

# Comparative Evaluation Of Audiovisual Distraction And Interactive Distraction Techniques Using Facial Image Scale In Making Of Radiovisiography Imaging System.

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## **Abstract:**

*Aim:* The aim of the study was to compare no distraction, audiovisual distraction, and interactive distraction techniques during RVG imaging systems in children between ages 4 – 6 years.

*Methods:* The study was an observational study. The sample consisted of 60 children aged 4-6 years. They were divided into three groups, and they were randomly allocated to groups A- no Distraction technique (n = 20), B- audiovisual Distraction technique (n = 20), and C- interactive Distraction technique (n = 20). The child's anxiety was checked with the help of the FIS (Facial Image Scale). The anxiety were assessed before and after taking RVG in respective groups

*Result:* Student t-test and one-way ANOVA was used to find the significance of study parameters. The highest anxiety reduction (mean difference) was seen in the audio-visual distraction technique followed by no distraction technique and interactive distraction.

*Conclusion:* Environmental distractions such as audio visual distraction techniques provide a positive environment and thereby help to reduce the anxiety in the children.

**Key Words:** Dental Anxiety, Children, Interactive Distraction, Audiovisual Distraction

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## **I. Introduction:**

RVG is most common routine dental investigation in the field of dentistry. It helps the dentist to establish a diagnosis and thereby provide proper dental care. Poor radiographic results can effect on the diagnosis as well as on the treatment protocol which needs to be followed. RVG gives the magnifying large digital image for optimal interpretation of radiographs<sup>1</sup>

Stress is an internal state of physiological or psychological tension caused by the imbalance between environmental demands and a person's capacity to respond. Pediatric patient often feels stress, anxiety, and helplessness in healthcare setting where the typical sterile looking environment and large radiology machine appears intimidating to children. The stressful nature of radiology procedures may result in short-term effects in pediatric patients including radiology procedure cancellations and backlogs, sedation use, and medical complications as well as long-term effects including post-traumatic stress syndrome and avoidance of healthcare<sup>2</sup>.

Dental anxiety is a state of apprehension in relation to dental treatment. In dentistry, various methods of reducing patient anxiety have been used and distraction is one of them. Mc Caul and Mallet developed the distraction theory by placing importance on the fact that the attention capacity of humans is narrow. Therefore, awareness of pain decreases when a person's attention is diverted away from the stimulus<sup>3</sup>.

According to salami A and et al conducted a study and explained that 44% of the radiographs had failed while taking periapical radiography in children. Out of this, 32% of the radiographs could not be interpreted and the rest could still There are various distraction techniques such as audio-visual distractions, visual distractions, and taste distractions be interpreted<sup>4</sup>

There are various distraction techniques such as audio-visual distractions, visual distractions, and interactive distraction<sup>5</sup>. Audio-visual distraction includes creating a new image which causes the mind to divert away and focus less on pain and anxiety thereby reducing it. With this background, the present study had incorporated visual distraction by means of projecting a child favourite cartoon. Interactive distraction includes telling the stories to child while holding toys in front of them to divert their attention towards RVG procedure. Moreover, above mentioned two distraction techniques were compared for anxiety reduction with conventional radiography. The aim of the study is to compare no distraction, audiovisual distraction, and interactive distraction techniques during RVG imaging systems in children between ages 4 – 6 years.

## II. Materials And Method:

### Study Design

This study was an in vivo, observational study that was conducted on a convenience sample size of 60 children aged between 4 to 6 years. This experiment was conducted in the Department of Pediatric and Preventive Dentistry, Dr. HSRSM Dental College and hospital Hingoli. Ethical approval was obtained by the Institutional Research Board (HDCH/Ethics/2022/034). Written parental consent and informed consent were taken for every participant.

