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Research Article

The Efficacy of a Tell-Show-Do-Play (TSD-Play) Behavioral Management Technique in Reducing Anxiety and Improving Cooperation in Pediatric Dental Patients: A Randomized Controlled Trial

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Abstract

Aim: This study aimed to evaluate the efficacy of a modified behavioral management technique, Tell-Show-Do-Play (TSD-Play), compared to the conventional Tell-Show-Do (TSD) method on anxiety and cooperation levels in pediatric dental patients.

Methods: 200 children (aged 4-7 years) undergoing routine dental examination were randomly allocated to a control group (TSD, n = 100) or an experimental group (TSD-Play, n = 100). The TSD-Play group incorporated a 90-second play phase with a replica mouth mirror on a model. Primary outcome was change in heart rate (HR). Secondary outcomes were behavior scores using the Face, Legs, Activity, Cry, Consolability (FLACC) scale and the Houpt scale.

Results: The mean increase in HR was significantly lower in the TSD-Play group (5.8 ± 2.9 bpm) compared to the TSD group (12.5 ± 3.8 bpm) ($p < 0.001$). The TSD-Play group also demonstrated significantly better median FLACC scores (1 vs. 4, $p < 0.001$) and Houpt scores (6 "Excellent" vs. 3 "Fair", $p < 0.001$).

Conclusion: The incorporation of a "Play" component into the traditional TSD technique significantly reduces physiological anxiety and improves cooperative behavior in children during dental examinations. TSD-Play is a simple, effective, and zero-cost enhancement to standard behavioral management.

Keywords: Pediatric Dentistry; Behavior Management; Dental Anxiety; Tell-Show-Do; Play Therapy

Introduction

Dental anxiety remains a pervasive and significant barrier to effective oral healthcare for children, often leading to poor cooperation, compromised treatment quality, and the development of lifelong dental phobia [1]. Studies estimate the prevalence of dental fear in children to range from 5% to 20% in various populations, highlighting a critical public health challenge [2]. This anxiety can trigger a cycle of avoidance, resulting in deteriorated oral health and increasingly complex dental needs, ultimately necessitating more invasive treatments that further exacerbate fear [3]. Effectively managing a child's first dental experiences is therefore not merely a procedural concern but a fundamental aspect of fostering lifelong positive oral health attitudes and behaviors.

The Tell-Show-Do (TSD) technique, first introduced by Addelston in 1959 and later refined by several researchers, remains the cornerstone of non-pharmacological behavioral management in pediatric dentistry [4,5]. It operates on principles of desensitization, using verbal explanation ("Tell") and demonstration ("Show") to demystify dental instruments and procedures before performing them ("Do"), thereby reducing fear of the unknown [6]. While TSD is widely accepted as effective, modern pediatric care increasingly emphasizes a more holistic, child-centered approach that acknowledges the role of empowerment, active participation, and play [7,8]. Play is a child's natural medium for expression and learning, allow-

ing them to process experiences, exert control, and reduce feelings of helplessness [9]. Although the theoretical benefits of play in healthcare settings are well-documented [10], its structured application in dentistry, particularly as an integrated component of established techniques like TSD, remains under-investigated and is not yet a standard protocol [11].

Therefore, this study proposes a simple modification to the gold standard: Tell-Show-Do-Play (TSD-Play), where the child is given a brief, structured opportunity to act as the dentist on a model using a replica instrument before the procedure begins. The aim of this randomized controlled trial was to compare the effectiveness of the TSD-Play technique against the conventional TSD technique in reducing anxiety and improving cooperation during a dental examination, measured through objective physiological and validated behavioral parameters.

Materials and Methods

Study design and ethical approval

A prospective, randomized, controlled, parallel-arm study was conducted over a three-month period. Ethical approval was granted by the Institutional Review Board (RDCHRC/ETHICSCOMMITTE/2024-25/0127). Informed consent was obtained from all parents/guardians, and child assent was obtained verbally where possible.

Participants

Based on a power analysis (power = 0.90, $\alpha = 0.05$, effect size d = 0.5), a sample size of 200 was determined. Two hundred systemically healthy children (104 boys, 96 girls), aged 4-7 years (mean age 5.3 ± 1.0 years), scheduled for a routine dental examination at the University Dental Clinic were recruited. Exclusion criteria were: previous dental experience, emergency appointments, children with special healthcare needs, and those with a history of cardiac or respiratory conditions that could affect heart rate.

Randomization and group allocation

Participants were randomly assigned using computer-generated random numbers to one of two groups:

- **Control Group (TSD):** Received the conventional Tell-Show-Do technique.
- **Experimental Group (TSD-Play):** Received the Tell-Show-Do-Play technique. Allocation was concealed in sequentially numbered, opaque sealed envelopes opened by a non-operating assistant after consent was obtained.

Intervention

All examinations were performed by a single calibrated pediatric dentist in the same operatory to minimize variability.

- TSD Group (Control): The dentist explained ("Tell") the mouth mirror and its purpose. The instrument was then demonstrated ("Show") on the child's fingernail. The dentist then proceeded ("Do") with the intraoral examination.
- TSD-Play Group (Experimental): After the "Tell" and "Show" phases (identical to the control group), the child was invited to "Play." They were given a replica mouth mirror and a typodont (dental model) for 90 seconds. The dentist provided simple, positive instructions (e.g., "Can you count the teeth on the dinosaur?" or "Can you find a shiny tooth?"). After this play phase, the dentist proceeded with the examination ("Do").

