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A novel method of Behaviour modification by multisensory stimulation- THE D-I-Y APPROACH

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Abstract

Aims: An anxiety free surrounding is one of the desires in a paediatric dental clinic and this can be obtained by incorporating various behavioural management techniques. Thus, this study aims to compare and evaluate the effectiveness of a novel multisensory behaviour modification technique DIY (do it yourself) with Tell Show Do and audiovisual aids for behaviour modification of child patient in the dental clinic.

Methods and Material: 45 children aged 4–7 years were enrolled in the study and randomly allocated into three groups i.e. group I (Tell-Show- do), group II (Audio Visual Aid) and group III (D-I-Y approach). Facial Image Scale (FIS) was used for evaluating the anxiety level of the child at three phase's i.e before behavioural modification, after behavioural modification and after treatment.

Statistical analysis used: Kruskal Wallis test followed by Post hoc Bonferroni test were applied to compare the Facial Image Scale of the three groups.

Results: The FIS showed statistically significant difference between all the three groups after behavioural modification. Statistically significant result was seen in all three groups just after the treatment.

Conclusions: DIY approach is effective in reducing children's fear and anxiety during dental treatment as the child enjoys performing the procedure in a live model. Thus, DIY can be used for managing uncooperative child patient.

Keywords: Anxiety, Behavioural Modification, Children.

Introduction

First impression is the last impression" so a child's first dental visit is important in delivering a positive attitude to a child regarding various dental treatments.

Dental fear, anxiety, phobia are most common features seen in a child during his/her first dental visit which can interfere in completion of dental treatment and can result in installing a negative attitude. The Etiology of dental fear or anxiety is multifactorial but mostly they are related to past painful dental experiences, the sight, sound, and sensation of various dental instruments. The effects of these dental fears may persist into adolescence and may cause dental negligence **[1].** It was also observed that 15% of the children did not seek care due to fear of dental treatment **[2].**

A co-operative child with an anxiety free surrounding is one of the desires in a dental clinic in order to provide successful and high-quality dental services. This can be obtained not only by physician skill but also by incorporating various behaviour management techniques. Several techniques have been developed like communicative and pharmacological interventions to manage an anxious child. The American academy of paediatric dentistry has recommended more focus on non-pharmacologic intervention **[3].**

The non-pharmacologic tell-show-do technique introduced by addelston in 1959 is based on the principle of learning theory. In this technique the dentist demonstrates and explain the procedures to the child before the procedure is started which consists of activating the child's visual, auditory and tactile stimulation. This technique is considered to be the most commonly used technique in paediatric dentistry **[4,5].**

Distraction technique on the other hand is a non-aversive behaviour management procedure which effectively reduces distress and disruptive behaviour in child patients during the invasive dental procedures **[6].** Based on the theory by mccaul and mallot, a patient's perception of pain is decreased when the patient is distracted from an unpleasant stimulus **[7].** This explains that the pain perception is directly associated with the amount of attention a patient pays to an unpleasant stimulus. These techniques thus engage child's attention away from unpleasant stimuli, which help in reducing the anxiety and pain **[8].**

Modelling method describe by bandura in 1967 refers to learning by observation. It is a process which can reduce children's fear and avoidance behaviour. Modelling can be performed in two forms: live or filmed one. Various studies on modelling have demonstrated its therapeutic effect as well as educational effect in improving coping skills of children in dental stressful situations **[9].**

Rather than describing, demonstrating, observing a model a child can be allowed to play with models resembling various dental instruments. This will provide better explanatory concept.

So, a new a multisensory approach, the d-i-y technique or the do-it-yourself technique based on the concept of stimulation of multiple senses (visual– auditory– kinaesthetic– tactile) of a child is designed to reduce child's anxiety and fear towards various dental treatment.

The aim of this study was to compare and evaluate the effectiveness of a novel multisensory behaviour modification technique diy (do it yourself) with tell show do and audiovisual aids for behaviour modification of child patient among the age group 4-7ys in the dental clinic.

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Material and Method

This randomized controlled trial study was approved by the ethical committee of institute of dental studies and technologies and was conducted in the department of paediatric and preventive dentistry from July to august 2019.

Among the patients referred to the paediatric department, 45 children aged 4–7 years (±4 months) with frankl scale 3 were enrolled in the study based on the eligibility criteria. Children with initial carious lesions (not involving pulp) in one of the primary molars who needed a restoration or direct or indirect pulp capping treatment with or without local anaesthesia were included in the present study.

The selected patients had no previous history of dental treatment. The children with systemic diseases and developmental disorders were excluded from the study. After the clinical examination was completed, the necessary radiographs were prescribed.

The parents were explained in detail about the study and written informed consent was obtained. Then, the child was enrolled in one of the study groups:

Group I (n=15): Tell Show Do

As soon the clinical examination was done, the child was taken to the operatory and was explained each and every object as well the procedure that the child was about to undergo. The conventional tell show do method was applied and the treatment was done.

Group II (n=15): Audio visual aids

After the clinical examination was done, the child was asked about his favourite cartoon film which was then played on the laptop in the dental chair. The child was given an earphone and after the child was distracted, the treatment was done.

