



Control of Anxiety in Pediatric Patients using “Tell Show Do” Method and Audiovisual Distraction

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ABSTRACT

Introduction: Visiting a dentist can easily evoke strong fear reactions and acute anxiety in children. It is one of the most basic reasons for avoidance and neglect of dental care. It may obstruct delivery of dental care, as the child may be unwilling to accept the treatment being provided by the dentist.

Aim: To evaluate and compare reduction in anxiety level in patients undergoing dental treatment at first dental visit.

Technique: The study was conducted on 400 patients coming to the Department of Pedodontics and Preventive Dentistry, Guru Teg Bahadur Hospital, University College of Medical Sciences, New Delhi, for their first dental visit. Anxiety was recorded using facial image scale (FIS), Venham's picture test (VPT), blood pressure, pulse rate (PR), and oxygen saturation (SpO₂) at different stages of the visit. Patients coming for the first dental visit were subjected to restorative treatment under Tell show do (TSD) method and audiovisual distraction (AVD). The data collected were tabulated and subjected to statistical analysis.

Conclusion: The AVD was found to be more capable in reducing anxiety than TSD. Combination of TSD and AVD had an additive effect in reduction of anxiety level and it proved to be more beneficiary.

Clinical significance: If a child's behavior in the dental office cannot be managed, then it is difficult to hold out any dental treatment that is needed. Bringing positivity in the child's behavior would not only increase efficiency of work but would also make the experience for child undergoing treatment more pleasant.

Keywords: Anxiety, Audiovisual distraction, First dental visit.

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INTRODUCTION

Anxiety or fear of unknown during dental treatment has been a concern for the dentist for a long time.¹ Approximately 6 to 15% of the population suffers from high dental fear and anxiety worldwide.² It has been reported as one of the most basic reasons for avoidance and neglect of dental care.³

Dental anxiety is defined as “distressed expectation of a visit to a dentist to the extent where a child might avoid treatment.”⁴ The pediatric patient with his/her first visit to dentist is mostly found anxious and apprehensive because of the dental equipment and the new experience.⁵ The first dental experience is important in molding child's attitude toward dentistry and dental outcome.⁶ It is essential to identify anxious children at the earliest age possible in order to institute a precocious behavioral treatment.

Anxiety can be measured using anxiety scales and physiological measures. Anxiety scales are valid and reliable for assessing children's response to dental stress.⁵ Measurement of autonomic nervous activity is quite useful in assessing the internal stress of children. Two most commonly measured reactions include blood pressure and heart rate.⁷

Dental treatment for children requires use of behavior management techniques for management of anxious children. It is important to communicate with the child patient briefly at the beginning of a dental appointment to establish rapport and trust. When nonpharmacological behavior management technique fails to provide an

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adequate desired result, other methods like sedation or general anesthesia are applied. The need for methods to avoid sedation sessions with general analgesic agents is widely acknowledged.⁸

Tell show do method is one of the most commonly taught behavior management techniques. It is based on the principle of learning theory. It dictates that before any procedure is done, the child is to be well informed and a demonstration should be given using a simulator exactly what will happen before the procedure is started.⁶

Distraction is defined as a nonaversive approach which is used to modify a child's discomfort by disrupting his/her attention away from the main task to accomplish successful treatment with high quality.⁴ It is a behavioral strategy which is useful in helping patients to cope with brief stress.⁵ Audiovisual distraction takes control in an enjoyable way over two types of sensations, hearing and visual, and at the same time it succeeds in partially isolating the patient from the sounds and sight of the unfriendly clinical environment.⁸

Some indirect evidence suggests that a when combination of two or more techniques is used simultaneously, such as distraction along with TSD, there are some positive, albeit unclear, and confounding effect.⁹

The purpose of the study was to evaluate and compare reduction in the anxiety level in patients undergoing dental restorative procedure using different behavior management techniques.

MATERIALS AND METHODS

A randomized controlled study was carried out in 400 patients including 221 males and 179 females in the age group of 5 to 8 years coming to the Department of Pedodontics and Preventive Dentistry, Guru Teg Bahadur Hospital, University College of Medical Sciences, Delhi, India accompanied by parent for their first dental visit. The study was conducted over a period of 1 year with 650 patients with initial caries cavity lesion (not involving pulp) in primary mandibular molar requiring restoration, out of which 250 were excluded. Patients having significant systemic disease (47), pain or who required local anesthesia administration for treatment (123), with previous history of hospitalization (32) or dental visit or with temper tantrums (48) were ruled out. Study procedure was explained to the parents and written informed consent was obtained. Samples were then divided into four groups.

