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Recent Advances in Non-Pharmacological Behaviour Management Techniques in Children – An Overview

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Abstract: *A proper communication combined with a caring attitude develops sound rapport with any paediatric patient. Non-pharmacological behaviour management techniques enable paediatric dentists to successfully alleviate behavioural problems by matching their selection of techniques to that of the child's style of interaction. On the other hand, few aggressive techniques applied in childhood have been implicated as being prominent factors in the behaviour of developed adult patients with dental phobias. The aim of instilling positive reinforcement is achieved by conventional methods but disruptiveness increase with increase in treatment time. Hence, to overcome this disadvantage newer non-threatening techniques were handled by the paediatric dentists, which provide long time reinforcement in younger children. This review will focus on enumerating the recent advances in non-pharmacological behaviour management techniques in children.*

Keywords: *Audiovisual distraction, Distraction, Virtual reality, Videogames*

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I. Introduction

Successful management of the child patient depends on the ability of the dentist to satisfy immediate dental needs which emphasize on enhancing the communication and partnering with the child and parent to promote a positive attitude and good oral health.[1] Behaviour management or child management in the dental office refers to methods of obtaining a child's approval of treatment in the dental chair which is based on proper communication, patient/ parent education with empathy, coaching and listening.[2] The concept behind guiding a child's behaviour is treating them rather than just operating the tooth alone.[3]

Wright (1975) defined behaviour management as the means by which the dental health team effectively and efficiently performs treatment for a child patient and at the same time instills a positive dental attitude. [2]

The commonly used non pharmacological behaviour management techniques are Tell-Show-Do, Non verbal communication, Voice control, Modelling, Distraction, Positive reinforcement, Hand Over Mouth Exercise and Protective stabilization.[4] Even though these conventional techniques are effective in guiding children, the invasiveness involved in some techniques limits the acceptability which in turn leads to the invention of newer non-invasive behaviour management techniques for children. This review article aims in enumerating the recent advances in non-pharmacological behaviour management techniques for children in the dental operatory.

II. Material And Methods

The purpose of the present review article is to elaborate the recent advances in non-pharmacological behaviour management techniques in children. A search on the Pubmed electronic database from 2009 to 2018 was done using the terms: 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. Only articles that pertain to recent behaviour management techniques were included in this review.

III. Background

Behaviour guidance is a comprehensive, continuous technique employed to initiate and nurture the child-dentist relationship. It aims to establish better communication, alleviate fear and anxiety, deliver quality dental care, build a trusting relationship between dentist and child and to instill a positive dental attitude towards oral/dental health and oral health care (AAPD Reference Manual, 2011). The outcome of these techniques could maintain a proper communication or extinguish disruptive behaviour related to dental treatment. It could be a combination of behaviour guidance approach individualized for the child. The behaviour guidance techniques

should enhance the communication in both cooperative and uncooperative children. Recently technologies were combined with the behaviour guidance to improve the communication and enhance positive dental attitude in a stress-free way.[5]

IV. Recent behaviour management techniques

1. Tell- Play- Do:

The commonly used behavior guidance technique namely Tell- Show-Do was modified by Vishwakarma AP as Tell-Play-Do in 2017 for children aged 5-7 years. The technique was similar to Tell-Show-Do but an additional component of allowing the child to play with dental equipments was carried in Tell-Play-Do. As per the learning theory of Bandura, the child's anxiety towards the dental equipments reduces, thereby feels more comfortable and develops cooperative behavior.[6] Since only one study has been reported in literature, further research is recommended to assess its effectiveness in the dental set-up.

2. Mobile dental app:

In 2017, Patil VH et al utilized mobile dental app for reducing fear and anxiety in children in the dental set up. An interactive session of using the dental application during the treatment was allowed and the children were virtually made dentists and allowed to provide different treatments through the application. [7] By this technique, the fear towards different dental instruments and its use in children could be reduced and more cooperative behaviour could be achieved. Mobile dental application could be used as an adjunct behaviour management technique however further research is needed.

