Archives of Dental Research 2023;13(2):92–99

Content available at: https://www.ipinnovative.com/open-access-journals

Archives of Dental Research

Journal homepage: https://www.adr.org.in/

Original Research Article

# The application of behaviour modification techniques among paediatric patients in a dental set-up- A pilot study

**Sharbari Dutta**[1]*, **Abinash Mohapatra**[2], **Brahmananda Dutta**[2]

[1]*Dept. of Health Research, International Institute of Health Management Research, Dwarka, New Delhi, India*
[2]*Dept. of Pedodontics, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha, India*

ARTICLE INFO

*Article history:*
Received 22-07-2023
Accepted 07-10-2023
Available online 18-12-2023

*Keywords:*
Nonpharmacological behaviour modification techniques
Paediatric dentistry
Positive Reinforcement
TellShowDo
TellShowPlaydoh
Modelling
Distraction
Parental presence
Desensitization

ABSTRACT

**Aims and Objectives:** This study was performed to evaluate the different non-pharmacological behaviour modification techniques preferred by the parents, to know whether single or multiple behaviour modification techniques are required to regulate the behaviour of the child and to assess the effectiveness of non-pharmacological behaviour modification techniques in the operating procedure.
**Procedure:** 30 children aged between 4-7 years who required pulp therapy treatment to be done under local anaesthesia were enrolled for the study with parental consent. A video containing different behaviour management techniques was shown to the parents who had accompanied the child to the operatory. A questionnaire was given to the parents for their feedback, the response to each question was coded and the values of each code were analyzed statistically. The parents' preferred technique was applied to their children before the planned treatment.
**Results:** Nonpharmacological behaviour modification techniques were effective in 90% of the children and it was found to be highly significant ($p \leq 0.05$). It was seen that 66.67% of the children required more than one nonpharmacological behaviour modification technique to make them behave positively. The most preferred technique by the parents in this study was Positive Reinforcement (30%).
**Conclusion:** This study brings forth that nonpharmacological behaviour management techniques can be successfully used to regulate most of the children in a paediatric clinic setup.



## 1. Introduction

In paediatric dentistry, one of the cornerstones of practice is to guide children behaviourally and psychologically toward an enriching dental experience. It is essential to evaluate a child's potential for cooperative behaviour before attempting any dental procedure.[1] Disruptive behavior can significantly interfere with the quality of dental care provided, increasing the time of the treatment procedure and the risk of injury to the child. Recent findings show that nearly one in four children (22%) attended by pediatric dentists may present marked behaviour management problems.[2]

In 1972, a survey on the behavior management methods of the American Association of Pedodontic Diplomates was published. The respondents of the survey strongly supported the psychological principles in the successful management of disruptive children; however, their management techniques were primarily focused on pharmacotherapy or physical restraint methods. By 1979, it was reported by pediatric dentists that uncooperative and disruptive children were a common challenge being faced in dental clinics (Ingersoll et al. 1978).[3] It is important to manage a dental child patient's behaviour and any approach employed in doing so should be rooted in concern and

* *Corresponding author*.
*E-mail address*: d.sharbari@gmail.com (S. Dutta).

https://doi.org/10.18231/j.adr.2023.019

empathy for the overall well-being of each child.[1] Keeping this in mind, research published in both psychological and dental literature has demonstrated the efficacy of a plethora of noninvasive techniques. The effectiveness of some of these procedures, such as filmed modeling technique, appears to be dependent on a variety of variables such as age and previous experience with the dentist (Melamed et al. 1975; 1978; 1984). There are other procedures that are found to be effective with children having high levels of fear or anxiety including modeling technique (Williams et al. 1983), contingency management procedures such as contingent distraction (Ingersoll et al. 1984), and contingent reward and escape(Allen and Stokes 1987; Allen et al. 1988) and desensitization (Klesges et al. 1984).[3] Changing attitudes on the part of parents and dentists alike have resulted in increasing interest of dentists to incorporate the non-invasive, non-pharmacological behavior management techniques in their clinical practice.[4]

Children behave differently based on the stage of their psychosocial and cognitive development which is influenced by their social, physical, and emotional development. It is imperative to deal with children differently based on their developmental stage, to understand their intellectual level, and treat them accordingly as the child's way of viewing the world around them greatly varies depending on the stage of their development.[5]

The present study aims to evaluate the different non-pharmacological behaviour modification techniques preferred by the parents, to understand whether single or multiple behaviour modification techniques are necessary to regulate the behaviour of a child, and to assess the effectiveness of these non-pharmacological behaviour modification techniques during the operating procedure(Figure 1).

