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ABC of newer behavior management techniques in pediatric dentistry with an updated review

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Abstract

Behaviour management in a child can be tricky mostly in newly qualified less experienced dentists. So a careful observation of child's age, cognitive abilities, emotional responses, communication skills, maturity, as well as an appreciation of the previous dental history, hospital experiences or dental anxiety might have play a role in different coping rates by different children.

The aim of this study is to evaluate dental professionals' knowledge, awareness and attitude regarding newer non-pharmacological behaviour management techniques and it focused on framing different non-pharmacological behaviour management strategies according to age in children.

Material and methodology: A cross sectional survey was conducted on 62 dental interns and graduates of Government Dental college and Hospital about behaviour management techniques in children using a questionnaire with likert scale of option strongly agree to strongly disagree. The data was collected and subjected to statistical analysis.

Results: It was seen 68% of respondents strongly agreed to the statement Does Childs age plays a role in the type of non-pharmacological behaviour technique they will advocate and 29% agreed to the statement.

Conclusion: A Pediatric dentist should provide a painless experience to a child by appreciation of the interplay of a child's age, cognitive development, personality and dental anxiety by introducing best non-

pharmacological behaviour management strategies according to age for them.

Keywords: Behaviour guidance, AAPD, Cognitive abilities.

Introduction

Behaviour Guidance is a comprehensive and continuous means to develop and nurture a healthy relationship between the child, parent and the dentist which ultimately builds trust and alleviates fear and anxiety during a dental treatment.¹ The main goal of Behaviour guidance techniques according to AAPD is to establish communication with the child and parent to alleviate the child's fear and anxiety, deliver safe and quality dental care by building a trustworthy relationship between the child, dentist, and parent to promote positive attitude towards good oral health in a child.² Child management in the dental office refers to approval of child on the dental chair based on proper communication, child/ parent education and counselling with empathy, coaching and listening by dentist. In pediatric dental operatory setup the major anxiety provocating factors in children are the sight of needles, drilling noises /sounds, smells of cut dentin and eugenol, along with the sensation of a high frequency of vibration.⁴

Over the years many conventional techniques of effective behaviour management were available but due to some limitations newer non-invasive behaviour techniques have been devised so as to make the experience of dental treatment fear free to instill positive oral health care practices in children. The aim of this article is to check how aware the dental graduates are related to recently introduced non-pharmacological behaviour management and whether they are completely aware about age wise behaviour management technique that can be employed.

Material and methods

A cross sectional survey was done on 62 dental interns and dental graduates of Government Dental college and Hospital, Srinagar about behaviour management techniques in children using a questionnaire with likert response scale with option strongly agree to strongly disagree. The ethical clearance was taken from said institution under order GDC/Pedo/2020. The questionnaire was framed on the recent advances in nonpharmacological behaviour management techniques in children after Pub med electronic database from 2012 to 2022 was searched for recent techniques in nonpharmacological behaviour management. The key words: Behaviour and Children, Behaviour management in children, Behaviour management and Paediatric dentistry, Child behaviour and Paediatric dentistry, Child behaviour and Dental anxiety, Behaviour management in Dentistry, Non-pharmacological behaviour management and Paediatric dentistry, Child management and Paediatric dentistry, Behaviour modification and Children, Virtual reality and Dentistry, Audiovisual distraction for children, Videogames and Distraction, Videogames and Virtual reality were used.

The staff and senior resident of the said college with experience were excluded from the survey. The survey was shared among respondents in the month of February 2022 during COVID pandemic through WhatsApp to maintain COVID-19 protocol. The data was collected and analysed.

Table 1: The questionnaire

1. Do you think Child's age plays a role in the type of non-	Strongly	Agree	Can't	Disagree	Strongly
pharmacological behaviour technique you will advocate?	agree		say		disagree
2. Can simple behaviour guidance tricks like magic, hypnosis	Strongly	Agree	Can't	Disagree	Strongly
or Eye movement distraction instill positive behaviour and	agree		say		disagree
reduce pain on injection in a child?					
3. Will a videotaped cartoons be helpful in reducing anxiety	Strongly	Agree	Can't	Disagree	Strongly
in children aged 7-9 years during restorative procedure?	agree		say		disagree
4. Will the introduction of mobile apps or tablets with dental	Strongly	Agree	Can't	Disagree	Strongly
games alleviate dental fear and anxiety in children and	agree		say		disagree
designing of dental games can be used as an oral health					
educational tool?					
5. Do you find a role of aromatherapy and music in reducing	Strongly	Agree	Can't	Disagree	Strongly
anxiety in children?	agree		say		disagree
6. Do you find a need about the age wise behaviour	Strongly	Agree	Can't	Disagree	Strongly
modification techniques to be taught in the undergraduate	agree		say		disagree
curriculum?					

