



Tell–Show–Do With and Without Audiovisual Distraction for Pediatric Dental Anxiety: A Comparative Clinical Study

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Abstract: Background: Dental anxiety is a common behavioral challenge in pediatric dentistry that may compromise cooperation and treatment outcomes. Tell–Show–Do (TSD) and audiovisual distraction (AVD) are non-pharmacological techniques used to improve children's acceptance of dental procedures. **Aim:** To compare the effectiveness of TSD alone and TSD combined with AVD in reducing dental anxiety among children undergoing restorative dental treatment. **Materials and Methods:** This two-group comparative clinical study included 100 children aged 5–10 years undergoing restorative dental treatment (50 receiving Tell–Show–Do [TSD] alone and 50 receiving TSD plus audiovisual distraction [AVD]). Dental anxiety was assessed with the Facial Image Scale (FIS), physiological arousal with pulse rate, and cooperation with the Frankl Behavior Rating Scale. Details of randomization implementation and ethical approval require verification against the study records. **Results:** In the collected study summaries, mean FIS scores decreased by 24.1% in the TSD group and 47.5% in the TSD plus AVD group. Mean pulse rate during treatment increased from 101.6 to 108.4 beats/min with TSD alone and decreased from 102.3 to 97.6 beats/min with combined treatment. Positive or definitely positive Frankl ratings occurred in 62% and 86% of children, respectively. These are descriptive comparisons; adjusted effect estimates and statistical significance have not been established. **Conclusion:** In this sample, TSD supplemented with AVD was associated with greater descriptive improvements in anxiety scores and cooperation than TSD alone. Confirmation of the magnitude and statistical precision of the between-group effect requires analysis of individual participant data.

Keywords: Dental anxiety; Tell–Show–Do; Audiovisual distraction; Pediatric dentistry; Behavior management.

INTRODUCTION

Dental anxiety is a significant concern in pediatric dentistry because it affects children's behavior, cooperation, and willingness to receive dental treatment. Fear may develop due to unfamiliar surroundings, anticipated pain, unpleasant sounds, dental instruments, or previous negative experiences. Children experiencing anxiety frequently demonstrate crying, avoidance, excessive movement, or refusal to

cooperate, making routine procedures difficult. Persistent dental anxiety may also contribute to irregular dental attendance and delayed treatment, increasing the risk of untreated oral disease. Effective management of anxiety is therefore essential for delivering comprehensive pediatric dental care and establishing positive attitudes toward future dental visits.¹

Behavior guidance forms an integral part of pediatric

dental practice and involves communication, psychological support, and behavioral techniques intended to develop trust between the dentist and child. Among the conventional approaches, Tell–Show–Do (TSD) remains widely used because of its simplicity and applicability across different clinical situations. The technique involves explaining the procedure in age-appropriate language, demonstrating the instruments or actions, and subsequently performing the procedure as described. This sequence familiarizes children with dental procedures and reduces uncertainty associated with unfamiliar clinical experiences.²

Although TSD is effective for many children, its success may vary depending on developmental maturity, temperament, previous dental experiences, and baseline anxiety. Children with greater apprehension may continue to experience discomfort despite verbal explanations and demonstrations. Consequently, distraction-based techniques have received increasing attention as additional approaches to behavioral management. Distraction redirects attention away from threatening stimuli toward alternative activities, thereby reducing the child's awareness of unpleasant sensations.³

Audiovisual distraction (AVD) involves presenting age-appropriate cartoons, animated videos, or other entertaining material during dental procedures. By simultaneously engaging visual and auditory attention, this technique may reduce awareness of dental instruments, procedural sounds, and anticipated discomfort. Systematic reviews have suggested that audiovisual distraction can improve behavioral responses and reduce anxiety or pain during pediatric dental treatment, although the magnitude of benefit differs across studies and clinical settings.⁴

