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ORIGINAL RESEARCH

Evaluation of the Role of Music as a Nonpharmacological Technique in Management of Child Patients

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ABSTRACT

Introduction: Behavior management and reducing anxiety and pain are very important for success of treatment. Hence, apart from pharmacological management, such as conscious sedation, nonpharmacological interventions like music play a significant role. This study aims to evaluate the effects of music in reducing anxiety, pain, and behavior management.

Materials and methods: This study was conducted at the Department of Pedodontics in 2015. It consisted of 60 patients, age ranging from 3 to 7 years, who required dental treatment with local anesthesia. They were divided into three groups of 20 each. Group I consisted of upbeat music distraction group. Group II consisted of relaxing music distraction group. Group III consisted of control group. We scheduled the treatment in two visits. We used Venham picture test, North Carolina behavior rating scale, and visual analog scale test for the study. Baseline heart rate was also recorded.

Results: No significant differences were found among the three groups based on three scales used in the study.

Conclusion: Management of child patient in dental clinic is a challenge for clinician. Apart from various pharmacological techniques, management of pediatric patients using audio music distraction has been introduced. However, music did not produce a reduction in pain, anxiety, or disruptive behavior.

Clinical significance: Various pharmacological techniques are present for the management of pediatric patients. Apart from it, there is need of introducing nonpharmacological techniques to reduce pain, anxiety, and to alter behavior of child. By this study, we have tried to evaluate the usefulness of music in child management.

Keywords: Anxiety, Behavior management, Pain, Pharmacological.

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INTRODUCTION

Children undergoing dental procedure, such as root canal treatment, extraction of teeth, etc., may experience perioperative pain, anxiety, and distress.[1] Because of their noncooperative behavior, management of children becomes very important and difficult. Behavior management and reducing anxiety is the key for success of treatment. Hence, apart from pharmacological management, such as conscious sedation, nonpharmacological interventions, such as music play an important role.[2] Many parents feel that pharmacological methods of managing their child are undesirable due to perceived medical risks. Keeping these points in mind, clinicians are looking for more advanced behavior management techniques. Music interventions have developed as an inexpensive, useful, complementary, nonaversive behavior management technique that may be equally effective and more acceptable to parents and children.[3]

Music affects and stimulates many parts of the brain and body. It stimulates many social-emotional processes and it has power of influencing emotions in everyday life. Music has a strong influence on pain, emotion, stress relaxation, and sleep disturbances.[4]

Many studies have been conducted so far to evaluate the useful effects of music in reducing patient's anxiety and pain. Several studies revealed that patients provided

with music before or during the injection of a preoperative medication or immunization experienced less pain and anxiety-related behavior than normal patients.[5,6]

Therefore, this study was conducted at the Department of Pedodontics to evaluate the effects of distraction by music on pain, anxiety, and behavior of patients aged 3 to 7 years undergoing dental treatment.

MATERIALS AND METHODS

This study was conducted at the Department of Pedodontics in 2015. It consisted of 60 patients, age ranging from 3 to 7 years, who required dental treatment with local anesthesia. Parents were informed regarding the study and a written informed consent was taken from the parents. Patients were divided into three groups of 20 each.

1. Group I consisted of upbeat music distraction group.
2. Group II consisted of relaxing music distraction group.
3. Group III consisted of control group.

The upbeat music was folk music songs. The relaxing music was slow, instrumental music.

Treatment was scheduled in two visits.

First Visit

In the first visit, no audio distraction or headphones were used. It consisted of restorative treatment using an inferior alveolar nerve block.

The preoperative Venham picture test was performed to measure patient-reported anxiety before treatment. Baseline heart rate was recorded by pulse oximetry. Heart rate was recorded at various intervals, before treatment, during the injection of local anesthetic and at 5-minute intervals during treatment. The dentist then entered the operatory, and video recording of the child's behavior began. Video recording was done during the procedure and child was made aware of it. After treatment, a postoperative Venham picture test and a visual analog scale were done to measure patient-perceived pain.

Second Visit

It was scheduled approximately 2 weeks after first visit. Treatment was done on the contralateral mandibular quadrant using inferior alveolar nerve block.

The children were made to wear headphones. In group I patients, upbeat music was played. In group II patients, relaxing music was played, and in group III (control) patients, no music was played; only patients were made to wear headphones. Video recording and heart rate measures were similar to first visit.

Venham picture test and baseline heart rate measure were performed. After treatment, a postoperative Venham picture test and the visual analog scale were administered. Results thus obtained were subjected to statistical analysis. Chi-square test was performed; $p < 0.05$ was considered statistically significant.

RESULTS

Table 1 shows readings of Venham picture scale test. This scale was administered to all three groups, both preoperatively and postoperatively. Group I showed preoperative and postoperative scores of 3.5 ± 2.5 and 2.8 ± 2.2 respectively, in first visit. In second visit, the preoperative and postoperative scores were 3.0 ± 2.4 and 2.6 ± 2.7 respectively. In group II, the preoperative and postoperative scores were 1.4 ± 2.0 and 2.6 ± 2.9 respectively, in first visit. At second visit, the preoperative and postoperative scores were 1.5 ± 1.6 and 2.2 ± 3.6 respectively. Group III showed preoperative (1.6 ± 1.8) and postoperative (2.5 ± 2.9) scores in first visit. There was no significant difference in dental anxiety among the three groups at first and second visits (Table 1). There was no statistically significant difference between pre- and postoperative scores in any of the groups.

Heart rate was recorded at various intervals, before treatment, during the injection of local anesthetic, and at 5-minute intervals during treatment. There was increase in heart rate during the injection of local anesthetic agent in all the groups. There was no significant difference in heart rate among all the groups ($p = 0.08$).