Result

62 dental interns and students participated in the study. 68% of the respondents strongly agreed to the statement Does age of child play a role in the type of nonpharmacological behaviour technique they will advocate as a clinician, 29% agreed to the statement whereas 3% couldn't comment on it (Figure 1, Table 1,2).



Figure 1: Graphical bar representation of response to statement Does child's age plays a role in the type of non-pharmacological behaviour technique they will advocate.

74% agreed to the statement Does simple behaviour guidance tricks like magic, hypnosis or Eye movement distraction instill positive behaviour and reduce pain on

injection in a child and 19% of the respondents strongly agreed (Figure 2, Table 2, q2).



Figure 2: Graphical representation of response to the statement Does simple behaviour guidance tricks like magic, hypnosis or Eye movement distraction instill positive behaviour and reduce pain on injection in a child.

52% of the respondents agreed to the statement that videotaped cartoons decreased anxiety in 7-9-year-old

children during any restorative procedure whereas 26% strongly agreed to the statement (Figure 3, Table 2).



Figure 3: Graphical representation of response to statement "Will a videotaped cartoons be helpful in reducing anxiety in children aged 7-9 years during restorative procedure".

3% respondents disagreed to the statement that introduction of mobile apps or tablets with dental games

help in alleviating dental fear and anxiety in children (Figure 4, Table 2).

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 A Strongly agree	23%
 B agree	65%
C can't say	10%
D disagree	3%
E strongly disagree	0%

Figure 4: Graphical representation of response to statement "Will the introduction of mobile apps or tablets with dental games alleviate dental fear and anxiety in children"

55% of the respondents agreed and 19% strongly agreed to the statement that aromatherapy and music play a role

in reducing anxiety in children (Figure 5, Table 2).



Figure 5: Graphical representation of response to statement "Do you find a role of aromatherapy and music in reducing anxiety in children."

45% of the respondents strongly agreed and 48% of them agreed to the statement that there's a need of proper guidance of age wise behaviour modification to be taught in undergraduate curriculum to the dentists for anxiety free dental management in children (Figure 6, Table 2)

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Figure 6: Graphical representation of response to statement "Do you find a need about the age wise behaviour modification techniques to be taught in the undergraduate curriculum"

Q.no	A strongly agree %(n)	B agrees	C can't say	D disagrees	E strongly
		%(n)	%(n)	%(n)	disagrees %(n)
1	68% (42)	29% (18)	3% (2)	0	0
2	19% (12)	74% (46)	6% (4)	0	0
3	26% (16)	52% (32)	16% (10)	6% (2)	0
4	23% (14)	65% (40)	10% (6)	3% (2)	0
5	19% (12)	55% (34)	26% (16)	0	0
6	45% (28)	48% (30)	6% (4)	0	0

Table 2: The frequency and % age of respondent's answers on likert scale.

Discussion

Age wise behaviour modification technique grading in the dental set up should be such that the new experience presented should be in a non-threatening way for instance for children aged 0-2 years grouped in the Sensorimotor group, the dental environment should be happy with avoidance of loud noise and distinct taste and smell for pleasant experience to the infants. 2 to 7 years old children grouped in Pre operational stage fantasy play, positive reinforcements, modelling, tell show do, egocentrism and distraction are useful for guiding the behaviour. During concrete operational stage children aged between 7-11 years verbal praise is more effective than rewards and systematic desensitisation is well understood by them. In formal operational stage in children aged 12 years onwards egocentrism returns to being and fluctuating personalities affected by aesthetics and motivation are expressed.

93% of respondents in our wanted age wise behaviour management techniques to be taught in detail in undergraduate curriculum and 93% knew that age is a deciding factor on which the behaviour management technique practiced depends.

