

## ORIGINAL RESEARCH



## Effect of Audioanalgesia in 6- to 12-year-old Children during Dental Treatment Procedure

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### ABSTRACT

**Introduction:** To evaluate the effect of audioanalgesia in 6- to 12-year-old children during dental treatment procedure.

**Materials and methods:** A total of 40 children were selected and divided into two groups, study group – with audioanalgesia and control group – without audioanalgesia. The value of their pain was evaluated using Venham's pain rating scale. Data were compared using one-sample t-test using Statistical Package for the Social Sciences (SPSS) (Inc.; Chicago, IL, USA), version 17.0.

**Results:** The difference in the control group and study group was statistically significant ( $p < 0.05$ ).

**Conclusion:** The method of distraction using audioanalgesia instills better positive dental attitude in children and decreases their pain perception.

**Clinical significance:** Playing or hearing music during dental procedure significantly alters the perception of pain in 6- to 12-year-old children.

**Keywords:** Audioanalgesia, Children, Dental treatment, Music.

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### INTRODUCTION

Management of children in dental clinic is relatively difficult when compared with adults. Pediatric patients are often subjected to procedures that can cause anxiety and

pain. Though newer techniques are used in the present scenario of pedodontics, such as general anesthesia and sedatives, nonpharmacological and noninvasive management techniques are in the verge of extinct. Routine follow-up of patients after being treated under general anesthesia has greatly decreased.<sup>1</sup> It is time to improvise the nonpharmacological method of child management for better long-term result. Distraction with audios and videos is a simple and effective technique that directs children's attention away from noxious stimuli.<sup>2</sup> Here, we used audioanalgesia (white noise) to reduce the fear and anxiety of the patients at the time of local anesthesia (LA) administration and extraction to find the effect of audioanalgesia in relation to pain perception. The aim of the study was to evaluate the effect of audioanalgesia during dental treatment procedure and to reduce the fear and anxiety in children between 6 and 12 years.

### MATERIALS AND METHODS

Children aged 6 to 12 years (40 children) who reported to our department for follow-up procedure, apparently healthy, with no systemic illness, and those requiring bilateral extraction were selected. Exclusion criteria included first dental visit, systemic illness, special children, and only unilateral extraction. An informed consent was obtained from the patient's parents/guardians after explaining and demonstrating the study procedure. Then, the children were divided into control group (extraction procedure without audioanalgesia) and study group (extraction procedure with audioanalgesia). Materials used were the extraction kit, head set, audio player, and Venham's pain rating scale chart.

After explaining the procedure, one side of the extraction procedure was done without audioanalgesia and children were asked to point out their experience by using Venham's pain rating scale,<sup>3,4</sup> both during administration of LA and during extraction. In the next visit, for the contralateral side extraction, headset/ear phones

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connected to audio player were placed. Then, pleasant instrumental music was played, and children were asked to concentrate on the music during the procedure. Children were liberal to adjust sound volume according to their perception. After injection, children were asked to point out their experience in the pain rating scale<sup>3,4</sup> and same was repeated for extraction procedure also.

Data were collected from both groups during administration of LA and compared using one-sample t-test using Statistical Package for the Social Sciences (SPSS) (Inc.; Chicago, IL, USA), version 17.0.

**RESULTS**

Table 1 shows the mean score for pain of both groups by Venham’s picture rating scale. Table 2 shows the comparison of Venham’s pain rating scale between the control group and study group during LA administration. The one-sample t- shows  $p < 0.05$ , which is statistically significant. Table 3 shows the comparison of Venham’s pain rating scale between the control group and study group for extraction procedure. The one-sample t-test shows  $p < 0.05$ , which is statistically significant. The tables show that the study group has less Venham’s pain rating scale compared with control group.

**Table 1:** Mean score for pain rating scale (by Venham’s picture rating scale)

	Without audioanalgesia		With audioanalgesia	
	During LA administration	During extraction	During LA administration	During extraction
Male (n=20)	3.8	4.6	1.4	2.6
Female (n=20)	2.4	2.2	1.4	2.4
Total (n=40)	3.1	3.4	1.4	2.5

**Table 2:** One-sample t-test during LA administration

	Test value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
					Lower	Upper
Without audio during LA (Control group)	11.196	39	0.000*	3.10000	2.5399	3.6601
With audio during LA (Study group)	6.827	39	0.000*	1.40000	0.9852	1.8148

\*p < 0.05, statistically significant

**Table 3:** One-sample t-test during extraction procedure

	Test value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
					Lower	Upper
Without audio during extraction (Control group)	10.077	39	0.000*	3.40000	2.7175	4.0825
With audio during extraction (Study group)	10.184	39	0.000*	2.50000	2.0035	2.9965

\*p < 0.05, statistically significant

**DISCUSSION**

The word “we are going to visit the dentist” from parents will instill great anxiety and fear in children. The sight of syringe, hand piece, and sound will increase the anxiety of the child still more.<sup>5</sup> Thus, the ambience of the dental clinic has to be pleasant, especially for children. Relying on response of very young children is questionable; hence, we chose 6- to 12-year-old children who have better cognitive development and motor skills to give appropriate feedback. Thus, this age group was selected as there was no communication barrier with the operator. Young children below this age group may have less cognitive development and their feedback depends on their parents’ perception. Cognitive status plays a role in selection of appropriate behavior management techniques.

This study is based on the nonpharmacological method of behavior management in children undergoing dental treatment. Nonpharmacological methods, such as modeling, voice control, tell show do, desensitization also plays a vital role before the application of distraction method in behaviour management. Altogether, nonpharmacological methods actually instill a positive dental experience in the child’s mind and alter the attitude toward dentistry. However the actual dental experience is devoid in case of pharmacological methods of behavior management. Various types of music, such as live music,<sup>6</sup> familiar songs,<sup>7</sup> recorded music and sounds,<sup>3</sup> upbeat sounds, and calm sounds can be used.<sup>7</sup>

Venham’s picture test is an effective method to measure the emotional state of the child at that particular instance as observed earlier by Venham et al<sup>8</sup> and Alwin et al.<sup>9</sup> Other methods to determine pain perception like pulse oximetry and sphygmomanometer will provide



with the objective assessment of the child like pulse and blood pressure. Even before the procedure, the child may have an increased pulse rate and blood pressure due to anxiety about the procedure. Hence, the data provided by pulse oximetry or sphygmomanometer on the child's pain perception can be inconclusive.

Bilateral extraction procedure was chosen because the patient perception on pain during the same extraction procedure with and without audioanalgesia will be more conclusive. The table shows the decrease in the mean pain rating scale with audioanalgesia. This study correlates with the study done by Prabhakar et al.<sup>10</sup>

But study done by Guinot Jimeno et al<sup>11</sup> concludes that there is no clinical significance but alters the emotional state of the patient. Sometimes fast music may distract the child, which would end up with dancing or relishing moves. Hence, we preferred pleasant instrumental music as an audioanalgesia.

Actively listening to music in a structured fashion may yield a cognitive strategy that alters the perception of pain by involving attention, distraction, emotion, imagery, catharsis, and relaxation.

## CONCLUSION

Hence, audioanalgesia with pleasant instrument music proves to be an effective behavior managing tool in children of age 6 to 12 years during dental procedures and instills positive dental attitude.

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