Group I: No specific behavior management technique during treatment (Control)

Group II: TSD applied during treatment

Group III: AVD applied during treatment

Group IV: TSD and AVD applied during treatment

Anxiety was recorded in these patients using the following parameters: FIS¹⁰, VPT¹¹, systolic blood pressure⁷ (SBP), PR, and SpO₂⁷.

The FIS comprised a row of five faces from very happy (1) to very unhappy (5). The VPT comprised eight cards, with two figures on each card, one "anxious" figure and one "nonanxious" figure. Score of 1 was given for anxious figure and a score of 0 at nonanxious figure. Score was totaled to give a final score (minimum score 0; maximum score 8). Patients were asked to point at the figure they felt most like at that moment (Fig. 1).

Blood pressure measurement was standardized by keeping the sphygmomanometer with a pediatric cuff (Omron automatic blood pressure monitor model HEM-711) on patient's left arm and pulse oximeter (Hygeia, POX 600) probe being placed on right-hand index finger (reading which appeared on screen after 20 seconds was recorded). All the readings were recorded at three stages and entered in the case record form. Restoration was done with glass ionomer cement by the same operator for each case.

All these parameters were recorded at three stages:

Stage 1: Just after sitting on dental operatory chair

Stage 2: Just prior to the restorative treatment

Stage 3: After the restorative treatment was complete

All the dental instruments and equipment required for restoration were set up. After the patient was being exposed to sight of all these armamentarium in accordance

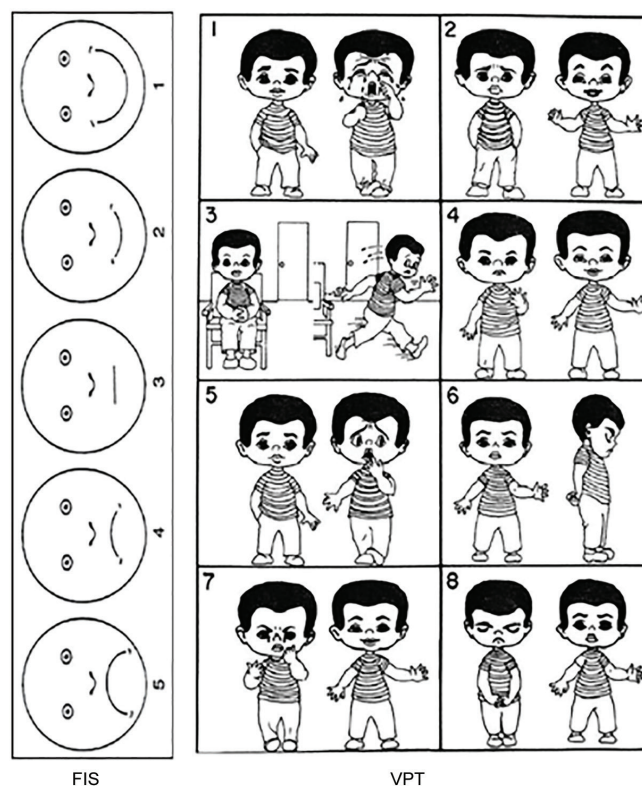


Fig. 1: Anxiety scales



Fig. 2: Tell show do as behavior management

with the group to which patient was categorized, behavior management technique was applied before and during the treatment.

Tell Show Do Method: Patient was demonstrated the procedure before each step on a cast model for a period of 1 to 2 minutes and demonstration was repeated as required. Language was altered to make it child-friendly using euphemisms and phrases appropriate to the developmental level of the child and allowed to hold dental imitating instruments to make them look familiar (Fig. 2).

Audiovisual distraction: Patient was shown cartoons and animated clips on laptop with earphones throughout the treatment and efforts were made to provide child with audiovisual presentation of his/her own choice. Collection of videos included famous cartoons popular among the age group of the study population (Fig. 3).

The effectiveness of behavior management method was evaluated by change in score or parameter value from one stage to another. All the data were entered into Microsoft office Excel Sheet 2007 and analyzed using Statistical Package for the Social Sciences version 20 software. Study flowchart gives the summary of methodology used for the study (Flow Chart 1).

