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RESEARCH ARTICLE

ACTIVE AND PASSIVE DISTRACTION TECHNIQUE ON CHILDREN'S BEHAVIOR UNDERGOING DENTAL TREATMENT

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ABSTRACT

Aim: Effective pain control during dental treatment of a pediatric patient is the cornerstone for successful behavior guidance. The aim of the present study was to evaluate the effectiveness of active and passive distraction techniques on children's behavior during dental treatment. **Material and methods:** Atotal number of 150 children between of 4-10 years of age group were selected and randomly divided into 3 equal groups. Group I comprised of the control group on whom the treatment was performed under normal dental setup, group II was the active distraction group, who were instructed for repeated deep breathing and blowing out air throughout the treatment and the group III, the passive distraction group were shown audiovisual presentation through Visual Reality Glasses 3D Box during the entire treatment. Each patient was scheduled for 3 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:** The maximum number of children (24%) belonged to the 6-7 years of age group. The mean values for SBP obtained during the prophylaxis visit in group II and group III was higher as compared to the control group. The SBP during the application of local anesthetic in group II and III group was significantly higher than the control group children ($p<0.05$). There were differences in the SBP, DBP and PR in all the groups but they were not statistically significant. The correlation of clinical anxiety and co-operative behavior showed that children were more relaxed in the group II and group III during dental procedures. **Conclusion:** The results of the study suggested that active and passive distraction made children not only less anxious as compared to the control group but they also showed more cooperative response during the invasive dental procedures.

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INTRODUCTION

Dental visits can awake strong feeling of fear and anxiety in children, which is one of the most common cause of neglecting dental treatment by children. Pain is an unpleasant sensory and emotional experience which is related to actual and potential tissue damage (Second, 2014). Effective pain control during pediatric dental treatment is the corner stone for successful behavior guidance (Ashkenazi, 2005). Prevention of pain of patient makes a good bond and trust between the dentist and the patient which makes the patient more cooperative during treatment. But sometimes subjective perception of pain and lack of use of pain assessment scale may oppose successful pain management procedure (American Academy of Pediatric Dentistry, 2015).

This ultimately harms the primary desire of the dentist to treat their patient in anxiety free environment which compromises the quality of treatment given by the dentist. 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. Therefore, 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 (Oosterink, 2009; Simpson, 2010). 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 in which 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 (Al-Namankany, 2014). 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 (Prabhakar, 2007). In the present study active and passive distraction techniques were employed to distract the children and to divert their mind during the dental procedure and to evaluatetheir behavior during the treatment as reported by children.

MATERIALS AND METHODS

A sample of 150 children, aged between 4 to 10 years, who were rated as negative on Frankl behavior Rating Scale were referred from undergraduate dental clinic to the specialty dental 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 were 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 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 study : Data recording proforma, picture cards related to Venham's Picture Test, mouth mirror, probe, IOPA radiographic films, hand scalers, ultrasonic scaler unit and scaler tips, Rubber dam kit, cotton rolls, suction tips, cheek retractor, mouth props, local anaesthesia, spoon excavator, plastic filling instrument, condenser, high speed hand piece, diamond burs, composite resin, etchant,bonding agent and Glass Ionomer Cement. Audiovisual aids used for behaviour management wereCartoon clips and Visual Reality Glasses 3D Box.

Patient assessment: The child's response to dental stress was assessed by the FIS for dental anxiety. This scale consists of 5 faces ranging from 'very happy' (1) to 'very unhappy' (5). The first two faces; response number 1 and 2 are positive, i.e., without signs of anxiety. 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. The response number (1) accounts for the most positive affect face (approval and no discomfort) and the response number (5) represents the most negative affect face (disapproval and extreme discomfort) following the MVARS.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 was used during this visit. This method includes; a verbal description by 'tell', 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 hand piece 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 3 groups consisting 50 children each:

- **Group I:** (Control Group) on whom the treatment was performed under normal dental setup.
- **Group II:** (Active Distraction Group) were instructed for repeated deep breathing and blowing out air throughout the treatment.
- **Group III:** (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:

