Acta Scientific Dental Sciences (ISSN: 2581-4893)

Volume 7 Issue 5 May 2023

Research Article

Tell-Play-Do Versus Tell-Show-Do Technique in Behavior Management of Pediatric Patients: A Randomized Clinical Trial

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DOI: 10.31080/ASDS.2023.07.1620

Received: March 15, 2023

Published: April 05, 2023

Abstract

Introduction: The Tell-Show-Do (TSD) method is limited by the level of cognitive development of the child when presented with certain amounts of information. Tell-Play-Do (TPD), a modification of TSD involves an explanation followed by the use of customized dental instrument toys in the mouth of a cartoon model by pediatric patients. The present research aimed to compare the effectiveness of the two techniques in improving the cooperation of 5 to 9-year-old pediatric patients during dental treatment.

Materials and Methods: The present randomized clinical trial was conducted with a parallel-arm experimental design on 60 patients within the age range of 5 to 9 years. The patients were subjected to behavior guidance by TPD and TSD, respectively, depending on the group assigned (n = 30 each). The patient's behavior was assessed by Frankel's behavior rating scale (FBRS) and anxiety levels were evaluated subjectively by the Facial Image scale (FIS) and objectively by Pulse rate (PR).

Results: The study population comprised 32 females and 28 males with a mean age of 6.9 + 1.43 years. The FBRS values and mean PR were found to be significantly higher and the FIS values were significantly lower in the patients of the TPD group as compared to the TSD group.

Conclusion: TPD is an effective behavior-shaping/management technique for improving the patient's cooperation during dental treatment. It is a more preferable functional alternative to the conventional TSD technique, providing superior results as a behavior management technique.

Keywords: Behavior Shaping; Behavior Guidance; Dental Fear; Odontophobia

Introduction

Dental treatment, in itself, is technique-sensitive which requires the elimination of pathological processes of the teeth and subsequent restoration, all while maintaining an isolated environment free of contamination. While the criteria are manageable in adults, the treatment of pediatric patients is quite challenging. Fear and anxiety develop in children right from the moment they enter into the dental office [1]. Consequently, they are reluctant to undergo dental treatment procedures and do not cooperate during the treatment. The lesser threshold of children to the pain perceived during the treatment procedures can lead to sudden jerking movements further adding to the already existing challenge of maintaining a contamination-free environment.

Much of the research in pediatric dentistry, therefore, emphasizes on the management of the behavior of the children right from their first visit to the clinic. The first experience of a child visiting a dental clinic has a significant impact on the child's attitude toward dental treatment and his/her behavior during the procedures [2]. Good cooperation during the treatment increases the success rate of the treatment while also minimizing the operating time. A number of pharmacological and non-pharmacological techniques have been developed over time in an attempt to shape or manage the behavior of pediatric patients [3].

Non-pharmacological are much preferred in general clinical settings owing to their obvious benefits of being simpler, feasible, and

less invasive without any physical adverse effects on the patient's body [4]. The tell-show-do (TSD) technique, formalized by Addleston in 1959, is one of the most frequently employed techniques for behavior-shaping in pediatric dentistry [5]. It is formulated on the basis of the 'learning theory' wherein the child is explained what procedures are to be performed by the dentist in a simplified language with terms comprehensive for the child.

Despite being popular for decades, the TSD method has certain limitations. The amount of perception of the presented information depends on the level of cognitive development of the child. The process of cognitive development is much more primitive in children and completes only by late adolescence. Therefore, it would be difficult for pediatric patients less than 10 years of age to grasp the concepts from the dentist's frame of reference without having a conceptual framework about the same [6]. Consequently, the need for developing a more explanatory technique was felt for better comprehension by the patients of this age group.

In this context, a modification of the TSD technique in the form of 'tell-play-do' (TPD) was introduced recently [7]. The technique involves an explanation of the procedure to the child by means of euphemism for customized dental instrument toys in the mouth of a cartoon model. The child is then allowed to hold the instrument-imitating toys and perform (play) the procedure in the mouth of the model, following which the treatment is performed for the child.

