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Effect of Audio and Audiovisual Distraction Technique on Anxiety of Pediatric Patients During Pit and Fissure Sealant Application: A Clinical Trial

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Abstract

This clinical trial evaluates the impact of audio and audiovisual distraction techniques on reducing anxiety in pediatric patients undergoing pit and fissure sealant application. A total of 60 children aged 6-12 requiring sealant application were randomly assigned into three groups: Control (no distraction), Audio distraction (listening to music), and Audiovisual distraction (watching cartoons). Anxiety levels were measured using the Venhem Anxiety Rating Scale (VARS) before and after the procedure. The study found a significant reduction in

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anxiety levels in the audio and audiovisual distraction groups compared to the control group. Specifically, the audiovisual group showed the greatest reduction in VARS scores, followed by the audio group.

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1. INTRODUCTION

Dental anxiety is a common concern among pediatric patients, often leading to uncooperative behavior, increased procedural time, and overall distress for both the child and the dental practitioner. Managing this anxiety is crucial for ensuring a positive dental experience and maintaining oral health. Traditional methods of anxiety management in dental settings include pharmacological interventions, which, although effective, come with potential risks and side effects.[1,2]

Non-pharmacological techniques have garnered interest for their safety and ease of implementation. This study focuses on two such techniques—audio and audio-visual distractions - as potential tools to mitigate anxiety in children during pit and fissure sealant applications.[3,4] Audio distraction involves the child listening to music, while audio-visual distraction includes watching cartoons. These methods aim to divert the child's attention away from the dental procedure, thereby reducing anxiety.[5,6] This clinical trial evaluates the efficacy of these techniques in reducing anxiety levels in children aged 6-12 years, using the Venhem Anxiety Rating Scale as a measure.

2. MATERIALS AND METHODS

The study was a randomized controlled trial including 60 pediatric patients aged 6-12 years who required pit and fissure sealant application. Participants were randomly assigned to one of three groups: Control (no distraction), Audio distraction (listening to music), and Audio-visual distraction (watching cartoons).

2.1. Inclusion Criteria: Children aged 6-12 years, Requiring pit and fissure sealant application, No previous history of significant dental anxiety or behavioral disorders.

2.2. Exclusion Criteria: Children with hearing or visual impairments, History of dental trauma, Psychiatric disorders affecting the outcome of anxiety measurement.

2.3. Intervention: Control Group - No distraction technique was provided. Children underwent the sealant application procedure in a standard dental setting without any additional stimulus. Audio Distraction Group - Children listened to calming, age-appropriate music through headphones during the procedure. Audiovisual Distraction Group- Children watched animated cartoons on a screen placed in front of the dental chair.

2.4. Measurement of Anxiety: Anxiety levels were assessed using the Venham Anxiety Rating Scale, a behavioral assessment tool specifically designed for dental settings. VARS was administered both before and after the sealant application to measure changes in anxiety. (Table 1)

2.5. Procedure: Upon arrival, participants' baseline anxiety levels were assessed using the VARS. Depending on the group assignment, children were either provided with headphones for audio distraction or a screen for audio-visual distraction, or they stayed in a traditional dental setting for the control group. Experienced pediatric dentists performed the pit and fissure sealant application while keeping the duration and interaction as consistent as possible across all groups. Post-procedure, anxiety levels were re-assessed using the VARS.

2.6. Statistical Analysis: Data were analyzed using descriptive statistics and inferential tests to compare pre- and post-intervention anxiety levels across the three groups. A Wilcoxon signed-rank test was used based on data normality for within-group comparisons, and Kruskal-Wallis test was used for between-group comparisons.

