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ORIGINAL RESEARCH

Can paper prints of Radiovisuography be helpful in teaching dental students? A cross- sectional study

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Abstract:

Background:

Aims and objectives: To assess whether radiovisuographic images on paper be helpful in teaching dental students. To analyze the radiovisuographic images on paper for image interpretation.

Materials and methods: Twenty-five dental students were chosen at random to examine the lateral and periodontal spaces on paper copies of radiovisuography. A total of fifty radiovisuographic pictures of the maxillary incisor area were obtained. The photos were produced on 75g/m2 using an Epson L210 series inkjet printer.The visuality was rated as bad, fair, good, or very good by the pupils. The data was analyzed using chi square testing, frequency and proportion tests, and other methods.

Result and conclusion: Overall the lateral periodontal space showed better visibility than the apical periodontal region.

Key words: lateral periodontal space, paper, periapaical area, radiovisuographic images

Introduction:

In 1987, a French company introduced Radiovisuography (RVG), signaling the beginning of the era of digital technology in dentistry. It has been in use for more than 25 years, but despite being more expensive and requiring more software to manage in offices without it, traditional film-based radiography has not completely replaced it. Consequently, there is a

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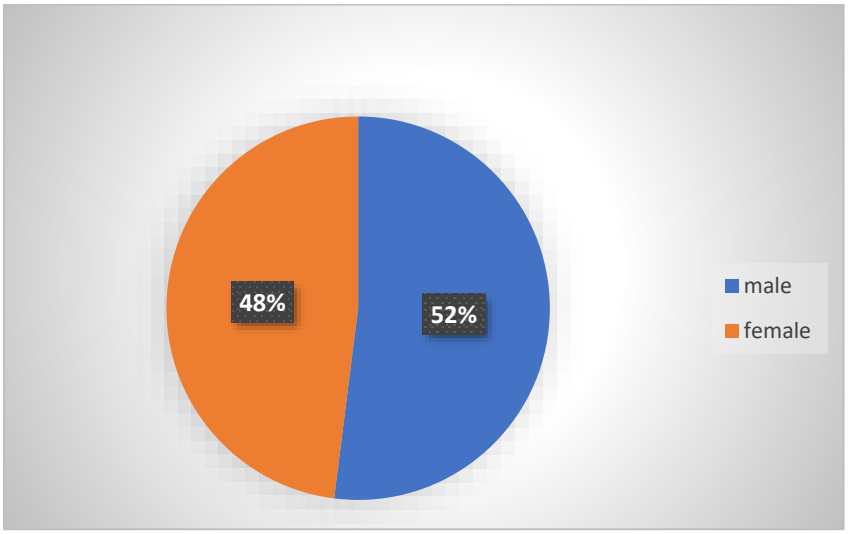
growing demand for the straightforward and dependable transfer of digital images between offices, which renders hard copies on film, photographic paper, and regular paper a viable and substitute option.[1,2] The majority of research that has been published has focused on how digital radiographs perform in comparison to film systems; however, a small number of writers have also examined how printed digital radiographs perform.[3] To ensure that no diagnostic data is lost, it is also crucial for the hard copy's subjective quality evaluation of the pictures. In order to determine whether a digital intraoral periapical image can be used as an educational tool, dental students have undertaken the present study, which involves evaluating individual structures in the image on plain paper.[1]

Materials and methodology:

The study was conducted in Maharana Pratap dental college, Kanpur. A random of 25 dental students were selected to analyze the periodontal space and lateral space on paper prints of Radiovisuography. A total of 50 radiovisuographic images were taken of maxillary incisor region. The images were printed by Epson ink jet printer l210 series on 75gm/m^2.The students were asked to grade the visuality as poor, fair, good and very good. Frequency and proportion test and chi square test was used to analyze the data.

Result:

In the study a total of 50 radiovisuographic images were used in which 52% were males and 48% were females (Graph 1). Out of 50 images 33 were in 20-30 years, 15 were in 31-40 years , 0 subjects were in 41-50 years and 2 were in 51-60 years(Graph 2). The analysis of the lateral periodontal space showed the good visualization (33) followed by good visualization of apical periodontal space(31). Overall a good visualization was seen in lateral periodontal space than apical periodontal space . Both lateral and apical periodontal spaces have the same mean (12.5), but the standard deviation is slightly higher for the lateral space (14.43) compared to the apical space (13.53) (Table 1).The p-value of 0.975 suggests that there is no statistically significant difference between the distributions of lateral and apical periodontal space conditions. The high p-value indicates that the observed frequencies are very close to the expected frequencies under the null hypothesis of no association.



Graph 1: The graph shows the gender divergence of subjects subjected to radiovisuography.