## 2. Materials and Methods

This study was conducted in the outpatient department of Pedodontics and Preventive Dentistry at Kalinga Institute of Dental Sciences after obtaining ethical clearance from the institutional review board (IRB). A pilot study was planned in which 30 children aged 4-7 years, were selected randomly from the outpatient department for the study who required pulp therapy treatment to be done under local anaesthesia. Informed consent was obtained from their parents for the same. The parents were asked to watch a video clip to understand all the variations of non-pharmacological behaviour management techniques (BMT) and basic behaviour guidance techniques (BGT). They were then provided a questionnaire to fill out (Figure 2) regarding the previous behaviour of their child in a dental clinic. The parents were asked about their own awareness of the techniques and to select a behaviour modification technique preferred by them. All the responses were coded. The inclusion criteria for the selection of the children for this study were children who were accompanied by their parents, and it was their first dental visit while those children who have previously been to a dentist, those children whose parents did not accompany them, and specially abled children were excluded from this study.

## 3. Results

In this study, Frankl's behaviour rating was done before the study and before treatment, children with positive behaviour were found to be 33.3% (Table 1). It was seen that 33.3% of the children could be managed by the behaviour modification technique chosen by their parents. 53.3% of the children had to be managed by some other non-pharmacological behaviour modification techniques apart from the one chosen by the parents while the 13.3% of the children had to be left on medication or required a pharmacological approach. (Table 2). This showed that for 66.67% of the children (53.3% of the children who had to be managed by more than just a single technique and 13.3% of the children who could not be managed by any of the non-pharmacological techniques), multiple non pharmacological behaviour modification techniques had to be applied to successfully carry out the treatment procedure. (Table 3) After completion of the procedure, Frankl's behaviour rating was done and 90% of the children had turned to positively behaved after treatment (33.3% positive and 56.7% definitely positive) with the application of multiple nonpharmacological behaviour management techniques and it was found to be highly significant. Thus, non-pharmacological behaviour modification techniques were effective in 90% of the children (Table 4). The most preferred technique by the parents in this study was Positive Reinforcement (30%), followed by Tell Show Do (27%), Distraction (23%), and parental presence or absence (20%) (Table 5). In this study, 33% of the parents admitted that they were previously aware of the different non-pharmacological behaviour management techniques in the questionnaire. The different behaviour modification techniques and the number of parents who preferred each technique show statistically insignificant data as the sample was small (Table 5).

## 4. Discussion

Behaviour management is done to establish a 'positive dental attitude' Children have relatively limited communication skills and are less able to express their fears and anxiety.[2] Dental clinic is not a place where a child will walk in willingly rather it is the parent's decision. So, behaviour management techniques are highly essential to establish child-dentist communication, alleviating the child's fear regarding dental treatment, and enabling the dentist to provide quality dental care to the child.[3]

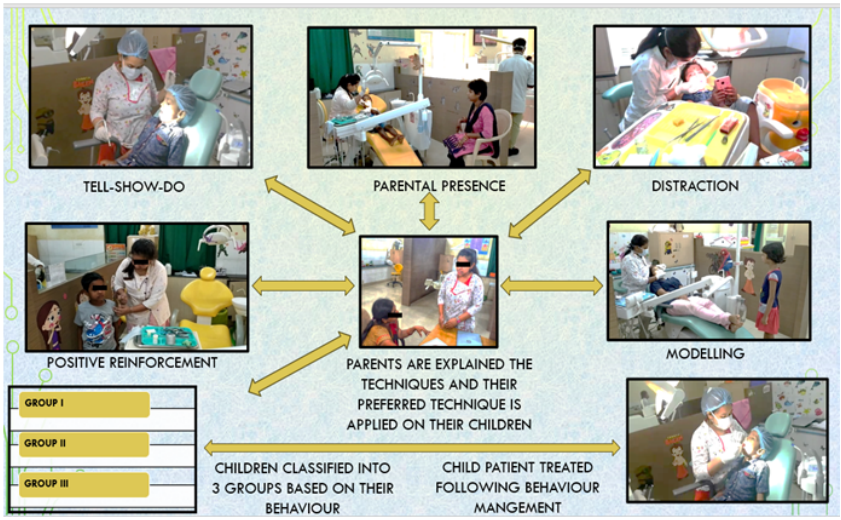


**Figure 1:** Visual abstract

Name of the Parent/Guardian
Contact no.
Email no
Name of your child
Age /Sex of your child
*your details won't be disclosed

