Contemporary Behavior Guidance Techniques to Outsmart Child’s Anxious Mind

Disha Kapil1, Bhavna G Saraf2, Neha Sheoran3, Gauri Kalra4, Siji Elizabeth5

ABSTRACT

Behavior guidance techniques have been the foundation stone behind success in pediatric dental practice involving both nonpharmacological and pharmacological methods. Modern approaches, attitudes, and expectations of parents and society have devised the modifications in old behavior guidance techniques. However, the applicability of these modalities has not been explored currently. These techniques principally emphasize alleviation of dental anxiety or dentophobia among infants, children, adolescents, and children with special health care needs (SHCN) to provide quality oral health care and to instill a positive dental attitude. This review is intended to provide updates in contemporary behavior guidance techniques such as tell-play-do, animal-assisted therapy, virtual reality, etc., which may provide state-of-art dental management in young children benefitting dental health care providers, parents, and other concerned parties.

Keywords: Child behavior, Dental anxiety, Dental fear and anxiety, Pediatric dentistry.

INTRODUCTION

A child’s dental anxiety and dental phobia stereotypically develop from multiple reasons like a dental drill, air rotor sounds, fear of needles, history of bad dental experience, the smell of dental clinic, and pain (Fig. 1).1 All these situations lead to ignorance and avoidance of dental maintenance, which results in reduced demand for pediatric dental care. "McElroy" in 1895 has beautifully stated that “although operative dentistry may be perfect, the appointment is a failure if a child departs in tears," stressing the importance of behavior shaping over technical excellence in pediatric dentistry. Avoidance and negligence lead to further complications and give birth to “vicious cycle of Dental Fear” (Fig. 2).2 So, to enhance the dental care, proper planning with the selection of particular techniques and tailoring it according to the needs of an individual parent and skills of the dentist is important. Behavior guidance is a clinical art form of providing safe and effective treatment.
and skills built on a foundation of science to modify the child’s behavior. A basic understanding of the social, emotional, and cognitive development of the child is very important to perform the specific behavior guidance techniques.\(^3\) To maintain compatibility with modern parenting style and child’s attitude with upcoming advanced technologies, the conventional behavior guidance techniques are modified. The focus of these modifications helps to alleviate a child’s dental anxiety and fear, to cultivate a positive dental attitude with the importance of oral health needs, and allowance to perform quality oral health care safely.\(^4\)

The first dental visit experience plays a vital role in altering the positive dental attitude in children for rendering quality dental treatment in further dental appointments.\(^5\) However effective communication development with the child is important owing to this, role plays and pretend play models have been proved to be very effective in engaging a child’s attention. With this idea, a behavior-shaping technique such as tell-show-do has been modified into tell-play-do using concepts of active learning by doing through a playful technique to reduce fear and anxiety in a child.\(^6\) Moreover, the fields of robotics and artificial intelligence have been dominating health care, therefore instead a pediatric dentist using conventional methods of behavior guidance may apply this technology in shaping the child’s behavior. All these techniques can be performed in a combination of two or more or individually based upon a benefit vs risk evaluation. As part of the process, parents also play an important role in decision making regarding the treatment and type of technique. With an informed consent (other than communicative guidance), the procedure must be explained to parents with suitable understanding and acceptance.\(^7\) Adequate evidence in the scientific literature regarding the knowledge and applicability of recent modifications of behavior guidance techniques in pediatric dentistry is lacking.

Thus, a narrative review is proposed to introduce recent updates in nonpharmacological contemporary behavior guidance techniques that can be efficiently used in the dental office to improve the quality of dental treatment for children.

**Data Source**

The main objective of this review article is to collaborate all the advancements and updates in nonpharmacological behavior guidance techniques and provide evidence-based information to support these methods. Data have been collected from five electronic databases: PubMed index, EBSCO, Scopus, the web of science, and Google Scholar from 2010 to 2020 December, using the terms: dental anxiety, contemporary behavior guidance, updates in behavior guidance techniques, nonpharmacological behavior management in pediatric dentistry, animal-assisted dentistry covering the nonpharmacological behavior guidance techniques, original research, and systematic review articles were included for data extraction (Flowchart 1 and Table 1).

### Inclusion Criteria

- Abstract available in English.
- Recent and updated behavior guidance techniques published from January 2010 onward.
- Children from 3 to 12 years were included, as the majority of problem occurs during this age group while performing a treatment.

### Exclusion Criteria

- Abstract Other than English
- Data regarding pharmacological behavior guidance techniques, meta-analysis, and conventional behavior guidance techniques of the past 10 years.
- Anxiety in children with special healthcare needs and behavior guidance techniques applicable in them.