- Pre-operative and post-operative anxiety was rated with FIS at the beginning and the end of treatment respectively
- 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 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 number of 150 children of age 4-10 years were included in the study. There were 79 boys and 71 girls who participated in the study (Table 1). The maximum number of children (24%) belonged to the 6-7 years age group (Table 2). During each dental procedure every patient's systolic BP (SBP); the diastolic BP (DBP); and the pulse rate (PR) were assessed. 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 I and group II were higher as compared to the control group. The mean average values for all 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 I and group II was significantly higher than the control group children ($p<0.05$). There were differences in the SBP, DBP and PR in all the groups but they were not statistically significant. The proportions of clinical anxiety and co-operative behaviour (MVARS)showed that children were more relaxed in the group II and group III during dental procedures. Only 3 children in both group II and III were reluctant during the administration of local anesthesia as compared to 4 children of the control group who were reluctant to get the injection. The proportions of self-reported measures of anxiety (FIS), before and after each visit showed that more children in group II (37) and group III (40) were very happy as compared to group I (34).

DISCUSSION

Pain control is one of the most important factors in delivering quality dental treatment and can be achieved by behavior modification. Child's anxiety and fear are natural during any dental visit. Dental anxiety is a multi-dimensional concept that consists of behavioral, 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 (Wang, 2008). The present study was designed to evaluate the efficiency of active distraction technique by using repeated deep breathing and blowing out air techniques throughout the treatment and the passive distraction technique by using audiovisual presentation through Visual Reality Glasses 3D Box during the entire treatment with the control group. 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 (Lee, 2013). In the present study, local anesthesia was administrated by the same pedodontist while the other one recorded 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 active distraction technique employed in this study appears to be simple, time saving, inexpensive and gives rise to an effective relaxed and co-operative experience in short painful dental procedure. The present study showed that audio visual distraction using visual reality glasses 3D box and cartoon were effective in reducing observer-rated dental anxiety and keeping good co-operative behavior in children during the dental treatment. Apart from this, this study could not show any effect on the cases in the control group. These type of therapies are good for long term basis with 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 audio visual effect made a major impact considering the fact that it engages two senses of the children, making them more engaged which provided better cooperation during invasive dental treatment.

Ram *et al.,* showed that audio visual technique is more effective than the regular television screen and also suggested that it could be used instead of nitrous oxide gas.[11]Apart from this, another study suggested that when compared with the other, similar behavior modification methods during the treatment like watching television, playing video game, storytelling and music relaxation audio visuals 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.[12]Also, a study by Prabhakar *et al.,* showed results coinciding with the present study.They found that the use of AV distraction during dental treatment was more effective in managing the children than using audio distraction solely (Prabhakar, 2007). MVARS specifically determined the children's behavior during the dental procedure. This system was found to have validity when used in the previous studies (Venham, 1979). SBP and DBP, as well as PRs are commonly used as indirect measures of dental anxiety in children (Marwah *et al.,* 2005). The present study showed that SBP and DBP were increased during injections with local anesthesia in all the groups. However, this change was not significant between these groups. This was in agreement with the previous studies that reported a small increase in arterial BP, but not significant, in children undergoing dental treatment following administration of local anaesthesia (Marwah *et al.,* 2005). Nuvvula *et al.,* suggested that audiovisual effect on children's behavior impact more to reduce their anxiety during dental procedures as compared to listing music (Nuvvula *et al.,* 2015). Abdelmoniem and Mahmoudshowed that there was no statistically significant difference in distraction techniques compared in SEM (Sounds, Eyes, and Motor) scale scores and in Wong-Baker FACES Pain Scale scores, and this may be related to either the operator experience, or the effectiveness of distraction as a behavioral management technique in minimizing procedural pain, fear, and distress by reducing the sensory and affective components of pain (Abdelmoniem, 2016; Wright, 2000).