Recent behaviour management techniques

Distraction

a. Eye movement distraction can be used as an effective distraction modality to reduce anxiety during local anesthesia administration in needle-phobic children. Tirupathi S et al. in 2019 evaluated the efficacy of eye movement distraction (EMD) in reducing anxiety during intraoral local anesthetic administration in needle-phobic children on 228 children aged 8–13 years. Children in the EMD group showed low Facial Pain Scale-R scores, which is statistically significant when compared to the control group (p < 0.0001).⁵

In our study 74% of respondents agreed that magic, hypnosis or Eye movement distraction instil positive behaviour and reduce pain on injection in a child wheras 19% of the respondents strongly agreed to the role of these simple behaviour modification techniques.

B. mobile dental app

Elicherla SR et al in 2019 aimed to measure the effectiveness of a mobile app (Little Lovely Dentist) compared to the tell-show-do (TSD) technique in managing anxious children aged 7-11 years during their first dental visit. The study concluded that educating the child prior to a dental procedure using a smartphone application such as Little Lovely Dentist can significantly alleviate the anticipatory anxiety and

engage children in dental treatment during their first visit.⁶

Tahersoltani et al in 2021 evaluated the effect of a dentistry smartphone game on children's anxiety on a treatment session using two scales in comparison with the conventional tell-show-do method and the study concluded video game method has appropriate efficiency for anxiety control compared with the tell-show-do method.⁷ In our study only 3% of respondents disagreed that introduction of mobile apps or tablets with dental games will help in alleviating dental fear and anxiety in children.

C. music distraction

Sapanpuneet K in 2021 conducted a study to evaluate the effect of music distraction in management of anxious pediatric patient aged 6-10 years in dental set-up where first group was music distraction group and in control group treatment was done without any distraction. The result showed that the music distraction was effective in managing the anxious pediatric patient.⁸

D. Audiovisual distraction

The concept of imagery and distraction delivered via audiovisual aids by diverting the focus, stimulating imagination, enabling engagement, avoiding anxiety provoking stimuli and motivation by providing a relaxing experience throughout the procedure are main goals of audiovisual distraction.

Khandelwal D et al in 2018 evaluated and compared reduction in anxiety level in patients undergoing dental treatment using Tell show do (TSD) method and audiovisual distraction (AVD). The study concluded 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 in children. ⁹ Bagattoni S in 2020 evaluated the effect of audiovisual distraction on the

dental chairside behaviour of 48 children with Down syndrome (DS) during dental restorations and its influence on the operator stress and the duration of the appointment. In the study group 64% of the children refused to wear the video eyeglasses during the whole duration of the dental treatment, and significantly more children showed a negative behaviour concluding audiovisual distraction using video eyeglasses is not useful in managing the dental chairside behaviour of children with DS.¹⁰ Al-Khotani A et al in 2016 used videotaped cartoons for reducing anxiety in children aged 7-9 years during restorative procedure.¹¹

E. Videogame distraction

It is based on the principles of cognitive- behavioral therapy and neuro feedback mechanism for children with anxiety disorders and can be implement distraction in children by active participation of the child during the dental procedure. Ega S In 2020 evaluated the influence of parent-provided distraction (PPD) and interactive distraction (ID) with a handheld video game (HVG) on the child's responses to local anesthesia (LA) administration during dental treatment. The study concluded that PPD would be the least distressful option, compared to the ID with HVG in children while administering LA^{.12} Aljafari A et al 2017 used videogames for oral health education in children with high-risk caries by promoting healthy diet and good oral hygiene .¹³

Contrary Garrocho-Rangel A et al in 2018 evaluated the effectiveness of a Video Eyeglasses/Earphones System (VEES) as distracting device in reducing anxiety in children during dental procedures carried out under local anaesthesia in children aged 5-8 years. The study concluded The VEES method was not more effective than traditional non-aversive behavioral techniques for

reducing anxiety and pain perception in children undergoing dental treatment^{.14}

F. Virtual reality-based distraction

This head mounted device contains the display screen which provides the view of virtual reality environment in a 360° view with tracking device that monitors the head movements and completely obstructs the present situation. Adel Zakhary in 2020 determined the effect of audio-visual distraction on heart rate during dental treatment in 42 children requiring pulp therapy randomly allocated either control group (managed by tell-show-do technique) or test group (managed by audio visual distraction using virtual reality eyeglasses). The study concluded audio visual distraction can be considered an effective method for reducing anxiety during dental treatment and helping the patients enjoy the dental visit.¹⁵ It is contraindicated in specially abled and medically compromised children especially children with epilepsy, migraine and vestibular disturbances and in children with previous history of nausea or dizziness following the use of VR device.