RESULTS

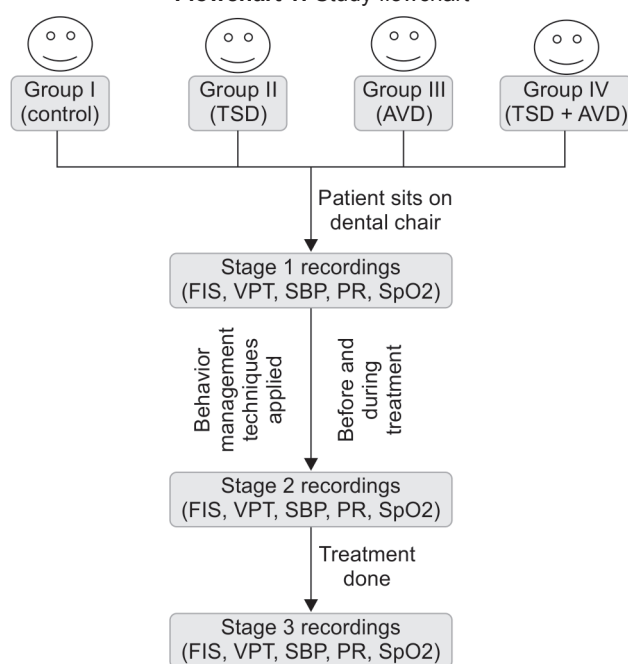
A total of 400 children were examined, out of which 221 (55.3%) were males and 179 (44.7%) were females. Statistical significance was considered for p-value less than 0.05 in all cases. *Post hoc* tests: Tukey honestly significant difference (HSD) multiple comparisons and analysis of variance (ANOVA) test were used to compare the variables at different time intervals.

Mean values of all parameters during different stages were determined and comparison was done with respect to three stages using the repeated-measures ANOVA test (Table 1). The difference between the various stages was



Fig. 3: Audiovisual distraction as behavior management

Flowchart 1: Study flowchart



found to be significant ($p < 0.05$) for all the four groups for all parameters.

The difference in mean value of all parameters between different stages was compared using the Tukey HSD multiple comparisons test. The change in mean FIS and VPT score from stage 1 to stage 3 showed an increasing trend from group I to group IV (TSD + AVD). This decrease in anxiety in groups II, III, and IV is statistically significant ($p < 0.05$) as compared with group I (Table 2).

The change in mean FIS and VPT score from stage 1 to stage 3 showed an increasing trend from group I to group IV (TSD + AVD). This decrease in anxiety showed a statistical significance ($p < 0.05$) when compared with group I. Group IV (TSD + AVD) seemed to show maximum anxiety decline among all groups (Table 2). Graph 1 shows that maximum change was observed in

