

Evaluation of Common Errors of Panoramic Radiographs in Tabriz Faculty of Dentistry

Farzaneh Kaviani¹ • Masume Johari¹ • Farzad Esmacili^{1*}

¹Assistant Professor, Department of Oral and Maxillofacial Radiology, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding author; E-mail: farzad56@gmail.com

Abstract

Background and aim. Knowledge of the common radiographic errors and their prevention could prevent imposing redundant radiation, time and money to patient and the dentist. The aim of this study was to assess the common radiographic errors on panoramic radiographs in a radiology department.

Materials and methods. 250 panoramic radiographs (100 male and 150 female; mean age, 24.3) taken at the Department of Oral and Maxillofacial Radiology were evaluated. Radiographs were categorized into five groups according to the type of errors (patient positioning errors, darkroom errors, failure to remove metallic accessories, equipment setup errors, and patient movement during exposure).

Results. There were 19 error-free radiographs. The number of radiographs with errors was 231, of which 26 were unacceptable and had to be retaken. Errors of patient positioning were observed in 78% of cases, film development in 69.2%, equipment setup in 3.2%, failure to remove metallic accessories in 3.2% and patient movement during exposure in 2.4% of cases.

Conclusion. The errors seen on panoramic radiographs were relatively high with errors in patient positioning being the most frequent error.

Key words: Panoramic radiograph, quality control, radiographic error.

Introduction

Radiography is a useful tool in various disciplines of medicine and dentistry for diagnosis and treatment planning of diseases. Changes in the quality of radiographs may lead to misinterpretation, resulting in incorrect diagnosis and treatment planning.¹ In cases without enough diagnostic quality, radiographs have to be retaken, which results in receiving unnecessary radiation by the patients.^{1,2}

The aim of this study was to evaluate the common errors on panoramic radiographs in order to prevent further occurrence of them in a radiology department.

Materials and Methods

Panoramic radiographs of 250 patients referred to the Department of Oral and Maxillofacial Radiology, Faculty of Dentistry, Tabriz University of Medical Sciences, between April 2007 and June

2008, were evaluated. All projections were made with the same radiographic equipment (Planmeca ProMax, Helsinki, Finland), according to the manufacturer's instructions. All films were processed manually. Radiographs were evaluated by two oral and maxillofacial radiologists and the frequency of errors was recorded. The assessed errors included: errors due to the positioning of the patient, darkroom errors, failure to remove metallic accessories, equipment setup errors and error of patient moving during exposure.^{2,3} Data were collected on special forms, and the frequency of each of error was calculated. The results were presented using descriptive statistics.

Results

Panoramic radiographs of 250 patients (female: 150 and male: 100 mean age, 24.3) were evaluated. 19 radiographs (7.6%) were error free and

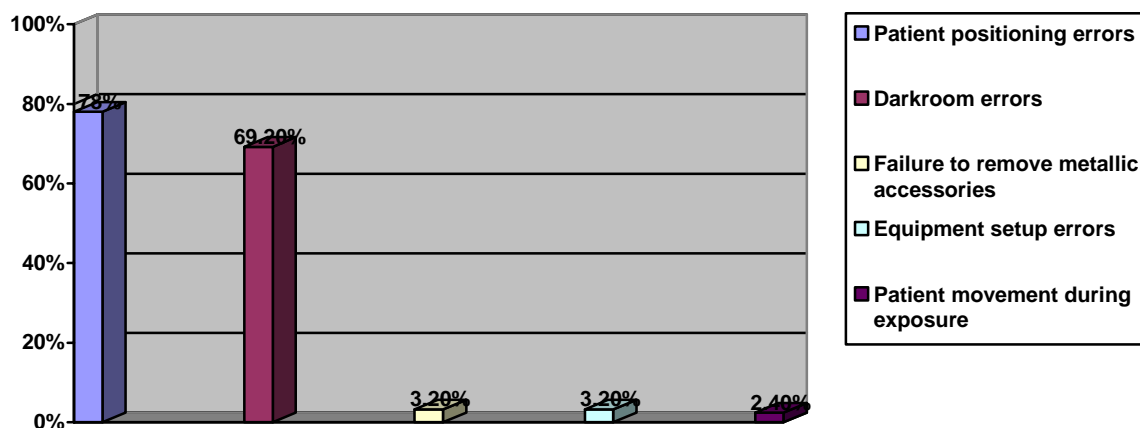


Figure 1. Frequency distribution of common errors of panoramic radiographs in the present study.

