

Effect of music therapy on anxious adult patients undergoing Root Canal Treatment

¹Rashmi Kawana, IV BDS, Department of Conservative Dentistry & Endodontics, Government Dental College & Hospital, Nagpur

²Shubha Hegde, MDS, Department of Conservative Dentistry & Endodontics, Government Dental College & Hospital, Nagpur

³Sadhana Raina, MDS, Department of Conservative Dentistry & Endodontics, Government Dental College & Hospital, Nagpur

⁴Manjusha Warhadpande, Department of Conservative Dentistry & Endodontics, Government Dental College & Hospital, Nagpur

Corresponding Author: Shubha Hegde, MDS, Department of Conservative Dentistry & Endodontics, Government Dental College & Hospital, Nagpur

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Abstract

Introduction: This study was conducted to evaluate the effect of music on the anxiety level of the patients who were undergoing Root canal treatment. Dental visit can be made more comfortable by incorporating music during treatments with no significant financial input.

Materials & Method: This comparative interventional study comprised of 100 randomly selected adult patients. The study group consisted of 50 individuals who were exposed to recorded instrumental music during the treatment and 50 individuals were in the control group and were not exposed to music. Anxiety level was assessed through variable measures such as; Pre-treatment questionnaire based on Modified Corah’s

Dental Anxiety Scale and pulse rate while waiting in the waiting room, during the dental treatment and post treatment procedure. All the findings were statistically analyzed.

Results: It was found that 71% patients were severely anxious, 16% were highly anxious, 10% were moderately anxious while 3% were not anxious while waiting in the waiting room. Patients of study group had statistically significant decrease in the pulse rate from very high (Pre-treatment) to normal (Post treatment). ($p < 0.05$) The patients of control group did not show major fluctuation in the pulse rate throughout the treatment.

Conclusion: Music therapy can be practiced during Root canal therapy for anxious patients as it reduces anxiety.

Keywords: Anxiety; Pulse rate; Root canal treatment, Pain; Music therapy;

Introduction

Dental treatment and the surrounding dental environment may elicit many different cognitive and emotional responses among people. For the majority of population, a dental appointment implies anxiety and discomfort, sometimes extending to extreme levels of phobia. It often means irregular dental visiting habits with only emergency dental treatments or even sometimes total avoidance which leads to the deterioration of oral health.¹

Root canal treatment is a routine procedure for the management of pulpal and periapical diseases. A study by Iyer et al. (2018)² showed that the awareness of root canal procedure among the general Indian population is quite high, ranging from teenagers (85.9%) to middle aged individuals (85.59%). However it was noted that only 52.56% teenagers and 50.91% geriatric patients reported to the dental clinic within 1-3 weeks of suffering from dental pain. One of the probable causes in the patients' hesitation to seek dental treatment is patients' anxiety and fear of dental treatment.³ Hence, it is of great significance to diagnose anxiety on time and handle the anxious patient properly by choosing the right method of management.

Music is a long established mode of stress relief. Linnemann et al. (2015)⁴ found that relaxing music causes subsequent decreases in subjective stress levels and lowers the cortisol concentrations thereby shedding light on the physiological mechanisms underlying the stress-reducing effect of music. There are very few studies aiming to assess the effect of passive music therapy on the anxiety levels of patients undergoing dental treatment. This article aims to assess the effect of passive music therapy on the anxiety levels of patients undergoing root canal treatment.

Material and Method

This comparative interventional study comprised of 100 randomly selected healthy adult patients who reported to the department of Conservative Dentistry & Endodontics and were indicated for root canal treatment. After obtaining informed consent, patients were randomly assigned to a study group (N= 50) and a control group (N= 50). Anxiety of all the patients before treatment was assessed through a Pre-treatment questionnaire containing 5 questions based on Modified Corah's Dental Anxiety Scale.⁵ An additional question was added to point out the factors which increase anxiety in dental patients. (Figure 1) Radial pulse rate of all the patients was recorded at the wrist while waiting in the waiting room.(PR1) Root canal opening under local anaesthesia (2% lignocaine with 1: 80,000 adrenaline), working length determination and cleaning and shaping was performed during the appointment for each patient. The study group was subjected to passive music therapy in which recorded light instrumental music was played during the treatment procedure. Radial pulse rate of all the patients was recorded at the wrist during the dental treatment.(PR2) At the end of the appointment, radial pulse rate of all the patients was recorded at the wrist again (PR3) and a self designed validated post therapy feedback form (Figure 2) was obtained from the patients of the study group. All the data obtained was analysed.

