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Barbara Ellen Bauer
Sharp Coronado Hospital

Carolyn Mitchell
Sharp Coronado Hospital

Erin Salmon
Sharp Coronado Hospital

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Cover Page Footnote

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The effect of soothing sound machines and meditation using CD players on relaxation in acute care orthopedic patients

Barbara Bauer, RDN, *Sharp Coronado Hospital, barbara.bauer@sharp.com*

Carolyn Mitchell, RDN, *Sharp Coronado Hospital, carolyn.mitchell@sharp.com*

Erin Salmon, RN *Sharp Coronado Hospital, erin.salmon@sharp.com*

Abstract

This research studied the relaxation effect in orthopedic surgical patients using guided meditation or soothing sounds (SS) machines. The study used a comparative study design to evaluate differences in the effect of SS or guided meditation on patients' perceptions of relaxation. IRB approval was obtained prior to initiating the study. A convenience sample of orthopedic surgery patients consented to voluntarily rate their perceptions of relaxation on a 5-point Likert scale ranging from "none", "mild", "moderate", "good" or "very good". A demographic survey was used to describe the sample. The sample included 50 patients with ages ranging from 40 to 70 years. Seventy-eight percent (78%) of the sample was female and 22% were male. The participant selection of relaxation type was 82% soothing sounds machines, meditation 12%, and both (SS machines and meditation) 6%. The response rate was 100% for the guided meditation as compared to the 93% response rate for the SS machine. The greatest relaxation change was noted for the guided meditation (66.5% good to very good) as compared to the SS machines (63.5% good to very good). Both SS machines and guided meditation improved relaxation with greater than 82% rating moderate to very good change. More patients selected SS machines over guided meditation. The active process for guided meditation provided a higher relaxation rating than the passive process using soothing sounds machines.

Keywords

Soothing sounds, meditation, integrative therapies, patient experience

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Background

Management of pain and stress levels in postoperative patients is optimum for patient healing. Alternative therapies, like aromatherapy, guided meditation, and soothing music, may complement existing medical therapies. The purpose of this article is to report on research focused on improving relaxation for acute care orthopedic patients during hospitalization. To enhance this experience the use of guided meditation compact discs (CD's) and soothing sound machines were studied to compare their effectiveness in enhancing the relaxation process for post-operative orthopedic patients. The hospital uses lavender aromatherapy, massage, acupuncture, and music therapy (listening to soothing music) to provide a calming experience. The patient's comfort is priority, so adding guided meditation using a CD player and soothing sounds machines was a natural

progression of our relaxation experience. Since meditation to quiet the mind is not practiced by all our patients, the response to guided meditation during the care of surgical patient's was unknown.

The research question for the study was: In the postoperative period, what is the effect of patients listening to soothing sounds compared to guided meditation in relieving patients' perceptions of relaxation postoperatively?

Review of the Literature

Interest in using integrative therapies to improve relaxation, decrease anxiety, decrease pain, enhance healing, and reduce hospital lengths of stay has progressed in the past decade. In 2004, Dunn¹ reviewed numerous articles analyzing the effect of music in the reduction of postoperative pain and determined while results were

mixed about the effectiveness of these treatment modalities, listening to music produced a positive patient experience as a distraction from the discomfort resulting in a reduced perception of pain. Similarly, Antall and Kresevic² used a guided imagery audiotape intervention to determine the effect of complementary therapies on managing postoperative pain in thirteen elderly orthopedic patients. The authors reported that patients perceived decreased levels of anxiety and pain and experienced decreased lengths of hospital stay. Although the findings were not statistically significant², the study has clinical significance. Chan studied another method of meditation, “mantra meditation”, in 2014,³ highlighting its benefits as a means to enhance wellness and decreased anxiety and depression.