Clinical investigations have evaluated audiovisual distraction during restorative procedures, local anesthetic administration, and other dental interventions. Some studies have demonstrated improved cooperation and reduced anxiety-related responses, while others have reported limited differences in subjective anxiety measurements. These variations may be associated with differences in audiovisual devices, treatment complexity, age distribution, and the instruments used to assess anxiety.⁵

Combining TSD with audiovisual distraction may provide complementary advantages. TSD prepares children by explaining the clinical procedure, whereas audiovisual distraction helps maintain their attention on pleasant stimuli during treatment. This combination may reduce anxiety while preserving the communication and reassurance provided through conventional behavior guidance. Previous investigations have explored the combined approach

and reported potentially favorable behavioral outcomes.²

Reliable assessment of dental anxiety requires age-appropriate instruments. The Facial Image Scale (FIS) allows children to identify their emotional state through illustrated facial expressions and can be administered without extensive verbal explanation.⁶ Physiological indicators, particularly pulse rate, may provide supplementary information regarding autonomic arousal, although they are influenced by factors other than anxiety.⁷ Behavioral cooperation can also be assessed using the Frankl Behavior Rating Scale, which categorizes children's responses according to their acceptance of dental treatment.⁸ Despite increasing interest in distraction-based techniques, evidence regarding the additional benefit of audiovisual distraction when combined with conventional TSD remains heterogeneous. Differences in study methodology and clinical outcomes highlight the importance of further comparative evaluation.⁹ The present study was therefore designed to compare TSD alone with TSD supplemented by audiovisual distraction in children undergoing routine restorative dental treatment, with particular emphasis on anxiety reduction, physiological responses, and behavioral cooperation.

MATERIALS AND METHODS

Study Design and Setting

This two-group comparative clinical study included 100 children aged 5–10 years undergoing restorative dental treatment: Group A (TSD alone, n=50) and Group B (TSD plus AVD, n=50). Both groups received the same initial Tell–Show–Do explanation and demonstration. Only Group B additionally received audiovisual distraction during restorative treatment. Anxiety, pulse rate, and cooperation were assessed using the same outcome measures in both groups.

Study Population

A total of 100 children aged 5–10 years requiring restorative treatment for dental caries were included: 50 in Group A and 50 in Group B.

Inclusion and Exclusion Criteria

Children aged 5–10 years who were systemically healthy, required routine restorative dental treatment, and could understand age-appropriate instructions were eligible for inclusion. Written parental consent and child assent were required.

Children with significant communication difficulties, medical conditions affecting physiological responses, acute dental emergencies, or conditions requiring pharmacological behavior management were excluded. Children receiving sedative or anxiolytic medications were also excluded to minimize

interference with anxiety assessment.

Sample Size Determination

The analyzed sample comprised 100 children, divided equally between Group A (TSD alone, n=50) and Group B (TSD plus AVD, n=50). The basis for the original sample-size target should be documented from the study planning records; it cannot be established from the summary tables.

Randomization and Group Allocation

Participants were assigned to two groups in a 1:1 ratio (n=50 per group). The original protocol describes a computer-generated allocation sequence and sealed envelopes; implementation details require confirmation from trial records.

group flow: 100 children included → Group A: TSD alone (n=50) | **Group B:** TSD + audiovisual distraction (n=50) → identical anxiety, pulse-rate, and behavioral assessments in both groups.

Two groups of 50 children each were compared. Both received conventional Tell–Show–Do; the sole planned intervention difference was the addition of audiovisual distraction in Group B.

Group A — TSD alone (n=50): Children received conventional Tell–Show–Do. The dentist explained the procedure in age-appropriate language, demonstrated the instruments, and then performed restorative treatment with verbal reassurance. No audiovisual distraction was used.

Group B — TSD plus AVD (n=50): Children received the identical Tell–Show–Do preparation as Group A, followed by age-appropriate animated audiovisual content during restorative treatment. The audio volume permitted communication with the dentist.

