Chair Massage for Treating Anxiety in Patients Withdrawing from Psychoactive Drugs

Shaun Black, MSc; Kathleen Jacques, PhD; Adam Webber, MSc; Kathy Spurr, MHI; Eileen Carey, MSW; Andrea Hebb, PhD; and Robert Gilbert, PhD

Abstract

Context: Therapeutic massage has been proven to be an effective, nonpharmacologic, alternative for managing state and trait anxiety in a variety of clinical situations. However, no controlled study has investigated this effect in an addiction treatment setting.

Aim: The aim of this study was to investigate the effectiveness of chair massage for reducing anxiety in persons participating in an inpatient withdrawal management program for psychoactive drugs.

Design: The design was a randomized, controlled clinical trial conducted from June 2008 to January 2009.

Subjects: Eighty-two (82) adult patients received inpatient treatment for psychoactive drug withdrawal (alcohol, cocaine, and opiates).

Setting: This study was conducted at the Withdrawal Management Services at the Capital District Health Authority, Halifax, Nova Scotia.

Interventions: Subjects were randomly assigned to receive chair massage ($n = 40$) or a relaxation control condition ($n = 42$). Treatments were offered for 3 consecutive days. Standard counseling and pharmacologic management were also offered concurrently to patients in all conditions.

Measurements: The primary outcome measure was anxiety assessed using the Spielberger State–Trait Anxiety Inventory (STAI). State and trait anxiety scores were determined immediately prior to and following each treatment intervention.

Results: Analysis of STAI scores showed a significant reduction in state and trait anxiety for both interventions ($p < 0.001$). The magnitude in the reduction in state ($p = 0.001$) and trait ($p = 0.045$) anxiety was significantly greater in the chair massage group where the effect on state anxiety was sustained, at least in part, for 24 hours.

Conclusions: Within the clinical context of this study, chair massage was more effective than relaxation control in reducing anxiety. Further investigation of chair massage as a potential nonpharmacologic adjunct in the management of withdrawal related anxiety is warranted.

Introduction

Withdrawal from psychoactive drugs can be extremely difficult, often exacting a physical and emotional toll on those who try. Central to the challenge are many troublesome withdrawal-related symptoms including but not limited to anxiety, sleep disturbances, depressed mood, fatigue, irritability, headaches, restlessness, clouding of sensorium and, in a small percentage of individuals, life-threatening seizure and delirium tremors. If unmanaged, these symptoms can adversely affect the quality of the withdrawal experience, the completion of withdrawal, and the entry into rehabilitation programs subsequent to withdrawal.

Anxiety experienced during withdrawal can be managed pharmacologically, typically with short-acting benzodiazepines. While they are effective and safe in managing anxiety, in a variety of clinical settings, benzodiazepines have limitations and liability in the addiction treatment setting. For example, the high doses of benzodiazepines typically required to manage alcohol withdrawal symptoms may cloud the sensorium, potentially affecting multiple areas of...
cognition, most notably, interfering with the formation and consolidation of memories of new material and may induce complete anterograde amnesia. This can create a challenge to the development of effective therapeutic relationships between patients and clinical staff. Furthermore, when administered at doses outside the therapeutic range, which is common in the management of withdrawal symptoms, benzodiazepines are liable to abuse and dependence.8,10–13 Unfortunately, there is currently no other equally effective anxiety management agent better suited to this population.

Today, many withdrawal management programs incorporate complementary therapies as adjuncts to the traditional pharmacologic treatment of anxiety. Auricular acupuncture, biofeedback, and hypnosis have become standardized therapies in many addiction treatment programs.14 However, due to a paucity of rigorous research, the validity and extent of efficacy of most of these practices remain unsubstantiated.