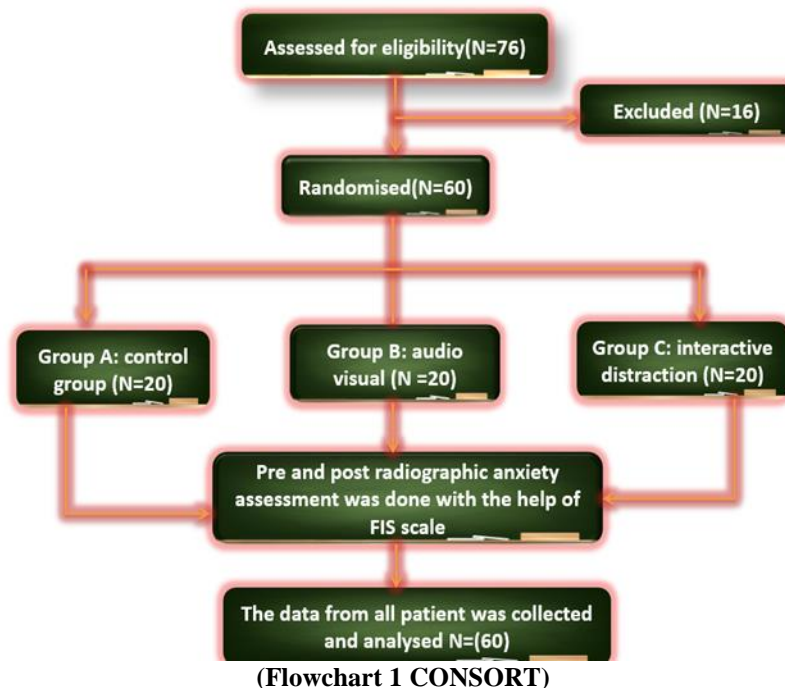
### Inclusion Criteria

- Children between the ages 4–6 years who were not ready to take radiographs under normal dental setup
- With previous dental treatment experience
- Those who gave consent for the study.

### Exclusion Criteria

- Any medically and physically compromised children
- Children who do not require X-ray as a diagnostic aid
- Those who had not given consent for the study.

Initially, 66 children had come to the dental operatory while the study was going on. But out of those 76, 16 children were excluded as they did not meet the inclusion criteria. Then 60 children were randomly allocated into three groups by simple random sampling through the lottery method by the investigator (CONSORT diagram). Group A was the control group (n = 20), group B was the audiovisual group (n = 20) and group C was the interactive distraction group via the digital screen (n = 20).



### Evaluation Method

The anxiety of the child was assessed through the Facial Image Scale<sup>6</sup>. The FIS presents a row of five faces ranging from very happy to very unhappy (figure 1). Each child was asked to choose a face that was most similar to his/her feeling at that moment. Group A (Fig. 2) that is the conventional group, the child was made seated and was explained about the procedure with the help of the Tell show do technique. Then pre radiographic anxiety was recorded using the FIS facial image scale followed by a RVG was taken via the conventional method. Then post-radiographic anxiety was again assessed with the help of the FIS Facial image scale. (Figs 1). In group B (Fig. 3) The distraction was done using the audio visual method. In this, the child's pre radiographic anxiety was recorded using the FIS Facial image scale (Figs 1). This was followed by playing child favourite cartoon video in the digital screen. The cartoon was projected prior and while taking radiographs and it was projected in such a way that the cartoon was visible within their sight and radiograph was recorded

while child is watching cartoon. After taking the radiograph, post radiographic anxiety was assessed with the help of FIS Facial image scale (Figs 1).

In group C (Fig. 4), the interactive distraction was done by telling them the story while holding soft toy in front of a child. This pre radiographic anxiety assessment was done FIS Facial image scale.

There was a minimum waiting period and the appointment was kept as short as possible. While taking radiographs, the parents were asked to sit outside the operator room. Size 0 intraoral sensor was used for all the children.



Figure 2: Group A Conventional Group

**Statistical Analysis**

Data were analysed using SPSS 23.0 version (IBM; Chicago). Variables were expressed as mean, standard deviation and percentages. Paired t-test was applied within each group to find significant differences between the pre and post radiographic phases. One-way ANOVA was run to find intergroup significance. P-value lesser than 0.05 was considered statistically significant