Clinical Procedure

For both groups, the clinical sequence was: preliminary examination and baseline data collection; age-appropriate Tell–Show–Do explanation and instrument demonstration; assigned restorative treatment (without AVD in Group A, with AVD in Group B); and post-treatment outcome assessment. Previous dental experience and baseline anxiety were documented before the intervention.

In Group A (n=50), restorative treatment proceeded after Tell–Show–Do preparation without audiovisual distraction. The dentist maintained verbal communication and reassurance.

In Group B (n=50), the same Tell–Show–Do preparation was followed by audiovisual distraction introduced before the operative phase and continued during restorative treatment, while maintaining verbal

communication.

Assessment of Dental Anxiety

Dental anxiety was assessed using the Facial Image Scale developed by Buchanan and Niven. The scale consists of five facial expressions representing emotional states ranging from very happy to very unhappy. Children selected the expression corresponding to their feelings before and after treatment.

Each expression was assigned a numerical score from 1 to 5, with higher scores representing greater anxiety. The difference between baseline and post-treatment scores was used to assess changes in anxiety following the intervention.

Physiological Assessment

Pulse rate was measured using a fingertip pulse oximeter before, during, and immediately after treatment, as described in the original methods. Specify the exact clinical moments and measurement procedure from source records to establish reproducibility.

The same monitoring approach was applied to both groups. Factors capable of influencing pulse rate, including crying, movement, and procedural discomfort, were considered during interpretation.

Assessment of Behavioral Cooperation

Behavioral cooperation was evaluated using the Frankl Behavior Rating Scale, which classifies children's responses into four categories: definitely negative, negative, positive, and definitely positive.

Frankl behavior ratings were assigned during treatment on the standard four-category scale. Report the number and training of assessors and whether independent or blinded assessment was feasible; these details require confirmation.

Outcome Measures

The primary outcome was the between-group difference in change in FIS score from baseline to post-treatment. As FIS is ordinal, analyses should account for its measurement scale; a prespecified ordinal model of post-treatment FIS adjusted for baseline FIS is preferable where individual-level data are available.

Secondary outcomes were pulse rate over the three assessment periods, ordinal Frankl ratings, and any additional behavior guidance required. Treatment completion and local anesthetic use should be reported only if reliably recorded.

Statistical Analysis

The available group-level summaries were described using means, standard deviations, frequencies, and percentages. Individual-level observations are

required to estimate paired changes, confidence intervals, and valid between-group significance tests. No p values or inferential claims are reported here because the underlying participant-level dataset was not supplied.

For reanalysis, consider an ordinal regression model for post-treatment FIS adjusted for baseline FIS, age, previous dental experience, and clinically important procedure factors. Analyze repeated pulse-rate measurements with a suitable mixed-effects model, and Frankl ratings using ordinal regression. Report effect estimates, 95% confidence intervals, missing-data handling, and whether analysis followed original

allocation (intention to treat) when applicable.

Any confirmatory p values should be based on participant-level analyses with a prespecified significance threshold. Secondary analyses should be interpreted cautiously because of multiple comparisons.

Ethical Considerations

Ethical approval, informed parental consent, child assent, and any trial registration should be reported with their verified identifiers and dates from institutional records.

RESULT

Results are presented for 100 children: Group A (TSD alone, n=50) and Group B (TSD plus AVD, n=50). All percentages in the group tables use a denominator of 50 unless stated otherwise. Recruitment, exclusions, losses, and missing outcomes cannot be reconstructed from the available aggregate tables.

Table 1. Baseline demographic and clinical characteristics of the study groups

Parameter	Group A: TSD (n=50)	Group B: TSD + AVD (n=50)
Age (years), mean $\pm$ SD	7.42 $\pm$ 1.53	7.36 $\pm$ 1.48
Male, n (%)	27 (54.0)	26 (52.0)
Female, n (%)	23 (46.0)	24 (48.0)
Previous dental experience, n (%)	19 (38.0)	21 (42.0)
No previous dental experience, n (%)	31 (62.0)	29 (58.0)
Baseline FIS score, mean $\pm$ SD	3.48 $\pm$ 0.81	3.54 $\pm$ 0.79
Baseline pulse rate (beats/min), mean $\pm$ SD	101.6 $\pm$ 10.4	102.3 $\pm$ 10.1

FIS: Facial Image Scale; SD: Standard deviation.

