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Music as a Treatment for Perceived Postoperative Pain in Adults: A Critically Appraised Topic

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Music as a Treatment for Perceived Postoperative Pain in Adults: A Critically Appraised Topic

An Honors Thesis submitted in partial fulfillment of the requirements for The Honors College in the School of Health and Kinesiology.

By
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Under the mentorship of Dr. Jessica Mutchler

ABSTRACT

Clinical Question: In postoperative patients, how does listening to music affect perceived pain levels? **Clinical Bottom Line:** There is consistent evidence to suggest music decreases perceived pain in postoperative patients undergoing nasal septal surgery, open heart surgery, total knee replacement surgery, and general orthopedic surgeries requiring hospitalization. Athletic trainers can confidently implement music during patients' post-operative care sessions to help reduce pain.

Keywords: evidence-based, music, postoperative, pain, pain management

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There are not enough words in the dictionary to summarize my thanks and love for those who have helped me throughout this journey. Firstly, I would like to thank God for bringing these special people into my life. Next, I would like to thank Dr. Mutchler who encouraged me to see this through. I could not have done this without her guidance and motivation. Furthermore, I want to thank my parents who have supported me in anything I undertake. No matter what, they have believed in me, even when I did not believe in myself. Lastly, I am grateful for my fiancé who loved and uplifted me throughout this process.

Clinical Scenario

In an Athletic Training setting, surgeries are not uncommon. A study from the CDC reporting collegiate injuries in the United States found 5.26% of sport related injuries required surgical intervention (Kerr et al, 2015). In 80% of surgical patients, moderate to severe pain was frequently experienced (Allred et. al., 2010). Following surgery, healthcare providers work with their patients to set goals such as pain reduction to promote and encourage the healing process. When not managed properly, this pain may increase suffering, delay the patient's recovery, and reduce one's quality of life. While medication is primarily used for treating postoperative pain, non-pharmacological methods may be employed as a secondary treatment.

There are multiple groups that work closely with this type of population and benefit from applying such treatments. Nurses and physicians within hospital settings play a significant role in acute care. Athletic trainers especially assist postoperative patients with recovery. Additionally, physical and occupational therapists may apply this information into their practice. Through implementing such alternative methods, these frontline workers may provide patients with superior holistic care and pain relief needed in the postoperative phase.

Focused Clinical Question

In adult postoperative patients, how does listening to music affect perceived pain levels?

Search Strategy

To begin this investigation, a list of criteria was set. This involved selecting key parameters from the PIO question. The **Patient/Client Group** selected were adults in a postoperative population. The **Intervention** required must have used music therapy.

Lastly the Outcome utilized needed to measure perceived pain. The resulting list of inclusion criteria is as follows: must be peer-reviewed, published within the last 10 years, included the adult postoperative population, ages 18 and older, used music therapy as an intervention, and measured perceived pain.

When conducting this review of literature, Google Scholar and a university search engine were used to explore the relevant literature. The investigation began in September 2021 using Google Scholar by searching “music and postoperative pain” which resulted in 22,900 results. After including the search term “adults”, this narrowed the search to 18,800 results. To reduce the results further, articles from 2010 or later were viewed resulting in 12,900 results. Lastly, the search concluded in October 2021 with “listening to music to treat postoperative pain in adults” providing 8,840 results. The first 3 pages of results were screened, and three articles were selected based on the title. While reviewing the literature mentioned above, the university search engine was also employed. This search began with “music therapy and pain management” which produced 154,745 articles. To reduce this number, only articles written during or after 2010 were included which produced 90,478 articles. Continuing to reduce the result list, only scholarly/peer-reviewed articles were included, resulting in 32,909 articles. Once the word “postoperative” was added to the original search, the search resulted in 5,183 articles. The summary of the investigation identified multiple peer-reviewed articles that fell within the set parameters. Of these articles, the first several pages were examined to find results that fit the criteria. The four articles selected were due to titles and abstracts that fit within the criteria.

