Journal of Clinical and Diagnostic Research
ISSN - 0973 - 709X

Dentistry Section DOI : 10.7860/JCDR/2021/46076.14508

Year : 2021 | Month : Feb | Volume : 15 | Issue : 02 Page : ZE01 - ZE03

Effect of Music Distraction in Managing Anxious Paediatric Dental Patients- A Review

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Abstract

Dental anxiety is one of the most commonly encountered problems seen in the dental clinic. Anxiety begins at a very young age, if not addressed at that point; it will result in more drastic consequences. As a dental clinician, there are various methods of behaviour management; one of them is music therapy. Music has always been one of the most commonly used methods to relieve anxiety. A lilting melody from a mother calms down the child in a few minutes. So, this review was performed to know the effect of music distraction in management of anxious dental patients. Music therapy is one of the most efficient forms of non-invasive therapy as the equipment used are musical instrument headsets, audio player among others. Various studies have shown that audio distraction causes a noticeable reduction in the anxiety level of the patient. While it may not have reduced the amount of pain the patient undergoes, it has been recorded that the music therapy shows a positive response in patients. Hence, music distraction proves to be an effective behaviour management tool in children during dental procedures and thus, instils a positive dental attitude.

Introduction

Anxiety is defined as a displeasing feeling related to sensation that something undesirable is going to happen. It is a state of apprehension, uncertainity or fear, resulting from the anticipation of a realistic or imaginary threatening event or situation [1]. The causes of anxiety in child patients are direct experience, indirect experience, lacking of control, fear of unknown, trait anxiety of children, socio-economic status, temperament of the child and general behaviour problem of the child [2]. Amongst

various anxieties, dental anxiety is placed at fourth position and at ninth position among intense fear. If left untreated for a long time, it will worsen the oral health of such patients, which eventually leads to invasive and complicated dental treatment, that is often going to be unpleasant and in turn increases the negative attitude in an anxious children [2].

Inspite of many efforts taken regarding the techniques, technologies, and materials, anxiety related to the dental environment and specific procedures is a significant and common problem faced by the children globally and considered as barrier in providing quality dental treatment [3]. One such non-invasive, non-pharmacological technique to manage a child appropriately in dental clinic is distraction. 'Audio distraction' is the non-invasive and easily acceptable technique in which the patient listens to music throughout a stressful dental treatment procedure and distracts herself/himself. The success of audio distraction in medical setting is well-recognised, but the effect of this technique in dental settings still needs to be investigated and researched [4].

Music Therapy

Music is used in various clinical fields such as medical, dental practices, physiotherapy, speech therapy and surgical field. Music is a set of information which in the form of signals reaches the human nervous system. Music also affects our metabolism and therefore, it can change our behaviour, develop emotions or bring memories to our minds. Music is well-known for its relaxing effects and easing anxiety [5].

Music therapy is an interpersonal process in which the therapist uses music and all its aspects to improve and restore the health of patients. Factors contributing to the effects of music therapy are:

Modulation of attention: Music diverts our mind and grabs our attention from unpleasant stimuli such as pain, anxiety and so on. Therefore, this explains reduction in anxiety and perception of pain during painful dental procedures.

Modulation of emotion: Listening to a particular song can make you smile or feel sad or experience any other emotion. Music has the ability to modulate emotions because it plays an important role in regulating the activity of brain.

Modulation of cognition: Music is related to memory and storage processes which include events related to musical experiences.

Modulation of behaviour: Music therapy also works through modulating behaviour. Music affects behaviour patterns such as walking, speaking and grasping.

Modulation of communication: Music also influences communication; infact music is a means of communication.

Mechanism of Action of Audio Distraction/Music Therapy

The first and the most important mechanism is the gate control theory of pain given by Ronald Melzack and Patrick Wall in 1965 [3]. This theory implies that pain signals are carried from place of injury via nerve receptors in the spinal cord through synapses to receive the pain information in the brain. When there are two sensory stimuli, the gate is opened for auditory stimulus, thus, increasing audio stimulation and decreasing pain perception. Therefore, here the audio stimulation prevents pain sensation travelling to Central Nervous System (CNS) [3]. A second mechanism is distraction. Noguchi defines it as, "Any technique which can divert the attention from noxious, painful stimuli such as the sound of hand instruments utilised by dentists for scraping across a rough tooth surface". Distraction is a technique of diverting the patient's attention from harmful stimuli to pleasant stimuli.

The use of distraction techniques enables the child to divert his/her attention from anxiety inducing stimuli to more pleasant stimuli [6]. Thereby, helps in reducing the perception of the pain, especially during the administration of local anaesthesia. Various factors affecting the use of distraction techniques such as age of the child; as younger children show more disruptive behaviour and the mental development of the younger differs from older children. Other factors affecting the behaviour of the children are past adverse dental experience, the sound of air rotor and suction device, indirect experience or familial trait, lack of control of the situation, fear of unknown etc., [7]. Final mechanism is the cross sensory masking. It is the direct suppression of pain by intense stimulation by another sensory mode [8]. Physiologically, pain and auditory pathways are closely associated in reticular formation and lower thalamus. These two interactions are highly inhibitory. Therefore, suppression of pain sensation is due to stimulation of another sensory pathway which is inhibitory. This is due to the masking of pain impulses by the auditory stimulation [9].

Audio Distraction in Anxious Dental Patients

Distraction is one of the non-pharmacological behaviour management technique in which it draws the attention of child away from unpleasant stimuli in order to accomplish dental treatment with desired quality. Based on the theory of McCaul and Mallot, the pain perception of the patient is decreased when the patient is distracted from an unpleasant stimulus. Perception of pain is directly proportional to the amount of time patient concentrates on the painful stimulus [10].