Descriptively, the two groups had similar reported age distributions, sex proportions, previous dental experience, and baseline mean FIS and pulse-rate values. These summaries alone do not demonstrate equivalence.

Table 2. Comparison of dental anxiety scores before and after intervention

Anxiety parameter	Group A: TSD (n=50)	Group B: TSD + AVD (n=50)
Pre-treatment FIS score	3.48 $\pm$ 0.81	3.54 $\pm$ 0.79
Post-treatment FIS score	2.64 $\pm$ 0.83	1.86 $\pm$ 0.72
Mean reduction in FIS score	0.84	1.68
Percentage reduction in mean score	24.1%	47.5%

Values are group means $\pm$ SD where available. Percentage changes were computed from group means. Paired variability, between-group confidence intervals, and statistical significance cannot be recovered reliably from these summaries alone.

Mean FIS scores decreased from 3.48 to 2.64 in Group A and from 3.54 to 1.86 in Group B.

The larger descriptive reduction in Group B should be tested using individual-level data, with adjustment for baseline FIS and relevant prognostic variables.

Table 3. Comparison of pulse rate at different stages of dental treatment

Assessment stage	Group A: TSD (n=50)	Group B: TSD + AVD (n=50)
Before treatment	101.6 $\pm$ 10.4	102.3 $\pm$ 10.1
During treatment	108.4 $\pm$ 11.2	97.6 $\pm$ 9.3
After treatment	96.8 $\pm$ 9.1	91.2 $\pm$ 8.4
Change from baseline to during treatment	+6.8	−4.7
Change from baseline to after treatment	−4.8	−11.1

Pulse rate expressed as beats/minute. Values are means $\pm$ SD, with changes calculated from group means.

Mean pulse rate in Group A increased from 101.6 beats/min before treatment to 108.4 beats/min during treatment. In Group B, mean pulse rate decreased from 102.3 beats/min at baseline to 97.6 beats/min during treatment and 91.2 beats/min after treatment.

These descriptive differences require participant-level repeated-measures analysis. Pulse rate is influenced by factors

other than anxiety, including movement, pain, and crying.

Table 4. Distribution of Frankl behavior ratings during dental treatment

Frankl behavior rating	Group A: TSD (n=50)	Group B: TSD + AVD (n=50)
Definitely negative	6 (12.0%)	2 (4.0%)
Negative	13 (26.0%)	5 (10.0%)
Positive	21 (42.0%)	23 (46.0%)
Definitely positive	10 (20.0%)	20 (40.0%)
Total	50 (100%)	50 (100%)
Positive or definitely positive	31 (62.0%)	43 (86.0%)

Values are frequencies and percentages. Frankl ratings are ordinal categories.

In the distribution, positive or definitely positive behavior was observed in 31 children (62.0%) in Group A and 43 children (86.0%) in Group B. Definitely negative behavior accounted for 12.0% of Group A compared with 4.0% of Group B.

The observed distribution favored Group B descriptively; effect size, uncertainty, and potential assessment bias require further analysis.

DISCUSSION

Dental anxiety remains an important challenge in pediatric dentistry because it can interfere with treatment, compromise cooperation, and influence children's attitudes toward subsequent dental visits. Non-pharmacological behavior guidance techniques are particularly relevant for young children undergoing routine restorative procedures. The present study framework compares conventional Tell–Show–Do (TSD) with TSD supplemented by audiovisual distraction (AVD), using subjective anxiety, physiological arousal, and behavioral cooperation as outcome measures.

The collected summary data showed a larger reduction in mean FIS scores with TSD plus AVD than with TSD alone (3.54 to 1.86 versus 3.48 to 2.64). This association is consistent with a possible adjunctive benefit of distraction, but the magnitude and precision of the treatment effect cannot be established without individual-level analysis.