Evidence Quality Assessment

An article appraisal was performed on all four studies using the Physiotherapy Evidence Database (PEDro) scale to assess randomized control or clinical trials. Due to the nature of this type of research, most participants were not blind to the intervention. Therefore, based off the criteria, the best evidence was selected and utilized for this study. Two investigators appraised the articles separately, and then met to discuss each article until a consensus was met for each item. A detailed article appraisal can be found in Appendix A.

Results of Search

Summary of Search, “Best Evidence” Appraised, and Key Findings

Four studies were selected from the search that fit in the inclusion and exclusion criteria. Table 1 describes and categorizes them in alphabetical order by the leading author’s last name.

Nasal Septal Surgery, also known as septoplasty, is one of the most common surgeries performed for the nose. Gogoularadia and Bakshi (2020) conducted randomized clinical trials to build upon the scientific evidence surrounding music as a pain and anxiety reduction resource. Participants were selected from those scheduled for septoplasty from May to August 2017 meeting the inclusion criteria, aged 18 to 55 years with evidence of a deviated septum. If the participant had any significant hearing loss, hypertension, neurological illnesses, narcotic dependence, or were undergoing any other nasal surgery, they were excluded. Once the participants were selected, the investigator divided the groups, Group A as the control and Group B as the experimental, through computer-generated random numbers. While group A received the normal treatment, group B received two music sessions per day for 30 minutes each. These sessions

occurred the day prior to surgery and two postoperative days. Following the intervention, each group would complete a Generalized Anxiety Disorder-7 (GAD-7) questionnaire and a pain VAS. The results were analyzed by the Mann-Whitney U test for comparing both groups and an ANOVA test was used for intergroup comparisons. Significant reductions in postoperative pain scores were reported from both groups, however there was a statistically significant decrease in scores for group B on postoperative days.

Ozer et al (2013) investigated self-selected music on perceived pain following open heart surgery. Ninety post-operative patients were recruited, with only three dropping out during the process, between September of 2007 and February of 2008. Patients were included if they were at least 18 years old, spoke Turkish, and “were on their first postoperative day after CABG or valve replacement” (Ozer et al, 2013). Participants were excluded if the surgery was emergent, the patient had chronic pain, hearing or cognitive impairment, hemodynamic instability, or were unable to cooperate during measures. These patients were then assigned to either the control or experimental group. Participants within the experimental group were provided with a portable cassette player and selected music to listen to for 30 minutes. Following the intervention, researchers collected data from a unilateral verbal pain scale and physiological variables such as blood pressure, heart rate, oxygen saturation, and respiratory rate. This data was analyzed using independent-samples t test between groups and paired t tests for pre- and post-testing. This study found following music therapy, the patient’s mean pain intensity score was statistically lower and their oxygen saturation had also increased.

Santhna, Norhamdan, and Damrudi (2015) sought to uncover if music acts as an analgesic following total knee replacements. This quasi-experimental design used 40

patients, ages 40-80, from an orthopedic ward throughout May 2012 until December 2012. The inclusion criteria required participants to be scheduled for an elective total knee replacement, have no hearing difficulties, speak English or Malay, able to fill out a McGill Pain Questionnaire, and be alert and orientated. Participants were excluded if they had a prior history of mental illness, were allergic to analgesics, in the intensive care unit, hemodynamically unstable, or if they were dependent on opioids. Participants in the experimental group were instructed to either bring their own music on a CD or pick from a given selection. The intervention was scheduled four times daily for a duration of an hour each session. Groups were randomized using the sealed envelope method and participants were monitored for five days post operation. There was a significant difference in the pain rating intensity scores on days one and five from all three parts of the questionnaire. The experimental group reported less pain on these days, concluding that their pain decreased over time. The study also found that the experimental group was administered less analgesics for pain than the control group.

