RESEARCH PAPER

Efficacy of Cotton Candy Flavoured Edible Oil and Audio-Visual Therapy on Pain Perception and Anxiety among Children aged 6- 9 years on Administration of Inferior Alveolar Nerve Block: A Randomized Clinical Trial.

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ABSTRACT
Aim and Background: To compare efficacy of cotton candy flavoured edible oil and audio-visual therapy on pain perception and dental anxiety in children on administration of local anesthesia.
Materials and Method: 40 children aged 6-9 years were included in the study and were divided into two groups. Group I was Lorr Ann Cotton candy flavour and group II was Audio-visual therapy. Pain perception and anxiety was assessed pre-operatively. The vitals (Heart Rate and Oxygen Saturation) of the child were recorded pre-operatively using pulse oximeter. Following this inferior alveolar nerve block was administered. Pain perception and anxiety was assessed after administration of the block. The vitals (Heart rate and Oxygen Saturation) were recorded post administration of inferior alveolar nerve block.
Results: Statically significant decrease was seen in the anxiety levels and pain perception in both the groups. However, children were less anxious in Group I when compared to Group II.
Conclusion: Both the methods were effective in reducing the anxiety of the child out of which cotton candy flavour being the most effective one.
Clinical Significance: Both the techniques were effective in reducing dental anxiety of the children, allowing dental procedures to be performed more efficiently and with minimal behavioral disruption. Overall both the techniques contribute to a positive early dental experience, benefiting both the child and the clinician
Keywords: Sucrose analgesia, Audio-visual distraction, children, inferior alveolar nerve block, distraction techniques..
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INTRODUCTION

The success rate of any dental treatment depends upon various factors which includes proper isolation, quality of treatment done, behaviour management being one of them. In children, dental fear is most commonly associated with fear of pain. This fear makes the child more anxious during dental treatment.[1] Besides, the main fear of the child while visiting the dentist is trypanophobia which is fear of needles. Consequently, a variety of behaviour management strategies have been implemented to enhance the child's level of ease during dental treatment.[2]

The distraction technique is one of the most desirable method during administration of local anesthesia in which a painful stimulus is replaced with other things to divert the child's attention. Various distraction techniques like active distraction with the help of smartphones, virtual reality glasses, audio distraction, audio-visual distraction have been used.[3]

There are two types of distraction techniques: active and passive, children participate in the activity during active distraction, a perfect example of this technique is child playing video games on smart phones during dental

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treatment. The second type of distraction is passive type in which the child does not participates in the process. Example of this technique is audio-visual distraction[4] Audio-visual distraction is the most common distraction technique which is preferred by many dentists. Audio-visual distraction calms the child by camouflaging the sounds during dental procedure.[5] Hence the child becomes more cooperative during dental treatment.

Sucrose analgesia is recently gaining quite attention in pediatric dentistry. Sweet taste solutions act on both first and second order neurons, which decreases the amount of pain perception.[6]

LorAnn flavours have been used since a long time. As these products are Kosher certified, it can used in children as well. Cotton candy flavour is most preferred by the children. It gives a sweet taste in cooking. Claiming the product to be sugarfree, it can also be used in children with high caries risk. Here sucrose is replaced by malt sugar which makes it sugarfree.

Therefore, the purpose of this study is to ascertain which of the two distraction strategies is more effective in reducing the child's pain and anxiety before administration of local anesthesia.

Materials:

LorAnn cotton candy flavour edible oil
Topical anesthetic gel
Q-Tips
Lox 2% Lidocaine (2%) & Adrenaline (0.005mg) Injection

Method:

The study was approved by Institutional Scientific and Ethics Committee and was conducted in Department of Pediatric and Preventive Dentistry after receiving consent from the parents. This study was registered under Clinical Trials Registry- India- CTRI/2025/08/092482.

40 healthy children aged 6 to 9 years with Frankl's behaviour rating score 2 and 3 with mandibular carious molar undergoing procedures requiring inferior alveolar nerve block were included in the study and divided into two groups by randomization method. Whereas, children falling under Frankl's behaviour rating score 1 and 4, children with special health care needs and hearing problems as well as children with systemic diseases were excluded from the study.

Procedure

The parents were informed about the procedure, and informed consent was obtained in a language they understood prior to initiating the study. Children were divided into two groups based on computer generated random numbers.

Group I: Cotton Candy Flavoured Edible Oil
Group II: Audio-visual distraction

Pain perception and dental anxiety was assessed with Wong Baker FACES pain rating scale and Modified Dental Anxiety Scale pre-operatively. The child was asked to point out the emoji that depicts their feelings at that time using pain scale. (Figure 1,2)

Vitals (Heart rate and Oxygen saturation) were recorded pre-operatively using pulse oximeter. (Figure 3)

Children were divided into two groups and local anesthesia was administered.