A growing body of evidence supports the efficacy of therapeutic massage in the management of anxiety and other conditions. Therapeutic massage has been practiced for millennia and is purported to promote and restore good health. Its Western form, known as Swedish massage, offers an inexpensive treatment modality with a low side-effect profile.15 The benefits of therapeutic massage are proposed to be in its induction of a relaxation response, increasing blood and lymphatic circulation, increasing endogenous endorphin release, potentiation of analgesic effects, decreasing edema and release of muscle spasms.16 A meta-analysis of 37 therapeutic massage studies identified significant reductions in anxiety, blood pressure (BP), and heart rate postmassage, in a variety of clinical settings.17 Massage has been shown to produce relaxation in patients with rheumatic disease,18 to reduce anxiety in patients with general anxiety disorders,19 and to reduce anxiety and improve quality of life in patients with cancer.16,20,21 Chair massage has been shown to decrease anxiety and lower salivary cortisol levels in adult volunteers.22

While numerous studies have illustrated the effectiveness of therapeutic massage in reducing state and trait anxiety, its potential in the management of the anxiety experienced during withdrawal from psychoactive drugs has not been investigated. The present study was conducted as a pilot to evaluate the effect of chair massage in reducing anxiety in this clinical context.

Methods

Study design

A randomized, controlled clinical trial was performed. Two (2) treatment groups were included: a chair massage group and a relaxation control group. Subjects were instructed to attend treatment sessions on each of 3 consecutive days. The primary outcome measure was the effect of treatment on subject’s state and trait anxiety levels, measured immediately before and after each treatment session. Standardized anxiety measurement tools were used to determine the effect of treatment on anxiety.

Subjects

Individuals receiving inpatient treatment for withdrawal from psychoactive drugs and who were able to give informed consent and comply with study procedures were eligible to participate. The study was conducted in the withdrawal management unit at Addiction Prevention and Treatment Services, Capital District Health Authority, Nova Scotia, Canada. This unit serves approximately 900 admissions annually. Subjects were enrolled between June 1, 2008 and January 31, 2009. Inclusion criteria were (1) being at least 18 years old; (2) self-reported primary presenting problem as one of the following: alcohol, cocaine, or opioids; (3) have no prior treatment or experience with massage therapy; (4) no prior history of anxiety or sleep disorder; (5) have no history of coagulation or platelet disorders or be currently taking medications that may promote bleeding; and (6) have no contraindications to the treatment intervention as described in the standards of care of the College of Massage Therapists of Ontario. The study was approved by the Capital Health Research Ethics Board and was conducted in accordance with the code of ethics of the College of Massage Therapists of Ontario. All the subjects provided written informed consent. Subjects were not for compensated for their participation in this study.

Procedure

Following completion of the enrollment interviews, eligible participants were randomized to one of the two treatment groups (described below) according to a computerized randomization procedure. Participants were told their treatment assignment and attendance requirements. Treatments were described with a standardized script, encouraging subjects to view both treatments groups as potentially beneficial in reducing the symptoms of withdrawal. Participants were treated 3 times over 3 consecutive days. Participant’s progress through the trial is illustrated in Figure 1.

Treatment group 1: Chair massage. Five (5) female massage therapists registered with the Massage Therapist Association of Nova Scotia performed the chair massage. An Avilla II massage chair was used in this study (Zen Massage Tables & Supplies, Nova Scotia, Canada). On each of 3 consecutive days, participants (while fully clothed and in a seated position) received a 20-minute back, shoulder, neck, and head massage from the same massage therapist. Participants were treated with conventional light-pressure Swedish massage techniques, which consisted of continuous systematic strokes including kneading and stretching to loosen and rehabilitate the soft tissues of the body (muscles, tendons, and fascia) and to provide general relaxation. The manual techniques include effleurage (smooth gliding movements intended to evoke the relaxation response), soothing petrissage (lifting, squeezing, wringing, or kneading of soft tissues to increase circulation and to reduce muscle spasm), repetitive stroking (a soothing technique used to decrease sympathetic nervous system firing and to decrease pain perception), rocking (rhythmic side to side motion of a limb or trunk), squeezing (compression of a muscle), and mild joint mobilization (slight distraction and stretch of joint capsules and surrounding tissue). Spinal manipulation and nonconventional techniques were not performed. As is standard practice in massage therapy delivery, room lights were dimmed and soft, soothing music (a compilation of instrumental classical music over-
laid with background ocean sounds) was played to enhance relaxation during therapy. The chair massage occurred between 6:00 pm and 7:30 pm to avoid confound because of the time of day.

