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Research Article

**PASSIVE DISTRACTION: A TECHNIQUE TO MAINTAIN  
CHILDREN'S BEHAVIOR UNDERGOING DENTAL  
TREATMENT**

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**Abstract:**

**Aim:** Dental anxiety is one of the most common problems among children which causes hurdle in delivering quality treatment by the dentist. The aim of the present study was to evaluate the effectiveness of passive distraction technique on children's behavior during dental treatment.

**Material and methods:** A total number of 100 children of the age group 4-10 years were selected and randomly divided into 2 equal groups. Group I was the control group on whom the treatment was performed under normal dental setup and group II was the passive distraction group where audiovisual presentation through Visual Reality Glasses 3D Box was shown during the entire treatment. Each patient was scheduled for three dental visits. Pre and post-operative response to dental stress was assessed using the Facial Image Scale for dental anxiety. Statistical analysis was done using SPSS 18 (Chicago, USA) and  $p < 0.05$  was considered to be statistically significant.

**Result:** Maximum number of children (29%) belonged to the age group of 6-7 years age. The mean values for SBP obtained during the prophylaxis visit in group II was higher as compared to the control group. The SBP during the application of local anesthetic in group II was significantly higher than the control group children ( $p < 0.05$ ). There were differences in the SBP, DBP and PR in both the groups but they were not statistically significant.

**Conclusion:** The results of the study suggested that passive distraction using cartoon clips and visual reality films made children not only less anxious as compared to the control group but they also showed more cooperative response during the invasive dental procedures.

**Keywords:** Distraction; behavior management; audiovisual aids; dental anxiety.

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## INTRODUCTION:

Visiting a dentist can easily awake strong feeling of fear and anxiety in children, which are the most common causes of neglecting dental visit or treatment by children. Pain is an unpleasant sensory and emotional experience which is related to actual and potential tissue damage. [1] Effective pain control during pediatric dental treatment is the cornerstone for successful behavior guidance. [2] Prevention of pain in patients helps to make a good bond and trust between the dentist and the patient and makes the patient more cooperative during treatment. But sometimes a subjective perception of pain and lack of use of pain assessment scale may oppose successful pain management procedure. [3] This ultimately harms the primary desire of the dentist to treat his/her patient in an anxiety-free environment which compromises the quality of the treatment.

Dentists have to implement their learned skill and experience to achieve the patient's confidence and deliver quality treatment. Fear and anxiety are closely related to each other. Dental fear is defined as the distressed expectation that interferes with normal functioning and dental anxiety is therefore defined as the distressed expectation of a visit to a dentist to the extent where a child might avoid treatment. [4,5]

During invasive procedures in children, distraction is found to be one of the major techniques which are used to divert the children's attention during the dental procedures. Distraction is said to make it easier for the dentist to deliver quality dental treatment in lesser time. Generally, distraction is divided into 2 categories, active and passive. Active distraction is where dental health care professional actively distracts his/her mind from ongoing procedure while in passive technique it is done by taking support of video games, movies, telling stories, etc. [6] It has also been shown that the use of audiovisual (AV) distraction leads to full involvement of scenes (visual and auditory), and also induces a positive emotional reaction resulting in a relaxed dental experience. [7] Several studies have shown that AV distraction in medical practice is commonly used in short invasive procedures to reduce the patients' pain and anxiety. [8,9] In the present study the passive distraction technique was employed to distract the children by using cartoon clips and visual reality glasses to divert their mind during the procedure.

## MATERIAL AND METHODS:

A sample of 100 children, aged between 4 to 10 years, who were rated as negative on Frankl behavior Rating Scale were referred from undergraduate clinic to the speciality clinic for behavior management in the

Department of Pedodontics and Preventive Dentistry. The parents were informed about the procedure of the study and a written informed consent was taken prior to the study.

## Dental operatory procedures

A fully equipped dental clinic with a dental unit, pulse oximeter and blood pressure (BP) monitor was used for the study. The study was conducted by two paediatric dentists. One of them gave all explanations, spoke with the child and carried out the anaesthesia procedure and the other observed and assessed the child during the entire dental procedures, i.e., before, during and after the prophylaxis process in visit 2 and the restorative procedure in visit 3. The accompanying parent/guardian was allowed to attend the entire procedure. The amount of time for each visit was 30 minutes or less.

**Inclusion Criteria:** Patients with general good health, no previous dental experience involving local anesthetic administration for the last 2 years, restorative treatment required under local anesthesia, children with accompanying parents, and children and parents who are willing to participate in this study and who have given written informed consent.

## Exclusion Criteria:

Patients having previous unpleasant experience in a medical setting or known dental phobia as reported in the medical records, need for pharmacological management to cooperate and medical disability such as the history of seizures or convulsion disorders, nystagmus, vertigo or equilibrium disorders, eye problems and autism were not included in the study.

