A Comparative Evaluation of Heart Rate and Blood Pressure on Two Different Behaviour Management Techniques in Children

Dr Sruthi P1, Dr Shivaprakash P.K2, Dr Hina Noorani3

1Post-Graduate Student, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka, India
psruthinambiar[at]gmail.com
2Professor and Head, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka, India
drshivaprakashshgk[at]gmail.com
3Professor, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka, India
drnoorani21198[at]gmail.com

Abstract: Background: Dental practitioners have numerous methods to control anxiety and pain in children, and distracting the child appears to be the most common technique used for behavior management during dental procedures. Aim: To compare between two behaviour management techniques: audiovisual technique and parental presence based on heart rate and blood pressure among boys and girls of age group 5 to 10 years. Materials and Methods: Sixty children, thirty boys and thirty girls, aged between 5 to 10 years were selected and divided into three groups - Control group, Audio visual group, Parental presence group. Minor restorative procedures were done by the same operator for every child. The blood pressure of children was recorded before and after the procedure. Heart rate was recorded before, during and after the procedure using pulse oximeter. Chi Square Test was used to compare the Blood pressure among study participants. Repeated measures of ANOVA test followed by Bonferroni’s Post hoc Analysis was done to compare the mean Heart Rate between different time intervals in each study group. Results: Children in VR group showed lesser variation in BP and also a decrease in heart rate post treatment than the parental presence group. Conclusion: Use of audio visual technique is effective compared to parental presence in controlling the anxiety in children undergoing short dental treatments.

Keywords: Virtual reality, Parental presence, Heart rate, Blood pressure

1.Introduction

Behaviour management is considered a keystone entity in paediatric dentistry [1]. The major aspect of child management in the dental care is managing dental anxiety and fear as it is considered to be the main barrier for successful completion of dental treatment [2]. 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 [3]. Thus, the fear of painful dental treatments and dental anxiety are confounding problems with which dentists must cope up [4].

Dental practitioners have numerous methods to control anxiety and pain in children, and distracting the child appears to be the most common technique used for behavior management during dental procedures [5]. The application of virtual reality as a distraction technique could possibly be superior to traditional distraction techniques because it offers more immersive images via the occlusive headsets that project the images right in front of the eyes of the user. Depending on the model of VR device used, it may block out the real-world (visual, auditory, or both) stimuli. However, a literature review revealed sparse investigations on the potential application of VR distraction in the paediatric dental setting [6].

Parental factors such as child–parent relationship, parental anxiety, parent’s perceptions for child’s behavior in the dental operatory, parent’s past dental experiences, and parental presence or absence in the operatory during dental treatment have a major role in the behavior of the child in the dental operatory during treatment. However parental presence in dental operatory is considered a controversial issue [7].

Hence, the present study was planned to compare between two behavior management techniques: audiovisual technique and parental presence based on heart rate & blood pressure among boys & girls of age group 5 to 10 years.

2.Objectives

To compare between two behaviour management techniques: audiovisual technique and parental presence based on heart rate and blood pressure among boys and girls of age group 5 to 10 years.

3.Materials and Methods

The study was carried out in the Department of Pediatric and Preventive dentistry, P.M.N.M Dental College, Bagalkot. Sixty children, thirty boys and thirty girls, in the age group 5 to 10 years were selected after obtaining written consent from parents.

3.1 Inclusion criteria

- Children who were willing to participate in the study with parental consent.
- Children of the age group 5 to 10 years undergoing 1st dental visit.
- Children without any history of systemic disorder or infectious diseases.
3.2 Exclusion criteria

- Children who were not willing to participate in the study.
- Children suffering from any systemic disease or with any history of illness.
- Children whose parents were not willing to give the consent.

3.3 Data collection

The blood pressure (BP) of the child was recorded using a sphygmomanometer. The patient was seated on a chair with arm flexed and elbow at the level of heart. The cuff was wrapped around the upper left arm and inflated. Both systolic and diastolic pressure was noted. The variation in BP before and after the procedure was recorded.

Pulse oximeter was used to monitor the heart rate of the child during entire treatment. The oximeter was clipped to the index finger of the child’s left hand. To reduce the risk of recording errors, it was ensured that the child did not move hand. An assistant manually transcribed the data posted on the pulse oximeter screen into the child’s file at each interval for a total of 3 data points; before, during and after the treatment.