Reduction in anxiety due to music distraction may occur:

When a child listens to music, he/she tends to close his/her eyes to concentrate on the audio presentation and therefore, it screens out the sight of dental treatment.

The sound of music also eliminates the unpleasant sounds in the dental setting like the sound of air rotor [2].

The various modalities available for audio distraction are music, audio presentations (which may include the use of mother’s voice) via headphones, story telling etc. Whereas the use of television, mobile phones, video games and recently the inclusion of virtual reality, all contribute to audiovisual aids. Selection of the individual aid depends upon various factors like age of the child, its reliability, ease to use in clinical settings, tools themselves must not provoke anxiety etc., [11]. Audiovisual aids increases the co-operation of patients as they are user friendly, decreases the chair side time, creates a positive atmosphere, inexpensive except in case of virtual reality. Although advantageous, some limitations may include like the cost, availability of these aids, some dentists may find them as obstacles limiting access to child’s mouth, need for proper positioning of ear phones and eye glasses [12]. An ideal distracter is one which involves all the senses. Therefore, audiovisual distraction is considered superior as it involves all the senses, leading to full concentration of child on pleasant stimuli and in return reducing the anxiety leading to positive favourable experience [10].

According to a study conducted by Yamini V et al., music distraction may be helpful as an adjuvant with other behaviour management techniques, the use of audiovisual distraction has showed positive outcomes in the behaviour of child exhibiting mild to moderate anxiety [2]. Similar result of positive outcomes was obtained by Alves IBS et al., in the behaviour of child exhibiting mild to moderate anxiety [13]. Literature review of previously published studies and conclusions is presented in [Table/Fig-1] [2-4,14-20].

[Table/Fig-1]:

Studies and Conclusions [2-4,14-20].

Authors	Title of the study	Methodology	Conclusion

Authors	Title of the study	Methodology	Conclusion
Yamini V et al., [2] 2010	Effectiveness of music distraction in management of anxious paediatric dental patients	Music distraction, Venham's picture test.	Audio distraction did decrease the levels of anxiety in anxious paediatric dental patients.
Navit S et al., [3] 2015	Effectiveness and comparison of various audio distraction aids in management of anxious paediatric dental patients	Nursery rhymes, Venham's picture test	Audio distraction was effective in reducing anxiety and audio stories were most effective.
Singh D et al., [4] 2014	Stress reduction through audio distraction in anxious paediatric dental patients	Audio distraction (head phones), Venham's picture test, Pulse oximeter	Audio distraction did decrease the anxiety in paediatric patients to a significant extend.
Ainscough SL et al., [20] 2019	A review of effect of music on dental anxiety in children	Instrumental music, North Carolina scale Behaviour rating scale	Music has been shown to influence both biological and psychological aspect of anxiety.
Ramar K et al., [18] 2016	Effect of audio analgesia in 6 to 12 year old children in dental treatment procedure	Head set, audio player, Venham's picture scale	Method of distraction using audio analgesia instils better positive dental attitude in children and decreases pain perception.
Jindal R and Kaur R [16] 2011	Can we tune our paediatric patients?	Headphones, Venham's picture test	Audio distraction did decrease the level of anxiety in anxious paediatric patients.
Marwah N et al., [15] 2005	Music distraction -it's efficacy in management of anxious paediatric dental patients	Instrumental music, nursery rhymes, Venham's anxiety rating scale.	Audio distraction did decrease the anxiety in paediatric patients although not to a significant level.
Singh RK et al., [17] 2016	Effectiveness and comparison of various audio distraction aids in management of anxious paediatric patients	Musical nursery rhymes, Venham's picture test	Managing paediatric patients with audio distraction aids of their choice is an effective method for comfortable handling of patients.
Gupta N et al., [19] 2017	Evaluation of role of music as non pharmacological technique in management of child patients	North Carolina Behaviour Rating Scale, Venham's picture test, upbeat music	No significant differences were found with music in reduction of anxiety.
Bhagdadi ZD [14] 2000	Evaluation of audio analgesia for restorative care in children treated using electronic dental anaesthesia	North Carolina Behaviour Rating Scale, 3M Dental Electronic anaesthesia system, Music	The use of electronic dental anaesthesia with audio distraction resulted in significant behaviour of paediatric patient behaviour

According to a study conducted by Navit S et al., audio stories was most effective in reducing anxiety in children as child become more involved and concentrate on the audio story and thus diverting attention from anxious dental stimuli [3]. Several other studies conducted by Yamini V et al., Marwah N et al., Jindal R and Kaur R, Singh RK et al., Ramar K et al., Ainscough SL et al., Butala PB et al., who found that music distraction is an effective means of reducing stress in anxious dental children [2,15-18,20,21]. Whereas, others like Gupta N et al., found no significant differences in reduction of anxiety with the use of music distraction [19].

Conclusion(s)

Music/audio distraction is a non-pharmacological and non-invasive method of behaviour management. This technique is easily acceptable by the parent as it calms the child and thus reduces the anxiety of the child. However, it can hamper communication between dentist and child, but this can be avoided by keeping the appropriate volume of the music. Management of children with dental anxiety still poses a major concern in our daily practice. For any dentist the main desire is to treat their child patients in anxiety free environment, at the same time providing best quality dental care. Music has always shown to instil a positive attitude among children. Hence, audio distraction could be one of the most efficient, economical, non-pharmacological means of behaviour management techniques. Therefore, further research is necessary with other non-invasive techniques of behaviour management.

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