## Following instruments and material were used during the study

Data recording proforma, picture cards related to Venham's Picture Test, Mouth mirror, WHO probe, IOPA radiographic films, hand scalars, ultrasonic scaler unit, scaler tips, Rubber dam kit, cotton rolls, suction tips, cheek retractor, mouth props, local anaesthesia, restorative hand instruments: spoon excavator, plastic filling instrument, condenser, high speed handpiece, diamond burs, composite resin, etchant and bonding agent and Glass Ionomer Cement. Audiovisual aids used for behaviour management were Cartoon clips and Visual Reality Glasses 3D Box.

## Patient assessment

The child's response to dental stress was assessed using the FIS and MVARs for dental anxiety. FIS scale consists of five faces ranging from 'very happy' (1) to 'very unhappy' (5). Each patient was asked to choose one of these faces that best represented his/her feeling at the beginning, and at the end of each visit. MVARs scale consists of six categories, (range from 0 to 5), where; 0=Relaxed, 1=Uneasy, 2=Tense, 3=Reluctant, 4=Interference, 5=Out of contact. Each category describes the patient's mental status in the dental chair when a particular dental procedure is performed, the systolic BP (s-BP); the diastolic BP (d-BP) and the PR. The values obtained for FIS, MVARs were averaged to produce mean value for the visit. Three visits for each patient were as follows:

#### **Visit 1: Dental examination and inclusion visit**

Before the clinical dental examination, including radiographs where necessary, the parent/guardian was asked about the child's medical and dental history. After the examination, a treatment plan was prepared and discussed with the parent/guardian. In order to introduce the child to the dental procedures, the psychological behavior management technique tell-show-do technique was used during this visit. This method includes; a verbal description by 'tell', a demonstration by 'show' and completion of the show by 'do' to introduce the child with dental settings.

#### **Visit 2: Acclimatization visit including oral hygiene information and prophylaxis**

This visit was started by using the tell-show-do technique to explain the procedure. After that, the Facial Image Scale (FIS), validated to assess dental anxiety, was explained to the child and was asked to choose one of the five faces that best represented his/her current emotional state. A BP cuff and a pulse oximeter sensor were then placed on the left biceps muscle and the big toe of the right foot respectively and the baseline values for BP and pulse rate (PR) were obtained. The acclimatization was started with the instructions of oral hygiene by explaining the technique to brush the teeth (toothpaste and toothbrush were used). After that, dental prophylaxis was performed using a slow-speed handpiece with a rubber cup and prophylaxis paste, followed by application of topical fluoride using disposable trays. Information regarding the topical fluoride was given to both the child and parent/guardian. At the end of the acclimatization visit the child rated his/her anxiety on the FIS.

#### **Visit 3: Restorative visit**

Before the visit, the participating patients were randomly divided into two groups consisting 50 children each. **Group I:** (Control Group) on whom the treatment was performed under normal dental setup.

**Group II:** (Passive Distraction Group) who were shown audiovisual presentation through Visual Reality Glasses 3D Box during the entire treatment.

In all groups, the following procedures were carried out:

(1) Pre-operative and post-operative anxiety was rated with FIS at the beginning and the end of treatment respectively

(2) The Modified Venham's clinical ratings of anxiety and cooperative behavior scale (MVARs). BP and PR were registered pre-operatively and also during the procedure: (a) intraoral examination, (b) injection with local anaesthesia, (c) application of rubber dam, (d) cavity preparation and (e) tooth restoration.

During all the procedures the same behavior management techniques were used including verbal communication and positive reinforcement. Before starting the restorative procedure, the child was introduced to the AV-system and was allowed to choose his/her favorite cartoon. The cartoon film was in the Arabic language to involve full auditory and visual engagement.

The data was collected and analyzed using the SPSS18 software (Chicago, USA). Statistical analysis was done and p-value <0.05 was considered to be statistically significant.

#### **RESULTS:**

A total of 100 children of age 4-10 years were included in the study. There were 51 boys and 49 girls who participated in the study (Table 1). The maximum number of children (29%) belonged to the 6-7 years age group (Table 2). Each patient's systolic BP (SBP); the diastolic BP (DBP); and the pulse rate (PR) were assessed when a particular dental procedure was performed. The values obtained were averaged to produce mean value for the visit. The mean values obtained during the prophylaxis visit are shown in Table 3. The SBP in group II was higher as compared to the control group. The mean average values for both the groups during the dental procedures and after the treatment are shown in Table 4. The SBP during the application of local anesthetic in group II was significantly higher than the control group children (p<0.05). There were differences in the SBP, DBP and PR in both the groups but they were not statistically significant.

