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Accuracy of digital and film panoramic radiograph for assessment the sites of periapical bone lesions (comparative study)

Dr.Amal Raouf S. Mohammed, B.D.S.,H.D.D.,M.Sc.

Abstract

The dental pulp is a delicate connective tissue , it react to bacterial infection or to other stimuli by an inflammatory response .Once infection has been established in the pulp , spread of the process can be through the root canals and into the periapical lesions.

The aim of this study was to evaluate the accuracy of digital and film panoramic radiographs in detection the periapical bone lesion in different sites ,which detected previously by periapical radiographs .In this study 106 teeth were examined by intra oral periapical radiographs which indicated that only 60 teeth were with periapical bone lesion , then by both digital and film panoramic the teeth with periapical lesion were examined .The results show significant advantage of digital panoramic which show the same mean of periapical lesion like conventional periapical radiographs , also the study show significant differences between digital and film panoramic radiographs in incisor region for the detection of periapical bone lesion .

Key word : Periapical bone lesion , Digital panoramic , Film panoramic.

Introduction

The dental pulp is delicate connective tissue liberally interspersed with tiny blood vessels, lymphatics , myelinated and unmyelinated nerves connective tissue cells. Like other connective tissues throughout the body , it react to bacterial infection or to other stimuli by an inflammatory response ⁽¹⁾ .Once infection has been established in the dental pulp ,spread of the process can be in only one direction , through the root canals , and into the periapical lesion , so a number of different tissue reactions may occur depending upon a variety of circumstances ⁽²⁾ .

The diagnostic process of jawbone lesions is complex since several etiologic factors , histopathologic

,morphological details ,and distinct radiographic characteristics are involved ⁽³⁾ . Diagnosis can be established or better understood by carefully analyzing the site of the lesion , it,sradiographic aspect , as well as the effect of the lesion on adjacent structures .⁽⁴⁾

Panoramic radiograph is a simplified extraoral procedure which visualizes the inter maxillo-facial region on a single film ⁽⁵⁾ . The term digital radiograph refers to a method of capturing a radiographic image using a sensore , breaking it into electronic pieces , and presenting and storing the image using a computer ^(6, 7) .

The digital radiographs were used to differentiate the lesions , and

provide much more information, than intraoral and film panoramic radiographs which provide imaging techniques available for examination in local health centers.⁽⁸⁾

Material and Methods

Fifty patients attending Al-Mamoon center for specialist complaining of toothache of multi-factorial causes. The age of the patients ranged between (12- 50) years. All the patients were examined clinically which include

- extra oral examination by inspection (visual evaluation), which include, presence of swelling, presence of sinus discharge, lymph adenopathy, limitation of mouth opening.
- intra oral examination, the tooth in question is examined closely, in addition adjacent teeth, and surrounding structures were examined.

All the patients were examined radiographically by conventional periapical radiograph.

One hundred and six teeth were examined radiographically by two specialist, who choosed the teeth with periapical lesion which is only 60teeth.

The teeth with periapical lesions were viewed by both digital and film panoramic radiographs.

The data was arranged in tables to compare the mean value of both panoramic modalities according to the site of the lesion.

Results

Results of this study revealed that (60 out 106) of the teeth that examined had different periapical lesion. The teeth with periapical lesions distribution as in table (1).

According to the evaluation of the periapical lesion by the two specialist, the result shows that the mean number of teeth involved with periapical lesion by digital panoramic radiographs were 60, in comparison to 52 by film panoramic radiographs, table (2), show that there is significant differences between digital and film panoramic radiograph in detection of alveolar bone lesion.

Table (3) show the diagnostic accuracy of different regions of the jaws. In incisor region of both jaw, and according to student t- test, there were significant differences between both types of radiographs ($p < 0.0001$).

For all canine, premolar and molar regions there were non significant differences between both types of radiographs ($p > 0.05$).

Discussion

In this study the two specialist were reliable in examining the radiographs according to the presence of periapical lesion which appeared in the conventional periapical, so all the radiographs which not contain a periapical lesion were excluded from the study⁽⁹⁾.

In incisor region of both maxilla and mandibul, the digital radiographs show significant advantage than film panoramic radiographs, this may be explained by unsharpness in the film panoramic while digital panoramic can increase the contrast of the film by enhancement computerize program, also may be due to the fact that the focal trough panoramic is narrow in the anterior region.⁽¹⁰⁾

In canine and premolar regions, there was non significant differences for both modalities, this may be explained by the fact that in the first bicuspid region produce an area of poor diagnostic value, because of rotation axis on each side at this point.

For molar region in both jaws there were non significant differences between both radiographs for detection of periapical lesion, the explanation of this is due to the fact that focal trough in panoramic radiographs for both digital and film radiographs is wide in the posterior region., so in both types of radiographs, the detection of periapical lesion were good.

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Table (1) Distribution of teeth with periapical lesion.

Incisor		Canine		Premolar		Molar		Total
Max.	Mand.	Max.	Mand.	Max.	Mand.	Max.	Mand.	60
6	8	4	2	10	10	10	10	

Max—Maxilla

Mand__Mandibular

Table (2) t-test for digital and film panoramic radiographs with periapical lesion .

Digital panoramic		Film panoramic		P- value	Sig
Mean	SD	Mean	SD	0.000	HS
60	3.88	52	4.002		

Table (3) Mean differences between digital and film panoramic according to the site of the lesion.

Site	Digital panoramic	Film panoramic	Mean differences between area	SD	P-value	Sig
Maxillary region						
Incisor	0.300	0.053	0.247	1.431	0.000	HS
Canine	0.476	0.320	0.156	0.357	0.374	NS
Premolar	0.133	0.130	0.003	0.670	0.080	NS
Molar	0.430	0.376	0.064	0.849	0.374	NS
Mandibular region						
Incisor	0.200	0.063	0.137	1.431	0.000	HS
Canine	0.391	0.333	0.058	0.670	0.080	NS
Premolar	0.486	0.333	0.156	0.357	0.374	NS
Molar	0.402	0.312	0.090	0.849	0.374	NS

P<0.001 High significant

P>0.05 Non significant