



ORIGINAL RESEARCH PAPER	Dentistry
COMPARISON OF DIFFERENT DISTRACTION TECHNIQUES USED IN PEDIATRIC DENTAL PATIENTS: A SYSTEMATIC REVIEW	KEY WORDS: Pediatric patients, Pedodontics, Dental fear and anxiety, Distraction methods.

Dr Fozia Mir.	Tutor Department of Pedodontics. GDC and Hospital Srinagar.
Dr Nadia Irshad	Tutor Department of Pedodontics. GDC and Hospital Srinagar.
Dr Nazia Lone	Professor and Head Department of Pedodontics. GDC and Hospital Srinagar.
Dr Insha Showkat	Registrar. Department of Pedodontics. GDC and Hospital Srinagar.
Dr Sakshi Bamba.	Associate Professor. Department of Pedodontics. GDC and Hospital Srinagar.
Dr Sana Farooq	Lecturer. Department of Pedodontics. GDC and Hospital Srinagar.

ABSTRACT	Dental anxiety is one of the major problem that Pedodontists face while treating the pediatric patients thus, clinicians tend to perform one or other behavior management techniques in order to overcome dental anxiety in children. Thus, this systemic review aimed to compare and evaluate the published literature regarding the sequel of distraction techniques on pain perception, anxiety and patient experience during dental practice. A detailed electronic search was conducted on 3 databases including PubMed, Google Scholar, and Cochrane Library. The databases were searched for articles published in the English language between 2015 and 2024. Among 144 studies, 32 studies fulfilled the criteria of eligibility and were included in this study to be analysed (PRISMA). Various approaches have been proposed from time to time to overcome dental anxiety in children such as use of audio-visual aids and instruments, active distraction etc which manifested in reducing the anxiety level of child.
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INTRODUCTION

Dental anxiety is defined as an emotional reaction in response to constant distress associated with dental procedures. It can involve the emotional, physiological, behavioral and cognitive components that may vary between different personalities. The patient perceives fear and anxiety as a signal of threat and danger due to unusual surroundings, potentially painful or invasive procedures, noise production from dental equipment's, and previous negative dental experiences. The prevalence of anxiety and fear in response to the dental procedures range from 6% to 42% among children of different ethnicities and backgrounds¹. A young child's emotional and behavioral response to dental treatment is a matter of serious concern to pediatric dentists and researchers. The child's fearful or uncooperative behavior may impede the efficient delivery of dental care and compromise the quality of treatment provided. If not adequately resolved, a persistent negative response pattern may emerge which functions as a barrier to routine dental care². Thus, various techniques are employed in order to overcome the anxiety levels in children. The main objective of these techniques is to treat child in safe and effective way, and thus ensuring successful treatment. A wide variety of techniques are available to assist and manage the uncooperative children such as audio, audio visual, tell-show-do, relaxation, distraction, systematic desensitisation, modelling, audio analgesia, hypnosis, behaviour rehearsal etc. Among these techniques, traditional behaviour management techniques such as papoose board and hand-over-mouth techniques can be successful, but the attitude of parents towards these techniques is unacceptable and thus their usage is reduced nowadays. lately, non-aversive technique like distraction is becoming more popular. Thus, this systematic review was done to determine the efficacy of various distraction techniques in reducing the anxiety level of highly uncooperative pediatric patients³.

MATERIAL AND METHODOLOGY

A detailed electronic search was done by two researchers searching the randomized controlled trials on PubMed, Google Scholar, and Cochrane Library, with key words Pediatric patients, Pedodontics, Dental fear and anxiety, Distraction methods between 2015 to 2024 using key words: Pediatric patients, Pedodontics, Dental fear and anxiety,

Distraction methods. After extraction of data the Quality assessment of all articles was done by Jadad and Chalmers score. Finally the data which met all the criteria's were included in the study. (PICO and PRISMA). (Table 1 and FIGURE 1). Among 144 studies, 32 studies fulfilled the criteria of eligibility and were included in this systematic review. (Table 2).

Inclusion Criteria

- Literature published in English
- Original research including RCTs and comparative studies
- Studies based on distraction methods used to manage dental anxiety during dental treatment
- Studies involving patients upto 12 years of age

Exclusion Criteria

- Letter to editorials
- Incomplete trials
- Case reports

HYPOTHESIS

NULL HYPOTHESIS:

There is no difference between the different distraction techniques in reducing anxiety of children

ALTERNATE HYPOTHESIS:

There is a difference between the different distraction techniques in reducing anxiety of children

Table 1

PICO
P: Participants (Pediatric patients)
I: Investigation (Distraction)
C: Comparison (Dental treatments performed with different distraction methods)
O: Outcome (effectuality of distraction techniques in reducing anxiety)