Treatment group 2: Relaxation control. On each of 3 consecutive evenings, participants in this group participated in a 20-minute relaxation session. This treatment was delivered in the same location and with the same lighting and music as with the chair massage group. Each participant was asked to choose a comfortable position in a chair, clear their minds of stressful thoughts, and focus on their breathing. A staff member, blinded to the intent of the study and not trained in body or energy work, sat quietly in the room approximately 4 feet behind the participant. As with the experimental group, control interventions were performed between 6:00 pm and 7:30 pm.

Relaxation control and chair massage sessions were not performed concurrently. All study participants received normal standard of care, which included pharmacologic management of their withdrawal symptoms and counseling.

Measures of treatment efficacy

Primary outcome measure. The primary outcome measure was the effect of treatment on subject anxiety. The Spielberger State–Trait Anxiety Inventory for adults (STAI; Forms Y-1 and Y-2) was used to measure anxiety. This tool is a self-reporting instrument demonstrated to provide a valid measure of anxiety, as classified by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition. This instrument consists of two 20-item scales: one that measures trait (baseline anxiety or, how one usually feels) and one that measures state (situational or how one feels at a particular moment) anxiety. For each item on the scales, a person rates agreement on a 4-point Likert scale from 1 (almost never) to 4 (very much so). Scores on the STAI range from 20, indicating a low level of anxiety, to 80, indicating an extreme level of anxiety. Research has shown that the STAI has adequate concurrent validity and internal consistency (r = 0.83). To indicate clinically elevated levels of anxiety, a cut-off ≥40 was used. This cut-off is normally used to indicate the presence of clinically significant state anxiety. Baseline STAI scores were obtained on the day of recruitment and immediately before and after each intervention session.

Secondary outcome measures. Secondary outcome measures included changes in the heart rate and BP, evaluated immediately pre- and post-treatment. Both heart rate and BP have been used as dependent variables in behavioral studies designed to examine the ability of interventions to alter levels of anxiety. Heart rate and BP were measured using the OMRON HEM-650CAN IntelliSense Automatic Blood Pressure Monitor.
Adverse medical events were recorded and evaluated daily. STAI, heart rate, and BP assessments were conducted by research staff blind to the study participant’s intervention and to the intent of the study.

Data collection

Upon recruitment into the study, participants completed a demographic questionnaire, which included the variables of gender, age, marital status, working status, and education, gathered through purpose-designed questions. Baseline information on clinical variables, including STAI scores, heart rate and BP, primary drug of choice, and pharmacology were obtained. During the course of the study STAI scores, heart rate and BP were measured immediately before and 10 minutes after (pre/post session design) chair massage or relaxation control interventions, on each day of the study.

Data analysis

It was determined that the analysis of 37 subjects per group would provide 80% power at the 5% significance level to detect a 10-point difference between treatment group means for state anxiety, given a standard deviation (SD) of 15 in each group.

The categorical demographic characteristics of the groups were compared using either the χ² or the Fisher’s Exact Test. Age was compared with a t-test.

A mixed-model analysis was performed on each set of anxiety data (state and trait), heart rate, systolic BP, and diastolic BP. Three (3) main independent variables were considered: pre- or post-treatment (baseline was considered a “presession” data point), treatment group (chair massage or relaxation control), and session number (1–7; baseline then pre- and post-treatment for each of 3 consecutive days, treated as a continuous variable). Subjects were treated as a group variable; differences in subjects are accounted for, but were not of interest and were not explicitly tested. Demographic variables were included in initial models but were only retained if they were at least marginally significant (p < 0.1).