Outcome measures

- **Physiological Anxiety:** Heart Rate (HR): Baseline HR was recorded using a calibrated finger pulse oximeter after the child was seated in the dental chair and had rested for 2 minutes. HR was recorded again immediately post-examination. The difference (ΔHR) was calculated.
- **Behavioral Cooperation:** FLACC Scale: An independent trained observer, blinded to the group allocation, scored the child's behavior during the examination on the FLACC scale (0-10, where 0=relaxed and cooperative, 10=distressed) [11].
- **Global Behavior:** Houpt Scale: At the end of the procedure, the operating dentist rated overall behavior using the Houpt scale (1 = Treatment interrupted, 2 = Poor, 3 = Fair, 4 = Good, 5 = Very Good, 6 = Excellent) [12].

Statistical analysis

Data were analyzed using SPSS v.29. Normality of continuous data (ΔHR) was assessed with the Shapiro-Wilk test. An independent samples t-test was used to compare ΔHR between groups. The non-parametric Mann-Whitney U test was used to compare ordinal data (FLACC and Houpt scores) between groups. A p-value of <0.05 was considered statistically significant.

Results

All 200 children completed the study. The groups were comparable at baseline in terms of age (TSD: 5.4 ± 0.9 yrs, TSD-Play: 5.2 ± 1.1 yrs, p = 0.42) and gender distribution (p = 0.68).

Outcome measure	TSD group(n = 100) Mean ± SD/Median (IQR)	TSD-Play group(n = 100) Mean ± SD/Median (IQR)	p-value
Heart rate	12.5 ± 3.8	5.8 ± 2.9	<0.0001
FLACC Score (0-10)	4 (3-5)	1 (0-2)	<0.0001
Houpt score (1-6)	3 (3-4)	6 (5-6)	<0.0001
Analyzed with independent t-test; analyzed with Mann-Whitney U test			

Table 1: Comparison of Outcome Measures between TSD and TSD-Play Groups.

Physiological anxiety (Heart rate)

The mean increase in heart rate was significantly lower in the TSD-Play group (5.8 bpm) compared to the TSD group (12.5 bpm) (p < 0.0001).

Behavioral cooperation (FLACC Scale)

Children in the TSD-Play group exhibited significantly better behavior, with a median FLACC score of 1 (mild occasional whimpering), compared to a median score of 4 (mild to moderate fearfulness) in the TSD group (p < 0.001).

Global behavior (Houpt Scale)

The operating dentist rated the overall behavior of the TSD-Play group as significantly better, with a median Houpt score of "Excellent", compared to a median score of 3 "fair" in the TSD group (p < 0.0001).

Discussion

The results of this study strongly support the hypothesis that incorporating a brief, structured play-based component into the established TSD framework significantly enhances its effectiveness in managing pediatric dental patients. The significantly lower rise in heart rate in the TSD-Play group provides robust, objective, physiological evidence of reduced anxiety, corroborating findings from other studies that use HR as a reliable correlate of stress [13,14]. This objective data is powerfully complemented by the superior scores on both behavioral scales, indicating that children who participated in the play phase were not only calmer internally but also more cooperative and less distressed externally.

The pronounced success of TSD-Play can be attributed to its alignment with core principles of developmental psychology and current paradigms of child-centered care [6,15]. The play phase effectively transforms the child from a passive, apprehensive recipient of care into an active, engaged participant. This active engagement fosters a sense of control, mastery, and familiarity over the unfamiliar environment and instruments, which is a powerful antidote to the feelings of helplessness that are a key contributor to dental anxiety [16,17]. As noted by Wright (20), perceived lack of control is a primary driver of fear in the dental setting. Furthermore, wielding the instrument themselves demystifies it, directly addressing the "fear of the unknown" that TSD aims to conquer [5], but through experiential learning rather than passive observation.

Our findings are consistent with a growing body of literature that supports the use of non-threatening, familiarization tech-

niques. For example, the use of video glasses to pre-familiarize children with procedures has shown promise [18], and the positive effects of magical thinking and positive storytelling align with the empowering narrative created by TSD-Play [19]. However, this study adds a novel dimension by integrating the familiarization process directly into the hands of the child through play, making it a more active and immersive experience. The results suggest that the simple act of "playing dentist" bridges the gap between observation and experience more effectively than observation alone.

Limitations and Future Research

The limitations of this study include its conduct at a single center and its restriction to a non-invasive procedure (examination). The promising results warrant further investigation. Future studies should investigate the efficacy and potential dose-response of TSD-Play during more invasive restorative procedures, with larger and more diverse cohorts, and across different age groups to identify the optimal developmental window for its application.

Conclusion

Within the limitations of this study, the Tell-Show-Do-Play (TSD-Play) technique is a highly effective, zero-cost enhancement to conventional behavior management. It significantly reduces physiological anxiety and improves observable cooperative behavior in pediatric dental patients aged 4-7 years during an oral examination. By leveraging the universal language of play, this technique empowers the child, demystifies the procedure, and fosters a more positive dental experience. Pediatric dentists are strongly encouraged to adopt this simple, child-centered modification to improve the clinical experience for their young patients and potentially mitigate the development of long-term dental anxiety.

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