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Evaluation of permanent premolars intended for endodontic treatment in term of root number & form, condition of periapical area and state of lamina dura (Radiographic survey).

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Abstract

The radiographic film serves an extremely important need in detecting disease process that affects the tooth and its surrounding structures. The aim of the present study is to take a radiographic view to determine root number and form, condition of the periapical area and state of the lamina dura for permanent premolar teeth intended for root canal therapy. One hundred ninety radiographs representing the step of working length determination for permanent premolars intended for root canal therapy were selected from a number of private clinics in Baghdad. Results of this study shows that 52.1 % of the endodontically treated teeth having curvature free roots, while 47.9 % of them were presented with curved roots, most of teeth 94.2% were free of periapical lesions and lamina dura was absent in 65.8 % of the teeth.

Key words: radiograph, periapical lesion, lamina dura, working length, endodontic.

Introduction

The radiographic films serve an extremely important need in detecting disease process that affect the tooth and its surrounding structures ⁽¹⁾.

Periapical lesions (abscess, cysts and granuloma) as an example can not be evaluated on a clinical basis only without a vital other measures that should be required, and the most popular supplement in this situation is the dental radiographs ⁽²⁾. On the other hand these lesions can not be diagnosed by the radiographic appearance alone; instead the perfect diagnosis is based on the clinical features, radiographic and microscopic appearance ⁽³⁾.

Radiographic information is not always without limitations. These limitations should be well recognized by the dental work team ⁽⁴⁾. As a general talking different periapical lesions may give us different radiographic pictures. So on dental radiographs these lesions may appear either radiolucent or even radio-opaque areas surrounding the periapical area.

It is well known that with the development of periapical lesions the widened periodontal ligament space at the apical area enlarged and appears as a round or ovoid radiolucency ⁽⁵⁾ and the lamina dura is not visible between the root apex and the periapical lesion

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⁽⁶⁾, in spite of the fact that the lamina dura is not easily detected on a radiographic film ⁽⁷⁾.

On a dental radiograph a typical periapical cyst appear as a well demarcated round or oval radiolucency, but as it is popular that in case of an acute periapical abscess, no radiographic changes may be evident, however early radiographic changes may include an increased width of periodontal ligament space.

In cases of chronic periapical abscess a round or oval apical radiolucency is seen with poorly defined margins and absence of lamina dura between the root apex and the radiolucent lesion ⁽⁸⁾.

Many studies have been made for detection of periapical lesions by different radiographic and clinical methods ⁽⁹⁻¹²⁾. It is useful to determine the number and the curvature of roots and canals to identify the super imposed roots and to distinguish between anatomical land marks and apical pathology ⁽¹⁾. Root curvature evaluation has been made by different methods as direct digital or conventional radiography ^(13,14).

The aim of the present study is to take a radiographic view on root number and form, condition of the periapical area and stat of the lamina dura for permanent premolar teeth intended for root canal therapy.

Materials and methods

One hundred ninety radiographs representing the step of working length determination for permanent premolars intended for root canal therapy were selected from about 500 radiographs collected from a number of private clinics in Baghdad. The selected radiographs should be clear, free from any distortion or artifacts as black spots especially in the periapical area that may misinterpreted as a periapical

lesion, taken with proper angulations that permit a correct analysis and also they should extend at least two mm beyond the root apex to give more chance for detection of any periapical lesion freely. Radiographs that not satisfied these criteria were excluded from this research. Then these radiographs were analyzed for detection of number of roots, root curvature, presence of periapical lesion and state of lamina dura.

Results

Table (1) shows that majority of the collected sample were maxillary second premolars (70 teeth) while the least type of tooth in this study were for mandibular first premolar (23 teeth). It is also clear that majority of maxillary first premolar having two roots while all the mandibular first and second premolars were single rooted teeth.

Table (2) shows that 52.1 % of the endodontically treated teeth having curvature free roots, while 47.9 % of them were presented with curved roots. In more detailed picture, 67.3 % of maxillary first premolars presented with curved roots, while 68.75 of mandibular second premolars were presented with curvature free roots.

Table (3) shows that most of teeth were free of periapical lesions 94.2%, while periapical lesion only seen in 5.8 % of the sample. Most type of teeth presented without periapical lesion was mandibular first premolar 95.7%, followed by maxillary second premolar 94.3% and maxillary first premolar 93.9%.

Table (4) shows that the lamina dura was absent in 65.8 % of the teeth and it was intact only in 34.2 % of the collected sample. The most type of teeth that had been affected by loss of lamina dura was the maxillary second premolar 78.6%, followed by

mandibular second premolar (70.8%) and mandibular first premolar 52.2%.

Discussion

Selection of 190 from about 500 radiographs may give a clue about the difficulty of sample selection in this survey because most of the primary sample were excluded either due to absence of the criteria that were required or just that these radiographs were not represent the tooth type under research. Such small selected sample in relation to the primary big one may tend to attenuate the findings of this study at least from the point of view of some critics. Such misunderstanding may be melt when we know that the remaining sample is quite enough from statistical point of view. It is well accepted that a few clear radiographic images may provide more useful information than many vague images because image clarity is an important factor for the correct statistical analysis⁽¹¹⁾. The importance of this study is that it may provide a quick view on certain conditions that may be associated with teeth intended for endodontic therapy. One can notice from the results of this survey that the majority of teeth intended for root canal therapy were permanent second premolars because caries in these teeth is not easily detected by the patient before other symptoms as pain is encountered. This observation may be supported by other finding of this study which is that majority of the collected sample were free from periapical lesions which also lead to a third fact that the chief complain of most patients seeking endodontic treatment was sever pain of acute pulpitis rather than other conditions.

Absences of lamina dura in majority of teeth under research can be explained by the high sensitivity of this organ to be early affected before any

other structures, while the intact lamina dura in most of permanent maxillary first premolar can be explained by the early detection of caries in these teeth as they situated in amore front position in related to the permanent second premolars.

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Table (1) distribution of the population sample by the root number

Tooth	No	One root		Two roots	
		No	%	No	%
Maxillary 1 st premolar	49	24	48.9	25	51.1
Maxillary 2 nd premolar	70	65	92.8	5	7.2
Mandibular 1 st premolar	23	23	100		
Mandibular 2 nd premolar	48	48	100		

Table (2) distribution of the sample by root curvature

Tooth	Curvature free		Curved root s	
	No	%	No	%
Maxillary 1 st premolar	16	32.7	33	67.3
Maxillary 2 nd premolar	37	52.9	33	47.1
Mandibular 1 st premolar	13	56.5	10	43.5
Mandibular 2 nd premolar	33	68.75	15	31.25
Total	99	52.1	91	47.9

Table (3) distribution of the sample by periapical lesion

Tooth	With periapical lesion		Without periapical lesion	
	No	%	No	%
Maxillary 1 st premolar	3	6.1	46	93.9
Maxillary 2 nd premolar	4	5.7	66	94.3
Mandibular 1 st premolar	1	4.3	22	95.7
Mandibular 2 nd premolar	3	6.25	45	93.75
Total	11	5.8	179	94.2

Table (4) distribution of the sample by state of lamina dura

Tooth	Loss of lamina dura		Intact lamina dura	
	No	%	No	%
Maxillary 1 st premolar	24	49	25	51
Maxillary 2 nd premolar	55	78.6	15	21.4
Mandibular 1 st premolar	12	52.2	11	47.8
Mandibular 2 nd premolar	34	70.8	14	29.2
Total	125	65.8	65	34.2