Eckhouse, Hurd, Cotter-Schaufele, Sulo, Sokolowski, and Barbour⁴ studied a group of orthopedic and oncology patients using a combination of music, coping skills, relaxation techniques, and education as a means to reduce anxiety. There was a significant decrease ($p < .05$) in anxiety levels reported for all 112 participants. Similarly, Good, Stanton-Hicks, Grass, et al. investigated using relaxation, music, and the combination of the two measured during rest and ambulation on postoperative pain. Pain was measured by an adapted version of the dual VAS Johnson’s numerical rating scales. Pain was measured before and 15 minutes after rest and at four time points on each postoperative day. Patients in the treatment group listened to the music during these periods and/or performed jaw relaxation techniques previously taught to them by staff. Patients in the three treatment groups reported a significant decrease ($p < .05$) in pain across all days and activities compared to the control group. Good, Anderson, Ahn, Cong and Stanton-Hicks⁶ studied patients ($n = 167$) following intestinal surgery using three non-pharmacological interventions (relaxation, chosen music, and the combination of the two) to determine the effect of the interventions on pain relief. Ninety six percent (96%) of participants reported the interventions reduced pain. After multivariate analysis of covariance, the intervention group reported significantly less ($p < .05$) post-test pain (16% to 40% less pain) than the control group after three of six post-tests during ambulation on postoperative days one and two.

In a 2014 randomized trial, Gorju, Davanloo and Heidarigorji⁷ studied the effects of relaxation training with hemodialysis patients. The subjects were taught to use the Benson method that guides the patient through breathing techniques for stress, anxiety, and perceptions of pain. With the patients ($n = 80$) randomly placed into two groups (treatment group and control group), the results demonstrated that the Benson method was a low risk, easy, and cost effective method to reduce stress in hemodialysis patients.

Salvatore, Miller and Montgomery-Downs⁸ studied the effects of ambient sound on overall sleep in adults ($n = 28$) suffering from self-reported disturbed sleep disturbance. Sleep was evaluated 3 ways: (1) objectively (measured by actigraphy and Personal digital assistant (PDA) data analyzed by the provider), (2) a subjective sleep report, and (3) administration of a morning psychomotor test that was given. The subjective sleep report was self-reported on the PDA within 2 hours of awakening. The report included the number of awakenings and rated sleep quality with a score of 100 equaling fully rested. Overall, the results for the actigraphy demonstrated the second night of sleep with music resulted in significantly less ($p < .05$) awakenings compared to the first night (baseline).

Locsin⁹ demonstrated that an intervention with music resulted in a decrease in perceptions of pain among obstetric/gynecology patients within the first 48 hours postoperatively. Nilsson, Rawal, Unestahl, Zetterberg and Unosson¹⁰ who evaluated the effect of music on patients’ relaxation reported similar findings. The music group experienced increased oxytocin levels indicating a more relaxed state. Another study by Nilsson¹¹ with hysterectomy patients ($n = 90$) using intra-operative music to improve post-surgery recovery demonstrated the beneficial effects of music on post-operative recovery.

Voss, Good, Yates, Baun, Thompson and Hertzog¹² examined the effect of sedative music and scheduled rest on reducing anxiety and pain for postoperative open-heart surgery patients ($n = 61$). Patients to measure anxiety, pain sensation, and distress used a visual analogue scale. The study found sedative music to be more beneficial than scheduled rest. In a comprehensive review of studies on the effects of music therapy on postoperative pain, Whitaker¹³ reported that music therapy is effective in reducing postoperative pain through oxytocin release that decreases anxiety levels, increases calmness, and decreases the need for pharmacologic pain relief. Whitaker reported that more research is needed to determine music therapy timing, duration, and frequency to ensure optimal effectiveness, but Whitaker reported music therapy is a low risk, supportive intervention that should be offered as one element of a pain management program. A critical review by Ott, Norris and Bauer-Wu¹⁴, explained how mindfulness meditation is an effective intervention beneficial for cancer patients in relieving psychological and physical suffering for cancer patients.

Importance of this Study

The literature review indicates beneficial effects of soothing sounds and guided meditation with patients’ perceptions of relaxation and pain perception. Because there was limited research with orthopedic patients, this study is important in evaluating patient preferences with outcomes of guided meditation as compared to soothing

sounds. It was decided to offer both guided meditation using a CD player or a soothing sounds machine and to allow study participants to select use of either a guided meditation CD player or a soothing sounds machine during the study.

Methodology

This study used a cross-sectional, comparative survey design with postoperative orthopedic patients hospitalized in a community hospital in the southwest region of the United States. Institutional review board approval was secured from the healthcare system prior to initiation of the study. The two interventions compared were use of the guided meditation CD or a soothing sounds machine.

Pre-Intervention Patient Instruction

Orthopedic patients were introduced to the availability of soothing sounds machines and guided meditation CD players at the preadmission orthopedic class offered at the study site hospital. The orthopedic joint class educates patients about their surgery for elective hip and knee orthopedic procedures. The introduction educated patients about the availability of relaxation methods, but did not solicit subjects for the study or obtain consent.