Results

Subject recruitment

Subjects were recruited for the study between June 2008 and January 2009. From an estimated 240 individuals receiving inpatient treatment for alcohol, opioids, and cocaine withdrawal over the study period, 90 voluntarily attended a recruitment session, 82 were randomized, and 8 were not (Fig. 1). The reasons for not being randomized included a lack of comfort with the idea of massage in 7 persons and a medical contraindication to the proposed procedures in 1. In this study, 40 subjects were randomized to chair massage and 42 to the control arm of the study.

Study withdrawals

Of the 82 subjects randomized, only 69 were still in the Withdrawal Management Unit at the time of the study’s commencement (Fig. 1). Of the 13 subjects who were not, 12 had discharged themselves from the Withdrawal Management Unit and 1 subject was admitted to the medical unit of the hospital. Sixty-nine (69) subjects completed at least one session, 55 completed at least two sessions, and 46 completed at least three sessions. While no subject withdrew from the research study, some subjects discharged from the Withdrawal Management Unit and were therefore unable to complete three sessions.

Subjects’ characteristics

There were no significant differences on pretreatment variables by treatment group, except with the use of antidepressant medications. Table 1 provides demographic data by treatment group. The demographic profile of subjects randomized to this trial was similar to that of the general population admitted to withdrawal management inpatient services at Addiction Prevention and Treatment Services. For example, in the 2009 fiscal year (April 1, 2008–March 31, 2009) 66% of patients admitted to this service were male and 34% were female. Of these patients, 55% had attended high school and 35% had some postsecondary education.

Clinical responses

Primary outcome measures. Effect of treatment on STAI scores. The data from all 69 subjects was used in the analysis regardless of sessions (one, two, or three) they completed. Subjects in this study had mean baseline state and trait anxiety scores of 54.9 (SD = 8.9) and 57.3 (SD = 11.5), re-

Table 1. Demographic and Clinical Characteristics of All 69 Participants by Treatment Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chair massage (n = 36)</th>
<th>Relaxation (n = 33)</th>
</tr>
</thead>
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<tr>
<td>Gender</td>
<td>16 F, 20 M</td>
<td>10 F, 23 M</td>
</tr>
<tr>
<td>Age</td>
<td>43.11 (14.05*)</td>
<td>43.53 (9.81*)</td>
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<tr>
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<tr>
<td>Post secondary</td>
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<td>17</td>
</tr>
<tr>
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<td>12</td>
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<tr>
<td>Part time/seasonal</td>
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<tr>
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<td>7</td>
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<td>1</td>
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<tr>
<td>Marital status</td>
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<td>0</td>
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<td>Days in detox before entering study</td>
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<tr>
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<td></td>
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<td>29 No</td>
</tr>
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</table>

*Indicates standard deviation.
Scores on the STAI can range from 20 to 80. Scores of ≥40 on either scale indicate clinically significant levels of anxiety, and scores of greater than 50 indicate high levels of anxiety. The observed standard deviation of state anxiety scores in session 1 was 10.8; given the size of the patient groups, this study had a 98% power at the 5% significance level for detecting a 10-point difference between treatment groups for state anxiety.

Figure 2 shows the mean pre- and post-treatment STAI scores for each of three successive treatment sessions. For both the State and Trait Anxiety model fit, the results show that there were significant effects on the primary outcome measures, for pre and post \((p < 0.0001)\), as well as significant interactions between all three variables.