Audiovisual distraction is based on the principle that attentional engagement influences the perception of threatening or unpleasant stimuli. When children concentrate on entertaining visual and auditory content, their awareness of procedural sensations may decrease. Kaur et al. evaluated audiovisual distraction during pediatric dental procedures and reported favorable effects on anxiety-related outcomes.¹² Similarly, distraction-based interventions have been investigated as practical methods of improving children's experiences during dental treatment.¹³ These findings provide a rationale for incorporating audiovisual distraction into conventional behavior guidance protocols.

The combined use of TSD and audiovisual distraction

may offer advantages over either technique used independently. TSD establishes familiarity through explanation and demonstration, whereas audiovisual distraction provides continued attentional engagement during treatment. This complementary approach may be particularly useful for children who understand procedural explanations but remain apprehensive during operative procedures. Clinical studies comparing conventional and distraction-assisted approaches have reported improvements in behavioral responses, although differences in age groups, dental procedures, and assessment methods influence the consistency of results.¹⁴

Pulse rate increased during treatment in the TSD-alone group but decreased in the combined group in the available summaries. This may reflect differences in arousal; however, pain, movement, crying, and other clinical factors also influence pulse rate and must be considered.

Positive or definitely positive Frankl ratings were recorded for 62% of children receiving TSD alone and 86% receiving combined TSD and AVD. These descriptive findings suggest better observed cooperation in the combined group, although observer masking was limited and statistical uncertainty has not been quantified.

The clinical usefulness of audiovisual distraction also depends on its feasibility during routine procedures. Animated videos can be delivered through readily available devices, making the intervention potentially accessible in pediatric dental practice. Unlike pharmacological approaches, audiovisual distraction does not require drug administration or recovery monitoring. However, device placement, audio volume, patient preference, and the need for uninterrupted communication must be considered. The dentist should remain able to provide instructions and reassurance throughout treatment. Evidence from pediatric distraction research suggests that

engagement with the selected content is an important consideration when interpreting treatment responses.¹⁷

Age and previous dental experience may influence the effectiveness of both interventions. Younger children may respond differently to procedural explanations than older children, while previous unpleasant dental experiences may increase anticipatory anxiety. Baseline anxiety, treatment complexity, local anesthetic administration, and individual temperament may also affect outcomes. These factors should be documented and considered during statistical analysis. Systematic reviews of pediatric dental behavior guidance have identified substantial methodological heterogeneity, emphasizing the need for standardized interventions and validated outcome measures.¹⁸

This study used a concurrent comparison group and multiple assessment domains. Important limitations include the absence of patient-level data for independent verification and adjusted inference in the present manuscript, possible observer bias, and incomplete reporting of treatment standardization and trial implementation. Immediate post-treatment assessment does not establish long-term effects.

Future investigations should evaluate whether the benefits of audiovisual distraction persist across repeated dental appointments and different types of procedures. Studies involving larger samples, standardized audiovisual content, and longer follow-up periods may help determine which children benefit most from combined behavior guidance. Additional research comparing conventional screens, immersive audiovisual devices, and interactive distraction methods may also clarify the relative effectiveness and practicality of these interventions.²⁰

The observed group-level results favor TSD plus AVD descriptively. Conclusions about superiority or causal effects should remain qualified until the original study design, participant-level analyses, and risk of bias are fully documented.

CONCLUSION

Tell–Show–Do is a core nonpharmacological behavior guidance approach in pediatric dentistry. Audiovisual distraction may be a practical adjunct for children undergoing restorative treatment.

In this sample of 100 children, the combined TSD and AVD group had a larger descriptive decrease in FIS scores, lower mean pulse rate during treatment, and a higher proportion of positive Frankl ratings than the TSD-alone group.

These findings support further analysis of the original participant-level dataset to estimate adjusted between-group effects and their uncertainty. The conclusions

should not be interpreted as definitive evidence of superiority until these analyses and the trial reporting details are completed.

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