Table 1: Mean values of all parameters at different stages

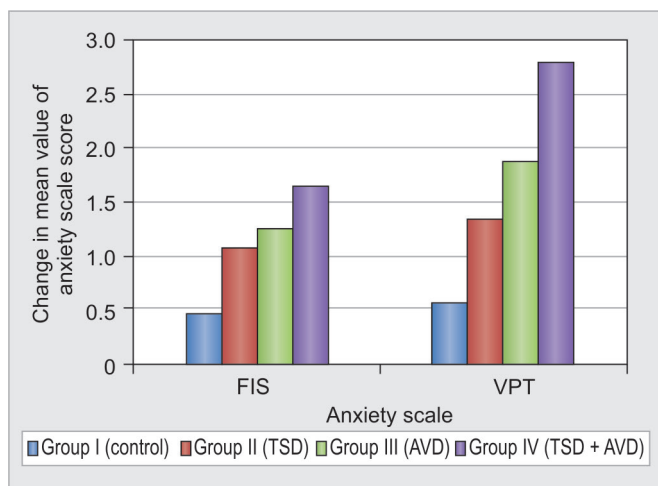
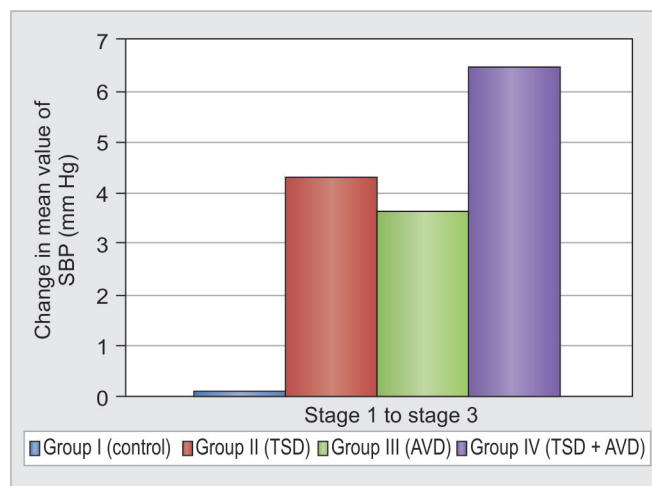
Parameter		Group I (control) (mean \pm SD)	Group II (TSD) (mean \pm SD)	Group III (AVD) (mean \pm SD)	Group IV (TSD+ AVD) (mean \pm SD)
FIS	Stage 1	2.93 \pm 0.844	3.43 \pm 0.795	3.17 \pm 0.829	3.37 \pm 0.872
	Stage 2	3.04 \pm 11.741	2.83 \pm 0.943	2.31 \pm 0.813	2.02 \pm 0.666
	Stage 3	2.46 \pm 10.448	2.36 \pm 0.905	1.92 \pm 0.662	1.72 \pm 0.668
VPT	Stage 1	3.71 \pm 1.365	4.23 \pm 1.325	4.12 \pm 1.028	4.32 \pm 1.428
	Stage 2	3.90 \pm 1.514	3.28 \pm 1.415	2.67 \pm 1.164	2.24 \pm 1.102
	Stage 3	3.14 \pm 1.484	2.89 \pm 1.470	2.23 \pm 1.238	1.50 \pm 1.202
SBP	Stage 1	96.69 \pm 10.647	100.51 \pm 8.162	96.33 \pm 9.173	94.22 \pm 7.581
	Stage 2	98.80 \pm 11.741	97.69 \pm 7.192	91.25 \pm 7.942	89.04 \pm 6.262
	Stage 3	96.58 \pm 10.448	96.21 \pm 5.890	92.66 \pm 7.225	87.74 \pm 6.231
PR	Stage 1	96.82 \pm 9.316	95.65 \pm 7.889	99.58 \pm 7.881	96.70 \pm 5.056
	Stage 2	100.28 \pm 11.856	92.45 \pm 9.095	91.54 \pm 8.143	88.64 \pm 7.433
	Stage 3	95.45 \pm 10.667	92.37 \pm 6.788	90.60 \pm 7.815	84.78 \pm 7.289
SpO ₂	Stage 1	98.11 \pm 0.510	97.89 \pm 0.490	98.13 \pm 0.544	98.03 \pm 0.332
	Stage 2	97.80 \pm 0.739	98.20 \pm 0.778	98.44 \pm 0.978	98.93 \pm 0.700
	Stage 3	97.72 \pm 0.683	97.90 \pm 0.674	98.44 \pm 1.048	98.72 \pm 0.900

VPT and FIS in score, SBP in mm Hg, PR in per min, and SpO₂ in %; SD: Standard deviation

Table 2: Intergroup comparison of mean change in parameters from stage 1 to stage 3

Groups	Mean \pm SD (FIS) (score)	Mean \pm SD (VPT) (score)	Mean \pm SD (SBP) (mm Hg)	Mean \pm SD (PR) (per min)	Mean \pm SD (SpO ₂) (%)
I	0.47 \pm 0.81 ↓	0.57 \pm 1.08 ↓	0.11 \pm 6.10 ↓	1.37 \pm 5.83 ↓	0.39 \pm 0.85 ↓
II	1.07 \pm 1.00 ↓	1.34 \pm 1.30 ↓	4.30 \pm 5.67 ↓	3.28 \pm 6.18 ↓	0.01 \pm 0.83 ↑
III	1.25 \pm 0.90 ↓	1.89 \pm 1.11 ↓	3.67 \pm 5.83 ↓	8.98 \pm 7.62 ↓	0.31 \pm 1.20 ↑
IV	1.65 \pm 0.87 ↓	2.82 \pm 1.29 ↓	6.48 \pm 6.38 ↓	11.92 \pm 6.88 ↓	0.69 \pm 0.91 ↑
Significant groups at 0.05% level	I vs II, III, IV	I vs II, III, IV	I vs II, III, IV	I vs III, IV	I vs II, III, IV
	II vs IV	II vs III, IV	III vs IV	II vs III, IV	II vs IV
	III vs IV	III vs IV		III vs IV	

↑ indicates rise in value; ↓ indicates drop in value; SD: Standard deviation

**Graph 1:** Change in mean value of anxiety score from stage 1 to stage 3**Graph 2:** Change in mean SBP from stage 1 to stage 3

group IV (TSD + AVD) for FIS and VPT. Similar trends were observed for SBP and PR, and decline in mean values was significantly found to be more in groups III (AVD) and IV (TSD + AVD), with group IV showing maximum change for all the groups ($p < 0.05$). Graph 2 shows the maximum change in SBP observed for group IV (TSD + AVD) from stage 1 to stage 3.