A significant reduction in the post-treatment mean STAI scores was observed in both treatment groups and on each of the three treatment sessions. However, subjects in the chair massage group demonstrated significantly greater reductions in mean STAI scores than those in the relaxation control group. On each of the three sessions, the mean post-treatment state anxiety scores in the chair massage group were between 37 and 39, a score that indicates anxiety in the normal range, whereas the score in the relaxation control group (48–50 range), while decreased indicated significantly high levels of anxiety. Additionally, the anxiety-reducing effects of chair massage were immediate and the reduction in state anxiety was sustained, at least in part, for 24 hours. In the model fit, the sustained decrease in STAI scores was significant in the chair massage group; however, it was not significant in the relaxation control group.

Secondary outcome measures. Effect of treatment on heart rate and BP. Treatment affected heart rate and BP as follows:

- **Heart rate**—Over the course of the study, heart rate did not show a systematic pattern of change in either the chair massage or relaxation control groups (Fig. 3). Furthermore, there was no significant difference in heart rates across the two treatment groups. None of the subject measures tested showed a significant relationship with heart rate. There were no observable trends or patterns to the heart rates observed in this study as they relate to chair massage, relaxation control, pre/post-treatment, or session number.

- **Diastolic BP**—In both treatment groups, there was a significant pre/post-treatment effect for diastolic BP \((p = 0.0013)\). The effect was an increase in diastolic BP observed immediately post treatment sessions (Fig. 4). A significant downward trend in the mean diastolic BP was also observed over the course of the study, in both treatment groups \((p < 0.0001)\).

- **Systolic BP**—No significant change in systolic BP was observed in either the pre- or post-treatment or between the treatment groups (Fig. 5). No significant interaction effects were observed for systolic or diastolic BPs and for that reason, they were not included in the final model.

**Additional effects.** Additional effects of treatment on STAI scores were:

- **Age and gender**—Gender was not a significant factor in predicting STAI scores as part of the models given above \((p = 0.84 \text{ for state, } p = 0.72 \text{ for trait})\). Age was a significant predictor of both state and trait anxiety scores and was included in the larger models. In both cases, older subjects reported lower anxiety levels, although with state anxiety scores the effect was predominantly observed on the presession measures. Specifically, older subjects reported a larger decrease in their presession state anxiety scores than younger subjects, by about 2.4 points per decade older.

- **Primary presenting problem**—When included in the large model with state anxiety score as the dependent variable and pre/post session, session number, age, and experimental treatment group, differences between the primary presenting problem (alcohol, cocaine, opioids) were not significant at presession anxiety levels.
When included in the large model with trait anxiety as the dependent variable and pre/post session, session number, age, and experimental treatment group, differences between primary presenting problem were not significant at presession anxiety levels \((p = 0.099)\) or for changes post-treatment \((p = 0.810)\). From these results, we have concluded that chair massage has provided similar benefits for all three primary presenting problems.

**Antidepressant medications**—A review of medical histories revealed that 29% of the study subjects were receiving treatment for depression and that the chair massage group had significantly more subjects on antidepressant medications, \(p = 0.007\) \((\chi^2)\). Use of antidepressant medication had no significant relationship with state anxiety scores \((p = 0.4129\) as the only independent variable, \(p = 0.9473\) as part of the larger model) or trait anxiety scores \((p = 0.935\) as the only independent variable, \(p = 0.8268\) as part of the larger model), so there is no reason to believe from the information in this study that the mismatch between the antidepressants in the two groups is a cause for concern.

**Discussion**

This is the first study that objectively evaluated the effect of chair massage on the anxiety that patients experience during withdrawal from psychoactive drugs (alcohol, opioids, and cocaine). Our results clearly demonstrated that chair massage was superior to relaxation control treatment in reducing anxiety during withdrawal, that the effects were immediate, and in the case of state anxiety the reduction was sustained, at least in part, for 24 hours.