Ever since its inception, three studies have been reported pertaining to the evaluation of the concept in pediatric patients and comparing it with other behavior management techniques such as audiovisual distraction or modeling [7-9]. However, none of the studies evaluated the actual difference in the effectiveness of the TPD technique and the conventional TSD technique. The present research aimed to compare the effectiveness of the TSD and TPD techniques in improving the cooperation of 5 to 9-year-old pediatric patients during dental treatment.

Material and Methods

The present randomized clinical trial was conducted with a parallel-arm experimental design on 60 patients within the age range of 5 to 9 years. The study protocol was approved by the institutional ethical review board and was conducted abiding by all human ethical principles as per the declaration of Helsinki and guidelines of the Occupational Safety and Health Administration. A sample size of n = 29 was determined using the estimates of mean and standard deviation values from literature using the formula as described in Annexure A [9,10].

Children having a carious lesion that required to be excavated and restored by glass ionomer cement were considered eligible for the study. It was ensured that it was the patient's first dental visit before including them in the study. Those with a history of systematic or developmental disorders were excluded from the study. Informed consent was obtained from the eligible patients, following which the baseline behavior of the child was assessed using Frankl's behavior rating scale (FBRS). The baseline level of dental anxiety of the patient was also assessed subjectively using the Facial Image Scale (FIS) and objectively by recording their pulse rate (PR) by means of a pulse oximeter (PO) (NL-50D, NecLife, India) on the index finger (Figure 1).

Figure 1: Assessment of the child's anxiety levels by A) Facial Image Scale, and B) Pulse oximeter.

The patients were then allotted to either of the two groups-Group I (TPD Group, n = 30) and Group II (TSD Group, n = 30) by means of an online randomization tool. [Available online at: http://www.randomization.com. [Last accessed: 20 May 2022] Depending on the group assigned, on the first visit

- **Group I (TPD Group):** The child was introduced to a kit that comprised dental instrument-imitating toys including diagnostic instruments (mouth mirror, tweezer, dental probe), airotor, toothbrush, toothpaste, and a model of a dentulous mouth (Figure 2). The investigators described the instruments using appropriate euphemisms and procedures in terminologies comprehensible to the child. The child was then allowed to hold the instrument-imitating toys to play and perform a dental procedure on the denture model (Figure 3).
- **Group II (TSD Group):** The child was explained about the dental instruments and procedures by the investigators in a language simple enough for the child to understand. The investigators then demonstrated the procedure chair-side to the child.

Figure 2: Kit comprising dental instrument-imitating toys and a denture model.

Figure 3: Patient using the dental instrument-imitating toys on the denture model.

After the demonstration of procedures by either of the techniques, another set of assessments was carried out by FBRS, PO, and FIS. The investigators then performed oral prophylaxis (ultrasonic scaling and topical fluoride application) for the patient. The assessments of behavior and anxiety levels were again repeated after the completion of the prophylactic procedures. The patients were then re-called for a second visit after seven days.

At the time of the second clinical visit, the restorative treatment by occlusal cavity preparation for the restoration using glass-ionomer cement was performed with the same three-point protocol for assessment of the child's behavior and anxiety. It was ensured that the possible confounding factors such as the attending and operating investigators, his/her assistant, the working environment, time of the day, duration of treatment, and the type of euphemisms used were identical for all the patients to minimize the introduction of bias in results.

Results

The study population (n = 60) comprised 32 female and 28 male patients of age 5 to 9 years with a mean age of 6.9 ± 1.43 years. The mean age of the patients in the TPD group was 7 + 1.44 years and that of the TSD group was 6.8 +1.45 years. A statistically non-significant difference (p > 0.05) between the mean age by t-test and individuals of each gender by Chi-square test was found between both the groups.

