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Comparative evaluation of state anxiety & pain perception of children using virtual reality and audio guided imagery- A randomized clinical trial.

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Abstract

Background and Aim: Behaviour management is not just the application of individual technique formulated to deal with individuals but is a comprehensive methodology meant to build a relationship between patient and dental professional & at same time in still positive dental attitude. The study aims to evaluate the efficacy of virtual reality & audio guided imagery in reduction of state anxiety and pain perception during inferior alveolar nerve block among 5-8 years old children.

Methodology: A total of 25 children aged 5-8 years classified as outwardly apprehensive and fearful according to Lamp shire's classification requiring bilateral inferior alveolar nerve block were selected. A split-mouth technique was implemented with Virtual Reality (VR) as intervention applied on one side and Guided Imagery (GI) applied on the contralateral side with 14 days follow-up between the interventions. Pre and post operative state anxiety and pain perception during inferior alveolar nerve block were assessed using RMS pictorial scale and sound eye motor scale respectively. All the readings were entered and statistically analysed using paired and unpaired t test.

Results: Patient's acceptance to virtual reality was better than audio guided imagery. Pain perception and post-op anxiety was significantly lower when VR was used in comparison to audio guided imagery. There was no statistically significant difference in pre op and post op anxiety when audio guided imagery was used.

Conclusion: State anxiety can trigger a very adverse response in dental setup and behaviour management with VR can be a good distraction technique in children with state anxiety, hence it can be implemented as one of the distraction techniques in clinics to reduce state anxiety and pain perception.

Keywords: state anxiety, virtual reality, audio guided imagery.

Introduction

Behaviour is manner in which a person acts or performs. Behaviour management is not just the application of individual technique formulated to deal with individuals but rather is a comprehensive methodology meant to build a relationship between patient and dental professional. It is means by which the dental health team effectively and efficiently performs treatment for a child and at same time, instils a positive dental attitude. (Wright)¹

Childhood experience plays an important role in forming an adult behaviour, proper behaviour management from early stages will help in development of proper oral health attitude among individuals throughout life.¹

Most children willingly accept dental treatment when app roached in a positive, supportive manner but for those who exhibit considerable anxiety or problematic behaviour, child behaviour management requires skills in expressive communication, empathetic listening and coaching.¹

Negative dental experiences, especially those resulting from dental pain, can lead to the development of fear and anxiety, which in turn can lead to the avoidance of further dental treatment. Thus, the fear of painful dental treatments and dental anxiety are confounding problems with which dentists must cope up.¹

Appropriate management techniques should be chosen based on the individual child's requirements and the individual dentist's experience and expertise. Various techniques have been used to manage the child's Behaviour during the dental visit.¹

Distraction is a well-known technique, based mainly on redirecting attention away from the painful stimulus. At present, the most common distraction techniques used include hypnosis, music, audio-visual media and VR, almost all of which are based on distraction, relaxation, imitation, and systematic desensitisation.2 These VR devices limit the input of stimuli from the real environment and enhance the input from the virtual environment, decreasing, by perceptual mechanisms, the sensation of presence in the real world and increasing the presence in the virtual environment. Virtual reality glasses and incorporated auditory helmets are the most commonly used components; with them, the subject's

visual and auditory field is practically covered by the virtual information, preventing sensory input from the real dental world (sound of turbines, sight of instruments, needles, injections, etc.) in which the patient is truly immersed. 2

Another an innovative pain relief technique called imagery therapy that works on imagination before/ during and after procedures is now based on the assumption that the daydreams of others can be affected through deliberate effort.3 This type of mind-body exercise involves having patients imagine themselves in a pleasant place to reduce stress. This type of psychomotor exercise is widely viewed as an alternative treatment method aimed at decreasing pain and anxiety and this can alter the child's overall perception. ³

The present study focuses on evaluating the efficacy of virtual reality & audio guided imagery in reduction of state anxiety and pain perception during inferior alveolar nerve block among 5-8 years old children.

Materials and methods

A randomized clinical trial was performed on children attending the Department of Pediatric and Preventive Dentistry, KVG Dental College and hospital, Sullia. Ethical clearance was provided by the institutional ethical committee of KVG Dental College and hospital, Sullia. A total of 25 children aged 5-8 years classified as outwardly apprehensive and fearful according to Lamp shire's classification requiring bilateral inferior alveolar nerve block were selected. Children with systemic diseases, special health care needs who require pharma co logical behavioural guidance techniques were excluded.