**QUESTIONAIRRE**

1. **Is this your child's first dental visit?**
   yes
   no
2. **Do you think milk teeth should be treated?**
   yes
   no
3. **Were you previously aware of the various behaviour management techniques for children in a dental set-up**
   yes
   no
4. **Did your child ever complain of pain, discomfort or condition of his or her mouth before**
   yes
   no
5. **The last time your child went to the dentist, was there a need to hold (restrain) him / her down for the procedure?**
   yes
   no
6. **Has your child ever had dental anaesthesia?**
   yes
   no
7. **Was your child scared after his or her last visit to the dentist**
   yes
   no
8. **How would you describe your child's behaviour the last time he / she went to the dentist?**
   good
   fair
   poor
9. **Would you prefer any of the shown procedure being applied on your child?**
   yes
   no
10. **If yes, which is your preferred behaviour management technique for your child**
    Tell Show Do
    Desensitization
    Modelling
    Distraction
    Positive reinforcement
    Parental absence / presence

**Figure 2:** Questionnaire

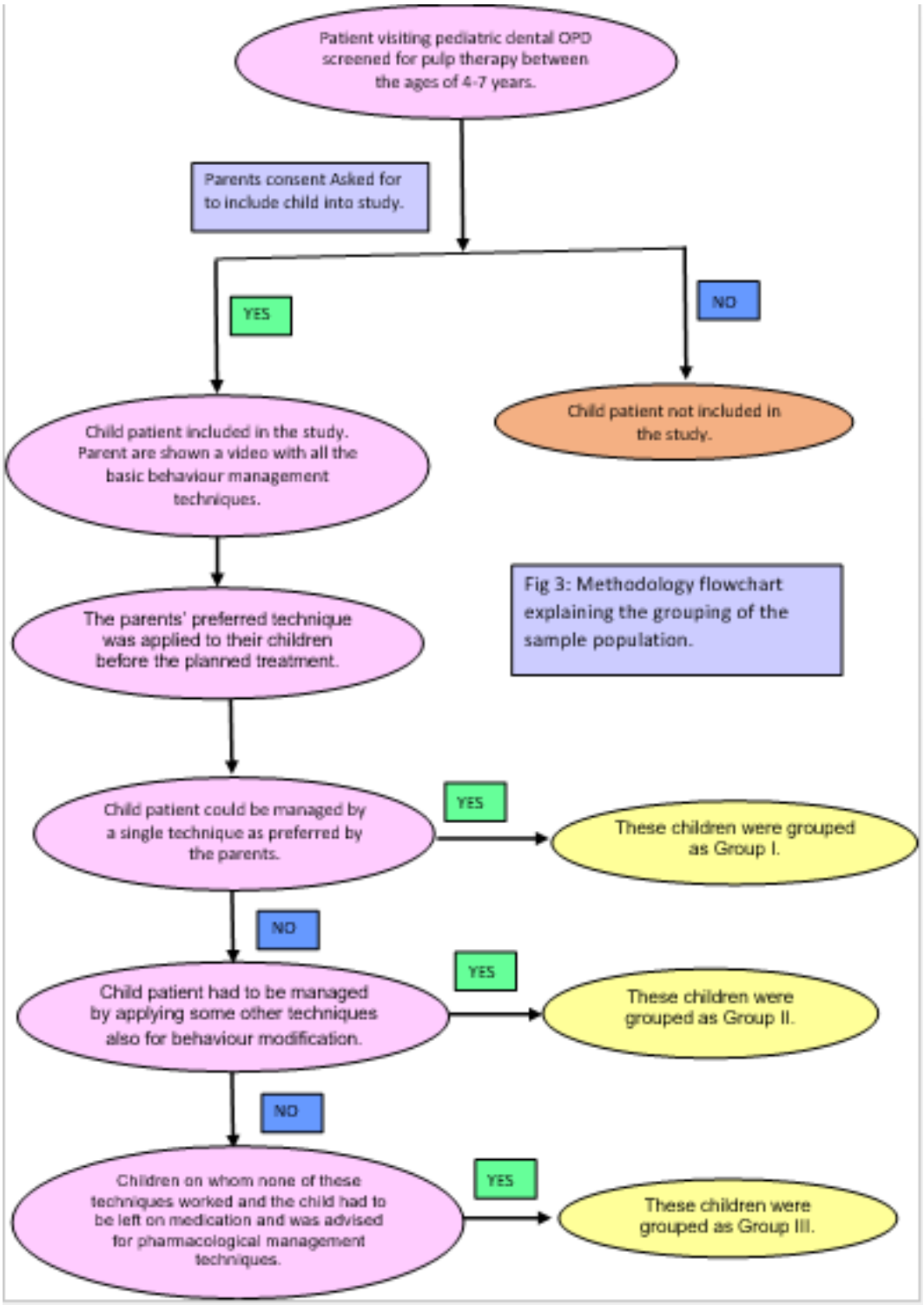


**Figure 3:** Flow diagram of methodology

**Table 1:** Frankl's Behaviour scale (before the administration of technique) based on the visit

| | | Frankl's. Before | | | Total | P value |
|---|---|---|---|---|---|---|
| | | Positive | Definitely Negative | Negative | | |
| Total | Count | 10 | 3 | 17 | 30 | 0.007 |
| | % of Total | 33.3% | 10.0% | 56.7% | 100.0% | |

**Table 2:** Distribution of children into groups based on their behaviour outcomes.

| Group 1 | Group 2 | Group 3 |
|---|---|---|
| Positive to Definitely positive | Negative to Definitely positive | Negative to Definitely negative |
| 10 | 1 | 4 |
| | Definitely negative to Positive | |
| | 3 | |
| | Negative to Positive | |
| | 12 | |
| (33.33%) | (53.33%) | (13.33%) |

**Table 3:** Percentage Distribution of children into groups based on their behaviour outcomes.

| Goups of Patients | Count | Percent | P value |
|---|---|---|---|
| Technique chosen by Parents | 10 | 33.3 | |
| Other techniques applied by clinician when the first didn't work | 16 | 53.3 | 0.027 |