**DISCUSSION:**

Pain control is one of the most important factors in dental treatment it can be achieved by behavior modification to deliver quality dental treatment. Child dental anxiety and fear are considered as natural factors during any dental visit. Dental anxiety is a multi-dimensional concept that consists of behavioural, cognitive and physiological components. Some factors which stimulate dental anxiety in children are parent-child relationship, parent attitude, intellectual development of child, medical and dental history of child, behavior of dental team etc. [10] The children were not selected on the basis of gender as many studies suggested that there is no difference between girls and boys for pain perception in children. [11] In the present study, local anesthesia was administered by the same pediatrician while another one was there to record all the data. Administration of anesthesia was done by the same person so that the optimal standard condition will be maintained for accurate comparison between distraction techniques. The present study showed that audiovisual distraction using visual reality glasses 3D box and cartoon were effective in reducing observer-rated dental anxiety and keeping good cooperative behavior of children during dental treatment. Apart from this, this study could not show any effect on the cases in the control group. This type of therapy is good for long term basis with a positive effect on the patient, as it builds confidence in the patient for future dental visits, which should be the primary focus of the dental team. The audiovisual effect made a major impact on child considering the fact that it engages two senses and becoming more engaged provided better cooperation during invasive dental treatment.

Ram et al., showed that audiovisual technique is more effective than the regular television screen and also suggested that it could be used instead of nitrous oxide gas. [12] Apart from this, another study suggested that when compared with the other, similar behavior modification methods during treatment like watching television, playing video game, storytelling and many other like music relaxation audiovisuals proved to be more effective as it not only minimized children's anxiety towards dental treatment but also made the children more cooperative towards dental treatment. [13] Also, a study by Prabhakar et al., showed results coinciding with the present study while comparing the AV distraction and only audio distraction. They found that the use of AV distraction during dental treatment was more effective in managing the children than using audio distraction solely. [7]

MVARs specifically determine the children's behavior during the dental treatment procedure. This system was found to have validity when used in the previous studies. [14] SBP and DBP, as well as PRs are commonly used as indirect measures of dental anxiety in children. [15] The present study showed that SBP and DBP were increased during injections with local anaesthesia in both groups. However, this change was not significant between these groups. This was in agreement with previous studies that reported a small increase in arterial BP, but not significant, in children undergoing dental treatment following the administration of local anaesthesia. [15] Nuvvula et al., suggested that audiovisual effect on children behavior impact more to reduce their anxiety during dental procedures as compared to listening music. [16] Nevertheless, there is still a controversy regarding the effectiveness of distraction during dental treatment procedures. Some studies concluded that the use of AV distraction is successful in decreasing not only anxiety but also pain perception. [17,18] However, other studies found that distraction by displaying a videotaped cartoon did not reduce uncooperative behaviour during dental treatment. [19] On the other hand, Sullivan et al., showed that AV distraction significantly reduced the pulse but did not have an effect on anxiety or behavior, similar to the findings of the present study. [20]

The present study does have some limitations due to the limited sample size and also the study didn't take any qualitative aspects of child patients' opinion into consideration. It is possible that if this study can be done on general clinical setting it can be effective and/or change the result. Apart from this, the study excluded the children who had a past bad experience which might have affected the results and hence considered as a limitation. However, this is chosen in order to achieve as a homogenous group as possible to draw a conclusion.

**CONCLUSION:**

The present study suggested that audiovisual reality on children during restorative dental treatment does not only report less distress during the procedure than those without, but they also show a more positive response after injection with local anesthesia.

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Tables

Group	Male	Female	Total
Group I	24 (48%)	26 (52%)	50 (100%)
Group II	27 (54%)	23 (46%)	50 (100%)
Total	51 (51%)	49 (49%)	100 (100%)

Table 1: Distribution of the study population according to gender

Group	Age (years)						Total
	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	
Group I	8 (16%)	12 (24%)	15 (30%)	5 (10%)	4 (8%)	6 (12%)	50 100%
Group II	10 (20%)	2 (4%)	14 (28%)	6 (12%)	5 (10%)	13 (26%)	50 100%
Total	18 (18%)	14 (14%)	29 (29%)	11 (11%)	9 (9%)	19 (19%)	100 100%

Table 2: Distribution of the study population according to age

Groups	SBP	DBP	PR
Group I	106.24	65.92	85.78
Group II	108.08	66.2	85.48

Table 3: Prophylaxis Visit

	SBP		DBP		PR	
	Group I	Group II	Group I	Group II	Group I	Group II
Examination	103.4	104.28	64.88	65.48	84.6	85.24
After LA	108.16	106.8	66.24	65.56	91.62	87.24
After RD	106	105.8	65.9	65.84	87.8	85.2
During CP	105.68	105.2	65.92	65.92	86.78	86.2
After t/t	104.4	104.3	65.9	65.9	85.98	85.94

Table 4: Mean average values for both the groups during the restorative visit