231 radiographs (92.4%) had errors, of which 26 (10.4%) were unacceptable and had to be retaken.

Frequency distribution of common errors observed in the studied sample is shown in Figure 1. Errors due to the positioning of the patient were observed in 195 cases (78%), being the most common error. The error of patient moving was the least frequent (2.4%). Among the patient positioning errors, 77 cases (39.5%) were due to patients' head rotation to left or right; not using of bite block in 11 cases (5.6%) had the least frequency of occurrence. Failure to remove metallic accessories error was observed in eight cases (3.2%). The equipment setup error was also seen in eight cases (3.2%).

Darkroom errors were observed in 173 cases (69.2%), of which insufficient fixing (33.6%) was the most common error. Electrostatic effect and double exposure were not seen in the studied sample.

Discussion

In our study various errors were observed on panoramic radiographs. The most common errors were related to patient positioning (78%). This finding is in agreement with the findings of previous study, in which they demonstrated that the most common error on panoramic radiographs was "positioning of patient" error (89.3%).⁴ In another study, the percentage of this error was reported to be 60%.⁵ However, an evaluation of panoramic radiographs of edentulous patients showed the most common error was palatoglossal air space shadow above the tongue.⁶ The assessment of edentulous patients in the latter study could be the reason of differences between the mentioned results.

In the present study, among patient positioning

errors, rotation of head to left or right was the most common error followed by "too upper chin, too lower chin," insufficient extension of neck, opening of lips and finally not using of bite block, respectively.

Dark room errors were in the second place of common errors in our study, which is not in agreement with previous studies.⁴⁻⁶ Insufficient fixing was the most common dark room error. High density, low contrast and low density of films, developer and fixer spots, finger print, light leakage of film, not recording of patient's information on the radiographs and insufficient rinsing were other frequent errors, respectively. The technique for developing and fixing of radiographs - manual or automatic- is important to the occurrence of darkroom errors.^{1,2} The manual technique was used in this study while previous studies used automatic technique,⁴⁻⁶ and this could be the reason for high frequency of errors in our study.

The occurrence of equipment setup error in our study was only 3.2%. The panoramic projections in the present study were made by highly efficient equipment, which could be the reason for few equipment setup errors observed. This is in line with findings of previous studies.^{7,8}

In conclusion, the errors seen on panoramic radiographs were relatively high in the present study. Errors in patient positioning were the most frequent followed by darkroom errors. It seems that operator skill and automatic processing of films can decrease the number of errors and help produce high quality radiographs.

References

1. White SC, Pharaoh MJ. *Oral Radiology: Principles and Interpretation*, 5th ed. Philadelphia: CV Mosby; 2004: 200-217.

2. Langland OE, Langlais RP, Preece JW. *Principles of Dental Imaging*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2002: 219-258.
3. Miles DA, Van Dis, Jensen CW, Ferretti AB. *Radiographic Imaging for Dental Auxiliaries*, 3rd ed. Philadelphia: Saunders; 1999: 165-178.
4. Mckee IW, Glover KE, Williamson PC, Lam EW, Heo G, Major PW. The effect of vertical and horizontal head positioning in panoramic radiography on mesiodistal tooth angulations. *Angle Orthod* 2001; 71:442-51.
5. Schiff T, D'Ambrosio J, Glass BJ, Langlais RP, McDavid WD. Common positioning and technical errors in panoramic radiography. *J Am Dent Assoc* 1986; 113:422-6.
6. Glass BJ, Seals RR Jr, Williams EO. Common errors in panoramic radiography of edentulous patients. *J Prosthodont* 1994; 3:68-73.
7. Akarslan ZZ, Erten H, Güngör K, Celik I. Common errors on panoramic radiographs taken in a dental school. *J Contemp Dent Pract* 2003; 4:24-34.
8. Rushton VE, Horner K, Worthington HV. The quality of panoramic radiographs in a sample of general dental practices. *Br Dent J* 1999;186:630-3.