

Original Article

The effect of Filmed modeling on the anxious and cooperative behavior of 4-6 years old children during dental treatment: A randomized clinical trial study

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ABSTRACT

Background: The aim of this study was to evaluate the effect of Filmed modeling in comparison with commonly used Tell-Show-Do technique (T.S.D) on the anxious and cooperative behavior of 4-6 years old children during dental practice.

Materials and Methods: Forty six children aged 4-6 years were enrolled in this study and randomly allocated into two groups. Group I: At the first visit, the procedure of Tell-Show-Do, and at the second visit, the treatment procedures were performed by the dentist for the children. Group II: At the first visit, children watched a film consisting of the procedure of Tell-Show-Do performed on a child model. At the second visit, treatment procedures were performed. In both groups, during the treatment procedure, index of heart rate was measured and behaviors of children were recorded. The children's anxious and cooperative behaviors on the recordings were quantified according to Venham and Frankl rating scales, respectively. The data were compared between two groups using T-test method. All statistical references were made at 0.05.

Results: There were no statistically significant differences in heart rate measures, clinical anxiety and cooperative behavior scores of children between the two groups ($P = 0.6$).

Conclusion: Filmed modeling can be an efficient alternative method to Tell-Show-Do technique in pre-appointment preparation of the 4-6 years old children during dental treatment.

Key Words: Cooperative behavior, dental anxiety, film modeling, pediatric dentistry

Received: February 2013
Accepted: August 2013

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INTRODUCTION

Dental appointment is a stressful situation, which raises children's anxiety level and avoidance behavior. Children's dental anxiety is an intense but situational and transient anxiety.^[1] If it is not managed, it will possibly continue to adulthood.^[2] Several communicative, advanced and pharmacological interventions have been developed to manage children's anxious and cooperative

behaviors.^[3] The American Academy of Paediatric Dentistry (AAPD) recommended focusing more on non-pharmacologic intervention in future studies.^[4]

The first dental visit is crucial in the formation of the child's attitude toward dentistry and future treatment success. Tell-Show-Do technique is commonly used by pediatric dentists in management of children's anxiety at a pre-treatment visit. It dictates that before anything is done, the child be told what will be done and then shown by some sort of simulation exactly what will happen before the procedure is started. Tell-Show-Do technique is based on principle of learning theory;^[5,6] and is performed by the dentists themselves in the operatory room.

Other methods such as desensitization, observational modeling and play therapy have also been recognized

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for the modification of children's behavior.^[6] Modeling refers to learning by observation and children may reproduce behavior exhibited by the model in the same situation. It was described by Bandura in 1967 as a process which can reduce children's fear and avoidance behavior.^[5] Modeling can be performed in two forms: live or filmed one. Studies on modeling have demonstrated its therapeutic effect in management of anxiety^[7,8] and educational effect in improving coping skills of children in medical stressful situations.^[9] Modeling can have a deserving educational effect in patient with different intelligence quotient.^[10,11]

It has been suggested to use the live or Filmed modeling technique as an effective intervention to prepare the child for a dental visit.^[12] Live models such as peers, siblings or parents are used for pre-appointment teaching of the expected behavior to the child patient.^[13-15] Several studies have evaluated the efficiency of the modeling through a film in the reduction of child's dental anxiety.^[16-22] It has been shown that Filmed modeling can be effective as well as live modeling and also desensitization methods.^[16,18] Contrary to other social learning-based methods, Filmed modeling does not take time by the dentist and dental team; although it has not achieved its proper situation.^[12]

The aim of this study was to evaluate the effectiveness of Filmed modeling in comparison with common and effective Tell-Show-Do technique in a group of Iranian children and to introduce an alternative time saving method to practitioners.

MATERIALS AND METHODS

This randomized clinical trial study was approved by Ethics Committee of *Zahedan University of Medical Sciences* and conducted in pediatric clinic of Zahedan dental school in 2010.