### Modified Behavior Guidance Techniques

**Tell-Show-Do**

This technique of behavior shaping is used by many pediatric dentists; it involves a verbal explanation of what is about to happen in procedure with instruments that will be used (tell), followed by the demonstrations of the procedure by application of visual, tactile, olfactory, and auditory aspects carefully and pleasantly (show), and then (do), initiated by completion of a procedure without deviating from explanation and demonstration.\(^4,5\) Various modifications of the concept of tell-show-do have been introduced recently.

**Tell-Play-Do (TPD)**

Vishwakarma et al., in 2017, introduced the application of customized dental imitating playing dental objects like a syringe, air rotary, and a cartoon character with mouth wide open in the dental...
### Table 1: Evidence-based studies

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operatory. The setup was arranged in the playroom for children to perform dental procedures on it. This made the child to understand the basic dental framework and to become more comfortable with actual dental procedures with a decrease in anxiety levels. He found that TPD was more effective than live modeling on the child's dental anxiety among the 5–7 years' age group.

Tell–Show–Play–Doh
The most commonly used method in pediatric dentistry tell-show-do was modified into the tell-show-play-doh technique by Radhakrishna et al. in 2019. The battery-operated "Play-Doh Doctor Drill 'n Fill toy" set was introduced to play and familiarize them with dental setup consisting of suction, air rotor, and air-water syringe. This idea of modification, learning by doing on dental imitation toy with euphemisms, helped the children to alleviate anxiety, construct a bond for future communication, and aided in improved dental treatment with quality (Fig. 3).

Distraction
Distraction techniques involve the strategies that overload the patient's limited attention capacity, thus diverting their attention from unpleasant dental treatment in which several types of distraction techniques (3D eyeglasses, biofeedback, children's stories, and toys, dental operating microscope, nursery rhymes, live modeling, virtual reality eyeglasses, use of camouflaged syringes, and telescopic needles) were included. They concluded it as a good strategy for the management of anxious and fearful children without any contraindication.

Smart Phone Dentist App
The forthcoming advancements in technology have also entered the dentistry sphere. Patel et al. in 2017 and Meshki et al. in 2018 introduced the Android application dentist games to reduce dental fear and to make comfortable and aware of the dental procedures and idea of the performance of treatment. The dentist application was downloaded days before the treatment on the parent's Android phone and virtually allowed the children to play the game. These games are approved by a panel of experienced pedodontists for demonstrating the clinical procedure like brushing, oral prophylaxis, restorations, and extractions, etc., giving the clinical effects with sounds categorize in different levels to reach the complete healthy mouth at the end (Fig. 4).

Animal-assisted Activity
Animal-assisted activities (AAA) can be a great adjunct to practice in the dental office with appropriately trained and qualified dogs according to the infection control guidelines and potential health risks. Shiloh et al. in 2003 revealed that petting a live animal over a toy animal reduced self-reported anxiety. Moreover, Barker et al. in 2003 verified that interaction with a live animal for just 15 minutes significantly reduced anxiety and fear when compared to the control group of children who read magazines. Comparison of the anxiety level of children between 4 years and 11 years by introducing the therapy dog in the waiting area and operatory area showed a significant reduction in levels of stress hormones, such as cortisol, adrenaline, and norepinephrine. Also, AAAs have been found as a complementary intervention in reducing pain and its related symptoms, anxiety, depression, and loneliness in the medical field. However, more studies are needed to be done in dental offices in India for stronger evidence (Fig. 5).

Music Therapy
Audiotaped music connected to headphones works as the distraction technique, which showed a reduction in both biological and psychological anxiety levels. In 2012, Spintge et al. suggested a positive result in the moderation of pain, stress, and anxiety by music therapy. Also, in 2014 Singh et al. exhibited a decrease in intraoperative anxiety levels by listening to self-selected music.
between 6-year and 12-year-old children undergoing extraction.\textsuperscript{10} Whereas on the contrary, Gupta et al. in 2017 concluded that music did not significantly reduce pain, anxiety, or disruptive behavior between 3-year and 7-year old children who required treatment under local analgesia.\textsuperscript{26} This concluded the indecisive and partial quality of evidence in support of reducing dental anxiety in children with music therapy and the need for more evidence-based study for a more significant result.\textsuperscript{52,53}

**Audiovisual Distraction**

It has been thought that distraction should be able to involve visual, auditory, and kinesthetic sensory modalities and active participation of the child. The focus of the child is diverted from unpleasantness and to engage them with specific visual and audio effects with imagination. Audiovisual distraction (AVD) was modified from the audio distraction technique and demonstrated a more significant result. Various ways of AVD techniques such as iPads and tablets have been presented with a moderate type of anxiety, which has been shown to alleviate anxiety and comfort children during anesthesia induction, immunization shots, and wart cryotherapy.\textsuperscript{6,54–56} In 2016, Chaturvedi et al. conducted a study on comparative evaluation with and without AVD eyeglasses and found an iPad-based video delivery system to decrease anxiety before cast room procedures in 6–10-year-old children.\textsuperscript{18}