![FIG. 3. Mean heart rates for chair massage and relaxation control treatment groups, measured at baseline and pre/post-treatment and on three successive treatment sessions. BPM, beats per minute.](image)

![FIG. 4. Mean diastolic blood pressures for chair massage and relaxation control treatment groups, measured at baseline and pre/post-treatment and on three successive treatment sessions. BP, blood pressure.](image)
State anxiety is defined as the emotional reaction a person may experience in response to physical danger and psychologic stress, the intensity and duration of which are determined by an individual’s perception of a situation as threatening or demanding. Withdrawal from psychoactive drugs is a stressful process and as demonstrated in the present study, participants experience feelings of high state anxiety. This is not unexpected given the similarly high levels of trait anxiety observed in participants of this study, which along with situation, is important in determining state anxiety. Symptoms of state anxiety include apprehension, tension, worry, and heightened autonomic nervous system activity. If left unmanaged, these symptoms have the potential to adversely affect the completion of withdrawal and the entry into recovery programs subsequent to withdrawal. For patients with pre-existing chronic conditions, uncontrolled anxiety can detrimentally affect their physical health.

Our finding that chair massage significantly reduced state anxiety may prove doubly valuable to this patient population, in that the reduction of anxiety, in addition to improving patients’ feelings of well-being, may also serve to maintain their physical health. For both STAI measures, the effects of treatment with chair massage are considered large, given the results of other treatment studies of anxiety. To our knowledge, no other study has examined trait anxiety levels in this clinical population and therefore we are not able to draw comparisons. However, a recent meta-analysis has shown therapeutic massage capable of significantly reducing trait anxiety in a variety of clinical settings, and with an efficacy similar to that of psychotherapy.

It has been theorized that therapeutic massage may alter autonomic nervous system activity, decreasing sympathetic and increasing parasympathetic activity. A recent meta-analysis has shown therapeutic massage to be effective in reducing heart rate and BP, findings consistent with this theory. In the present study, we did not observe significant changes in heart rate or systolic BP for either treatment group. Such findings are not without precedence and may reflect participants’ discomfort with the device or process used in determining heart rate and BP (e.g., white coat syndrome). Interestingly, we did note a significant downward trend in mean diastolic BP over the course of the three sessions, and for both treatment groups. Reductions in diastolic BP across the two treatment groups were not significantly different. This finding was not unexpected because relaxation therapies, similar to the one used in this study, have been previously shown to affect autonomic nervous system action. Recent work has suggested that the intervention “relaxation,” typically used as the control in massage therapy research, may not adequately control for the attention, touch, and healing intent attributes of therapeutic massage. Future studies of chair massage should consider incorporating “simple touch” as a control for these attributes.

Inpatient withdrawal management services comprise interventions designed to safely and effectively manage acute intoxication and/or the symptoms of withdrawal. Anxiety can be a significant symptom of withdrawal and, if unmanaged, can contribute to high rates of patients self-discharge. Management of this symptom is therefore essential and pharmacologic approaches, although less than ideal, serve as the mainstay.
Today a number of evidence-based nonpharmacologic tools efficacious in the clinical management of anxiety exist. Evaluating the efficacy and suitability of these tools to patients in a withdrawal management setting may lead to the development of new nonpharmacologic approaches for managing withdrawal-related anxiety. The results of this pilot study suggest that chair massage may offer one such approach. Additional work is needed to further substantiate the anxiety-reducing effects of chair massage and to determine its potential to serve as an adjunct in the drug-based management of withdrawal-associated anxiety.

Conclusions

In conclusion, while this pilot study demonstrates the efficacy of chair massage in reducing withdrawal-related anxiety, larger multicenter trials are needed to substantiate the internal and external validity of our findings. By improving the experience of the withdrawal process and providing patients with a wider range of approaches to manage the way that they feel, chair massage may help retain patients within service areas and improve overall wellness.

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Disclosure Statement

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References


Address correspondence to:
Robert Gilbert, PhD
School of Health Sciences
Faculty of Health Professions
Dalhousie University
Bethune Building
1278 South Park Street
Halifax, Nova Scotia B3H 2Y9
Canada
E-mail: rgilbert@dal.ca