| None of the nonpharmacologica techniques worked and patient was left | 4 | 13.3 | |
| Total | 30 | 100.0 | |

**Table 4:** Distribution of children into groups based on Frankl's behaviour Rating Scale

| | | Count | Percent | P value |
|---|---|---|---|---|
| Frankl Scale (After) | Definitely Positive | 10 | 33.3 | 0.005 |
| | Positive | 17 | 56.7 | |
| | Definitely Negative | 3 | 10.0 | |
| | Total | 30 | 100.0 | |

**Table 5:** Distribution of children into groups based on Behaviour management techniques used.

| Techniques Used | | Definitely Positive | Positive | Definitely Negative | Total | P value |
|---|---|---|---|---|---|---|
| Tell Show Do | Count | 2 | 7 | 0 | 9 | 0.813 |
| | % of Total | 6.7% | 23.3% | 0.0% | 30.0% | |
| Distraction | Count | 3 | 3 | 1 | 7 | |
| | % of Total | 10.0% | 10.0% | 3.3% | 23.3% | |
| Positive reinforcement | Count | 3 | 4 | 1 | 8 | |
| | % of Total | 10.0% | 13.3% | 3.3% | 26.7% | |
| Parental Presence or Absence | Count | 2 | 3 | 1 | 6 | |
| | % of Total | 6.7% | 10.0% | 3.3% | 20.0% | |
| Total | Count | 10 | 17 | 3 | 30 | |
| | % of Total | 33.3% | 56.7% | 10.0% | 100.0% | |

Assessment of cooperativeness in children's basic skills for any pediatric dentist. Frankl's behavior rating scale (FBRS) was developed in 1962. It is one of the most used behavior assessment scales for children in dental research and in dental clinical practice. It classifies child behavior into four groups according to the child's attitude and cooperativeness during dental treatment.[6] There are four categories of behavior ranging from definitely positive, positive, negative, and definitely negative. These categories are assigned by the treating clinician and can be applied at any stage during treatment. It is considered one of the most reliable tools developed for behavior assessment ratings for children in dental set-ups.[6,7] However, this classification does not enlist points of observation during the rating process.[8,9] This study used this tool for rating the child's behaviour and found that it is a user-friendly, convenient, and standardized tool for this purpose.