Pre-treatment questionnaire based on Modified Corah's Dental Anxiety Scale.

- If you go to your dentist for a **root canal treatment**, how would you feel?
Extremely Anxious/ Very Anxious/ Fairly Anxious/ Slightly Anxious/ Not Anxious
- 2) If you were sitting in the **waiting room** (waiting for treatment), how would you feel?
Extremely Anxious/ Very Anxious/ Fairly Anxious/ Slightly Anxious/ Not Anxious
- 3) If you were about to have a **tooth drilled**, how would you feel?
Extremely Anxious/ Very Anxious/ Fairly Anxious/ Slightly Anxious/ Not Anxious
- 4) If you were about to have **sharp needle like instrument** in your tooth, how would you feel?
Extremely Anxious/ Very Anxious/ Fairly Anxious/ Slightly Anxious/ Not Anxious
- 5) If you were about to have a **local anaesthetic injection** in your gum, how would you feel?
Extremely Anxious/ Very Anxious/ Fairly Anxious/ Slightly Anxious/ Not Anxious
- 6) Which are the factors that increase your **anxiety** in the dental clinics?
Smell of the medicines./ Noise of dental instruments from inside the clinic./ Other patients in the waiting room making noise. /Reading about dental treatments online

Figure 1: Modified Corah's Dental Anxiety Scale.

1. Do you still feel anxious?	Neutral	yes	No
2. Do you feel relaxed compared to the time you entered the clinic?	No difference	Yes	No
3) Do you feel any reduction in the pain?	No difference	Yes	No
4) Have you visited any dentist who practices music therapy? If yes, where?	Where	Yes	No
5) Would you recommend music therapy to be practiced by all dentists and in specialty clinics?	Necessary	No	Yes
6) How was your experience with the music therapy?	Good	Not bad	Bad

Figure 2: Post treatment feedback form

Observation and Results

Pre-treatment anxiety levels assessment (Modified Corah’s Dental Anxiety Scale)

- Answers to the first five questions from Modified Corah’s Dental Anxiety Scale were statistically calculated. It was found that 71% were severely anxious, 16% were highly anxious, 10% were moderately anxious while 3% were not anxious. (Figure 3a)
- Among all the factors that elicit patients anxiety level it was found that noise from dental instruments (47%) is the most prominent factor, followed by smell of medicine (33%), noise from other patients in the waiting room making noise (12%) and reading about dental treatment online (8%). (Figure 3b)

Comparison of pulse rate

The pulse rate values of both the groups at three occasions are shown in Figure 4a. Intergroup comparisons were done by the paired t test. When comparing the heart rate of the patients, the pulse rate showed variations in study group as opposed to the patients in control Group. The findings showed that the patients of study group had an evident decrease in the pulse rate from very high to normal before treatment, during and after treatment. The patients of control group did not show major fluctuation in the pulse rate throughout the treatment. When the pulse rate of both the groups during treatment (PR2) was compared, it showed statistically significant difference between the groups. When compared between post

treatment pulse rate values of both groups, (PR3) the study group showed statistically significant lower values than the control group. (Table 1)

Post-therapy feedback form

When patients were asked whether they still feel anxious, 76% said “No”. When they were asked “Do you feel relaxed as compared the time you entered the clinic?” 84% of patients said “Yes”, stressing on the role of music in relaxing the anxious patients. 82% of patients perceived reduction in pain after music therapy. 80% of patients felt that music therapy should be recommended in dental setup. (Figure 5) Overall, 93% of patients rated their experience with music therapy as good and very good. (Figure 4b).