The mean values of pulse rate dropped from a baseline of 91 beats/min to 88 beats/min by the end of the treatment on the second visit in the TPD group. The difference between the mean pulse rate at all three points of assessment was, however, found to be non-significant in both groups by unpaired t-test. While the mean pulse rate in the TSD group remained at 90.5 beats/min from the baseline to the end of the second visit, except instead a rise to 91.17 beats/min was found after the first-visit treatment procedure.

The normality of the recorded numerical data of pulse rate was checked using the Shapiro-Wilk test. A p-value of >0.05 indicated that the data for PR followed a normal curve; hence parametric tests were used for further comparisons between the two groups. The inter-group comparison of FBRS and FIS values was done using the Mann-Whitney U test.

There was a statistically highly significant difference seen for the values between the groups (p < 0.01) of FBRS with higher values in the TPD group as compared to the TSD group at all time intervals except for the values after behavior management but before treatment in the second visit (Table 1). On the other hand, the FIS values were significantly lower (p < 0.05) after the treatment in the second visit in the TPD group as compared to the TSD group, while there was a non-significant difference (p > 0.05) between the values of the two groups at the other time intervals (Table 2). The pulse rate was also found to be significantly higher (p > 0.05) after treatment during both visits in the TSD group as compared to the TPD group.

	Grp	N	Mean	Std. Deviation	Std. Error Mean	Median	Mann-Whitney U value	Z value	P value of Mann-Whitney U test
FBRS V1 Baseline	1	30	2.17	.834	.152		413.000	-0.583	0.560#
	2	30	2.03	.765	.140				
FBRS V1 ABM	1	30	3.17	.791	.145		222.000	-3.564	0.000**
	2	30	2.37	.809	.148				
FBRS V1 ARx	1	30	3.33	.758	.138		227.500	-3.439	0.001**
	2	30	2.43	1.006	.184				
FBRS V2 ABM	1	30	2.77	.728	.133		355.000	-1.489	0.137#
	2	30	2.40	.968	.177				
FBRS V2 ARx	1	30	3.57	.504	.092		205.000	-3.934	0.000**
	2	30	2.73	.868	.159				

Table 1: Intergroup comparison of FBRS values at all time intervals.

FBRS: Frankel's Behavior Rating Scale; V1: First Visit; V2: Second Visit; ABM: After Behavior Management; ARx: After Treatment; *: statistically significant difference (p < 0.05); **: statistically highly significant difference (p < 0.01); #: non-significant difference (p > 0.05).

	GRP	N	Mean	Std. Deviation	Std. Error Mean	Mann-Whitney U value	Z value	P value of Mann-Whitney U test
FIS V1 Baseline	1	30	3.53	.973	.178	436.000	-0.218	0.828#
	2	30	3.47	.900	.164			
FIS V1 ABM	1	30	2.70	.837	.153	399.500	-0.806	0.420#
	2	30	2.93	.980	.179			
FIS V1 ARx	1	30	2.17	.913	.167	382.000	-1.059	0.290#
	2	30	2.53	1.196	.218			
FIS V2 ABM	1	30	2.93	.785	.143	391.500	-0.924	0.355#
	2	30	3.13	.900	.164			
FIS V2 ARx	1	30	2.03	.964	.176	318.500	-2.049	0.040*
	2	30	2.53	.937	.171			

Table 2: Comparison of Facial image scale values between the two groups at all time intervals.

FIS: Facial Image Scale; V1: First Visit; V2: Second Visit; ABM: After Behavior Management; ARx: After Treatment;
*: statistically Significant Difference ($p < 0.05$); #: Non-Significant Difference ($p > 0.05$).

Discussion

Before comparing the effectiveness of two methods in a population, especially one such as the pediatric age group wherein numerous other confounding factors can affect the results, it is essential to ensure that the populations are homogenous. The non-significant difference between age, gender, and baseline FBRS, FIS, and PR values of the two groups implied that both groups had identical baseline characteristics (Tables 1,2, and 3). This ensured that the randomization in the present study was adequate and that bias due to confounding variables or differences in baseline characteristics of the participants of both groups was minimized.