In group I:

Cotton candy flavoured edible oil was dispensed on the Q-tip and applied on the tongue. Topical gel was applied followed by administration of inferior alveolar nerve block. (Figure 4,5,6)

In group II:

Children were exposed to audio-visual distraction with the help of smartphone. Topical anesthetic gel was applied and inferior nerve block was administered.

Pain perception and dental anxiety was assessed after administration of local anesthesia using Wong Baker FACES Pain Rating scale and Modified Dental Anxiety Scale. (Figure 8,9)

Vitals (Heart rate and Oxygen saturation was recorded after administration of inferior alveolar nerve block) (Figure 10)

RESULTS:

The data obtained were tabulated and entered into database using SPSS Software. It was measured with one way ANOVA, Bonferroni post hoc test, and post-hoc test.

A P value of <0.05 was considered to be significant.

Comparison of pre-treatment mean score of SpO2 in group I & II showed statistically insignificant difference mean diff 0.20 (p=0.660) & post treatment 0.250 (p=0.636). (Graph 1)

Pre-treatment score of heart rate showed statistically insignificant difference 0.550 (p=.784) whereas post treatment score of heart rate showed significant difference 5.80 (p=0.025). (Graph 1)

WBFPS pre-treatment showed statistically insignificant difference 0.100 (p=.833) whereas post treatment score showed statistically significant difference 1.00 (p=0.005). (Graph 1)

MDAS pre-treatment showed no difference whereas post treatment score showed statistically significant difference 1.95 (p<0.001), (Graph 1)