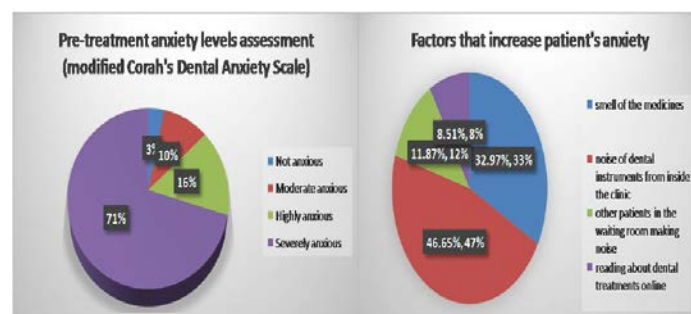


Figure 3a: Pretreatment anxiety levels assessment 3b: Factors eliciting stress in dental clinic

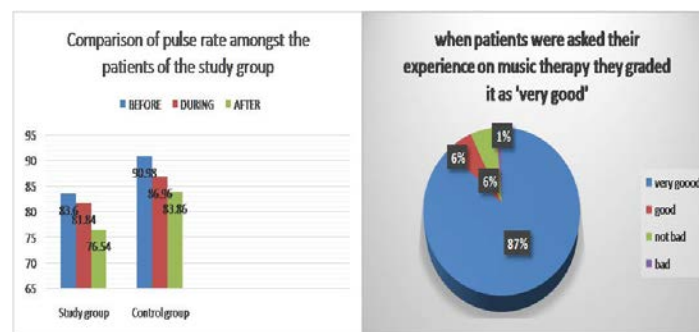


Figure 4a: Pulse rate values of both groups. 4b: Response of patients towards music therapy



Figure 5: Results of data obtained from post-treatment questionnaire

Pulse Rate	Groups	N	Means	Standard deviation	p Value
PR2	Test	50	81.84	13.8526	0.04941
	Control	50	86.96	11.5134	
PR3	Test	50	76.54	12.1411	0.00201
	Control	50	83.86	10.6452	

Table 1: Paired t test values of pulse rate measured during treatment (PR2) and (PR3). P value less than 0.2 indicates statistical significance.

Discussion

The prospect of dental treatment elicits a stressful response among patients. In addition, root canal treatment is perceived as a painful procedure by patients. It is universally accepted that music creates a sense of relaxation and well being. This study used passive music therapy as a tool to alleviate patients' anxiety.

The use of music in relation to illness and health has been known since ancient history. In the 19th century, music was considered for healing purposes as highlighted by Florence Nightingale regarding the effect of noise and music in the care of patients.⁶ Dunbar et al.⁷ proved its role in increasing the pain threshold. Many studies have

been done on pediatric and gynecological patients and other specialties.^{8,9}

Music reaches the human nervous system in the form of impulses. It can have a positive influence on a patient by making concentration easier, fostering patience and above all, easing anxiety. There are various hypotheses regarding the effect of music on the human body.^{10,11}

1. Music increases the amount of dopamine produced in brain a 'mood enhancing chemical', making it a feasible treatment for depression.
2. Music triggers the release of endorphins (opioids) in the brain, the body's natural pain reliever.
3. Music may alleviate stress, by lowering body's cortisol level, the hormone released in response to stress.
4. Music increases the body's production of antibody immunoglobulin A and natural killer cells, the cells that attack invading viruses and boost the immune systems effectiveness.

Heart rate variability is a long trusted tool to assess stress levels. The most easiest and quick method to assess heart rate variability with minimal armamentarium is pulse rate.¹² In this study, radial pulse was measured to determine pulse rate owing to its ease of measurement and high reliability.

This study showed that the pulse rate of patients in the study group showed wide variation before and after treatment. (PR1 and PR3) The average pulse rate of the study group at the end of the appointment was 76.5 which is very close to the normal pulse rate, thereby indicating that the patients were no longer anxious. Also, the comparison of pulse rate during treatment (PR2) and after treatment (PR3) between study group and control group showed a statistically significant difference, clearly suggesting that passive music therapy had a positive relaxing effect in alleviating the anxiety of the patient.

This study showed that noise from dental equipment was the most prominent cause of fear among patients. The presence of relaxing music may act as a distraction mechanism which may help divert the patients' attention thereby relaxing them. Results obtained from the post treatment feedback form filled by patients of study Group indicated that patients welcomed the passive music therapy and responded positively to it.

It was found that only 3% of patients coming for root canal treatment were not anxious. This implies that the overwhelming majority of 97% of patients are anxious to some degree and require some relaxation mechanism in order to make their experience of root canal treatment less traumatic. The use of passive music can be an economical and simple method of achieving this objective.

Conclusions

In this study, it was observed that passive music therapy has a positive impact in reducing the anxiety of the patient undergoing root canal treatment. Patients who were listening to music during root canal treatment showed lower level of tension, better co-operation and better adjustment to treatment.

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