Among the patients referred to the clinic, 46 children aged 4-6 years (± 2 months) were enrolled in the study according to the inclusion criteria [Figure 1]. They had caries lesion in one of the primary mandibular molars and needed a pulpotomy with restoration treatment. It was confirmed that they have no previous experience of hospitalization and dental visit. The children with systemic diseases and developmental disorders were excluded from the study. The examination was completed and the necessary radiographs were prescribed.

Each child's parent was asked to complete the informed consent and a questionnaire gathering demographic characteristics of the child and family. Then, the child was enrolled in one of the study groups based on balanced block randomization as follows:

Group I (Tell-Show-Do Group) (Control): Children came in the operation room. Tell-Show-Do, prophylaxis with paste and rubber cap and fluoride therapy was performed by the dentist for each participant to increase their familiarity with dental procedures. The duration of the appointment was about 20 minutes and constant for all children. At the end of the first visit, the child was rewarded and the date of the second treatment visit was set for one week later. A child in the first group was excluded from the study because of his definitely negative behavior (Score I in Frankl index).

In the second session, the child entered the operating room alone. A video-camera located on the top of the dental unit light pole under a covering cloth was focused on the child's head and hands and started to record child's behavior.

The required injection including the use of topical anesthesia and a mandibular alveolar nerve block technique was performed by the dentist. The heart beat rate of each child was recorded manually before and following the injection by the dentist. Then, the occlusal cavity was prepared for pulpotomy and restoration of the teeth. The treatment protocol was the same for all the participants.

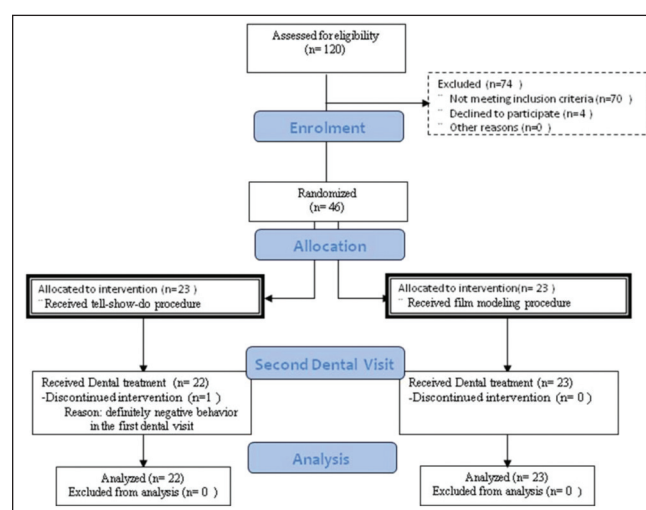


Figure 1: Flowchart of patient's selection and randomization in two study groups (Tell-Show-Do and Filmed modeling groups)

In all children, parameters such as the attending dentist, his assistant, the working environment, time and duration (30 minutes for each child) of work, and the type of dialogues were all the same. Care was taken to make sure that the children were not tired, hungry, or did not have a common cold.

Group II (Filmed modeling group): The children were directed to a quiet and comfort room to watch a film presented by a dental assistant. The film showed the same procedure consisting of Tell-Show-Do, prophylaxis with paste and rubber cap and fluoride therapy on a 5-year-old child model with a time of 20 minutes. The child in the film was cooperative and was reinforced by a reward at the end of the procedure. The produced film had been approved by 3 pediatric dentists.

The second treatment session was set for one week later. Dental procedures, measurement of the heart rate and recording of the behaviors were all performed as in Group I.

The recorded videotapes of all children were independently evaluated by 2 pediatric dentists who were blind to the grouping of the children. Children's anxiety reactions and cooperative behaviors were scored based on Venham Scale and Frankle Index, respectively [Tables 1 and 2]. The viewers were asked to rate the child's responses in two stages: At the injection of local anesthesia and at the beginning of the tooth preparation.

Statistical analysis

Mean of heart rate measurements and behavioral ratings were used for statistical analyses. Data analysis was performed applying t-test method in software package of statistical analysis (SPSS-15, SPSS Inc., Chicago, IL, USA). All statistical references were made at 0.05.