3.4 Study design

Sixty children, thirty boys and thirty girls, in the age group 5 to 10 years who reported to Department of Pediatrics and Preventive dentistry, P.M.N.M Dental College, Bagalkot were selected. The informed consent from the parent, as well as institutional ethical clearance was obtained. They were randomly divided into three groups:

- Control group – 20 children to whom communication and tell show do technique was used during treatment.
- Audio visual group- 20 children to whom along with communication and test show do technique, video using virtual reality (VR) glasses was shown during treatment.
- Parental presence group- 20 children whose parents were made to be present in the dental operatory during treatment.

Children who came for their first dental visit and had to undergo minor restorative procedures were selected. The entire treatment was completed by the same operator for every child. Using communication and tell show do technique the children were explained about the dental procedure.

The children in Group II received the VR device, which was to be worn during the dental treatment. It was introduced to the children using Tell-Show-Do technique. These children were given a choice of episodes from their favourite cartoon shows (like Tom and Jerry, Chotta Bheem, and Ben 10) and were asked to view them in the dental operatory for 5 minutes, before start of the dental treatment. The children were then asked to relax and continue watching their favourite shows while the dental treatment was carried out. Once the dental treatment was completed, the eye-glasses were removed.

For the children in group III, parents were made to be present in the dental operatory during the entire treatment.

3.5 Statistical analyses


Descriptive Statistics: It includes expression of the study variables in terms of mean & SD for continuous variables, whereas in frequency and proportions for categorical variables.

Inferential Statistics: Chi Square Test was used to compare the Blood pressure among study participants.

ANOVA test followed by Tukey’s HSD Post hoc Analysis was used to compare the mean Heart Rate between different study groups at different time intervals.

Repeated measures of ANOVA test followed by Bonferroni’s Post hoc Analysis was used to compare the mean Heart Rate between different time intervals in each study group.

The level of significance [P-Value] was set at P<0.05.

4. Results

The mean ages of the subjects in group I was 8.4 years (range, 6-10); group II was 7.9 years (range, 6-10), and in group III was 7.7 years (range, 5-10) respectively. On comparison of Blood pressure among study participants using Chi Square Test, it was noticed that 55% in group I, 10% in group II and 25 % in group III showed variation before and after the treatment. This was statistically significant with a p value of 0.007. [Table-1]

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>x² value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variations</td>
<td>n%</td>
<td>n%</td>
<td>n%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>11</td>
<td>55%</td>
<td>2</td>
<td>10%</td>
<td>5</td>
</tr>
</tbody>
</table>

On multiple comparison between different groups the p-values between, group I vs group II was 0.002 and group I vs group III was 0.04, which were statistically significant. Comparison between group II vs group III was 0.21 which was not statistically significant. [Table-2]

<table>
<thead>
<tr>
<th>Groups</th>
<th>G1 Vs G2</th>
<th>G1 Vs G3</th>
<th>G2 Vs G3</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Value</td>
<td>0.002*</td>
<td>0.04*</td>
<td>0.21</td>
<td></td>
</tr>
</tbody>
</table>

*.Statistically significant

On comparison, the mean Heart Rate between different time intervals (before, during and after) in each study group, were: group I-99.15, 103.20, 100.60; group II -101.25, 92.50, 91.40; group III-107.55, 108.85, 105.55, respectively, which were statistically significant with a p value of <0.001. [Figure-1].
technique is more effective in older children than in younger children compared to simple distraction techniques\textsuperscript{16}.

On comparing the heart rate of children in parental presence group, it was noticed that there was an increase during and after treatment, but there was no much variation compared to control group. 25\% of children in this group exhibited an elevation in BP post treatment. This was in accordance with the studies by Venham et al\textsuperscript{17}, Vasilikiet al\textsuperscript{18} and Ahuja et al\textsuperscript{19}. At the age of 4–7 years, psychological and emotional development occurs and after the age of 7 years, there is a development of trust and autonomy, so the parental presence or absence does not play a significant role. In contrast to the above, in a recent study of Nathan et al, parent’s presence played an important role for children 30 months of age or older\textsuperscript{20}.

6. Conclusion

Use of virtual reality technique is effective compared to parental presence in controlling the anxiety in children undergoing short dental treatments.

7. Future Scope

Techniques which enhance the behavioral response in children should be considered for a better pediatric dental practice. Future research should involve well-controlled efforts to develop and evaluate other techniques or devices that can reduce anxiety and which require minimal time.

References


Author Profile

Dr Sruthi P received the bachelor’s degree in Dental Surgery from KMCT Dental College in 2012. She is now pursuing her Masters in Pediatric and Preventive Dentistry.