Maximum change out of all parameters was found in group IV which signifies maximum decline anxiety change when both TSD and AVD were applied. There was a drop in SpO₂ in group I, while all other groups' rise was noted in the SpO₂ level. All experimental groups seemed to have statistically significant rise in the saturation level with a maximum rise in group IV (TSD + AVD) ($p < 0.05$).

Table 3: Intergroup comparison of mean change in parameters from stage 1 to stage 2

Groups	Mean \pm SD (FIS) (score)	Mean \pm SD (VPT) (score)	Mean \pm SD (SBP) (mm Hg)	Mean \pm SD (PR) (per min)	Mean \pm SD (SpO ₂) (%)
I	0.11 \pm 0.96 \uparrow	0.19 \pm 1.48 \uparrow	2.11 \pm 5.99 \uparrow	3.46 \pm 7.05 \uparrow	0.31 \pm 0.76 \downarrow
II	0.60 \pm 0.90 \downarrow	0.95 \pm 1.29 \downarrow	2.82 \pm 4.62 \downarrow	3.20 \pm 7.00 \downarrow	0.31 \pm 0.80 \uparrow
III	0.86 \pm 0.73 \downarrow	1.45 \pm 0.95 \downarrow	5.08 \pm 4.62 \downarrow	8.04 \pm 5.48 \downarrow	0.31 \pm 1.14 \uparrow
IV	1.35 \pm 0.67 \downarrow	2.08 \pm 1.16 \downarrow	5.18 \pm 4.81 \downarrow	8.06 \pm 7.43 \downarrow	0.90 \pm 0.73 \uparrow
Significant groups at 0.05% level	I vs II, III, IV II vs IV III vs IV	I vs II, III, IV II vs III, IV III vs IV	I vs II, III, IV II vs III, IV	I vs III, IV II vs III, IV	I vs II, III, IV II vs IV III vs IV

\uparrow indicates rise in value; \downarrow indicates drop in value; SD: Standard deviation

When observation was made for change in mean values from stage 1 to stage 2, maximum change in mean values out of all parameters was observed in group IV (TSD + AVD) and least change was observed in the control group. There was no statistical difference ($p > 0.05$) in change in mean value of SBP and PR for group III (AVD) and group IV (TSD + AVD). A statistically significant difference ($p < 0.05$) was observed between group I and other experimental groups (Table 3).

Intergroup comparison of difference in mean value of both parameters from stage 2 to stage 3 was not found to be statistically significant ($p > 0.05$).

DISCUSSION

Stimuli found in every dental operatory, such as bright lights, loud noise, and strange environment can easily arouse and produce anxiety.¹² It is necessary to modify or influence the children's behavior pattern to achieve the confidence of the potentially cooperative children during dental treatment.¹³

The TSD is the most commonly used technique in pediatric dentistry, as it is comfortable for both the dentist and the patient. Hence, this justifies being the method of choice for patient education and behavior guidance during the first dental visit.⁶

Previous studies have also shown distraction to be a helpful intervention for individuals undergoing stressful procedures. For example, patients undergoing dental procedures with distraction report less anxiety, discomfort, and distress.¹⁴ Different means of distraction include video games, sound, watching video and television, pictures, cartoons and audiotaped stories, etc.¹⁵⁻¹⁸ This study was designed to evaluate and compare the efficiency of TSD and AVD in reducing child anxiety during dental treatment.

The age group of 5 to 8 years was selected for the study because dental problems are difficult to treat in this age group, as they exhibit more disruptive behavior, have dental anxiety, and are most difficult to manage.⁸ The results of the study showed that AVD was more effective than TSD on reducing child anxiety levels and

increased likelihood of cooperative behavior during dental treatment.