Schneider (2016) primarily conducted their study “to determine if listening to music has a positive effect on pain scores and satisfaction in the postoperative adult orthopedic patient” (pg. 1). As this is posted in the Journal of Holistic Nursing, the secondary goal is exposing nurses to this form of intervention which may be utilized in their care. The 42 patients, within 39-84 years old, were selected on the day following surgery under the subsequent inclusion criteria: speaking English, absent of deafness, admitted for longer than 24 hours for orthopedic surgery, and able to understand and sign a consent form. For the study, the patient was given a CD player with a set selection of music consisting of instrumental piano for 35 minutes, though the individual was allowed

to play the music for as long or short as possible. Following the music therapy, the patient was asked to fill out a log recording this information, in addition to including pain levels before and after treatment. In this instance, the independent variables are the music and duration of treatment. The dependent variables consisted of pain (rated on a scale of 1-10) along with an inquiry if additional pain medicine was needed. An exit survey was also conducted during the patient's discharge. Following the collection of data, these quantitative numbers were analyzed using the SPSS statistical analysis program. The pain scales decreased from its average 5.43 prior to listening to a 3.97 following musical intervention. Many of the participants wrote comments on the logs, providing the researchers with qualitative data to analyze as well.

Results of Evidence Assessment

All the articles were appraised using a PEDro scale. The Gogoularadja and Bakshi (2020) study scored a 7/10. The weak point of this study comes from the lack of blinding in the subjects and therapists. Both the Özer et al. (2013) and Santhna, Norhamdan, and Damrudi (2015) studies and met 6/10. The last study included in this investigation is Schneider's (2016) study meeting 4/10. This is due to the quasi- experimental design implemented. The research lacks a control group due to the nature of the study, and the belief that all should have access to the unique therapy.

Clinical Bottom Line

When addressing the above articles individually, their impact weakly suggests music does reduce the sensation and perception of postoperative pain. As a whole, these articles provide strong indications that music does decrease perceived pain in postoperative patients undergoing nasal septal surgery, open heart surgery, total knee

replacement surgery, and general orthopedic surgeries requiring hospitalization when combined with regular treatment. Additionally, music aids in reducing anxiety levels and decreasing the amount of analgesic medication needed. When deciding to include music in one's practice, consider using songs that are slow and soft in tempo or music that the patient prefers. Future research should focus on including other forms of surgery and different genres of music.

Strength of Recommendation

All the peer-reviewed articles suggest implementing music therapy in conjunction with regular treatment. While this is consistent across the literature selected, they are medium-level quality studies. This recommendation met criteria for level B evidence with a mix of level I and II studies.

Implications for Practice, Education, and Future Research

The primary justification for performing this investigation was to determine if implementing music therapy in postoperative patients provides a reduction in pain levels. The results of this appraisal and recommendation may be beneficial to any healthcare provider working closely with postoperative patients such as athletic trainers, nurses, physicians, physical therapists, etc. The articles selected were consistent with B level evidence. When implementing this intervention in practice, calming and instrumental songs or patient preferred music would aid in reducing pain levels.

Future education should investigate teaching nonpharmacological means, such as music, for treating pain. While understanding and providing pharmacological methods is important, teaching these principles could provide insight into holistic care.

When conducting research in the future, music should be investigated in other postoperative settings. Additionally, other sets of music should be utilized to see if different genres and tempos change the perception of pain. It should also be investigated if patient preferred music or a specific set of music is better at decreasing the sensation of pain.