Based on Piaget's classification, paediatric patients in the pre-operational phase are ideal for testing behaviour modification techniques. Hence children aged between 4-7 years of age have been selected for the study as the development of concentration ability, vocabulary, and attention during this time is a mark of their social communication fine-tuning.[10] Thus behaviour management techniques at this stage would promote the child's positive attitude towards oral health care and help them to show readiness to undertake dental treatment procedures.[11]

Behaviour management techniques (BMT) are sub-classified into universally applied and non-universally applied. The behaviour management techniques which are universally applied are the nonpharmacological BMT like Tell-Show-Do, Desensitization, Distraction, Modelling, and Positive Reinforcement, while the non-universally applied BMT are parental presence, aversive conditioning techniques like Voice control, Hand-Over-Mouth technique, active or passive restraining or pharmacological methods like sedation and general anesthesia.[1]

The Desensitization technique is a gradual exposure to a new stimulus or experience for the child dental patient of gradually increasing intensity so that the child becomes familiar with repeated exposure to a dental environment and can slowly acclimatize to the new situation instead of being overwhelmed by it. In a dental environment, the Tell-Show-Do technique is widely used for desensitization of the paediatric patient using euphemisms like raincoat for rubber dam or silver hat for stainless steel crowns.[12]

The tell-Show-Do technique is based on demonstrating to the child patient what procedure will be done but with the use of euphemisms and imitation toys instead of demonstrating on a model or observing one which is the basis of Bandura's Modelling technique(1967), where an older sibling is treated and serves as a model for the younger one to observe and learn.[13] Modelling in paediatric dentistry refers to learning by observation. Children observe the model and reproduce the same behaviour as exhibited by the model under similar circumstances. Modelling could be live or filmed where in live modelling, a child patient follows the actions of an older sibling with whom they have an emotional bond for better response. In filmed modelling, the child patient is shown a pre-recorded video of the desired behaviour exhibited by a model.[12]

Tell-Show-Play-doh is a concept of learning by helping the child reduce dental anxiety by playing with reusable Play-doh used by children for arts and crafts projects. A battery-operated toy drill is used to prepare a cavity in the toy teeth set and be filled with white Play-doh compound to simulate cavity preparation.[13] The distraction technique is used to divert the child patient's focus and attention from what may be a potentially anxiety-inducing, unpleasant experience during dental procedures. The distraction technique could be active or passive depending on the child's engagement. If the child patient is observing an activity without any active participation, like watching TV or listening to music, it is a passive technique. Magic is also a passive technique using the art of illusions and sleight of hands or deceptive devices to engage a child's imagination into something fun and frolic. An active distraction technique would involve a child's kinesthetic sensation in activities like virtual reality games, interactive toys, guided imagery, etc.[14] Niharika et al.[15] and Pande et al.[16] found that virtual reality toys can help diminish anxiety and fear of dental procedures in children to a great extent.

Positive Reinforcement is a very popular method of rewarding the desired behaviour which would increase the likelihood of repetition of the same behaviour and the child will learn the dental operatory etiquette. Positive reinforcers could vary from a verbal praise, positive voice modulation, and facial expression to a gift like stationery or stickers.[17] Positive Reinforcement is very effective in children of age 6 – 12 years of age as at this stage of psychosocial development, the child derives a sense of industry and accomplishment, and according to Peretz B et al.,[18] receiving positive reinforcement in a dental setup can boost a child dental patient and instill positive dental attitudes and improve future dental attendance.