Figure 1: Assessment of pain perception using WBFPS

Figure 2: Modified Dental Anxiety Scale (MDAS) recorded

Figure 3: Vitals were recorded pre-operatively

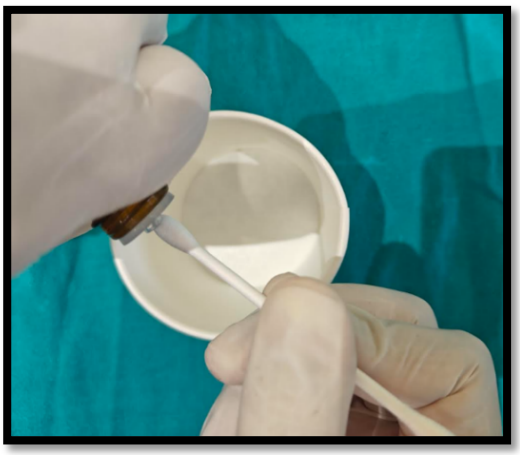


Figure 4: Cotton candy flavour dispensed

Figure 5: Flavour applied on the tongue

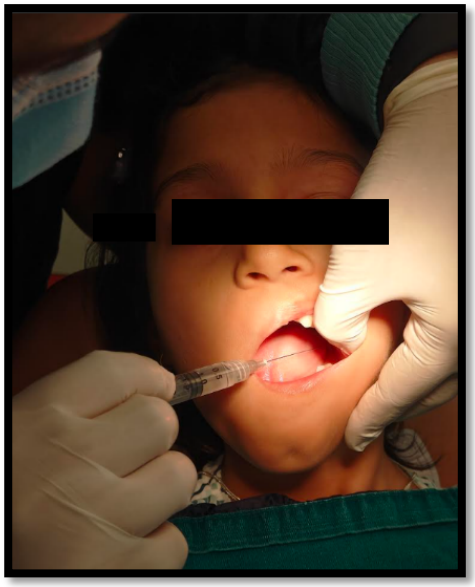


Figure 6: Inferior alveolar nerve block was administered

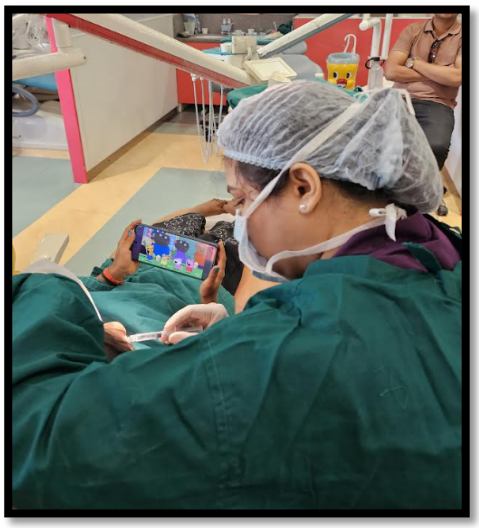


Figure 7: Inferior alveolar nerve block administered

Figure 8: Assessment of pain perception using WBFPS

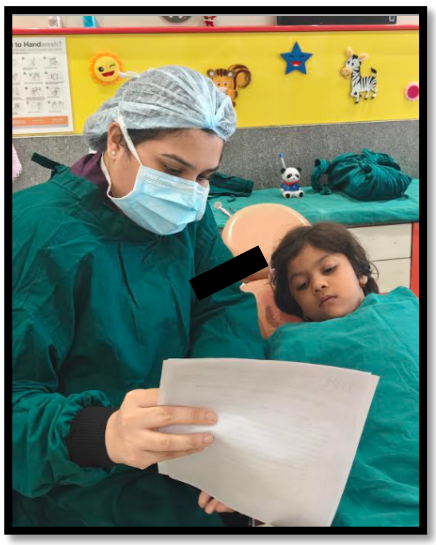
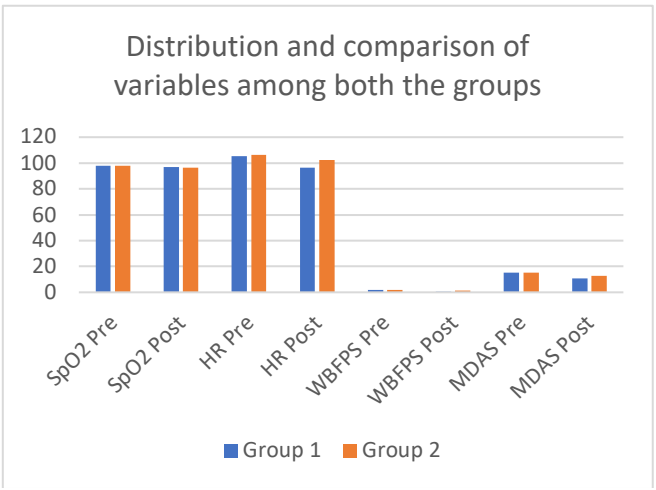


Figure 9: Modified Dental Anxiety Scale (MDAS) recorded

Figure 10: Vitals were recorded after administration of inferior alveolar nerve block.



Graph 1: Distribution and comparison of variables among both the groups

DISCUSSION

Pediatric dentistry being an age defined specialty focuses on the dental care of the child through adolescence. The primary goal of pediatric dentist is to treat children's teeth in the most relaxed and comfortable manner possible by lowering their anxiety levels during their dental treatment.

Children are more anxious during their dental visit. According to the study by Shreya Kothari et al, female child is more anxious than male child.[7] Various scales are used to check the anxiety in patients, Modified Dental Anxiety Scale being one of them.[8] It is a validated questionnaire with five questions, the maximum score given to the child can be 25. A score of 19 or above indicates that the patient is highly anxious[9].

In the present study, a significant difference was seen in the anxiety levels in both the groups post - operatively. Children in the cotton candy-flavoured oil group were less anxious compared to the audio-visual distraction group. Shekhar et al conducted a study using audio visual distraction during administration of local anesthesia and concluded that a child's anxiety during dental treatment might be decreased via audio-visual distraction.[10] The results of the study were in accordance with the present study.

As a visual pain assessment tool, the Wong-Baker FACES Pain assessment Scale makes use of cartoon faces to help children and adults communicate their pain levels.[11] A reduction in the pain scores was seen statistically after administration of local anesthesia in both the groups post-operatively. Ola B. Al-Batayneh et al conducted a study comparing the efficacy of application of sugar free flavor during dental injections. The study concluded that application of sugar free flavor before dental injections helped in reducing the associated pain in children.[12] The results of their study were in accordance to the results of the present study.

Intergroup comparisons of oxygen saturation levels prior to and after local anesthetic administration in the present investigation did not reveal any statistically significant differences.

Heart rate is one of the ways in assessing the physiological status of the child. Children between the ages of 6 and 9 typically have heart rates between 75 and 110 beats per minute[13,14]. The results of the study were in accordance to the study conducted by Zakhary et al. The study concluded that significant decrease was seen in the heart rate. The results of the study were in accordance to the present study.[15]

CONCLUSION

The study concluded that both the techniques were able to reduce the anxiety of children during administration of local anesthesia, however cotton candy flavour being the most effective one.

Clinical Significance:

Both the techniques have proved to be amazing in reducing pain and anxiety in children. Sucrose analgesia has proven to be a successful approach in reducing pain and anxiety and it can be boon for treating pediatric dental patients.

Conflict Of Interest:

The authors declare no potential conflicts of interest with regard to the authorship and/or publication of this article.

Acknowledgement:

The study was approved by the Institutional Scientific and Ethical Committee and was conducted in Department of Pediatric and Preventive dentistry after receiving consent from the parents.

Strength of the study:

The study being one of a kind, directly compared two non-pharmacological behavior management techniques in terms of anxiety reduction assessed using Modified Dental Anxiety Scale and pain perception, assessed using Wong Baker FACES pain rating scale pre- and post-operatively during administration of the inferior alveolar nerve block, and offers clinically relevant evidence for pediatric dental practice. It also contributes to limited existing literature on the use of sugarfree flavored edible oils as a distraction technique in pediatric dentistry for reducing anxiety and pain management during administration of inferior alveolar nerve block, during invasive procedures.

Limitations of the study:

The sample size was relatively small (n = 40), which limits the generalizability of the findings to a larger pediatric population.

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