

Does music therapy reduce the anxiety in patients undergoing dental extractions? A split-mouth study

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Abstract: Background: Dental anxiety is a prevalent issue affecting a significant proportion of patients, often leading to avoidance of dental care and subsequent deterioration of oral health. Dental extractions, in particular, are procedures that can trigger high levels of anxiety due to their invasive nature. Music therapy, a non-pharmacological approach, has been explored in various medical settings for its potential to reduce anxiety and improve patient outcomes. This study aims to investigate the efficacy of music therapy on the anxiety levels of patients undergoing dental extractions. **Materials and Methods:** This was a prospective split-mouth study in which patients having more than 18 years of age ASA I & ASA II physical status who were scheduled for therapeutic orthodontic extraction of all 4 premolars were included. The sample size was calculated as 29 in each group. Demographic variables like age, sex, tooth number, and patient anxiety levels after extraction were recorded using Corah's Dental Anxiety Score (CDAS). 1st and 4th quadrant extraction done without music was considered as a control group and 2nd and 3rd quadrant extraction done with music was considered as a music therapy group. Statistical analysis was performed using SPSS version 23 software. The paired t-test was used to analyze the difference between the anxiety levels of both groups. **Results:** The study population was 29 patients, with a male-to-female ratio of 12:17. The mean age of the participants was 20.1 years, with a standard deviation of 1.9 years. The mean Corah's Dental Anxiety Score with standard deviation in the control group was found to be 14.3 ± 0.8 and the mean Corah's Dental Anxiety Score with standard deviation in the music therapy group was found to be 11.2 ± 0.5 , indicating a decrease in anxiety when music was administered. This anxiety level difference was statistically significant $P < 0.001$ and 95% CI (2.75 - 3.36).

Conclusion: Music therapy significantly reduces anxiety levels in patients undergoing dental extractions. This study supports the incorporation of music therapy into routine dental practice to improve patient comfort and satisfaction with anxiety patients.

Keywords: Anxiety, Music, Extraction, Premolar .

INTRODUCTION

Dental anxiety is characterized as a sense of concern, trepidation, or uneasiness regarding a dental procedure that has an unknown result [1]. During treatment, patients who are anxious about their teeth may exhibit certain signs of rejection. Dyspnea, hyperventilation, tachycardia, hypertension, high respiration rate, nausea, and vomiting are the physiological symptoms that are most likely to be associated with the failure of the treatment [2].

Most dental professionals deal with this issue frequently, where individuals put off going to the dentist, which deteriorates their oral health [3]. A few pharmacological treatments, such as the use of benzodiazepines and antidepressants, can effectively alleviate anxiety; nevertheless, they may have negative consequences and side effects, including sleepiness, hemodynamic instability, agitation, and hyperactivity [4].

In order to prevent the side effects of many medications, patients choose for conservative approaches such as music therapy, which lowers anxiety and enhances the outcomes of medical procedures [5]. An effective, non-invasive, and affordable intervention is music therapy. In

human experiments carried out in laboratory settings, it has been shown that music listening can dramatically lower anxiety and the associated stress response [6]. In therapeutic settings, it has also been discovered that music listening reduces hospital patients' intervention-related stress and anxiety [7].

According to some beliefs, music helps patients block out the anxiety-inducing stimulus [8]. It might evoke images as well. This provides a brief reprieve from the harsh reality, which can be helpful in managing anxiety. Additionally, music may lessen the damage to the environment [7]. In a psychosocial sense, music offers the patient a visual experience that can bring them calm and comfort both before and during dental procedures. Bradt et al. observed this effect in a trial involving coronary heart disease patients, where the patient thought that the therapy was encouraging and validating [9]. The study hypothesis was there is a difference in the anxiety level of patients who are undergoing dental extractions with or without music therapy. This study aimed to investigate the efficacy of music therapy in the anxiety levels of among patients undergoing dental extractions.

MATERIALS AND METHODS

Study Population:

This prospective comparative split-mouth study was conducted at Saveetha Dental College and Hospitals, Chennai from January 2024 to May 2024. Before starting the study, ethical clearance was obtained from the Ethical Committee of Saveetha Dental College and Hospitals (IHEC/SDC/UG-2083/24/OMFS/242). Included participants were patients having more than 18 years of age ASA I & ASA II physical status who were scheduled for therapeutic orthodontic extraction of all 4 premolars and who were willing to provide consent for the study. Participants excluded from the study were patients who had hearing impairments, pre-existing psychiatric conditions, those who were under anxiolytic medication, having fear of music and refusing for consent. Informed written consent was secured from all participants before enrolling in the study.

The sample size calculation was done according to the literature [10] the mean CDAS score in the control group was 13.51 ± 3.11 , and the anticipated mean CDAS score in the music group was 10.5. The sample size would be 29 in each group at the power of study 90% and α error of 0.05.

Intervention:

It was a split-mouth study where extraction of 1st quadrant and 4th quadrant premolar was done under local anesthesia without music therapy as per standard protocol. This was considered as a control group in the present study. After one week in the second visit extraction of the 2nd quadrant and 3rd quadrant premolar was done under local anesthesia with favorite music of their own choice through their headphones were considered as the music therapy group in the study. Participants were then questioned regarding their anxiety levels after the dental extraction using Corah's Dental Anxiety Scale [11] in both groups.