RESULTS

A total number of 46 children, 22 boys and 24 girls, participated in the study and allocated between Tell-Show-Do ($n = 23$) and Filmed modeling ($n = 23$) groups. At the first visit, a child in Group I showed definite negative behavior of score level I based on Frankle index and was excluded from the study. Data revealed that both groups were the same in demographic characteristics including their sex, mean age, parental education and age, parental dental experiences, number of children in the family, and participation in

kindergarten. Table 3 shows the mean and standard deviation (SD) for the heart beat rate, anxiety level, and cooperative behavior of children during treatment in two groups. Accordingly, heart rate mean scores (before and after local anesthesia injection) showed no significant differences between two groups ($P = 0.6$). Moreover, there were no statistically significant differences for the anxious and cooperative behavioral mean scores between two groups ($P > 0.05$).

Table 1: Venham 6-point Index used to quantify the anxious behavior of 4-6-year-old children in the Tell-Show-Do and Filmed modeling groups

0 = Relaxed: smiling, willing, able to converse, displays behavior desired by the dentist
1 = Uneasy: concerned, may protest briefly to indicate discomfort, hands remain down or partially raised. Tense facial expression, 'high chest'. Capable of cooperating
2 = Tense: tone of voice, questions and answers reflect anxiety. During stressful procedure, verbal protest, crying, hands tense and raised, but not interfering very much. Protest more distracting and troublesome. Child still complies with request to cooperate
3 = Reluctant: pronounced verbal protest, crying. Using hands to try to stop procedure. Treatment proceeds with difficulty
4 = Interference: general crying, body movements sometimes needing physical restraint. Protest disrupts procedure
5 = Out of contact: hard loud swearing, screaming unable to listen, trying to escape. Physical restraint required

Table 2: Frankle 4-point Index used to quantify the cooperative behavior of 4-6 year old children in the Tell-Show-Do and Filmed modeling groups

Definitely Negative: Refusal of treatment, crying forcefully, fearful, or any other overt evidence of extreme negativism
Negative: Reluctant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, sullen, withdrawn
Positive: Acceptance of treatment, at times cautious, willingness to comply with the dentist, at times with reservation but patient follows the dentist's directions cooperatively
Definitely Positive: Good rapport with the dentist, interested in the dental procedures, laughing and enjoying the situation

Table 3: Comparison of heart rate measures, anxiety and cooperation level of 4-6-year-old children between Tell-Show-Do and Filmed modeling Groups

	Group I Mean (SD)	Group II Mean (SD)	P-value
Heart rate measure 1	98.89 (± 10.16)	102.80 (± 12.91)	0.31
Heart rate measure 2	111.17 (± 11.93)	113.90 (± 14.70)	0.53
Anxiety score	0.96 (± 0.72)	1.09 (± 0.99)	0.61
Cooperation score	3.02 (± 0.57)	3.03 (± 0.62)	0.95

Heart rate measure 1: Heart rate measurement before injection of local anesthesia; Heart rate measure 2: Heart rate measurement after injection of local anesthesia; Group I: Tell-Show-Do was performed at first dental visit; Group II: Filmed modeling was performed at first dental visit

DISCUSSION

Establishment of communication is the key for developing sound rapport with any patient.^[3] Based on Piaget's classification, children aged 4-6 years are in the pre-operational phase. The increment in vocabulary, attention, and concentration abilities in this period are signs of their readiness for social communications such as a dental visit.^[23]

Tell-Show-Do technique is the backbone of the child's education and behavior guidance and is commonly used in the first appointment. Several epidemiological inquiries have revealed its positive effect on the reduction of dental anxiety;^[24] but, performance of Tell-Show-Do needs the time constraints of both the dentist and the parents.

This study was designed to evaluate the efficiency of the videotaped model to familiarize the child patient with the dental visit. The results of this study showed that Filmed modeling is as efficient as Tell-Show-Do technique in the reduction of 4-6 years' old children anxiety and increase their cooperative behavior during dental treatment.