Patients were asked in the pre-surgery, preadmission phone interview which integrative therapies they preferred, either guided meditation CD players and/or soothing sounds machines, as a new offering for the relaxation experience. Information obtained from the preadmission phone interview was included on the surgery schedule, listing patients who requested the soothing sounds machines or guided meditation CD players.

Once the patients were admitted, the staff asked if the patient would like to use a soothing sound machine or guided meditation CD. Soothing sounds machines provided a timer to set listening for 15, 30 or 60 minutes and offered the choice of six soothing sounds. The guided meditation CD length was 45 minutes including 30 minutes of meditation and 15 minutes of affirmations.

To identify patients eligible for the study, patient lists from the electronic medical record system for the orthopedic unit were used. The list provides diagnosis, room number, name, date of birth, age, sex, admit date/time, and allergies on hospitalized patients. The list was used to identify patients with an orthopedic diagnosis of knee osteoarthritis or hip fracture. Patients with these diagnoses were considered as possible subjects for the study and were asked if they would like to use a soothing sound machine or guided meditation CD. Patient lists were saved for 24 hours and then shredded to ensure protected health information (PHI) confidentiality.

Data Collection

Patient participation in the study was voluntary. Patients declining to participate in the study were not restricted from using a soothing sounds machine or guided meditation CD. Each patient participating in the study received a number (from 1 to 50) coordinating with the numbered soothing sound machine or meditation CD used. No personal patient identifiers were collected. Consent to participate by answering a questionnaire evaluating their use of a guided meditation CD or a soothing sounds machine was obtained by the PI and co-investigator from the patient in their room. The PI and co-investigator were not the patient's primary nurse/caregiver. The consent used simple language without undue influence or coercion and inviting questions.

Demographic data collected included age, gender, and type of relaxation device selected. Patients using soothing sounds machines were placed in Group 1 (n = 41), and patients using guided meditation CD's were in Group 2 (n = 9). Patients requesting to use both guided meditation CD and soothing sounds machine were placed in Group 3 (n = 3). The final sample size was 50.

Patients choosing to use a soothing sounds machine or meditation CD were asked if they were willing to consent to answer questions evaluating their use of guided meditation using a CD player or a soothing sounds machine. Patients consenting to participate rated changes in their relaxation levels using a short survey indicating their perceptions on a 5-point Likert-like scale with response sets of 1= no change in relaxation, 2= mild change in relaxation, 3= moderate change in relaxation, 4= good change in relaxation and 5= very good change in relaxation.

Data Analysis

The data was analyzed to determine the patients' preference of using a guided meditation CD or soothing sound machine. Patient preferences were compared by (1) gender; (2) age; (3) type of relaxation device (soothing sounds only, meditation CD only, and combination of soothing sounds and meditation). Patient participants also rated the level of relaxation change when using a soothing sounds machine or when using a guided meditation CD.

When soothing sounds machines were used by the patient, they were placed on the bedside table in the patient's room. When listening to meditation CD's, patients used CD players with headphones. Soothing sounds machines and guided meditation CD players were battery operated, reusable, and cleaned after each patient use. Standard hospital cleaning practices were used. Earpieces on headphones were disposable and not reused. Patients requiring isolation precautions were evaluated to determine if precautions allowed participation. The patient's primary nurses obtained either the soothing

sounds machine or guided meditation CD player for the patient participants. The surgery schedule listing the patients' preferences was reviewed at the daily interdisciplinary integrative meeting to ensure that each patient requesting the soothing sounds machines and guided meditation CD players received their preferred intervention.

Results

Patients anticipate that a surgical procedure will be painful but along with common pain medication, the use of integrative therapies including guided meditation and soothing sounds machines improved the relaxation experience. Our hospital strives to practice patient centered care and maximize relaxation for acute care patients during their hospitalization to promote healing and decrease pain.

Table 1 outlines the demographic data for the 50 participants in the study. More females (78%) participated in the study as compared to males (22%). Most participants, male and female, were greater than 60 years of age with more females than males older than 70 years.

Table 2 outlines the participants' selection of the soothing sounds machine, the meditation CD, or both treatment modalities chosen by gender. The majority of participants (82%) chose the soothing sounds machine as contrasted to the meditation CD. Although the study did not request information as to why one modality was chosen over the

other, the choice might have been influenced by the passive nature of the soothing sound machine as compared to the active nature required by the meditation CD.