Managing the behavior and anxiety of pediatric patients requires extensive efforts and skills on the part of the dentist, sometimes even greater than that required for the treatment itself. Therefore, it is crucial to improve the existing methods of behavior management and also test their effectiveness in the patients. To assess the behavioral rating of the child during visits to a dental clinic, several scales have been developed over the years [11]. An ideal rating scale system should possess certain inherent properties. Firstly, it should be reliable such that the yielded results must remain constant on repetition of the test. Secondly, it should provide the same results when used by different observers at two different points of time. Such a scale would have good face validity in measuring the parameter that is intended to be measured [12].

FBRS is one of the most commonly employed scales in pediatric dentistry for evaluating the child's cooperation in the dental clinic. Wright had added symbols for definitely negative (--), negative (-), positive (+), and definitely positive (++), and the scale has been in use clinically as well as in research in the field of pediatric dentistry for decades [13]. The scale offers the advantages of being simple to use, highly reliable, and valid. The significantly higher values of FBRS noted at almost all the time points indicated that children guided by TPD exhibited more cooperative behavior than the TSD method.

The FBRS, however, has one obvious limitation given the fact that it evaluates the patient's behavior at a point in time during the dental visit. The patient may demonstrate different degrees of cooperation, for instance, in the waiting area, while fluoride application, and while injecting local anesthesia [11]. In this context, comparing FBRS values at different time points during a single dental visit may be questionable. Rather, an overall rating throughout the visit could be considered. Thus, in the present study, we assessed FBRS only at two end-points, one after the respective behavior management technique was used and the second, at the end of the treatment procedure during each visit.

Similarly, various scales have been developed to evaluate the child's anxiety related to dental clinics, one of which is the FIS. FIS comprises a spectrum of five faces exhibiting expressions from happy to sad on moving from left to right. The most positive face is scored as 1 while the most negative face is scored as 5 [14]. The significantly lower levels of anxiety in the TPD group after the dental treatment in the second visit as elicited by FIS indicated its superiority in effectiveness over the TSD method.

The findings were further supported by the significantly higher pulse rates noted at the end of both visits in patients in the TSD group as compared to those in the TPD group. Pulse rates have been correlated with changes in the stress levels of an individual. The phenomenon was also described in children by Marwah., *et al*. in 2005 wherein they used PR as an objective measurement for the anxiety levels of children in their study [15].

Our findings corroborate those from the earliest work on TPD by Vishwakarma., *et al.* the average pulse rate, and anxiety scores by FIS and Venham's picture test were significantly lower among children who were subjected to TPD behavior modification as compared to live modeling [7]. Another study on TPD also found that the technique was as effective as audiovisual distraction [9]. Kevadia., *et al.* described TPD as a functional alternative to the TSD and modeling techniques and found it to yield better results in reducing children's fear and anxiety as compared to videos and smartphone applications [8].

Our study presents itself with certain limitations. A larger sample size would give a more precise difference between the two techniques. Given the difficulty of analyzing methods in the pediatric age group during dental treatment, procuring large sample sizes becomes challenging in such trials. The TPD technique itself requires some amount of preparation prior to attending to the child as compared to the TSD technique which requires almost no preliminary preparations. The sounds of airotor and other equipment in the dental operatory could be incorporated to more closely mimic the clinical settings. Nevertheless, the TPD technique proved to be an effective tool for behavior guidance during dental treatment in pediatric patients of age 5 to 9 years.

Conclusion

TPD is an effective behavior-shaping/management technique for allaying dental fear and anxiety in pediatric patients. The technique improves the patient's cooperation during dental treatment and overall behavior during the dental visit. It can rightly be considered as a more preferable functional alternative to the conventional TSD technique, providing superior results as a behavior management technique.

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