Split mouth technique was used for the intervention and Flip of coin method was used to segregate the subjects for the intervention as follows: flip of coins -heads: virtual reality and flip of coins -tails: audio guided

imagery. For VR technique - After being seated on dental chair, child was introduced to VR device by explaining what it is and how it works, then the child was made to wear it. After child gets comfortable with the device then 2% lignocaine IANB was administered. For GI technique - After being seated on dental chair, Child was introduced to audio Guided Imagery by giving them a pair of headphones and a audio was played, after the child gets comfortable 2% lignocaine IANB was ad ministered. Procedure was performed after LA administration. Patient was Recalled after 14 days & alternate distraction technique was done i.e., left side -Guided Imagery and right side - VR method for 2 % lignocaine LA inferior alveolar nerve block. Pain perception was assessed during IAN block using sound eye motor scale. Anxiety was assessed using Raghavendra, Madhuri, Sujata (RMS) pictorial scale preoperatively and post operatively. All the readings were noted and entered in the excel sheet. All data collected was statistically analysed using the SPSS software. The mean and the standard deviation were calculated for each variable. Analysis of the data between groups was carried out by using paired and unpaired t tests. P < 0.05 was considered as statistically significant.



Figure 1:



Figure 2:



Figure 3:

Results

Table 1: Age and gender distribution among study participants.

Parameter	Frequency	Percentage
Gender		
Male	10	40%
Female	15	60%
Age (In terms of mean and SD)	7±1.07 years	

Table 2: Inter group comparison of pre and post opanxiety between VR and GI

Groups	Number of	VR	AGI	P value
	subjects			
Pre-op	25	3.70±0.57	3.75±0.44	0.759
Anxiety				
Post-op	25	2.05 ± 0.22	3.45±0.51	< 0.05
Anxiety				



Table 3: Inter group comparison of pain perceptionduring IAN block between VR and GI

Groups	Number of	VR	AGI	P value
	subjects			
Pain	25	1.75±	2.85±	< 0.05
perception		0.44	0.36	

Patient's acceptance to virtual reality was greater than audio guided imagery. Pain perception and post-op anxiety was significantly lower when VR was used in

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comparison to audio guided imagery. There was no statistically significant difference in pre op and post op anxiety when audio guided imagery was used.

Discussion

Dental fear and anxiety are more commonly experienced by children confronting administration of local anesthesia resulting in increased pain reactivity. Thus, managing a child's behaviour becomes vital part in Pediatric practice. The present study was intended to compare the effectiveness of Virtual Reality (VR) and audio guided imagery (AGI) in reducing state anxiety and pain perception during inferior alveolar nerve block. According to Ruth Suzanne et al inferior alveolar nerve block is one of the most painful and stressful procedures in Pediatric dentistry and children of 5-8 years of age were selected because they tend to show more anxiety which is backed by (Perou R et al).

In the current study, RMS pictorial scale (R M Shetty et al) was selected as it measures state anxiety similar to that of venham pictorial scale due to its strong cor relation (0.76) with an added advantage of child's real picture for better acceptance rather than animated pictures used in venham pictorial scale. Sound Eye Motor scale was selected to assess pain perception as it concentrates on changes in patients sound, eye and movement to evaluate whether patients are relaxed or under pain during treatment (Garima lath Wal et al) and has 90% interrater reliability according to (G.Z. Wright et al).

In the present study postoperative anxiety recorded using RMS scale and pain perception recorded using SEM scale was significantly lower when VR was used compared AGI as it is destitute of operator's field and sound and also has potential to reduce the memories during the procedure (Tanja et al).

Patient's acceptance to virtual reality was greater than audio guided imagery. There was no statistically signifi cant difference in pre op and post op anxiety when audio guided imagery was used.

Also, it would be better if different treatment procedures were evaluated separately and if both the genders were recruited equally.

One of the interesting features of VRD is that its effect on behaviour modification can be carried for long-term. So, it throws a challenge for researchers for further longterm follow-up studies based on VRD.

Conclusion

Even though there are studies that separately studied their efficacy on reduction of anxiety, this study is new of its kind that compare two types of distraction techniques and shows VR is much effective specially in inferior alveolar nerve block as it keeps the child's attention, perception away from site of injection, so state anxiety can be kept under control.

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