Table 1. Distribution of the study population according to gender

Group	Male	Female	Total
Group I	24 48%	26 52%	50 100%
Group II	28 56%	22 44%	50 100%
Group III	27 54%	23 46%	50 100%
Total	79 52.67%	71 47.33%	150 100%

Table 2. Distribution of the study population according to age

	Age (years)						
Group	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	Total
Group I	8 16%	12 24%	15 30%	5 10%	4 8%	6 12%	50 100%
Group II	5 10%	8 16%	7 14%	3 6%	16 32%	11 22%	50 100%
Group III	10 20%	2 4%	14 28%	6 12%	5 10%	13 26%	50 100%
Total	23 15.33%	22 14.67%	36 24%	14 9.33%	25 16.67%	30 20%	150 100%

Table 3. Prophylaxis Visit

Groups	SBP	DBP	PR
Group I	106.24	65.92	85.78
Group II	106.2	65.8	86.96
Group III	108.08	66.2	85.48

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

	SBP			DBP			PR		
	Group I	Group II	Group III	Group I	Group II	Group III	Group I	Group II	Group III
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 5. The proportions of clinical anxiety and co-operative behaviour (MVARS) for different groups

	0= Relaxed	1= Uneasy	2= Tense	3= Reluctant	4= Interference	5= Out of contact
GROUP I						
PROPHYLAXIS	25	13	12			
EXAMINATION	30	15	5			
LOCAL ANESTHESIA	15	20	11	4		
RUBBER DAM	34	10	6			
CAVITY PREPARATION	10	32	8			
TREATMENT	30	20				
GROUP II						
PROPHYLAXIS	18	15	17			
EXAMINATION	25	19	6			
LOCAL ANESTHESIA	19	20	7	3		
RUBBER DAM	40	10				
CAVITY PREPARATION	32	16	2			
TREATMENT	31	19				
GROUP III						
PROPHYLAXIS	20	13	17			
EXAMINATION	25	20	5			
LOCAL ANESTHESIA	20	19	8	3		
RUBBER DAM	42	8				
CAVITY PREPARATION	35	11	4			
TREATMENT	32	18				

Table 6: The proportions of self-reported measures of anxiety (FIS), before and after each visit for different group

	1= VERY HAPPY	2= SLIGHTLY HAPPY	3= INBETWEEN	4= SLIGHTLY UNHAPPY	5= VERY UNHAPPY
GROUP I					
BASELINE	30	20			
BEFORE PROPHYLAXIS	30	11	4	4	1
AFTER PROPHYLAXIS	22	15	12	1	
BEFORE TREATMENT	30	18	12		
AFTER TREATMENT	32	11	7		
GROUP II					
BASELINE	18	32			
BEFORE PROPHYLAXIS	27	9	9	3	2
AFTER PROPHYLAXIS	26	11	7	6	
BEFORE TREATMENT	21	12	12	3	2
AFTER TREATMENT	37	7	6		
GROUP III					
BASELINE	20	30			
BEFORE PROPHYLAXIS	30	6	10	2	2
AFTER PROPHYLAXIS	25	12	8	5	
BEFORE TREATMENT	23	11	10	4	2
AFTER TREATMENT	40	5	5		

However, active distraction demonstrated the greatest percentage (60%) of comfort score as evaluated using the SEM scale, and this is because active distraction involves multiple sensory modalities (auditory, and kinesthetic), active emotional involvement, and participation of the patient to compete with the signals from the noxious stimuli (Aminabadi *et al.,* 2012). Nevertheless, there is still a controversy regarding the effectiveness of distraction during dental procedures. Some studies concluded that the use of AV distraction is successful in decreasing not only anxiety, but also pain perception (El-Sharkawi, 2012; Hoge, 2012). However, other studies found that distraction by displaying a videotaped cartoon did not reduce uncooperative behavior during dental treatment (Ingersoll *et al.,* 1984). 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 (Sullivan *et al.,* 2000). Allani and Setty, showed that cartoon video or video game on a mobile phone can be offered to most children as they are easyto implement, portable, and effective method to reduce anxiety in the pre-operative area and during injection oflocal anesthesia for dental extraction. These techniques of distraction also reduce operatory stress on thepediatric dentist (Allani, 2016). The present study does have some limitations due to 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 past bad experience which might have affected the results and hence considered as a limitation. However this is chosen in order to achieve as homogenous group as possible to draw a conclusion.

Conclusion

The present study suggested that audio visual reality as well as involvement of the children through various activities during restorative dental treatment not only leads to less distress during the procedure than those without, but they also show a more positive response after injection with local anesthesia.

REFERENCES

Abdelmoniem SA. and Mahmoud SA. 2016. Comparative evaluation of passive, active, and passive-active distraction techniques on pain perception during local anesthesia administration in children. *J Adv Res.,* 7(3):551-56.

