionally, minimal bleeding occurred and was controlled following needle removal with the use of sterile gauze pads. The patients filled out a questionnaire before and after assessing the effectiveness of acupuncture. The questionnaire asked about level of relaxation, craving, and general feeling following treatment. Patients received a minimum of 10 sessions of acupuncture during the study (average, 22). The sessions occurred 5 days a week. Patients were encouraged to attend daily sessions although most attended approximately every other day. All acupuncture treatment providers were trained and certified in using the NADA protocol.

### Substance Abuse Protocols

Urine toxicology screens were randomly done in both the study and control group. The urine was collected in the HMO setting, minimizing the chance of patients altering the urine samples. The numbers of chemical dependency treatment sessions as well as protocols for each group were approximately equal, with the only variable being acupuncture detoxification treatment for the intervention group. The patients received substance abuse education and relapse prevention counseling. Each patient received a psychosocial evaluation. Patients had individual counseling weekly to once a month depending on the severity of their problem.

Substance, by Sex	No. (%) of Patients
Alcohol	
Male	10 (45)
Female	1 (5)
Cocaine	
Male	2 (9)
Female	1 (5)
Opiates	
Male	1 (5)
Female	1 (5)
Alcohol	
Male	2 (9)
Female	2 (9)
Multiple substances	
Male	2 (9)
Female	2 (9)

They were required to attend 1-2 groups per week. There was access to psychiatry in the HMO setting and primary care physicians as needed. AA or Narcotics Anonymous (NA) 12-step programs or self-help programs were available; patients were reviewed in a weekly case conference. The advantage to the HMO setting included easy access, fewer barriers to treatment, an integrated supervised system, and experienced staff with low counselor turnover.

<b>Table 2. Outcomes in Both Groups at 6 Months</b>		
	<b>No. (%)</b>	
	<b>Control Group (n=22)</b>	<b>Acupuncture Group (n=22)</b>
Acupuncture sessions per patient	0	22
Toxicology screens	26	25
Negative	22 (85)	24 (96)
Positive	4 (15)	1 (4)
Patients completing treatment successfully	8 (44)	14 (74)
Unsuccessful treatment	10 (56)	5 (26)
Patients transferred	4	0
Active in treatment	0	2
Lost to follow-up	0	1
Inpatient chemical dependency rehabilitation days	57	39
Ambulatory detoxification episodes	2	0
Psychiatric inpatient days	3	0
Detoxification inpatient days	0	0

<b>Table 3. Costs in Both Groups at 6 Months</b>		
<b>Outcomes</b>	<b>Control Group</b>	<b>Acupuncture Group</b>
Inpatient rehabilitation days (\$170 per day)	\$9,690 (57 days)	\$6,630 (39 days)
Ambulatory detoxification episodes (\$500 per episode)	\$1,000 (2 episodes)	0 episodes
Psychiatric inpatient days (\$450 per day)	\$7,200 (16 days)	0 days
Acupuncture supervision (New York State mandated) for 26 weeks	NA	\$8,350
Acupuncture supplies (needles, gauze, etc.)	NA	\$600
<b>Total Cost</b>	<b>\$17,890</b>	<b>\$15,580</b>
Abbreviation: NA, not applicable.		

### **Treatment Completion**

Completion of treatment was defined as completing the treatment protocol and having at least 3 months of sobriety.

### **Outcomes**

Claims data were reviewed for 18 months following initiation of acupuncture treatment for the

study group. Claims data were also reviewed 18 months following admission to treatment for the control group. The study patients completed acupuncture treatment within a 6-month period. A follow-up evaluation was done at 18 months following initiation of acupuncture treatment.

The groups were compared on the following measures: (1) number of chemical dependency sessions, (2) number of acupuncture sessions, (3) number of total treatment toxicology screens, (4) number of positive toxicology screens, (5) number of inpatient rehabilitation days, (6) treatment discharge status, (7) detoxification episodes and days, and (8) number of inpatient psychiatric days.

## **RESULTS**

Table 2 lists the main outcomes at 6 months in both groups.

Acupuncture group patients were less likely to test positive for addictive substances, and completed treatment successfully. They were also less likely to use inpatient chemical dependency services. At 6 months, there was a 43% reduction in inpatient chemical dependency days and a 46% reduction in all behavioral health inpatient days in the acupuncture group. These numbers continued the trend at 18 months. When comparing acupuncture vs the control group at 18 months, there was a 32% reduction in inpatient chemical dependency days. All behavioral health inpatient days were reduced 47% over 18 months for the study group vs the control group.

Table 3 looks at the costs associated with treatment in the control and acupuncture groups. The actual cost was greater in the acupuncture group after 6 months. However, the supervision costs remained fixed and the capacity for acupuncture sessions was much greater than the numbers above. Therefore, if more patients were enrolled in acupuncture detoxification, the savings would be significantly greater for the HMO or clinic involved.

## **DISCUSSION**

Application of auricular acupuncture to the treatment of substance abuse has been available since approximately 1973. Its value as adjunctive therapy in treating substance abuse is becoming more and more apparent. The mechanism of action, although not proven, appears to be release of endorphins<sup>7</sup> which help decrease cravings for the substance involved. Another possible mechanism, perhaps, is modulation of the vagus nerve. The concha of the external ear is innervated by the vagus nerve. In fact, it is the only place on the body where the vagus nerve can be accessed through the skin.<sup>8</sup> Stimulation of the concha with acupuncture needles may modulate or calm the autonomic nervous symptoms of withdrawal. Modulation or stimulation of the vagus nerve at the concha with acupuncture needles may increase parasympathetic tone in the organs and areas of the body innervated by the vagus nerve. Since the vagus nerve has a wide influence on pulmonary, cardiac, and gastrointestinal organs, this modulation may be significant.

