



Efficiency of Audiovisual Distraction Eyewear and Computer Controlled Local Anesthesia Delivery System in Children

Kshitija Kamlakar Bansode^{1*}, Dimple Padawe², Vilas Takate³, Kishor dighe⁴ and Gauri Vijaykumar Rathi¹

¹Post Graduate Student, Department of Pediatric and Preventive Dentistry, Govt Dental College and Hospital, Mumbai, India

²Professor and HOD, Department of Pediatric and Preventive Dentistry, Govt Dental College and Hospital, Mumbai, India

³Associate Professor, Department of Pediatric and Preventive Dentistry, Govt Dental College and Hospital, Mumbai, India

⁴Assistant Professor, Department of Pediatric and Preventive Dentistry, Govt Dental College and Hospital, Mumbai, India

*Corresponding Author: Kshitija Kamlakar Bansode, Post Graduate Student, Department of Pediatric and Preventive Dentistry, Govt Dental College and Hospital, Mumbai, India.

DOI: [10.31080/ASDS.2022.06.1356](https://doi.org/10.31080/ASDS.2022.06.1356)

Received: March 21, 2022

Published: April 11, 2022

© All rights are reserved by Kshitija Kamlakar Bansode, et al.

Abstract

Aim: The aim of this study is to evaluate the efficiency of audio-visual distraction eyewear and computer-controlled delivery system during extraction procedure.

Materials and Methods: This study includes 40 children, aged between 4 to 9 years. Children were randomly divided equally into two groups as I and II. Modified Child Dental Anxiety Scale was used for assessment of anxiety before treatment. After the procedure, children were asked to rate their pain while treatment on the Wong Bakers' faces pain scale. Changes in blood oxygen saturation level and heart rate were noted in every 10 min.

Results: Statistically significant difference was seen for the values of heart rate, anxiety and pain severity between the groups ($p < 0.01$).

Conclusion: The use of audio-visual distraction eyewear and computer controlled local anaesthesia delivery system is a good option for effective behaviour management technique for invasive procedures like extraction in young children.

Keywords: Audio-Visual distraction Eyewear; Extraction; Dental Anxiety; Pediatric Dentistry

Introduction

One of the most important aim of the Pediatric Dentist is to offer the anxiety free atmosphere along with good quality of dental treatment to the children. According to various studies it has shown that approximately 14% of 4-11 years old children are anxious during dental treatment and one of the biggest fears is of injection. To treat the children various pharmacological and non-pharmacological methods are available [1,2].

One of the common methods of non-pharmacological management is distraction. This helps in reducing the stress and pain perception of children. Distraction involves television watching, listening to music etc which helps to distract the child from painful stimuli. That will lead to relaxed experience to the child [3].

Recently computer controlled local anaesthesia delivery system has been introduced. It distributes a constant flow rate of local an-

aesthetic irrespective of the location, density, and resiliency of the soft tissues at the injection site [4].

Hence, the aim of present study is to evaluate the efficiency of audiovisual distraction eyewear and computer controlled local anesthesia delivery system.

Methods

This randomized clinical study was carried out in Department of Pediatric and Preventive Dentistry in GDC Mumbai.

The study included 42 children aged 4–9 years old. For evaluation of anxiety level of children Modified Child Dental Anxiety Scale (MCDAS) was used before extraction procedures of primary molars.

According to inclusion criteria children with previous dental treatment like restorations and with MCDAS score of 19 and above, with no systemic disorders were recruited.

Children were randomly divided equally into two groups as I and II using the stratified random selection method. Informed consent was taken from the parents. After taking proper medical, dental history and radiographic examination, group I patients had undergone extraction treatment while watching cartoon of their choice projected through a projector without video eyewear. Patients were then anesthetized by using computer controlled local anesthesia delivery system.

Patients in group II were seated and then video eyewear was placed on the patients’ eyes and attached to the mobile and cartoons were played.

The video eyewear blocked the visual field of the child completely and had headphones to deliver the sound. Patients were then anesthetized by using computer controlled local anesthesia delivery system.

Blood oxygen saturation and pulse rate were monitored and noted throughout the procedure every 10 min using pulse oximeter for extraction procedure. After the completion of the extraction procedure, pulse oximeter and audiovisual distraction eyewear were removed, and the patients were asked to rate their pain while

Extraction on the Wong Bakers’ faces pain scale. (Figure 1) Anxiety level is evaluated by MCDAS scale after the treatment. A paired sample t-test and independent sample t-test were used to compare the significant changes.