Group III (n=15): Do it yourself (DIY)

In this technique, after the clinical examination was done, the child was taken to a dental chair where a set of typhodont along with the jaw set was kept. A plaster model was prepared where in all the procedures including cavity restoration, biomechanical preparation of the teeth, extraction and crown placement could be done by the child. The child was explained the about the procedures and the instruments and was asked to perform them on the typhodont and the plaster model. Micromotor handpiece was given to the child to experience the real vibrations and the noises. After the child was comfortable and cooperative, the treatment procedure was completed.

In all children, parameters such as the attending dentist, his/her assistant, the working environment, time and duration of work, and the type of dialogues and euphemisms were all the same.

Evaluation:

The children were evaluated in the following sequence:

- Before behaviour management: As child entered the clinical area, he was made to sit on dental chair. After 1 min, the details of the child were entered and FIS was noted.
- After behaviour management: The respective child was taken to the operatory to receive particular intervention after which the FIS was noted.
- After treatment: After the needful treatment was done, the FIS was again noted.

Results

Kruskal Wallis test followed by Post hoc Bonferroni test were applied to compare the Facial Image Scale of the three groups.

A total number of 45 children were included in the study that was divided among the three groups as following: Group I: 15 children; Group II: 15 children; Group III: 15 children.

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Before behavior management, no significant difference was observed among the three different groups whereas after modification a highly significant difference was seen. However, no significant difference was observed among the three different groups after treatment. **[Table 1]**

The intergroup comparison showed highly statistically significant difference between group III and group I and also between group III and group II. **[Table 2]**

Discussion

Management of children's behaviour is an integral component of paediatric dental practice. Thus, this study was designed to evaluate and compare the efficiency of three different behaviour management techniques that are tell-show- do, audio visual aid and do- it- yourself technique in reducing child anxiety during dental treatment.

According to Piaget's classification, children aged 4-7 years are in the preoperational phase. This phase marks the development in vocabulary and concentration abilities in a child. Hence, in this study, 4-7 age group children were included **[9].**

Tsd method was introduced by addles ton in 1959 which is based on the learning theory and is performed by the dentists themselves in the operatory room. This is the most commonly used technique in paediatric dental clinics to modify the child's behaviour and as guidance during the first dental visit. It is most widely accepted by the parents **[10,11].** Radhakrishna s et al in their study stated that tsd technique was inferior to tell play doh and smart phones technique in instilling positive behaviour in patients **[12].**

Audiovisual distraction is a mode of passively distracting two types of sensations: hearing and viewing. Filcheck et al. Reported that the display of attention-grabbing videotaped material helped distracting the children from the fearful stimuli and is one of the most attractive methods for modifying children's behavior during dental treatment **[13].**

In this study, both tell- show-do and audio-visual technique helped reduced the child anxiety after modification and during the treatment but the reduction was statistically similar in both modifications.

According to amin Abadi et al, the ideal distracter for reducing dental anxiety would require an optimal amount of attention involving the multiple sensory modalities like visual, auditory and kinaesthetic **[14].** It is well stated by mercer and mercer in 1993 that the multisensory approaches have been used in learning theory, teaching in elementary schools. It is also known as vakt (visual-auditory-kinaesthetic-tactile) **[15].**

The diy method is a modification of the tell play do technique for managing an uncooperative child in the dental office which stimulates the multi- sensory functions of the child by simulating the real-life situation of a dental procedure through plaster models, typhodonts and working models. The child can himself do the role play of a dentist and thus gets sensitized towards the dental setup. In this technique, the multiple senses of a child are utilised to instil positive behaviour and loss of fear towards dental treatment.

The result in the present study has shown that diy technique proved to be better when compared to tsd and av techniques after modification. The reason may be because of the active participation of the child patient in performing the procedure in a live model. However, after treatment all the groups showed similar result showing that all the behaviour management technique helped in modifying the child behaviour from uncooperative to cooperative behaviour.

A larger sample size might have elucidated better and more conclusive results.

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Table 1: Comparison among the three groups at different time intervals.

		N	Mean	Std. Deviation	p-value
Before Modification	1	15	4.40	.507	0.522
	2	15	4.07	.799	
	3	15	4.20	.775	
After modification	1	15	2.40	.507	0.0001
	2	15	2.73	.458	
	3	15	1.40	.507	
After treatment	1	15	2.20	.775	0.778
	2	15	2.20	.775	
	3	15	2.07	.594	

Kruskal Wallis test applied, p-value significant at $p<0.05$

Table 2: Intergroup comparison among the three groups after modification

Groups (I)	Groups (J)	Mean difference	Significance	95% CI Lower bound	95% CI Upper bound
1	2	-0.333	0.210	-0.78	0.11
	3	1.00	0.0001	0.55	1.45
2	3	1.33	0.0001	0.89	1.78

Post hoc Bonferroni test applied.

Conclusion

Within the limitation of the study, the results showed that DIY technique proved to be a better behaviour modification technique than tell show do and audiovisual distraction technique and can be incorporated in day to day management of uncooperative child patient to achieve cooperative behavior during dental treatment.

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