Table 2

Author/ year	Study design	Sample size	Age	Distraction method	Results/conclusion
Navit et al./2015 ⁴	RCT	150	6-12	Audio only (instrumental music, the audio stories, movie songs and the musical nursery rhymes)	Audio stories were found to be more effective in anxiety reduction in children
Kaur et al./2015 ⁵	RCT	60	4-8	Audio and audiovisual	Audiovisual mode of distraction technique was found to be a most beneficial to manage the anxiety of children
Chaturvedi et al./2016 ⁶	RCT	40	6-10	Audiovisual (with and without wearing eyeglasses)	This technique was proved to be a good option in child's anxiety Management.
Al-Khotani et al./2016 ⁷	RCT	56	7-9	Audiovisual	AVD methods showed positive responses in reduction of anxiety and fear in children
Sayed et al/2016 ⁸	RCT	90	7-9	DOM: - Live display of the procedure was shown to the patient using video output of the DOM displayed on a 72-inch LCD monitor, angled for best visibility of the child	There is a reduction in anxiety from the first visit to the second visit for dental treatment when the DOM is used
Gupta et al./2017 ⁹	RCT	60	3-7	Upbeat music and relaxing music	Music distraction was found to be not effective in this study
Khandelwal et al./2018 ²	RCT	400	5-8	Audiovisual (cartoons and animated clips) and tell show do Methods	Combination of both the techniques produced more beneficiary effect in relieving the anxiety. AVD showed more better results than tell-showdo (TSD)
Ghadimi et al./2018 ¹⁰	RCT	28	4-5	Visual (cartoon and tell show do)	Reduction in fear and anxiety
Al-Halabi et al./2018 ¹¹	RCT	102	6-10	Audiovisual (virtual reality box and tablet device with wireless Headphone	Audiovisual (virtual reality box and tablet device with wireless Headphone
Niharika et al /2018 ¹²	RCT	40	4-8	Virtual reality eyeglasses.	VR distraction is a clinically viable technique with a high potential to alleviate pain and anxiety associated with various dental procedures.
Shetty et al./2019 ¹³	RCT	120	5-8	Audiovisual (virtual reality)	This can be practiced as an effective behavior adaptation technique in children during invasive procedures of dental treatments
Rajeswari et al./2019 ¹⁴	RCT	45	6-10	Audiovisual, cognitive behavioral play therapy and tell show do	CBT was found to be most effective method in children's anxiety reduction
Hegde et al./2019 ¹⁵	RCT	30	6-11	Vibration	It helped more in the management of the patients than the conventional method
Rao et al./2019 ¹⁶	RCT	30	6-10	Audiovisual (virtual reality)	Virtual reality tool helps in distraction of children's anxiety Level
Pande et al./2020 ¹⁷	RCT	60	5-8	Audiovisual (virtual reality, tell show do and video game)	VR alone was very helpful and TSD alone was the least beneficial in managing anxious child
Azher et al/ 2020 ¹⁸	RCT	48	6-8	Bubble Breath Play Therapy and Tell show do .	The BBPT acts as a distraction and can be considered a child-friendly method to enhance rapport with the children; however, it does not allay the fears; while the TSD technique is successful in achieving this. Hence, the BBPT can aid in relaxing the child and thereby help in desensitizing the child's fear by using appropriate behavior shaping strategies
James et al./2021 ¹⁹	RCT	150	6-8	Music and aroma Therapy	Both the techniques produced the better results. However, the music distraction produced was found to be more effective.
Greeshma et al./2021 ²⁰	R CT	90	6-8	Virtual reality distraction, audio distraction and tellshow-do	Virtual reality (VR) was found to be most effective distraction tool in comparison with audio and tell show do methods
Felemban et al./2021 ²¹	R CT	50	6-12	Audiovisual (virtual reality)	Female subjects and the younger age and female dental patients were found to be more likely to appear with higher pain scores regardless of the distraction tool used in treatment
Guinot et al./2021 ³	RCT	84	6-8	Active audiovisual (play station video games) and passive audiovisual (cartoon film)	Both active and passive distraction methods were adapted by the patients