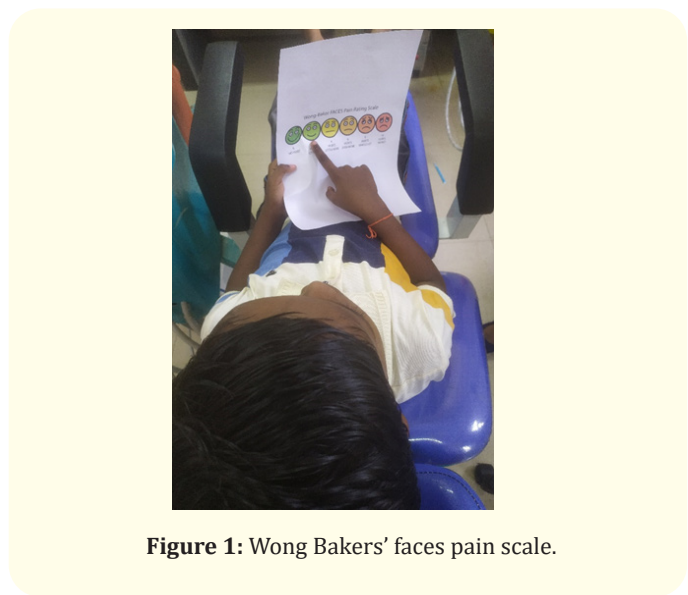


Figure 1: Wong Bakers’ faces pain scale.

Results

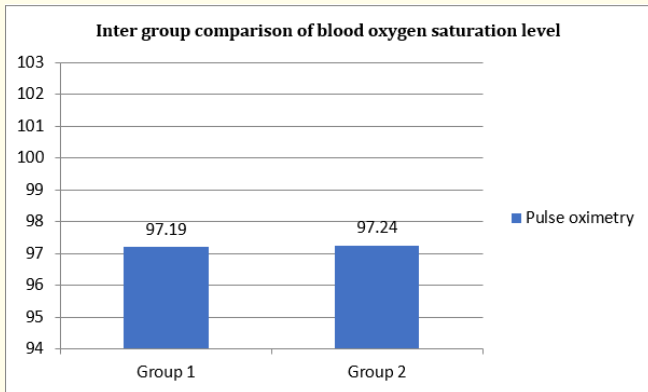
There were a random division 42 children two groups, 21 per group. Both the treatment groups had undergone extraction procedure. group I patients had undergone extraction treatment while watching cartoon of their choice projected through a projector without audiovisual video eyewear. Participants in group II, were allowed to use audio-visual video eyewear.

There is statistically non-significant difference among the groups for blood oxygen saturation level. While statistically highly significant difference seen for the values of heart rate, anxiety and pain severity between the groups ($p < 0.01$) (Graph 1-4)

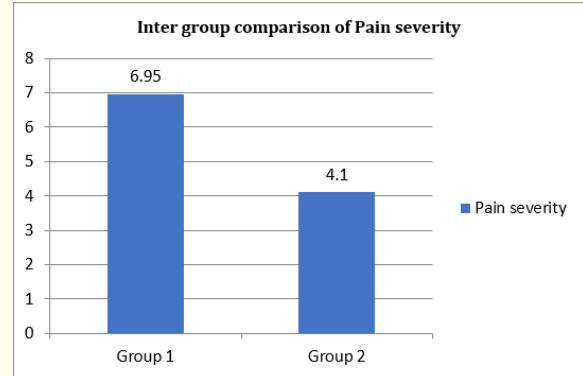
Discussion

This study showed that audio-visual distraction eyewear and computer controlled local anaesthesia are effective tools in management of anxious children.

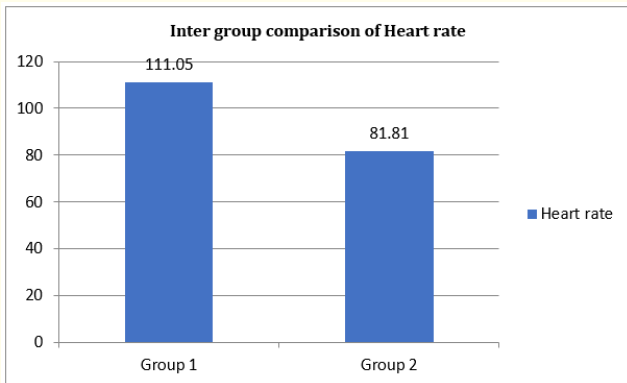
Ram., *et al.* (2010), in their study concluded that the use of AV eyeglass system was more effective than regular television screen and it can also be used instead of nitrous oxide-oxygen sedation in



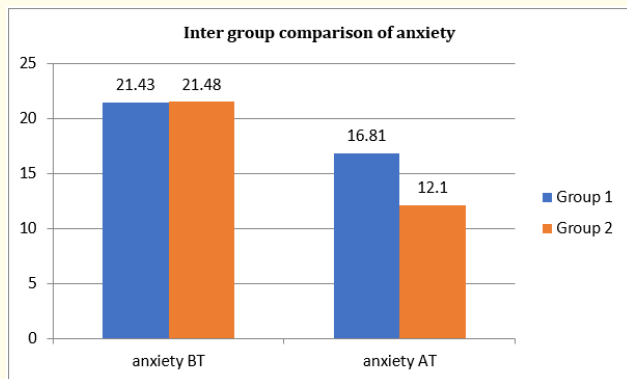
Graph 1: Inter group comparison of blood oxygen saturation level.