SCORE	SEVERITY OF ANXIETY
0-4	Patients with no fear
5-8	Some fear
9-12	Anxious-avoidant attitudes
13-16	High intensity of anxiety without somatic complaints
17-20	High intensity of anxiety with somatic complaints

Table 1: Corah's Dental Anxiety Scale



Figure 1: Dental extraction of 2nd quadrant premolar with music therapy.

Statistical analysis was performed using SPSS version 23 software. The present study split-mouth design hence paired t-test was used to analyze the difference between the anxiety levels of both group.

RESULTS

The study population consisted of 29 participants, with a male-to-female ratio of 12:17. The mean age of the participants was 20.1 years, with a standard deviation of 1.9 years. The mean Corah's Dental Anxiety Score with standard deviation in control group was found to be 14.3 ± 0.8 and the mean Corah's Dental Anxiety Score with standard deviation in music therapy group was found to be 11.2 ± 0.5 , indicating a decrease in anxiety when audio analgesia is administered. This anxiety level difference was statistically significant $P < 0.001$ and 95% CI (2.75 - 3.36).

DISCUSSION

Since ancient times, people have recognized the positive health effects of music. Hippocrates, Aristotle, Plato, and Pythagoras all used music in medicine [12]. Drumming, singing, dancing, and music have all been used by shamans and tribal healers to treat patients. Nightingale's concerns about the impact of music and noise on patient care in the 19th century addressed the idea that music may be utilized for healing. The first recorded music was employed in hospitals in the late 19th century to help patients feel less anxious before surgery. Since the end of World War II, this field of study has expanded, particularly in the USA and Germany [13]. Its function in raising the pain threshold was demonstrated by Dunbar et al [14].

Numerous stress systems, such as the sympathetic nervous system and the hypothalamus-pituitary-adrenal (HPA) axis, which control the immune system, are activated by anxiety. [15, 16]. High pretreatment anxiety and the stress reaction that goes along with it can make therapy more difficult, prevent or postpone the best possible recovery, or make pain worse after treatment [17]. These symptoms are the result of stress hormones like cortisol and catecholamines (adrenaline and noradrenaline) being secreted [18]. Dopamine, which controls mood and pleasure perception, is released when the NAc, the brain's most significant pleasure center, is activated. Dopamine interacts with endogenous opioids to provide central analgesia [19]. Research has also shown that music reduces activity in the amygdala, a part of the brain that is essential for the development and activation of a conditioned fear response [20].

A study by Kavita Dhinsa et al. used hemodynamic measures and salivary biomarkers (salivary cortisol, salivary α -amylase, and salivary immunoglobulin A (IgA)) to measure and compare dental anxiety in children patients undergoing noninvasive dental procedures. Additionally, the Corah's Dental Anxiety Scale (CDAS) will be used to assess the relationship between dental anxiety and all of the biomarkers. New patients had significantly greater salivary cortisol and amylase levels, according to the results, while returning patients had

even higher cortisol and lower amylase levels. The study concluded that estimating hemodynamic parameters and salivary biomarkers was a useful way to gauge dental anxiety in young patients.

Kim YK et al conducted a study that concentrated on lowering patients' anxiety levels after having an impacted mandibular third molar surgically extracted. Using a similar methodology, the results showed that, after adjusting for preoperative anxiety levels, the music-treated group experienced much less intraoperative anxiety than the nonmusic-treated control group. These findings lend credence to the theory that a patient's intraoperative anxiety levels are much reduced when music of their choosing is played during the surgical extraction of an IMTM [10].

The findings of this study indicate that music therapy is an effective intervention for reducing pain and anxiety in patients undergoing dental extractions. The significant decrease in anxiety levels in the music therapy group suggests that music has a calming effect, likely mediated by its ability to distract, relax, and modulate physiological responses to stress [21-23].

These results are consistent with previous research in other medical settings, reinforcing the potential of music therapy as a beneficial adjunct in clinical practice. Implementing music therapy in dental clinics is feasible and can enhance patient experience without additional costs or risks associated with pharmacological treatments.

LIMITATIONS AND FUTURE SCOPE

This study is only limited to therapeutic extraction for orthodontic treatment. This study can be carried out in future on a larger sample size with different control and music therapy groups. More than pain, patients' anxiety was lowered on music therapy, hence that could also be studied. Apart from just audio, different other methods can also be incorporated as a part of distraction analgesia therapy to achieve better patient comfort and satisfaction. This study will be continued with a questionnaire to obtain exact information on the anxiety during the study from patients.

CONCLUSION

Music therapy significantly reduces anxiety levels in patients undergoing dental extractions. This study supports the incorporation of music therapy into routine dental practice to improve patient comfort and satisfaction. Further research with larger sample sizes and diverse populations is recommended to generalize these findings.

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None

CONFLICT OF INTEREST

The authors hereby declare that there is no conflict of interest in this study.

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