Allani S. and Setty JV. 2016. Effectiveness of distraction techniques in the management of anxious children in the dental peratory. *IOSR Journal of Dental and Medical Sciences.*15:69-73.

Al-Namankany A., Petrie A., Ashley P. 2014. Video modelling and reducing anxiety related to dental injections – a randomised clinical trial. *Br Dent J.,* 216:675-79.

American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patient. Reference Manual; Pediatr Dent 2014-2015;36(6):180-90.

Aminabadi NA., Erfanparast L., Sohrabi A., Oskouei SG. 2012. Naghili A. The impact of virtual reality distraction on pain and anxiety during dental treatment in 4-6 year-old children: a randomized controlled clinical trial. *J Dent Res Dent Clin Dent Prospect.,* 6(4):117-24.

Ashkenazi M., Blumer S., Eli I. 2005. Effectiveness of computerized delivery of intrasulcular anesthetic in primary molars. *J Am Dent Assoc .,* 136:1418-25.

El-Sharkawi HF., El-Housseiny A.A, Aly AM. 2012. Effectiveness of new distraction technique on pain associated with injection of local anesthesia for children. *Pediatr Dent.,* 34:e35-38.

Hoge MA., Howard MR., Wallace DP. et al. 2012. Use of video eyewear to manage distress in children during restorative dental treatment. *Pediatr Dent.,* 34:378-82.

Hoge MA., Howard MR., Wallace DP. *et al.,* 2012. Use of video eyewear to manage distress in children during restorative dental treatment. *Pediatr Dent.,* 34:378-82.

Ingersoll BD., Nash DA., Blount RL. *et al.,* 1984. Distraction and contingent reinforcement with pediatric dental patients. *ASDC J Dent Child.,* 51:203-07.

Lee SH., Lee NY. 2013. An alternative local anaesthesia technique to reduce pain in paediatric patients during needle insertion. *Eur J Paediatr Dent.,* 14:109-12.

Marwah N., Prabhakar AR., Raju OS. 2005. Music distraction – its efficacy in management of anxious pediatric dental patients. *J Indian Soc Pedod Prev Dent.,* 23:168-70.

Nuvvula S., Alahari S., Kamatham R., Challa RR. 2015. Effect of audiovisual distraction with 3D video glasses on dental anxiety of children experiencing administration of local analgesia: a randomised clinical trial. *Eur Arch Paediatr Dent.,* 16:43-50.

Oosterink FM., de Jongh A., Hoogstraten J. 2009. Prevalence of dental fear and phobia relative to other fear and phobia subtypes. *Eur J Oral Sci.,* 117:135-43.

Prabhakar AR., Marwah N., Raju OS. 2007. A comparison between audio and audiovisual distraction techniques in managing anxious pediatric dental patients. *J Indian Soc Pedod Prev Dent.,* 25:177-82.

Ram D., Shapira J., Holan G. *et al.,* 2010. Audiovisual video eyeglass distraction during dental treatment in children. *Quintessence Int.,* 41:673-79.

Second YLK., Neelakantan P. 2014. Local anesthetics in dentistry-newer methods of delivery. *Int J Pharm Clin Res.,* 6(1):4-6.

Simpson HB., Neria Y., Lewis-Fernandez R. *et al.,* 2010. Anxiety disorders: theory, research and clinical perspectives. New York (NY): Cambridge University Press.

Sullivan C., Schneider PE., Musselman RJ. *et al.,* 2000. The effect of virtual reality during dental treatment on child anxiety and behavior. *ASDC J Dent Child.,* 67:193.

Suprabha BS., Rao A. 2015. Role of parent in behavior guidance of children in dental operatory: current trends. *Int J Adv Res.,* 3:466-70.

Venham LL., Gaulin-Kremer E. 1979. A self-report measure of situational anxiety for young children. *Pediatr Dent.,* 1:91-96.

Wang ZX., Sun LH., Chen AP. 2008. The efficacy of non-pharmacological methods of pain management in school-age children receiving venepuncture in a paediatric department: a randomized controlled trial of audiovisual distraction and routine psychological intervention. Swiss Med Wkly., 138:579-84.

Wright GZ. 2000. Psychologic management of children's behaviors. In: McDonald R.E., Avery D.R., editors. Dentistry for the child and adolescent. 7th ed. Mosby; pp. 34–51.

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