**III. Results:**

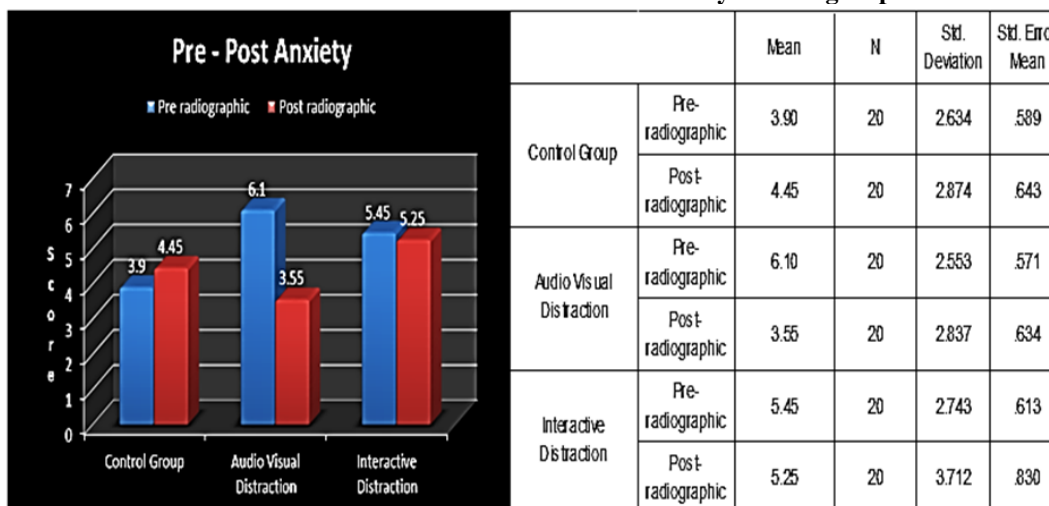
This study was conducted with total sample size of 60 children. No significant age difference was noted between the groups in age (p=0.508). Mean age of conventional, audio-visual Distraction, interactive distraction was  $4.80 \pm 0.834$ ,  $5.10 \pm 0.788$  and  $4.9 \pm 0.852$  of S.D. respectively. An equal distribution of gender was noted between the groups with p value = 0.935

Table 1 shows difference between Pre and Post anxiety in each group. It shows except control group, in all groups the post-radiographic anxiety was lower as compare to pre-radiographic anxiety.

Table 2 shows comparison of difference in Pre and Post anxiety in each group (ANOVA TEST). The difference in Pre and Post anxiety in Audio Visual Distraction was significant (P Value 0.000)

Table 3 shows Mean anxiety reduction difference in group A, B and C. The mean difference was more with audio visual group. In groups A, B, and C it was seen that the mean reduction in anxiety was 0.55 times in group A, 2.55 times in group B, and 0.20 times in group C. Hence, it can be inferred the highest anxiety reduction (mean difference) was seen in the audio Visual technique (group B) followed by Conventional technique (group A) and interactive technique (group C).