It has been observed that parenting styles greatly influence the child's behaviour. Though most studies show that parental presence in the dental operatory has a positive influence on the child dental patient, an anxious parent can influence a child patient's behaviour negatively thus, parents should be counselled separately before the child is treated and during treatment. It is seen that there is a relationship between maternal anxiety and difficulty in managing child dental patients. In the operatory, the dentist should interact with the child patient without parental interference as parental interference could adversely affect the child-dentist rapport.[19]

Though the Tell-Show-Do technique is the most used technique by a clinician in paediatric dentistry as it is notably easier to carry out the procedure using this technique.[12] but most of the parents in this study preferred the Positive Reinforcement technique. It also depends on the perception of the paediatric dentist how they perceive the child patient whether good or bad which determines the amount of effort a dentist would put in to treat a patient. If a child is considered good or 'angelic', the dentist will try to help and treat the child more sincerely than if the child is considered disruptive or 'devilish'.[20] It was seen that 33.33% of children were managed by a single behaviour management technique while for 66.67% of the children, more than one technique had to be applied simultaneously to modulate their behaviour. Out of the 66.67%, 13.33% required a pharmacological approach for their behaviour management. Only 33.3% of the children were positively behaved before treatment, while that after treatment with

the application of multiple nonpharmacological behaviour management techniques rose to 90% and it was highly significant. Behaviour management techniques require high technical expertise and need to be customized as per the needs and requirements of each child patient.[21] Behaviour management techniques should never be used as a punishment or to induce assertiveness in a child. It is the tool to make handling a child patient and administering treatment effective and easy.[22,23]

## 5. Conclusion

The behavior guidance techniques (BGT) were classified by the American Academy of Pediatric Dentistry (AAPD) into basic and advanced techniques. Basic BGT are the foundation of managing child dental patients which includes positive previsit imagery, direct observation, verbal and nonverbal communication, tell-show-do (TSD), ask-tell-ask, memory restructuring, distraction, communicative guidance, voice control, parental presence/absence, positive reinforcement and descriptive praise and nitrous oxide/oxygen analgesia. However, children who are difficult to handle or uncooperative require more advanced techniques, like sedation, protective stabilization, and general anesthesia (GA).[24] Hand-over-mouth technique has lost its popularity being used less by pediatric dentistry practitioners,[25] until it was eliminated from the clinical guidelines of AAPD.[24]

This study brings forth that non pharmacological behaviour management techniques can be successfully used to regulate most of the children in a paediatric clinic setup. Awareness on the part of parents is very important as dental stress-tolerance and coping skills of children are best when there is a structured home environment.[12] It is important to note that to manage the behaviour of dental child patients, the behaviour of the dental staff must be rooted in compassion and should be directed towards the wellbeing of each child.[13] The ability of a pedodontist to listen and answer questions with empathy builds a two-way rapport, establishes better communication, and reduces dental anxiety in patients. Communicative management is universally accepted in Paediatric dentistry and is helpful in managing both cooperative and uncooperative patients.[26,27]