3. Audiovisual distraction:

Audiovisual distraction involves the concept of imagery and distraction delivered via audiovisual aids, thereby removing the focus on the dental procedures, avoiding anxiety provoking stimuli and providing a relaxing experience throughout the procedure.[8]

The goals of audiovisual distraction are imagination (helps in distracting children from present situation), engagement (enables children's attention to focus on a single thing) and motivation (helps children to encourage getting treated for dental problems in future).[9]

a. **Management of dental anxiety:** A systematic review by Barreiros D 2018 concluded that audiovisual distraction is effective in controlling dental anxiety in children.[10] Al-Khotani A et al 2016 used videotaped cartoons for reducing anxiety in children aged 7-9 years during restorative procedure.[11] Kaur R et al 2015 compared audio and audiovisual distraction for reducing anxiety in children during their first dental visit and found audiovisual distraction reduced anxiety in anxious dental patients.[12]
b. **Management of pain:** Oliveira NCAC et al 2016 found audiovisual distraction could reduce the intensity of pain during painful puncture procedures.[9] Nuvvula S et al 2015 used three dimensional audiovisual distraction to reduce anxiety during local anaesthesia administration.[13] Fakhruddin KS et al 2015 used audiovisual distraction with and without video eyewear to reduce dental anxiety in children during computerized delivery of anesthesia.[8] Mitrakul K et al 2015 used audiovisual eyeglasses for reducing pain and anxiety during restorative treatment in 5-8 year old children.[14]

Thus, Audiovisual distraction could be an effective method for managing dental anxiety and pain related to dental procedures.

4. Videogame distraction:

Even though there are a wide range of behaviour management techniques available for managing highly anxious children, it was impossible to divert the child's attention during pain perception in invasive procedures.[15]

The use of videogame as a distraction tool is based on the principles of cognitive- behavioural therapy and neurofeed back mechanism for children with anxiety disorders.[15] Videogames are interesting and commonly available media, which can help in implementing distraction in children by active participation of the child during the dental procedure.[16]

a. For health promotion: Aljafari A et al 2017 used Oral health education related videogames for promoting healthy diet and good oral hygiene for high caries risk children.[17]

b. Management of dental anxiety: Ko JS et al 2016 used Ipads for reducing anxiety in children during their orthopaedic visits.[18] Sil et al 2013 and Wohlheiter KA et al 2013 used videogames to reduce pain perception during cold-pressor trials.[19,20]

Videogames could be an effective distractor and improve oral health related outcomes, however extensive studies in its applicability in the field of pediatric dentistry is required.

5. Virtual reality based distraction:

In 1968, Ivan Sutherland and Bob Sproull invented virtual reality with a head mounted device that was connected to a computer. Later in 1998, Heim described virtual reality as an interactive computer based software that can be used to immerse children in the virtual environment which completely obstructs the present situation.[21] The VR equipment contains head mounted display and a tracking device. The head mounted device contains the display screen which provides the view of virtual reality environment in a 360^0 view. The tracking device monitors the head movements. The equipment provide an attachment for mouse, joystick or dataglove for playing games.[22]

Uses of Virtual reality:

a. For distraction:

The virtual reality environment has abilities to withdraw attention of the child from the thoughts that are associated with the treatment and provide interactive distraction in a virtual environment. In 2014, Tanja-Dijkstra K et al used virtual reality distraction for reducing anxiety towards previous dental experiences.[23] Dahlquist LM et al 2010 evaluated videogame and virtual reality with and without head mounted display and found virtual reality with head mounted display could reduce pain tolerance during cold pressor trials. [24] Factors that influence the distraction using virtual reality device are the level of interest shown by the child and the level of immersion of the child into the virtual world.

b. Minor procedures:

Researchers used virtual reality environment for children undergoing invasive procedures requiring administration of anaesthesia and found there was an improvement in subjective pain tolerance to injections, anxiety and behaviour stress reduction levels in children and parents. In 2011, Hoffman et al showed that virtual reality reduced pain perception in children by reducing pain related brain activity.[25] Studies such as Shiri et al, Ramachandran VR et al and Patterson DR et al concluded that virtual reality could reduce the intensity of pain in patients with chronic illness.[26,27,28] The pain perception in children while using virtual reality was relatively low compared to conventional techniques.

Contraindications of Virtual Reality:

1. Medically compromised children especially children with epilepsy, migraine and vestibular disturbances.
2. Children with previous history of nausea or dizziness following the use of VR device. [22]

Virtual reality technology, an emerging field in the management of pain and anxiety could be used in dental operatory and clinical studies were indicated to solidify the effect of VR in dental situations.

V. Conclusion

The recent technologies such as audiovisual aids, videogames, mobile apps and virtual reality can be used as an adjunct for conventional techniques due to its immersive, interesting and innovational capability in managing children with behavioural problems and allow dentists to perform effective treatment in a stress-free environment.

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