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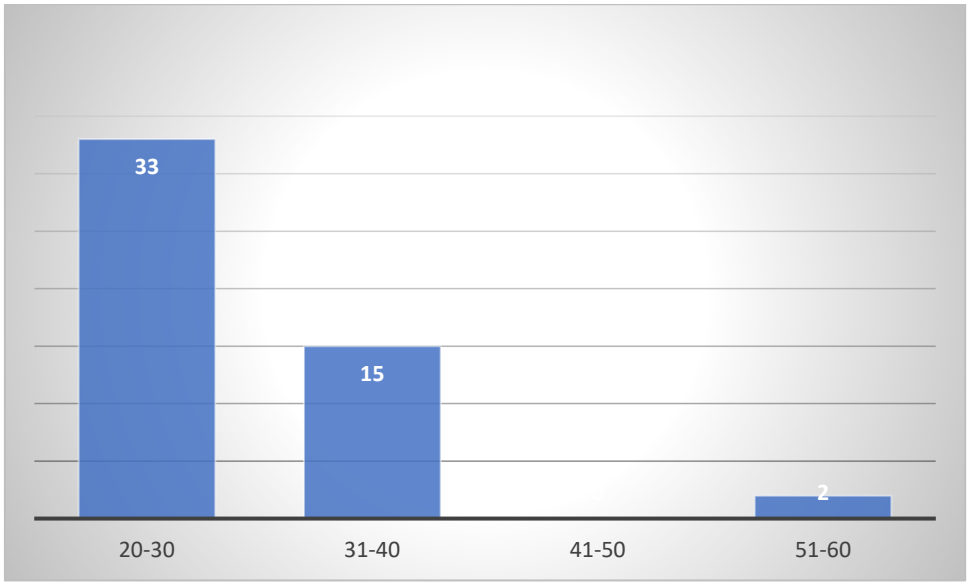

Graph 2: The graph shows the age distribution of subjects subjected to radiovisuography

		Assessment	Number	Mean	standard deviation	p - value
Maxillary incisor	Lateral periodontal space	poor	1	12.5	14.43	0.975
		fair	12			
		good	33			
		very good	4			
	Apical periodontal space	poor	1	12.5	13.53	
		fair	14			
		good	31			
		very good	4			

Table 1: The table shows the assessment of lateral periodontal space and periapical area with mean and standard deviation

Discussion:

Radiographic image acquisition, visualization, updating, storage, and transfer are all made possible by digital imaging, which makes use of digital receptors and computer technology. Radiation dose reduction is the most frequently mentioned benefit, but it is a very appealing alternative to film-based imaging, which has many advantages over traditional film-based radiography.[4] Over the more than ten years that it has been on the market, it has experienced significant advancements.[5] As far as we are aware, no research has been done on the evaluation of the digital paper image up to this point. In light of this, we investigated whether radiovisuographic images could be utilized as teaching tools by having dental students evaluate the radiovisuographic image quality on A-sized paper.

The image quality of fifty dental radiovisuographic pictures was examined in our investigation. Prachi et al. (2020) carried out similar investigations using a total of 500 intraoral apical

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radiographs.[1] Similar studies were conducted by Gijbels et al. on 15 digital panoramic radiographs, Benediktsdóttir I. S. on 164 digital panoramic radiographs, Gerrard on 5 digital panoramic radiographs, and Schulze et al. on just 3 typical intraoral radiographs.[1] Using an Epson L 210 series inkjet printer, radiovisuographical paper images were acquired for our study. In a similar vein, Prachi et al. (2020) also used an Epson L210 series inkjet printer. In a similar vein, Schulze et al.study used three ink jet and two thermo-sublimation printers,[6] while Gerrard's study used three printers—the Fuji DryPix 5000, the Hewlett-Packard LaserJet 2300, the EpsonStylus C45 printer.[1]

In the current investigation Similar to Prachi et al. (2020), radiovisuographical pictures were obtained on 75gm/m2 A-4 size white paper with an image size of 8.5 cm x 6.5 cm.[1] A related investigation with glossy paper as the output medium was conducted by Schulze et al.[6] Radiographic film was employed by Gerrard in his research. While a radiograph of the maxillary incisor region was employed in our investigation, Prachi et al. (2020) studied the mandibular and maxillary regions. In contrast to the study conducted by Prachi et al., which included the crown, root, periodontal space, lamina dura, periapical area, intraradicular bone, and Dental Pathosis/Restorations/RCT, our analysis of the radiographs focused solely on the lateral periodontal space and periapical space. Dental students conducted the analysis for this study in order to grade the visualization for instructional purposes.
The lateral periodontal space examination in our study revealed excellent visualization, which was followed by good visualization of the apical periodontal space. In terms of visuality, there was not much of a statistically significant difference.

Conclusion:

As far as we are aware, a literature search has not turned up any studies on the assessment of digital images obtained with a printer and paper for dentistry students' educational purposes. It is advised to conduct more study on a larger sample with a wider variety of lesions in order to evaluate the accuracy of the diagnosis and to provide a solid foundation for later studies.

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