The percentage of patients from the total in each group was calculated with the percentage of patients responding in each of the response sets from 1 = no change to 5 = very good change. Patients in both Group 1 (soothing sounds) and Group 2 (meditation CD) reported positive affects in relaxation levels.

Patient Ratings Relaxation Level Changes

A patient stated to the investigator, "my first night I was in a large amount of pain and couldn't sleep but the soothing sounds machine put me and my husband, who was in the room with me, right to sleep." When staff rounded for pain management and observed patients peacefully sleeping while the soothing sounds machine played, we felt rewarded for our effort in developing a non-pharmacological program.

At the same time that the program started using guided meditation CD's and soothing sounds machines, our hospital embarked on a major renovation that involved jack hammering and loud construction noises. The decision was made to begin the study with this limitation since hospital noise is often a factor on patient satisfaction surveys. The ability to provide an alternative soothing sounds machine or guided meditation CD when noise levels were greater than normal was well received by our patients. A patient was quoted as saying, "Thank you for the soothing sounds machine. I turned it up full blast to block the noise!"

Table 1. Demographics

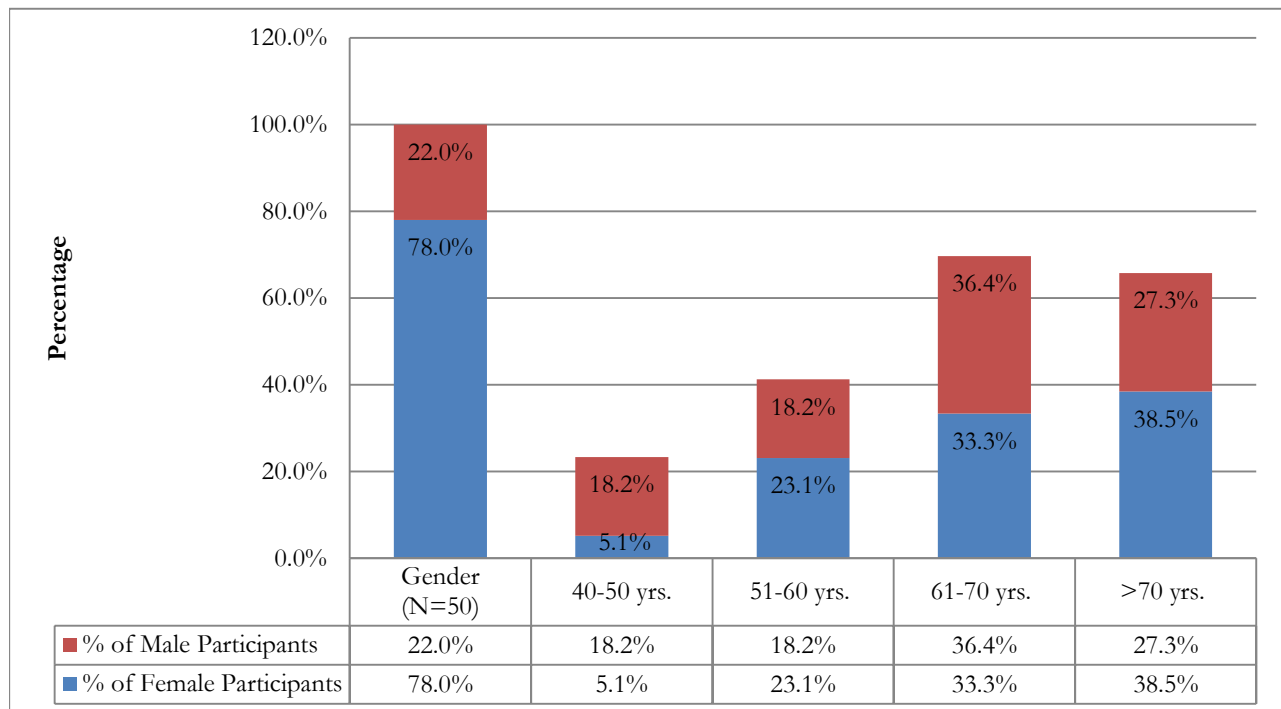


Table 2. Patients' Resource Selection by Gender

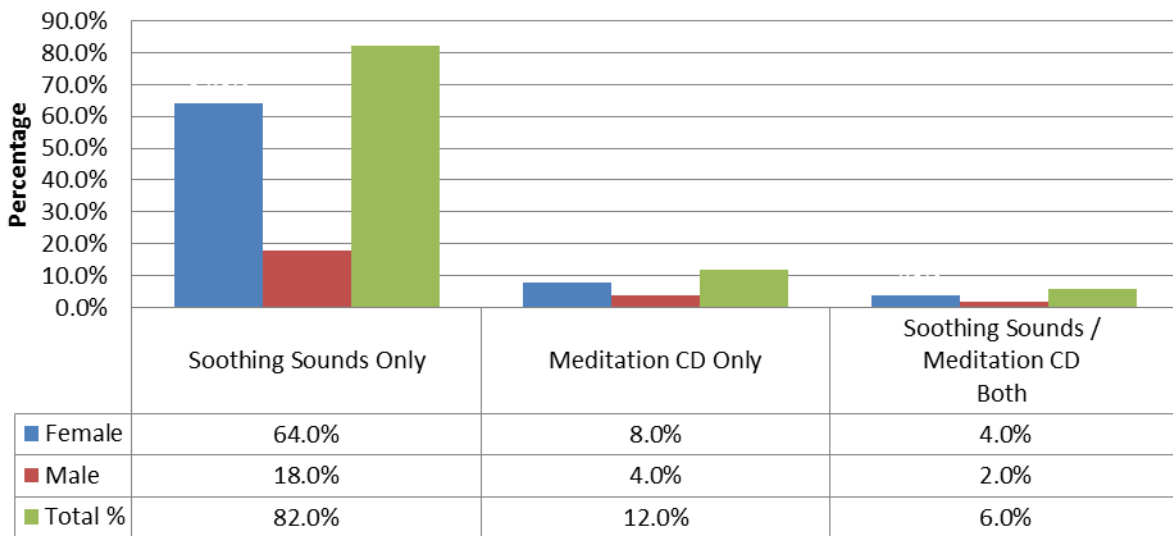
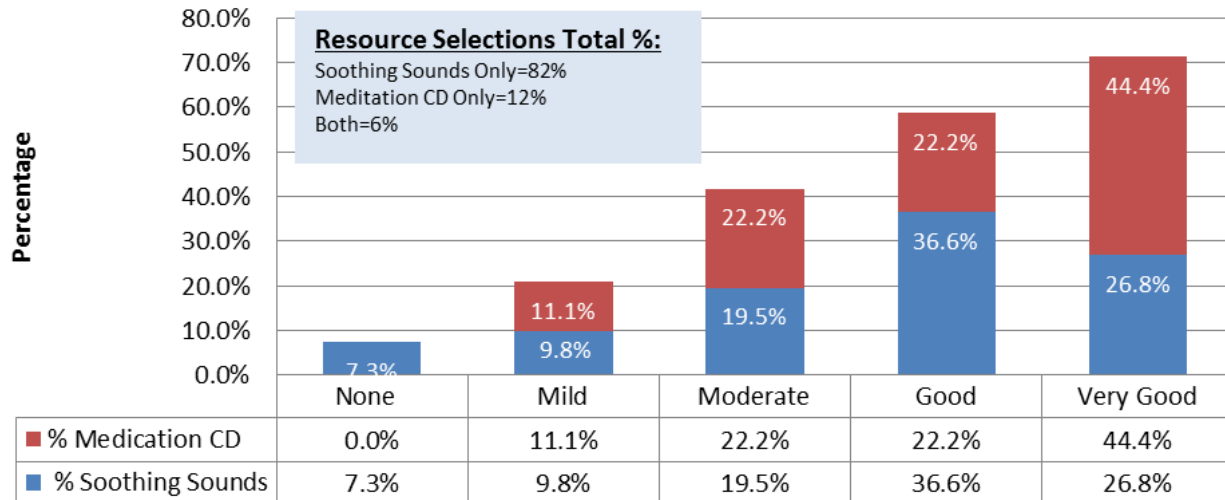


Table 3. Patient Ratings of Relaxation Levels after Using Resource



Patients expressed thanks that their comfort was considered even during construction and attempts were made to provide a restful environment. Our team has embraced offering these products to patients after observing their relaxation benefits.