Analysis of FIS and VPT revealed that decline in anxiety was significantly found to be more when behavior management technique was applied. Decline in anxiety was found to be most in group IV (TSD + AVD) as evaluated through anxiety scale score changes from both stage 1 to stage 2 and from stage 1 to stage 3. Group III (AVD) showed greater anxiety reduction than group II (TSD). Similar results were shown by studies done by Fox and Newton,¹⁹ Prabhakar et al,¹ Magora et al,²⁰ and Kaur et al.⁵ Where using anxiety scales, AVD was found to be more effective in controlling anxiety.

Child seeing the audiovisual presentation has multisensory distraction as he/she tends to concentrate on the TV screen, thereby screening out the sight of dental treatment and the sound of the program helps the child to eliminate the unpleasant dental sounds, such as the sound of handpiece.^{15,21}

According to the results shown by anxiety scales and physiologic findings, it clearly emerges out that AVD is better in anxiety reduction than TSD. In present study, AVD was found to be very much effective in reducing the patient's anxiety similar to the findings observed by Kaur et al,⁵ Prabhakar et al,¹ Wismeijer et al,²² and Melamed et al.²³

The use of AVD inspires pleasant memories and positive attitudes toward the dental experience. The impressions of distress left by the first dental visit build memories that effect conduct on upcoming appointments.⁸ The AVD is not recommended in children who demonstrate disruptive behavior, refuse treatment immediately, and insist on controlling the situation.

The measurement of physiological function is very useful for measuring anxiety in a patient before dental treatment. Heart rate and blood pressure can be used as reliable indicators of measuring anxiety.²⁴ Anxiety was measured using following physiological parameters, viz. SBP, PR, and SpO₂ in the present study.

Rayen et al⁷ confirmed that there is a direct correlation of SBP with anxiety produced in dental situations. There

was a significant reduction in anxiety from stage 1 to stage 3 and from stage 1 to stage 2 as measured by decline in SBP in all the three experimental groups. Maximum decline in SBP was observed in group IV (TSD + AVD). Similarly, in studies done by Kudo et al²⁵ and Sanadhya et al,²⁶ reduction in anxiety was in direct correlation with SBP stating effect of anxiety on hemodynamic and cardiovascular parameters.

Pulse rate when taken as a measure of anxiety depicted a significant decline in anxiety from stage 1 to stage 3 and from stage 1 to stage 2 in all experimental groups. Maximum decline in PR was observed in group IV (TSD + AVD) and least in group I. Similar findings were also founded by Rayen et al,⁷ Prabhakar et al,¹ Kudo et al,²⁵ and Farhat-McHayleh et al²⁷, indicating PR decline as measure of anxiety.

The SpO₂ as an indicator of anxiety has shown variable results. Rise in SpO₂ depicts decline in anxiety. Rayen et al⁷ found no direct correlation between SpO₂ and anxiety-producing dental situations. Prabhakar et al¹ and Yelderman and New²⁸ concluded that although there was a decrease in SpO₂, it was not statistically significant.

In the present study, there was a decline or no change in SpO₂ as appointment proceeded in groups I and II (TSD), whereas rise in SpO₂ was observed in group III (AVD) and group IV (TSD + AVD). But the decline in anxiety level was more group IV (TSD + AVD) from stage 1 to stage 3.

So, by considering results shown by both anxiety scales and physiologic findings, clearly, AVD emerged better in anxiety reduction than TSD.

The probable limitation of this study was that cognitive development of 5-year-old patient will not be the same as that of an 8-year-old patient. Thus, patients of different ages would react differently to a similar anxiety-inducing situation. Anxiety was not measured in a biochemical manner, namely by measuring salivary cortisol, catecholamine, or skin conductance temperature.

CONCLUSION

- The AVD is more capable of reducing anxiety than TSD for patients undergoing dental treatment in their first visit.
- Combination of TSD and AVD had an additive effect in reduction of anxiety level and it proved to be more effective.
- Anxiety scales showed similar trends between each other. They also showed similar trends with physiological parameters like blood pressure, PR, and SpO₂.

CLINICAL SIGNIFICANCE

If a child's behavior in the dental office cannot be managed, then it is better not to hold any treatment that

day. Managing the child's behavior in a positive way would not only increase efficiency of work but also make the experience for the child undergoing treatment more pleasant. Hence, gaining the confidence and cooperation of child for treatment, and managing the behavior of child become critical. The TSD reduces anxiety by increasing basic knowledge about the procedures the child may be going through while AVD diverts attention from stressful dental environment.

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