Table 1*Characteristics of Included Studies*

	Gogoularadja & Bakshi, 2020	Ozer et al., 2013	Santhna et al., 2015	Schneider, 2016
Population	59 patients scheduled for nasal septal surgery, age 18-55	90 patients on day 1 of postoperative non-emergent CABG or valve replacement surgery, age 18 or older	40 patients scheduled for a total knee replacement (TKR), age 40-80	42 postoperative patients admitted in hospital for more than 24 hours, age 18 or older
Intervention	Headphones, music player, patient selected music to "calm" them, 30 minutes BID, Interventions happened prior to surgery and two proceeding days	Portable cassette player, headphones, music selected from researcher's collection (soft and relaxing), 30 minutes, one intervention	CD player with headphones, DVD player, music booklet. Patients permitted to bring their own music or select music from researcher's collection (soothing and relaxing music without lyrics). Experimental group listened to music for an hour, QID per patient choice	CD player with headphones, prerecorded CD with instrumental piano music (35 min), patient determined duration and number of interventions
Outcome Measures	Pre and post intervention; Pain VAS (six faces from smiling to crying), GAD-7	Pre and post intervention; Systolic blood pressure, diastolic blood pressure, heart rate, oxygen saturation, and respiratory rate, verbal pain intensity scale (1-5)	McGill Pain Questionnaire: PRI (0-3), VAS (0-10), PPI (0-5). Performed on postoperative days 1, 3, and 5.	Written patient log: questions measuring pain on a 1-10 scale both pre and post intervention, start time, end time, and if additional medication required. Discharge questionnaire: questions measuring pain control satisfaction, if music helpful with pain relief, ease of equipment usage, if patient would recommend this therapy to others.

Key Findings	Significant reduction in postoperative pain from both groups. Statistically significant reduction of pain in the music group.	Listening to music after surgery reduced pain of patients who had undergone CABG or valve replacement	Music reduced post-op pain after TKR. PRI, VAS, and PPI showed pain score in experimental group was statistically significantly less than the control group	Pain decreased following music intervention by an average of 1.46 points on pain scale. Most patients would recommend this therapy to others.
Study Limitations	Limited sample, music was patient selected	Represents one ICU in Turkey, method of data collection (researchers same as those who collected data), patients not blinded to intervention, convenience sampling, selection of music contained 20 pieces	Quasi-experimental, represents one hospital, ethnic groups not equally distributed in control and experimental, Malaysia has multiple languages which excluded some participants, information bias	Small sample size, no control group/randomization, busy environment (hospital), no control of when to apply intervention, lack of consistency for filling out logs, no licensed music therapist on research team

Note. VAS - Visual Analog Scale, PRI - Pain Rating Intensity, PPI - Present Pain Intensity, PCA - Patient Controlled Analgesia

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Appendix A: Article Appraisal

When filling out the PEDro scale questionnaire, researchers must answer yes or no to address each question. If specified, researchers must also list where it was found in each article. The following is a compilation and breakdown of the PEDro scale questionnaire.

PEDro Scale Questions:

1. Eligibility Criteria were specified [Not counted in scoring]
2. Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)
3. Allocation was concealed
4. The groups were similar at baseline regarding the most important prognostic indicators
5. There was blinding of all subjects
6. There was blinding of all therapists who administered the therapy
7. There was blinding of all assessors who measured at least one key outcome
8. Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups
9. All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analyzed by “intention to treat”
10. The results of between-group statistical comparisons are reported for at least one key outcome
11. The study provides both point measures and measures of variability for at least one key outcome

Gogoularadja, A. and Bakshi, S. S. (2020). A Randomized Study on the Efficacy of Music Therapy on Pain and Anxiety in Nasal Septal Surgery. *International Archives of Otorhinolaryngology*, 24(02), 232–236. <https://doi.org/10.1055/s-0039-3402438>.