Table 3 outlines the results from Group 1-Soothing Sounds (n = 41) and the results from Group 2 Meditation CD (n = 9). In Group 1- Soothing Sounds, only 17% indicated that there was no change or only mild change,

and 82% of the patients indicated a moderate (19.5%), good (36.5%) to very good response (27%). Although the sample size for Group 2 – Meditation CD was very small (n = 9), only 1 person had less than a “moderate response” which proportionately is less than Group 1- Soothing Sounds in the same categories. In the Group 2- Meditation CD, 88.8% of the respondents indicated that the meditation CD influenced a moderate, good or very good relaxation response, which is higher than Group 1

(soothing sounds). In the Group 2 – Meditation CD, 44% of the respondents reported a “very good response”.

In Group 3 – combination of soothing sounds and meditation CD, patients (n = 3) rated the soothing sound machines as “good” and “very good” as compared to guided meditation as “mild” and “very good”. These findings must be interpreted with caution because of the small sample size.

Implications for Practice

Patient care facilities often struggle with providing a quiet and restful environment for patients healing. Patient satisfaction scores for noise issues are often low due to alarms and normal traffic outside the patient room. Having an alternative process to assist the patient to relax and block noise has been demonstrated in our study to be beneficial to the patient and was well received.

The research process engaged patients and asked them to rate the relaxation experience that they selected. Patients were eager to participate and invested in the process because their opinion was important to the project. These patients recently had surgery and were experiencing pain so it was expected that they would not want to participate but we found that they were open to alternative ways to improve relaxation and manage pain. Allowing the customer to evaluate the process is beneficial to the patient care experience. An unexpected finding was how much the patient wanted to provide an objective rating. Some patients asked the investigator to come back to allow more time to use either device before providing their rating of the experience to ensure accuracy.

This program was accepted by the organization without difficulty and has been expanded beyond orthopedic patients to all acute care patients at our facility due to the beneficial outcome. Although the focus of our study was on improving relaxation, patients mentioned they had less pain than they expected which is an area for further investigation.

The experience of initiating the program was not difficult or expensive and only required purchase of soothing sounds machines, CD players and meditation CD's which are widely available for purchase in retail stores or on-line. The battery-operated option for equipment was chosen that did not require following hospital industrial regulations for electrical equipment. The soothing sounds machines included a timing feature limiting use time to extend battery life. Single use disposable foam ear pads were used to allow reuse of earphones.

The nursing staff easily adapted to providing the soothing sounds machines and meditation CD players to patients during their usual care without requiring any additional

staffing. The soothing sounds machines and meditation CD players are housed on the nursing unit allowing the team easy access.

Due to the popularity of using soothing sounds machines and meditation CD players, maintaining stock after patients were discharged was an initial problem. Clearly labeling the equipment as hospital property and scripting with the patient how to purchase for home use resolved this problem. Supplies not in patient use were placed in a locked cabinet on the unit.

This research used patient engagement and the voice of the customer to improve the patient relaxation experience and indirectly decreased noise complaints. Guided meditation using a CD player was not fully researched due to small sample size but is an area worthy of additional study. Involving the patient in evaluating process changes can be used to improve other patient satisfaction problems.

Limitations

The findings of this study are not generalizable beyond the study site hospital, and the small, unequal group sizes make statistical comparison impossible. Since the study did not measure the effect of the interventions on pain levels or use of pain medications, the findings can only be interpreted as a positive effect on the patients' perceptions of relaxation.

Although the results indicated that guided meditation using a CD player improved relaxation, it is possible that a larger sample size in Group 2 might change the comparison results between Group 1 and Group 2. An uncontrollable compounding factor occurring during the study may have influenced the findings. Excessive construction noise could have affected how the participants rated the effectiveness of the soothing sounds machine or the guided meditation, since noise levels varied during the day when patients were using the devices.

The enrollment of patients who were elective orthopedic patients focused on relaxation needs after a surgical procedure, and therefore, the study did not include non-surgical patients. It is recommended that future studies include other patients with varied medical conditions to compare the effectiveness of using soothing sounds as compared to meditation CDs.

Conclusions

Both the soothing sounds and guided meditation CD players were effective interventions to enhance relaxation among the post-operative orthopedic patients. This study has implications for nursing practice and patient-centered care since soothing sound machines and guided meditation

CDs provide alternatives patients can select to enhance their relaxation levels with a hope of decreasing pain and anxiety levels postoperatively and improving healing and a sense of wellbeing.

Patients as well as families and visitors observe the benefits of the soothing sounds machines and guided meditation CD players for their family members. Many patients and families ask how to purchase the device to use at home. To assist patients, families, visitors and staff who observed the benefits of this program, the gift shop provided these products for purchase, so the relaxation experience could continue at home.

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