Table 1: Venham's Anxiety rating scale[7]

Score	Features
0	Relaxed, smiling, willing and able to converse
1	Uneasy, concerned. During stressful procedure may protest briefly and quietly to indicate discomfort. Hands remain down or partially raised to signal discomfort. Child willing and able to interpret experience as requested. Tense facial expression, may have tears in eyes.
2	Child appears scared. Tone of voice, questions and answers reflect anxiety. During stressful procedure, verbal protest, (quiet) crying, hands tense and raised, (not interfering much -- may touch dentist's hand or instrument, but not pull at it). Child interprets situation with reasonable accuracy and continues to work to cope with his/her anxiety

3	Shows reluctance to enter situation, difficulty in correctly assessing situational threat. Pronounced verbal protest, crying. Using hands to try to stop procedure. Protest out of proportion to threat. Copes with situation with great reluctance.
4	Anxiety interferes with ability to assess situation. General crying not related to treatment. More prominent body movement. Child can be reached through verbal communication, and eventually with reluctance and great effort he or she begins the work of coping with the threat.
5	Child out of contact with the reality of the threat. General loud crying, unable to listen to verbal communication makes no effort to cope with threat. Actively involved in escape behavior. Physical restraint required.

3. RESULT

Table 2 indicates a statistically significant decrease in anxiety levels from pre-treatment to post-treatment in both the audio and audio-visual groups. Notably, the Audio-Visual distraction group exhibited the most substantial reduction in anxiety. Furthermore, intergroup comparison revealed a statistically significant difference among the three groups ($P < 0.05$). **(Table 3)**

Table 2: Comparison of pre and post treatment VARS score

Group	Mean Pre-treatment VARS score	Mean Post-treatment VARS score	P Value
Control	4	3.5	> 0.05 (NS)
Audio	4	2.0	< 0.05*
Audio Visual	4	1.7	< 0.05*

*Significant, NS= Not significant

Table 3: Intergroup comparison of mean anxiety score

Group	P value
I vs II	< 0.05
I vs III	< 0.05
II vs III	> 0.05 (NS)

4. DISCUSSION

The results of this clinical trial emphasize the efficacy of both audio and audio-visual distraction techniques in mitigating anxiety in pediatric patients during dental procedures, specifically the application of pit and fissure sealants. The significant reduction in anxiety levels observed in the intervention groups aligns with existing

literature advocating for the use of distraction techniques in medical and dental settings to enhance patient comfort and cooperation.[8]

The greatest reduction in anxiety was observed in the audiovisual distraction group, suggesting that the combination of auditory and visual stimuli provides a more immersive experience that successfully diverts the children's attention away from the dental procedure. This finding can be attributed to the engaging nature of cartoons, which likely captures the children's cognitive and emotional engagement more effectively than auditory stimuli alone.

The audio distraction group also demonstrated a noteworthy decrease in anxiety levels, although not as pronounced as the audiovisual group. Music's ability to soothe and provide a calming effect might explain this reduction. Music has been shown to modulate physiological responses to stress, which could account for the observed benefits in this study.[9]

Implementing these distraction techniques can have profound implications for pediatric dental practice. Reduced anxiety levels can lead to improved cooperative behavior in young patients, making dental procedures less challenging for both children and practitioners. This can result in a more efficient workflow and potentially shorten the duration of treatment as less time is spent managing anxiety-related disruptions.[10]

Moreover, non-pharmacological interventions such as these are preferable due to their safety profile, ease of implementation, and cost-effectiveness. Techniques like these can be readily integrated into clinical practice without the need for additional specialized training or equipment.[10,11]

The study is not without limitations. The sample size of 60 children, while adequate for preliminary findings, may not fully represent the diverse pediatric population. Future research should aim to include a larger and more heterogeneous sample to ensure the generalizability of the results.

Additionally, this study focused solely on pit and fissure sealant applications. Further studies should explore the effectiveness of these distraction techniques across a range of dental procedures to determine their broader applicability.

4. CONCLUSION

Overall, the findings reinforce the value of audio and audio-visual distractions in reducing pediatric dental anxiety. With audio-visual distractions emerging as the most effective approach, dental practices should consider adopting these techniques to enhance the patient experience. Continuing to explore and refine distraction

methods will be essential in advancing pediatric dental care and promoting positive dental health behaviors from a young age.

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