The film was produced about a peer model in the same dental situation. It has been confirmed that a videotape showing a peer model coping with the similar dental procedures is more effective in reducing disruptive behavior and anxiety in comparison with an unrelated film. It also prevents more information to be imparted and the child patients were sensitized to the procedures.^[17,19,20]

It was attempted to prepare the film in conditions like that the children in Group I experienced. The operatory room and the dentist in the film were the same as in Group I. In the film, model's mother left the operatory room like the children in Group I who experienced parental absence. The parent's absence/presence in the dentistry operation room has no impact on the cooperation and anxiety of the preschool children who have had no previous dental presentation.^[25] Hence, the mothers were asked to leave the room to prevent the child — parent interactions.

At the end of the film, it was shown that the model was rewarded. Along with the presentation of proper information to the child, reinforcement of the appropriate behavior of the model is an important element of modeling procedure. It prompts the learning and performance of that behavior in the child to receive the rewards.^[1,26]

Studies by Machen and Johnson,^[16] Melamed *et al.*^[17,19] and Yahaya and Salam^[22] have found the effectiveness of Filmed modeling in comparison to desensitization in various patients.

Fields and Pinkham, and Rouleau *et al.*^[18,20] performed the procedure of prophylaxis at the first visit and presented a videotaped model to children at the following visits. They concluded that the presentation of a model through a film causes the children manifest relatively little negative verbalization and behavior and also request less parental presence. It seems that the procedure of prophylaxis before the film presentation can have positive effects on the child's familiarization and dental behaviors.

In this study, for the evaluation of the specific effects of the modeling through a film, children in group II did not experience the prophylaxis procedure before the film presentation. Furthermore, the operator dentist was absent throughout the film presentation and the treatment procedure was performed one week later after watching the film. When the children visited the dentist at second appointment, they didn't exhibit signs of severe anxiety and negative verbalization or behavior more than the children who were familiarized to the dentist and experienced Tell-Show-Do procedure. It seems that the information presented in the film was efficient in the familiarization of the child to the dentist and the description about the procedure. Therefore, the children in group II showed the behavior expected to do in a dental visit.

In previous studies, the clinical behaviors of the children have been assessed. The behavior of the child is not enough to detect the child's anxiety. In evaluating anxiety and cooperation levels of children in this study, the physiological and behavioral indexes were used simultaneously. The physiological index included the heart beat rate. It has been shown that this index is more in line with the anxiety experienced in dental visits.^[27]

For assessing the child's behavior in the dental visit, the treatment appointment was recorded through a video-camera, and then the child's behavioral reactions were quantified by an unaware observer (the blind method) using two scales. The scales used in our study were that of Frankle scale for cooperative behaviors and Venham Scale for anxious behaviors. These are very easy and quick methods with a reliability and validity for statistical analyses.^[25]

At the first visit, a child in Group I showed definite negative behavior with a score level I based on

Frankle index and was excluded from the study. Accordingly, further investigations are suggested to evaluate the effectiveness of Filmed modeling on the children with negative behaviors including scores I and II of Frankle index.

CONCLUSION

Filmed modeling is as efficient as Tell-Show-Do technique to control 4-6 years old children anxiety and cooperative behavior during dental treatment and may be a proper alternative method for Tell-Show-Do technique in some situations. Manifesting no more negative verbalization/behavior especially during child — mother separation and taking less time in comparison with Tell-Show-Do technique are the advantages of providing a model through films.

ACKNOWLEDGMENT

This study is based on a thesis to the graduate faculty, Faculty of Dentistry, Zahedan University of Medical Sciences, in partial fulfillment of the requirements for the M.S. degree. It has been reviewed and published in clinicaltrials.gov website (Identifier number: NCT01908127).

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How to cite this article: Paryab M, Arab Z. The effect of Filmed modeling on the anxious and cooperative behavior of 4-6 years old children during dental treatment: A randomized clinical trial study. Dent Res J 2014;11:502-7.

Source of Support: Zahedan University of Medical Sciences. **Conflict of Interest:** None declared.