Aditya et al./2021 ²²	RCT	102	6-9	Fidget spinner, kaleidoscope and virtual reality	Fidget spinner, kaleidoscope, and virtual reality seem to be effective distraction methods and can be recommended as effective approaches to help alleviate children's dental anxiety during inferior alveolar nerve block Procedures
Delgado et al./2021 ²³	RCT	100	4-6	Audiovisual	Despite of the children's subjective expression, AUD was helpful as a distraction tool for behaviour Management
Buldur et al 2021 ²⁴	RCT	76	7-11	Using virtual reality (audiovisual).	Virtual reality significantly reduced pain and anxiety during local anesthesia in children undergoing dental treatment.
Mahajan et al./2022 ²⁵	RCT	60	5-9	Audiovisual (PlayStation gaming console) and print format entertainment (favorite comic)	Distraction tools were effective in the management of patient's Anxiety
Bahrololoomi et al./2022 ²⁶	RCT	35	7-10	Bubble blower	The bubble blower used for the breathing exercises can be used as a beneficial and effective distraction method to reduce the moderate to severe anxiety and pain during the invasive dental procedures
Shekhar et al./2022 ²⁷	RCT	123	8-12	Active (stress ball) and passive (audiovisual)	Dental anxiety was improved by distraction techniques
Jafarimofrad et al./2022 ²⁸	RCT	60	4-7	Audiovisual and muted video	Audiovisual distraction (AVD) method was beneficial in reducing the anxiety and pain of children while mute-video distraction (MVD) method was not effective
Jameel F et al/2023 ²⁹	RCT	80	5-8	Audiovisual distraction, modelling comination of both	Combination of both techniques was found to be better than individual technniques.
Sadeghi et al /2023 ³⁰	RCT	60	4-8	Music and kids story	Both techniques reduce the anxiety level of patient
Lekshmi Shobana chandran et al/2024 ³¹	RCT	33	6-9	No distraction, mobile phone, virtual reality	Reduction of anxiety more by virtual anxiety followed by other distractuion methods and control group.
PAV Aditya et al/2024 ³²	RCT	60	6-9	Fidget spinner, kaleidoscope , virtual reality	All distraction methods showed the effectiveness in alleviating anxiety of children during dental procedures.
Zahra Bahrololoomi et al/2024 ³³	RCT	15	6-8	Virtual reality	Virtual reality group showed the significant reduction in anxiety level of children than control group.

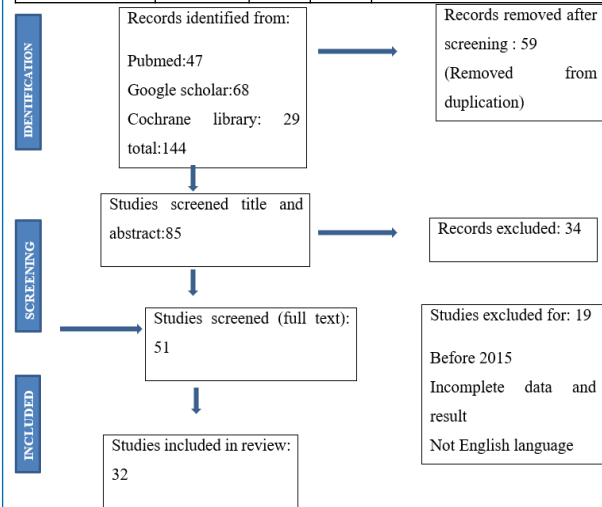


FIGURE 1

DISCUSSION

In certain cases, pharmacological behavior management can cause side effects such as drug allergy, however no adverse reactions are found when active or passive distraction interventions are used during the treatment of pediatric patients. The implementation of the use of distraction can be done through simple training, such as storytelling, watching TV, listening to music, playing with toys or interaction with parent, TSD etc. Various studies emphasize the significant importance and necessity for children to choose the type of distraction according to their own choice. Combining the

results of 32 RCTs, this study show that active distraction can effectively reduce the procedural pain and anxiety of children³⁴.

The various methods that are used to reduce dental anxiety includes the use of audio and visual aids, behavioral therapy and TSD methods during the treatment thus allowing the child to get treated in a calm and familiar environment¹. Most of above have shown that distraction can improve children's cooperation, reduce children's plasma cortisol concentration during procedure, reduce children's crying time, and thus reduce children's discomfort¹.

Some studies have shown that distraction can improve children's cooperation, reduce children's crying time, reduce children's plasma cortisol concentration during operation, and reduce children's discomfort. Previous studies have suggested that children's pain has not been effectively controlled because the central nervous system of infants and children is considered insufficient to translate, transmit, regulate and perceive pain; due to developments in the field of physiology and behavior, it has been recognized that the central nervous system begins to translate, transmit and regulate nociceptive stimuli from the 23rd week of pregnancy. Literature have justified the effectiveness of drug treatment and non-drug intervention in pain, sometimes the use of drugs alone for pain control is not enough, it is recommended to use non-drug treatment in some cases in order to shift the patient's attention to alternative factors. Distraction is by diverting patients' attention from medical operations to other things, limiting pain perception, changing operational pain responses and suppressing pain symptoms. The use of distraction techniques is an effective intervention that can

improve children's emotional effects and reduce pain³⁴.

The results show that pain stimulation can be effectively and significantly reduced in the emergency environment. Therefore, it is necessary to implement personalized distraction methods according to children's age, level of development, temperament and type of treatment and interest. This systematic review showed that distraction in any form significantly reduced the anxiety level of children however the study done by Gupta et al. 2017 showed that despite the use of distraction there was non signification reduction in anxiety levels and this could be attributed to the fact that the age group was included children was comparatively less as compared to the other studies.

CONCLUSION

Dental fear and anxiety among pediatric patients is a major concern among the pediatric dental surgeons. Several non-pharmacological methods have been employed from time to time to overcome this problem. These management techniques have proved to reduce the anxiety level of children. Thus null hypothesis is accepted as there is no difference between the different distraction techniques because all distraction techniques in one or other way reduce the anxiety of children and rejecting alternate hypothesis.

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