tell- play- do

Addlestone's Tell- Show-Do was modified by Vishwakarma AP as Tell-Play-Do in 2017 for children aged between 5-7 years. In this technique an additional component of allowing the child to play with dental equipments was carried which reduces child's anxiety towards the dental equipments according to learning theory by Bandura.¹⁶

Radhakrishna S et al in 2019 compared the techniques of Tell-Show-Play-box, a smartphone dentist game, and a conventional Tell-Show-Do method in the behavior modification of anxious 60 children aged 4-8 year in the dental operatory. The results showed lower mean pulse rates, lower FIS and FLACC scores, higher percentage of children with Frankl's behavior rating score of 4, and better operator compliance in both the Tell-Show-Playbox and smartphone dentist game groups than in the conventional Tell-Show-Do group.

The study concluded Tell-Show-Play-box and smartphone dentist game techniques are effective tools to reduce dental anxiety in pediatric patients.¹⁷

Aromatherapy

It is very effective in reducing anxiety levels of the children as reduction in pulse rate is seen due to the interaction of essential oil with the parasympathetic nervous system to modulate anxiety. Lehrner et al. observed that women who were exposed to orange odor had a higher level of calmness whereas Kritsidima et al. observed that lavender scent reduces anxiety in dental patients.^{18,19}

James J in 2021 conducted a study to compare and evaluate the efficacy of aromatherapy using orange essential oil with music distraction in managing 150 children aged between 6 to 8 years using Venham Picture test and facial image scale and the study concluded that both music distraction and aromatherapy are effective in reducing anxiety but music distraction present with better results .²⁰ 74% of the respondents agreed that aromatherapy and music play a role in reducing anxiety in children

Positive pre-visit imagery

Positive pictures or images of dentistry and dental treatment are shown to the parents of the child before the procedure starts and it provides the children with a chance to ask questions to the dentist about the procedure and parents to get a pictorial vision of the procedure to be done. Ibrahim Rashawn Z, Salah Eweida R, Ibraham Hamad et al in 2020 investigated the effect of VR distraction versus PPVI intervention on children's DFA during LA injection on 90 children aged from 4-6 years. The study concluded both VR distraction and

PPVI intervention showed positive effects and had excellent potential as evidence-based interventions for minimizing children's Dental Fear and Anxiety during LA injection. ²¹

Memory restructuring

Pickrell et al. designed an intervention for behaviour management that involved using positive images and specific reflection strategies to help children reconstruct their memory of dental treatment It is a behavioral management approach in which memories associated with an unpleasant or difficult event (e.g., first visit, local anesthesia, restorative procedure, extraction) are restructured into positive memories using information suggested after the event has taken place.

For behaviour guidance Sensory-adapted dental environments (SADE) by dimmed lighting, moving projections such as fish or bubbles on the ceiling, soothing background music, wrapping blanket around the child helps to provide deep pressure input to produce a calming effect by averting negative or avoidance behaviors in children with autism spectrum disorder, sensory processing difficulties, other disabilities, or dental anxiety .²² Similarly use of Animal-assisted therapy (AAT) utilizes a trained animal in a healthcare setting to improve interactions or decrease a Childs anxiety, pain, or distress whereas Picture exchange communication system (PECS) helps individuals with limited to no verbal communication abilities, specifically those with autism to express requests or thoughts using symbolic imagery and helps in instilling positive attitude towards dental treatment.¹

Conclusion

Pediatric dental clinicians want to provide the best experience to a child by appreciation of the interplay of a child's age, cognitive development, personality and dental anxiety for application of best nonpharmacological behaviour management strategies for them. Over the time the delivery of dental treatment can be tailored for each child's unique circumstance and introduction of newer behaviour guidance techniques such as audiovisual aids, videogames, mobile apps, aromatherapy, music, eye movement distraction, virtual reality can be used as an adjunct for conventional techniques due to its immersive, interesting and innovational capability in managing children with behavioral problems for a stress-free environment.

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