Graph 4: Inter group comparison of pain severity.



Graph 2: Inter group comparison of heart rate.



Graph 3: Inter group comparison of anxiety severity.

managing anxious patients in the dental clinic [5]. When there is comparison of various behaviour management techniques like music relaxation, storytelling, listening to the audio by headphones, playing video games and watching television, the AV eyeglasses minimize not only children’s anxiety towards dental treatment, but also enhance children’s cooperative behaviour [6,7] which is consistent with the results of this study.

Some earlier studies have also reported that parents and the paediatric dentists were relaxed and satisfied about this treatment modality [5].

Patel, *et al.* (2006) showed that children who enjoyed playing hand-held video games had less anxiety during local anaesthesia as compared with the children who had only their parental presence [8].

The video eyewear is a better distraction tool than watching videos projected on the screen. This is due to the occlusive eyewear which projects the images right in front of the eyes of the user thereby blocking out real world’s visual and auditory stimuli. As a result child’s attention will be diverted so that treatment will be easier. Animated cartoons can be shown to the children.

During any dental treatment, effective pain control is the key to achieve comfort, cooperation, and patient compliance [5,8]. Several techniques are used which include the application of topical anaesthetic before injection, use of smaller gauge needles, and slow delivery of the anaesthetic solution [9,10]. In our study, we used computer controlled local anaesthesia delivery system to induce local anaesthesia.

In the present study, there was no statistically significant difference for the values of blood oxygen saturation throughout the treatment.

Heart rate, pain severity and anxiety severity was greater in the group where audio-visual distraction eyewear was not used.

This combination modality using audio-visual distraction with audio-visual eyewear along with computer controlled local anaesthesia delivery system during extraction procedure was more effective than routine behaviour management interventions. Therefore, it is highly recommended as an effective behaviour management technique.

Conclusion

Audio-visual distraction and computer controlled local anaesthesia delivery system helps in reducing fear, anxiety of children while doing dental treatment. Hence, we should use it as adjunctive device for behaviour management.

Conflict of Interest

No conflict of interest.

Bibliography

1. Locker D., et al. "Age of onset of dental anxiety". *Journal of Dental Research* 78 (1999): 790-796.
2. Berge ten M., et al. "Childhood dental fear in the Netherlands: prevalence and normative data". *Community Dentistry and Oral Epidemiology* 30 (2002): 101-107.
3. Fakhruddin KS., et al. "Effectiveness of audiovisual distraction eyewear and computerized delivery of anesthesia during pulp therapy of primary molars in phobic child patients". *European Journal of Dentistry* 9 (2015): 470-475.
4. Hochman M., et al. "Computerized local anesthetic delivery vs. traditional syringe technique. Subjective pain response". *New York State Dental Journal* 63.7 (1997): 24-29.
5. Ram D., et al. "Audiovisual video eyeglass distraction during dental treatment in children". *Quintessence International* 41 (2010): 673-679.
6. Prabhakar AR., et al. "A comparison between audio and audio-visual distraction techniques in managing anxious pediatric dental patients". *Journal of Indian Society of Pedodontics and Preventive Dentistry* 25 (2007): 177-182.
7. Hoge MA., et al. "Use of video eyewear to manage distress in children during restorative dental treatment". *Pediatric Dental Journal* 34 (2012): 378-382.
8. Patel A., et al. "Distraction with a handheld video game reduces pediatric preoperative anxiety". *Paediatric Anaesthesia* 16 (2006): 1019-1027.
9. Al-Namankany A., et al. "Video modelling and reducing anxiety related to dental injections - a randomised clinical trial". *British Dental Journal* 216 (2014): 675-679.
10. Attar RH and Baghdadi ZD. "Comparative efficacy of active and passive distraction during restorative treatment in children using an iPad versus audiovisual eyeglasses: a randomised controlled trial". *European Archives of Paediatric Dentistry* 16 (2015): 1-8.

Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

Website: www.actascientific.com/

Submit Article: www.actascientific.com/submission.php

Email us: editor@actascientific.com

Contact us: +91 9182824667