<b>Table 4. Extrapolated Costs</b>		
Outcomes	Control Group	Acupuncture Group
Inpatient rehabilitation days (\$170 per day)	3 x \$9,690 = \$29,070	3 x \$6,630 = \$19,890
Ambulatory detoxification episodes (\$500 per episode)	3 x \$1,000 = \$3,000	0 episodes
Psychiatric inpatient days (\$450 per day)	3 x \$7,200 = \$21,600	0 days
Acupuncture supervision (New York State mandated) for 26 weeks		
(does not change with increased patient load)	NA	No change = \$8350
Acupuncture supplies (needles, gauze, etc.)	NA	3 x \$600 = \$1800
Total Cost	3 x \$17,890 = \$53,670	\$30,040
Total Projected Savings With Acupuncture		\$23,630

Abbreviation: NA, not applicable.

In our pilot study, the rate of inpatient days decreased by approximately 32% after 18 months. The long-term savings is significant in this setting since number of inpatient treatment days is a major cost in treating chemically dependent patients. It is also well-known that treatment completion in chemical dependency treatment programs improves outcomes. In this pilot study, 74% completed treatment vs 44% in the control group. In addition, patients reported less trouble with cravings and withdrawal and were also more relaxed during and after the acupuncture treatments. Since acupuncture is a relatively low-cost treatment modality, the incorporation of an auricular acupuncture treatment program in the HMO setting would be both cost-effective and would improve patient outcomes.

Although our study was small, the savings and positive outcomes were significant. A much larger study over a longer period would be reasonable to pursue. It is important that the savings are extrapolated to larger numbers of patients for the following reasons:

1. Acupuncture supervision is a fixed cost. Other states do not mandate the level and frequency of acupuncture supervision mandated in New York State (3 hours of supervision by a licensed or certified acupuncturist for every 15 hours or less of auricular acupuncture).
2. The number of patients in the acupuncture group can be increased dramatically since the capacity of acupuncture detoxification sessions was much greater than the 22 patients reviewed. The 22 patients treated represented about 20% of the acupuncture treatment capacity in this particular clinic.
3. As the number of patients in the acupuncture group increases, the expenses were only increased marginally, mainly the cost of the needles, approximately \$1 per patient per treatment.

However, the difference in cost of inpatient days would increase significantly when the figures are multiplied by 3 times or the number of the overall patients in the study is increased to 132. The costs would be as shown in Table 4.

Since the supervision costs remain fixed and the capacity for acupuncture sessions is even greater than the numbers above, the more patients enrolled in acupuncture detoxification, the larger the savings for the HMO or clinic involved.

### **CONCLUSION**

Our findings demonstrate that the use of auricular acupuncture as adjunctive therapy in a chemical dependency program may improve patient completion rates, decrease inpatient rehabilitation days, and improve the rate of negative urine toxicologies. These factors can result in a significant cost savings and improved patient satisfaction in an HMO setting. The positive outcome of our pilot study demonstrates the need for a much larger study with auricular acupuncture as adjunctive treatment in an HMO chemical dependency treatment setting. Scientific studies of the mechanism of action of auricular acupuncture in treating substance abuse is important for our complete understanding of this clinical observation.

### **ACKNOWLEDGEMENTS**

We wish to thank the support staff and the therapists in the chemical dependency department of LifeTime Health in West Seneca, NY, for their help in compiling the data.

### **REFERENCES**

1. Helms JM. *Acupuncture Energetics: A Clinical Approach for Physicians*. Berkeley, CA: Medical Acupuncture Publishers; 1995.
2. Smith MO. Acupuncture and natural healing in drug detoxification. *Am J Acupunct*. 1979;7(3):97-107.
3. Smith M. treatment setting. *Am J Acupunct*. 1984;12(3):251.
4. Smith MO, et al. Acupuncture detoxification in a drug and alcohol abuse treatment setting. *Am J Acupunct*. 1984;12(3):251.
5. Washburn AM, et al. Acupuncture heroin detoxification: a single-blind clinical trial. *J Subst Abuse Treat*. 1993;10:345-351.
6. Graham AW. *Principles of Addiction Medicine*, Third Edition. American Society of Addiction Medicine Inc; 2003.
7. Stux G, Pomeranz B. *Basics of Acupuncture*, Second Edition. New York, NY: Springer-Verlag; 1991.
8. Frank BL, Soliman NE. *Atlas of Auricular Therapy and Auricular Medicine*. Richardson, TX: Integrated Medicine Seminars; 2001. O. Creating a substance abuse treatment program incorporating acupuncture. *American Academy of Medical Acupuncture Review*. 1990;2(1):25-32.

**AUTHORS' INFORMATION**

Dr Ronald Santasiero is a Board-certified Family Physician, is Board-certified in Medical Acupuncture through the American Board of Medical Acupuncture (AAMA), and practices Holistic Medicine and Pain Management. Dr Santasiero is an acupuncture supervisor in the Chemical Dependency department at LifeTime Health in West Seneca, New York, Clinical Assistant Professor in Family Medicine at the State University of New York at the Buffalo School of Biomedical Sciences, and is the Medical Director at the D'Youville College Physician's Assistant program in Buffalo, New York.

Ronald P Santasiero, MD, DABMA\*  
Sedona Holistic Medical Centre  
5451 Southwestern Blvd  
Hamburg, NY 14075  
Phone: 716-646-6075  
Fax: 716-646-5912  
E-mail: [DRRONS@hotmail.com](mailto:DRRONS@hotmail.com)

Gregg Neussle is a Certified Social Worker and Senior Manager in Behavioral Health at LifeTime Health in West Seneca, New York.

Gregg Neussle, CSW-R  
LifeTime Health  
130 Empire Dr  
West Seneca, NY 14224