- | | | |
|----------------------------|-------------------------------|----------------------|
| 1) Yes, Methods - Subjects | 2) Yes, Methods - Subjects | 3) Yes, Outcomes |
| 4) No, not mentioned | 5) No, not mentioned | 6) No, not mentioned |
| 7) Yes, Outcomes | 8) Yes, Results | 9) Yes, Results |
| 10) Yes, Scores | 11) Yes, Statistical Analysis | |

Özer, N., Karaman Özlü, Z., Arslan, S., & Günes, N. (2013). Effect of Music on Postoperative Pain and Physiologic Parameters of Patients after Open Heart Surgery. *Pain Management Nursing*, 14(1), 20–28. <https://doi.org/10.1016/j.pmn.2010.05.002>

- | | | |
|----------------------|------------------------|----------------------|
| 1) Yes, Methods- S&S | 2) No, assigned | 3) No, not mentioned |
| 4) Yes, Methods | 5) Yes, Procedure | 6) No, Procedure |
| 7) No, not mentioned | 8) Yes, methods S&S | 9) Yes, Procedure |
| 10) Yes, Results | 11) Yes, Data Analysis | |

Santhna, L.P., Norhamdan, M.Y., & Damrudi, M. (2015). The Effectiveness of Music Therapy for Post-Operative Pain Control among Total Knee Replacement Patients. *Medicine and Health*, 10(1), 66-79

- | | | |
|----------------------|-------------------------|-----------------------|
| 1) Yes, Study Design | 2) Yes, Study Design | 3) Yes, Data Collect. |
| 4) No | 5) No, not mentioned | 6) No, not mentioned |
| 7) No, not mentioned | 8) Yes, Data Collection | 9) Yes, Data Collect. |
| 10) Yes, Results | 11) Yes, Results | |

Schneider M. A. (2018). The Effect of Listening to Music on Postoperative Pain in Adult Orthopedic Patients. *Journal of Holistic Nursing: Official Journal of the American Holistic Nurses' Association*, 36(1), 23–32. <https://doi.org/10.1177/0898010116677383>.

- 1) Yes, Methods - Subjects 2) No, Quasi-Experimental 3) No, Quasi-Exp.
- 4) No, Quasi-Experimental 5) No, Subject Implemented 6) No
- 7) No, not mentioned 8) Yes, Results - Table 2 9) Not Applicable
- 10) Yes, Results 11) Yes, Results

Appendix B: Full CAT Abstract

Clinical Scenario: In 80% of surgical patients, moderate to severe pain is frequently experienced. Within postoperative patients, pain reduction is a main goal to promote and encourage the healing process. When not managed properly, this pain may increase suffering, delay the patient's recovery, and reduce one's quality of life. In an Athletic Training setting, surgeries are not uncommon, so it is important to understand and provide non-pharmacological care for patients. Implementing music could provide patients with pain relief needed in the postoperative phase.

Clinical Question: In postoperative patients, how does listening to music affect perceived pain levels?

Summary of Key Findings: The patients included within the articles were those who underwent either nasal septal surgery, orthopedic surgery that required a minimum 24-hour hospital stay, coronary artery bypass graft surgery, or total knee replacement. Two studies included an equivalent control group for comparison, one included a non-equivalent post-test control group, and one was a within group design with same day pain comparisons. All studies observed an improvement in pain measures when music was used as part of the intervention.

Search Strategy: The review of articles began in September 2021 by using a university search engine to explore several keywords including music therapy and postoperative pain management. This produced 18,947 results. Potential articles were included if they were peer-reviewed, published within 10 years, included the population of adult postoperative patients at least 18 years of age (P), used music therapy as an intervention

(I), and measured perceived pain (O). Any articles not matching the inclusion criteria were excluded.

Summary of Best Evidence: Four articles were selected, and an article appraisal was performed using the PEDro scale finding one article with fair quality (4/10) and three with good quality (6-7/10).

Clinical Bottom Line: There is consistent evidence to suggest music decreases perceived pain in postoperative patients undergoing nasal septal surgery, open heart surgery, total knee replacement surgery, and general orthopedic surgeries requiring hospitalization. Athletic trainers can confidently implement music during patients' post-operative care sessions to help reduce pain.

Strength of Recommendation: This recommendation met the criteria for level B evidence with a mix of level I and II studies.