**Television (Chair or Ceiling Mounted)**

Khandelwal et al. (2018) concluded that the AVD technique by using cartoons and animated video clips on the laptop was more effective than tell-show-do and more beneficial if both the techniques are combined.\textsuperscript{52} Ceiling-mounted AVD was found to be the most effective in reducing anxiety followed by chair-mounted AVD as compared to audio distraction\textsuperscript{40} (Fig. 6).

**Active Video Games**

According to Allani et al. in 2016, an active video game or cartoon video on a mobile phone involves the visual, mental, and motor participation of the child that would help to reduce anxiety preoperatively.\textsuperscript{19} However, evidence applying this method in pediatric dentistry has been lacking.

**Virtual Reality**

Virtual reality (VR) technology constructs the computer-simulated environment with the use of a head-mounted display (HMD) that covers the eyes with an optical lens and two separate displays. This allows the patient to virtually experience an immersive, simulated visual, and auditory scenario to be in that world by withholding sensory information from the real world.\textsuperscript{29} Thus, VR has a substantial good effect during dental procedures because it breaks the negative cycles of past bad dental experiences and enhances the positive experiences resulting in overall successful dental treatment.\textsuperscript{37}

**Humanoid Robots**

Yasemin et al. in 2016 introduced a techno-psychological distraction technique by using a humanoid robot—“IRobi.”\textsuperscript{20,42} Such modification of the conventional distraction technique to distraction by humanoid robots with the multisensory system supporting videos, audio-based dialogues, expression, and gestures with bodily movement showed greater impact in distracting child and enabling them to feel less pain while treatment. This combination of audio, visual, and tactile stimuli with advanced technology where robots are superior to people in contact with children made a comfortable environment for both dentists and children. This novel technique too requires to be conducted and texted in the Asian subcontinent.

**Virtual Reality Box**

Al-Halabi et al. in 2018 demonstrated that video shown on tablet devices connected to headphones worked best over VR box in alleviating anxiety and pain during administration of inferior alveolar nerve block between 6-year and 10-year-olds.\textsuperscript{27} They also concluded that VR box to be more acceptable in older patients between 8- and 10-year-old children with an additive positive attitude for the next dental visits.

**Virtual Reality Eyeglasses**

The VR device (Google VR Box and Anti-Tank Virtual Reality 3D Glasses) connected to the cartoon series “Doraemon” was endorsed to children undergoing pulp therapy by Niharika et al. in 2018.\textsuperscript{31} These VR eyeglasses connected to headphones to provide the sound blocked the visual field of the child completely and made them in that virtual world. This technique is very effective in modulating pain and anxiety by letting the patient get to detach from viewing the dental procedures, instruments, and hearing of sounds of air rotor, making them unaware of what is happening in the environment. A similar study by Custódio et al. in 2020 substantiated it as an effective tool for improving behavior and reducing pain perception during the dental treatment of children.\textsuperscript{58}

**Cognitive Behavior Therapy**

Cognitive-behavioral therapy (CBT) is based on the concept that molds negative thoughts and feelings into parts to think in a positive way to manage current problems and behave accordingly. This medicine is used for psychiatric conditions that provide psychoeducation, techniques to cope up, and cognitive restructuring. Berge et al. (2017) evaluated the effect of five sessions of CBT for 10–16 years old children undergoing injection phobia. This showed significant positive results in alleviation of dental phobia when compared to the control group.\textsuperscript{34} Cognitive behavior therapy produces better anxiety reduction than diverse behavioral guidance techniques but requires stronger evidence-based studies in pediatric dentistry for its effective application.\textsuperscript{38} Bux et al. (2019) conducted the guided self-help CBT resources “Your teeth, you are in control” service with children aged between 8 and 16 years who had self-reported dental anxiety on their initial examination appointment. This evaluation indicated an effective and child-centered approach in reducing child dental anxiety.\textsuperscript{59} Convenience to perform CBT face to face had become difficult because of limited
time availability and long distances to the pediatric dental clinic with a lack of psychologists at the clinic. However, to overcome this loophole the cognitive behavioral therapy is reconstructed to internet-based CBT for making easy accessibility with advanced technology.31,60

Conclusion
As we are heading toward the modern world with the adoption and proliferation of digital communication technology widely in every field, a shifting paradigm has evoked the need to reconstruct the old conventional behavior guidance techniques with miraculous advancements for patient care in the smart digital era.

References
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