Table 2 shows North Carolina behavior rating scale. Patients' behavior, such as crying, oral physical respiration, quietness, hand and leg movements, was noted. The scores for quietness in groups I, II, and III were 92.6 ± 22.6, 88.3 ± 29.2, and 98.3 ± 7.3 respectively. The scores for oral physical respiration were 3.8 ± 12.4, 0.8 ± 1.8, and 0.4 ± 0.6 in groups I, II, and III respectively. The crying score was

Table 1: Venham picture scale test

	Group I	*Group II*	*Group III*	*p-value*
First visit				
Preoperative	3.5 ± 2.5	1.4 ± 2.0	1.6 ± 1.8	0.50
Postoperative	2.8 ± 2.2	2.6 ± 2.9	2.5 ± 2.9	0.43
Second visit				
Preoperative	3.0 ± 2.4	1.5 ± 1.6	1.8 ± 2.4	0.36
Postoperative	2.6 ± 2.7	2.2 ± 3.6	2.7 ± 3.0	0.48

Table 2: The North Carolina behavior rating scale

	Group I	*Group II*	*Group III*	*p-value*
Quite	92.6 ± 22.6	88.3 ± 29.2	98.3 ± 7.3	0.34
Oral physical respiration	3.8 ± 12.4	0.8 ± 1.8	0.4 ± 0.6	0.45
Crying	4.2 ± 10.2	9.4 ± 22.6	5.2 ± 4.9	0.67
Hand movement	3.2 ± 3.8	7.5 ± 16.4	3.3 ± 5.2	0.12
Leg movement	0.6 ± 1.2	0.8 ± 0.6	0.6 ± 0.2	0.29

Table 3: Visual analog scale

	Group I	*Group II*	*Group III*	*p-value*
First visit	47.2 ± 4.8	68.5 ± 32.4	30.2 ± 39.0	0.08
Second visit	36.2 ± 30.6	38.6 ± 42.6	48.0 ± 42.9	0.36

4.2 ± 10.2, 9.4 ± 22.6, and 5.2 ± 4.9 in groups I, II, and III respectively. The hand movement scores in groups I, II, and III were 3.2 ± 3.8, 7.5 ± 16.4, and 3.3 ± 5.2 respectively. The leg movement score was 0.6 ± 1.2, 0.8 ± 0.6, and 0.6 ± 0.2 in groups I, II, and III respectively. No disruptive behavior was seen in all the groups. The difference was statistically nonsignificant.

Table 3 shows visual analog scale to measure the pain experience at first and second visits in all the groups. The scale ranged from 0 to 100, where 0 indicates least pain and 100 indicates highest pain. In the first visit, score in groups I, II, and III were 47.2 ± 4.8, 68.5 ± 32.4, and 30.2 ± 39.0 respectively. In the second visit, scores in groups I, II, and III were 36.2 ± 30.6, 38.6 ± 42.6, and 48.0 ± 42.9 respectively. An analysis of variance showed variation in pain scores in all groups. Results were nonsignificant.

DISCUSSION

Child management is very important and challenging in pediatric patients undergoing tooth extraction, filling, root canal treatment, etc. These painful treatments are generally conducted under local anesthesia. Because of dentophobia, pediatric patients may need sedation.[7]

The purpose of pharmacological techniques, such as sedation is to reduce the patient's anxiety, fear, and pain during treatment. However, various nonpharmacological methods during different interventions, such as listening to music, nature sounds, the voice of the patient's mother have also been applied successfully to distract the patients' attention.[8]

It is well documented that music affects heart rate.[9] Musical accents and rhythmic phrases appear to resonate well with physiological variables. Dileo et al[10] in their study suggested that cardiorespiratory variables are influenced under different circumstances. Bringman et al[11] stated that relaxing music significantly decreases the level of anxiety than orally administered midazolam. Thus, relaxing music because of their lack of any adverse effects have been considered as an alternative to pharmacological techniques.

In this study, we evaluated the pain, anxiety, and patients' behavior on 60 pediatric patients. Patients were divided into three groups. Group I was upbeat music group, group II was music relaxing group, and group III was control group. Dental procedures were performed in all patients using inferior alveolar nerve block on one side in first visit. Same procedure was repeated on opposite side on second visit. We recorded Venham picture scale test (Table 1), North Carolina behavior rating scale (Table 2), and visual analog scale[12] (Table 3).

Patients' anxiety level was recorded with Venham picture scale test, which showed that there was no significant difference in dental anxiety among the three groups at first and second visits (Table 1). There was no statistically significant difference between pre- and postoperative scores in any of the groups. Our results are in agreement with the results of various studies. However, our results also conflicted with various studies showing a reduction in disruptive behavior with the use of audiotaped stories.[13,14]

Heart rate was recorded at various intervals. There was increase in heart rate during the injection of local anesthetic agent in all the groups. There was no significant difference in heart rate among all the groups.

For patients' behavior, such as crying, oral physical respiration, quietness, hand and leg movements, we used North Carolina behavior rating scale (Table 2). No disruptive behavior was seen in all the groups. The difference was statistically nonsignificant.

Visual analog scale was used to analyze the patient's perception of pain (Table 3). Results indicate that music distraction did not have an effect on pain experienced by these pediatric dental patients. However, a study by Parkin[15] found a reduction in anxiety with music distraction.

CONCLUSION

The authors concluded that management of child patients in dental clinic is a challenge for clinicians. Apart from various pharmacological techniques, management of pediatric patients using audio music distraction has been introduced. Results of study suggest that music did not produce a reduction in pain, anxiety, or disruptive behavior.

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