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

1. Roberts JF, Curzon M, Koch G, Martens LC. Review: behavior management techniques in paediatric dentistry. *Eur Arch Paediatr Dent*. 2010;11(4):166–74.
2. Kuhn BR, Allen KD. Expanding child behavior management technology in pediatric dentistry: a behavioral science perspectie. *Pediatr Dent*. 1994;16(1):13–7.
3. Allen KD, Stanley RT, Mcpherson K. Evaluation of behavior management technology dissemination in pediatric dentistry. *Pediatr Dent*. 1990;12(2):79–82.
4. Riba H, Al-Zahrani S, Al-Buqmi. A review of behavior evaluation scales in pediatric dentistry and suggested modification to the Frankl scale. *EC Dent Sci*. 2017;16(6):269–75.
5. Badakar CM, Thakkar PJ, Hugar SM, Kukreja P, Assudani HG, Gokhale N. Evaluation of the relevance of Piaget's cognitive principles among parented and orphan children in Belagavi City, Karnataka, India: A comparative study. . *Int J Clin Pediatr Den*. 2017;10(4):346–50.
6. Frankl SN. Should the parent remain with the child in the dental operatory. *J Dent Child*. 1962;29:150–63.
7. Sharma A, Tyagi R. Behavior assessment of children in dental settings: A retrospective study. *Int J Clin Pediatr Dent*. 2011;4(1):35–9.
8. Narayan VK, Samuel SR. Appropriateness of various behavior rating scales used in pediatric dentistry: A Review. *J Global Oral Health*. 2019;2(2):112–9.
9. Shindova MP, Belcheva AB. Behaviour evaluation scales for pediatric dental patients-review and clinical experience. *Folia Med*. 2014;56(4):264–70.
10. Asokan S, Surendran S, Asokan S, Nuvvula S. Relevance of Piaget's cognitive principles among 4-7 years old children: A descriptive cross-sectional study. *J Indian Soc Pedodont Preven Dent*. 2014;32(4):292–6.
11. Radhakrishna S, Srinivasan I, Setty JV, Krishna M, Melwani A, Hegde K. Comparison of three behavior modification techniques for management of anxious children aged 4-8 years. *J Dent Anesth Pain Med*. 2019;19(1):29–36.
12. Nelson TM. Desensitization and therapeutic behavioral approaches to dental care. Dental care for children with special needs: A clinical guide. and others, editor; 2019. p. 99–122.
13. 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.
14. Asokan S, Priya PG, Natchiyar SN, Elamathe M. Effectiveness of distraction techniques in the management of anxious children-A randomized controlled pilot trial. *J Indian Soc Pedod Prev Dent*. 2020;38(4):407–19.
15. Niharika P, Reddy NV, Srujana P, Srikanth K, Daneswari V, Geetha KS. Effects of distraction using virtual reality technology on pain perception and anxiety levels in children during pulp therapy of primary molars. *J Indian Soc Pedodont Prevent Dent*. 2018;36(4):364–73.
16. Pande P, Rana V, Srivastava N, Kaushik N. Effectiveness of different behavior guidance techniques in managing children with negative behavior in a dental setting: A randomized control study. *J Indian Soc Pedod Prev Dent*. 2020;38(3):259–65.
17. Shindova M, Belcheva A. Use of Behavior Management Techniques by Dental Practitioners During the Treatment of Pediatric Patients from Different Age Groups. *Euras J Health*. 2021;2(1):49–60.
18. Peretz B, Glaicher H, Ram D. Child-management techniques. Are there differences in the way female and male pediatric dentists in Israel practice? *Braz Dent J*. 2003;14(2):82–8.
19. Singh H, Rehman R, Kadtane S, Dalai DR, Jain CD. Techniques for the behaviors management in pediatric dentistry. *Int J Sci Study*. 2014;2(7):269–72.
20. Buldur B. Behavior Management in Pediatric Dentistry: An Overview and Interpretation. *Pesquisa Brasileira em Odontopediatria Clín Integrada*. 2019;19(1):4649.
21. Nazzal H, Shahawy E, Tahmassebi I, Al-Jundi, Hussein S. The use of behaviour management techniques amongst paediatric dentists working in the Arabian region: a cross-sectional survey study. *Eur Arch Paediatr Dent*. 2021;22(3):375–85.
22. Acharya S, Mohanty S, Acharya S. Newer Behaviour Management Techniques in Children. *Indian Journal of Forensic Medicine &*

*Toxicology*. 2020;14(4):8817–8837.
23. Kawia HM, Mbawalla HS, Kahabuka FK. Application of Behavior Management Techniques for Paediatric Dental Patients by Tanzanian Dental Practitioners. *Open Dent J*. 2015;9:455–61.
24. Behavior guidance for the pediatric dental patient. *Pediatr Dent*. 2017;39:246–59.
25. Adair SM, Waller JL, Schafer TE. Rockman RA A survey of members of the American Academy of Pediatric Dentistry on their use of behavior management techniques. *Pediatr Dent*. 2004;26(2):159–66.
26. Shekhar S, Suprabha BS, Shenoy R, Rao A, Rao A. Effect of active and passive distraction techniques while administering local anaesthesia on the dental anxiety, behaviour and pain levels of children: A randomised controlled trial. . *Eur Arch Paediatric Dent*. 2022;23(3):417–44.
27. Dutta S, Mohapatra A, Saha A, Shah N, Pramanik S, Nagarathna PJ, et al. Knowledge of Dental Students on Managing Dental Fear and Anxiety in Pediatric Patients: A Qualitative Study. *J Adv Med Dent Sci Res*. 2020;8(5):8–11.

## Author biography

**Sharbari Dutta,** Senior Research Officer https://orcid.org/0000-0002-2980-5246

**Abinash Mohapatra,** Professor

**Brahmananda Dutta,** Professor and HOD

**Cite this article:** Dutta S, Mohapatra A, Dutta B. The application of behaviour modification techniques among paediatric patients in a dental set-up- A pilot study. *Arch Dent Res* 2023;13(2):92-99.