**Table 1: difference between Pre and Post anxiety in each group**

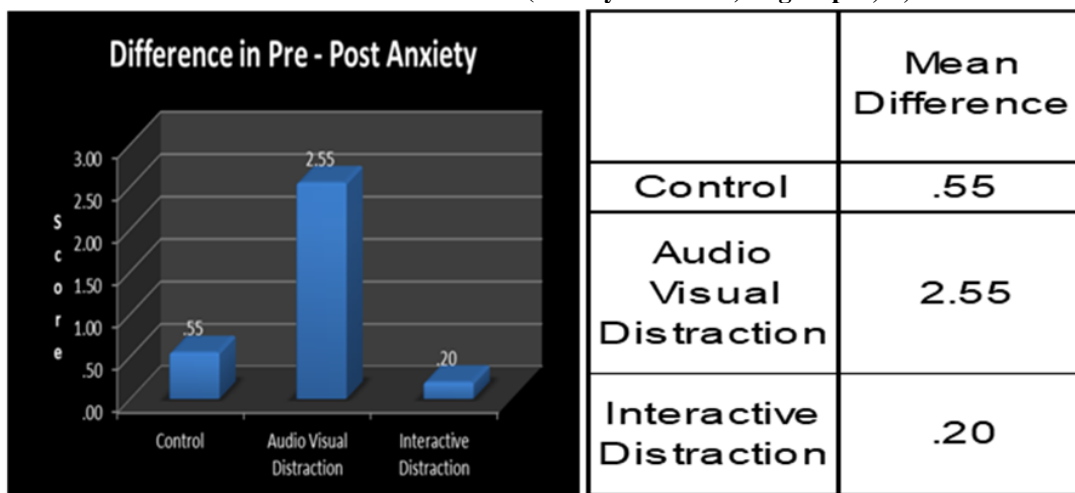


		Mean	N	Std. Deviation	Std. Error Mean
Control Group	Pre-radiographic	3.90	20	2.634	.589
	Post-radiographic	4.45	20	2.874	.643
Audio Visual Distraction	Pre-radiographic	6.10	20	2.553	.571
	Post-radiographic	3.55	20	2.837	.634
Interactive Distraction	Pre-radiographic	5.45	20	2.743	.613
	Post-radiographic	5.25	20	3.712	.830

**Table 2: comparison of difference in Pre and Post anxiety in each group**

	Mean Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Control	-.550	1.932	.432	-1.273	19	.218
Audio Visual Distraction	2.550	2.373	.531	4.807	19	.000
Interactive Distraction	.200	2.821	.631	.317	19	.755

**Table 3: shows Mean difference (anxiety reduction) in group A, B, C**



**IV. Discussion:**

Dental radiography is an aid used to assist dentists to conduct examinations, establishing a diagnosis, and arranging appropriate care management<sup>7</sup>. The indication of dental radiographs includes various diseased conditions like caries, periapical abscesses, and periodontal bone loss<sup>8</sup>. However, the placement of intraoral film during periapical radiographic procedures cannot be tolerated by many people, especially children. This can increase dental anxiety in children.

Usually, it is seen that dental anxiety is a common problem in children. There are two types of anxiety seen in children, one which is to specify dental stimuli (e.g., needle, drill, radiograph machine) and the other one is overall generalized anxiety.

Ivana Meyer Prado et al had done a systematic review on various distraction techniques (audio, audio-visual, instruments camouflage, biofeedback, dental operating microscope, toys) concluded that distraction techniques can be effective in managing children’s and adolescent’s dental anxiety and fear during dental treatment<sup>9</sup>.

In a study conducted by Chhabra N et al, the prevalence of dental anxiety was 6.3% in the 5-10 years age group, hence in the current study, this age group was chosen. As white and pharaoh states that the size of RVG sensor to be used in children is size 0, hence we have used size 0 RVG sensor. Also in this study FIS (facial image scale) had been used because it is easily understood and the child can relate more to this scale<sup>13</sup>.

In a study done by Rahul Mishra et al., the author had compared anxiety levels between audio-visual distraction with the help of chair-mounted monitors playing the clip and audio distraction with the help of earphones. It was seen that both groups had decreased the anxiety but the audio-visual distraction group was better. Similarly, in the current study, it was seen that both the distraction groups had reduced anxiety as compared with the conventional group but audio-visual distraction is better.<sup>14</sup>

In the presented study, distractions were beneficial in reducing anxiety and also digital screen method was found to be superior when compared with others. These results were in accordance with the study done by Xiabo Quan et al<sup>2</sup>.

Xiabo Quan et al had compared no distraction, minimal distraction with the help of light, and distraction with the help of light and animation. The animation was done with the help of the Projector method where cartoon or positive photograph was displayed. He found that there was a reduction in anxiety of children due to distraction and more reduction was with the help of light and animation. Due to this, it was seen that parents were willing to return with their children and to recommend others to them<sup>2</sup>

In this study results revealed that the visual distraction group had higher mean anxiety reduction and these results were consistent with the study done by S. Ghadimi et al., where the author had compared the visual distraction technique with the conventional tell show do technique and it was seen that there was more anxiety reduction in the visual distraction group than in the tell show do technique.<sup>15</sup>

## **V. Conclusion:**

Distraction techniques are a win-win situation when used appropriately for children, families, and healthcare professionals. Environmental distractions such as visual and interactive distraction techniques provide a positive environment and make the procedures less stressful. The present study suggested that audio visual distraction techniques through the digital method can be offered to children as they are easy to implement, portable, and effective methods to reduce anxiety.

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