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Cone-beam Computed Tomography Study of Root Canals variation of maxillary premolar teeth in patients of Jondishapur clinic in Ahvaz

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Abstract

Statement of the problem: Using CBCT to determine root morphology minimizes rate of treatment failure and adverse effects, such as gouging and perforations .Purpose one of the main reasons of the failure in root canal therapy of the maxillary premolar teeth, is missing the additional canals. therefore, for doing the successful root canal therapy, it is important to know about the canal morphology of teeth in this study the variation in number of roots and canals in men & women have been reported. one of the ways for studying anatomy and morphology of teeth is using CBCT that provide three dimensional radiography and having less ray in comparison . The aim of this study was to assess morphology of root canals first and second maxillary premolars using CBCT scans in ahvaz population .Materials and Methods: In this cross-sectional study, conducted in the Radiology Department of Ahvaz Dental School in 2015-2016 ,129 CBCT scans were studied. The following data were analyzed: number of roots, canals, and sex (men/women) of, first and second premolars maxillary Data was analyzed with SPSS 16.0 and descriptive statistical tests .Results: In this study first premolars in maxillary (56.9%) had one root in both sides and (41.5%) had two roots and (1.5%) had three roots in both sides. But second premolars (84.6%) had one root both sides and (3.6%) two roots and (1.8%) had three roots both sides. there is no different between men and women in prevalence of root .In this study first premolars (6.2%) had one canal both sides and (92.3%) two canals and (1.5%) three canals in both sides. but in second premolars (67.2%) had one canal both sides ,(31.3%) two canals and (1.6%) had three canals .Conclusion: it is important to have perfect knowledge of the root canal morphology before curing it. the result of this study emphasize that the dentist can obtain valuable information about the anatomy and morphology of the root canals based on the CBCT method.

Keywords: scapula, glenoid cavity, morphology, shoulder arthroplasty.

Introduction

Two- dimensional imaging techniques have been used since the first dental intraoral Corresponding radiographs were taken in 1896. Panoramic and tomographic imaging techniques were developed

to reduce radiation and faster processing time. CBCT imaging is a new technique of three-dimensional images with lower cost and lower dose compared with conventional CT.(1 3)

CBCT scanners were presented for use in jaw-facial examinations simultaneously in Japan and Italy in 1990. Advantages of CBCT over conventional radiography and tomography include sub-millimeter resolution, three-dimensional image reconstruction, removal of superimposed structures and showing normal anatomy and morphology of the root canal system without additional exposure. CBCT provides images of root morphology with higher resolution than those obtained by conventional periapical radiography.(4,5)

Kim et al reported that CBCT scans can enhance the understanding of root canal anatomy, with the potential of improving the outcome of endodontic treatment.

The aim of the present study was to use cone-beam computed tomography to evaluate root canals in ahvazpopulation in Iran.

Materials and Methods

CBCTs of 129 patients who referred to the Radiology Department of ahvazDental School

Results

(ahvaz, east of Iran), between 2015-2016 were studied.

.In this study first premolars in maxillary (56.9%) had one root in both sides and (41.5%) had two roots and (1.5%) had three roots in both sides. But second premolars (84.6%) had one root both sides and(3.6%) two roots and (1.8%) had three roots both sides.there is no different between men and women in prevalence of root.

In this study first premolars (6.2%) had one canal both sides and (92.3%) two canals and (1.5%) three canals in both sides.but in second premolars (67.2% (had one canal both sides ,(31.3%) two canals and (1.6%) had three canals.

Teeth with pathological lesions, developmental disorders and endodontically treated teeth were excluded.

In this study, the number of roots and canals, morphology in men and women were evaluated. Number of roots and canalswere analyzed in axial, coronal and sagittal planes.

Percent		number	Percent
	One root	138	60.5
Type of root	Two roots	87	38.2
	Three roots	3	1.3
		228	100

Table2-3: type of root , second premolar

		number	Percent
	One root	188	91.7
Type of root	Two roots	15	7.3
	Three roots	2	1.0
		100	205

Table 3-3: Type of canal, first premolar

		number	Percent
	One canal	17	8.2
Type of canal	Two canal	186	89.9
	Three canal	4	1.9
		207	100

Table 3-4: Type of canal, second premolar

		number	Percent
	One canal	118	57.6
Type of canal	Two canal	85	41.5
	Three canal	2	1.0
		205	100.0

Table3-5:first premolar(root)

p-value	Total	Three root	Two root	One root			
	34	1	17	17	16	Men	Sex
	100.0	% 2.9	%50.0	%50.0	%47.1		
	31	0	10	21	Number	WOMEN	
	%100	%0	%32.3	%67.7	percent		
0.186	65	1	27	37	Number		total
	100.0	% 1.5	%41.5	%56.9	percent		

Table 5-3: Second premolar(root)

p-value	Total	Three root	Two root	One root			
0.121	24	1	2	21	Number	Men	sex
	%100	%4.2	%8.3	%87.5	Percent		
	32	0	0	32		women	
	%100	0	0	%100			
	56	1	2	53	Number		total
	%100	%1.8	%3.6	%94.6	percent		

Table7-3: First premolar (root)

p-value	Total	Three root	Two root	One root			
0.121	24	1	2	21	Number	Men	Sex
	%100	%4.2	%8.3	%87.5	Percent		
	32	0	0	32	Number	women	
	%100	%0	%0	%100	percent		
	56	1	2	53	Number		Total
	%100	%1.8	%3.6	%94.6	percent		

Table8-3: Second premolar (root)

p-value	Total	Three root	Two root	One root			
0.344	32	1	32	1	Number	Men	sex
	%100	%2.9	%94.1	%2.9	Percent		
	31	0	28	3	Number	Women	
	%100	%0	%90.3	%9.7	percent		
	65	1	60	4	Number		total
	%100	%1.5	%92.3	%6.2	Percent		

Discussion

The main goal of endodontic treatment is to save the tooth through a root canal procedure, chemical and mechanical cleaning and filling it with a filling material. However, failure is observed in root canal therapy; one of the main reasons for failure is low knowledge about root canal anatomy and morphology, variations in the number of canals etc. Proper knowledge about root canal morphology can decrease these errors.

In this study, morphology (number of roots and canals and canal/root percentage in men and

women of maxillary first and second premolars were studied. No such study with CBCT has been carried out in Iran

In this study, between first premolar 60.5% had one root, 38.2% had two root, 1.3% had three roots but 8.2% had one canal 89.9% had two canals and 1.9% had three canals.

In this study in second premolar 91.7% had one root, 7.3% had two roots and 1% had three roots, but 57.6% had one canal 41.5% had two canals and 1% had three canals.

In this study first premolars in maxillary (56.9%) had one root in both sides and (41.5%) had two roots and (1.5%) had three roots in both sides. But second premolars (84.6%) had one root both sides and (3.6%) two roots and (1.8%) had three roots both sides. there is no difference between men and women in prevalence of root.

In this study first premolars (6.2%) had one canal both sides and (92.3%) two canals and (1.5%) three canals in both sides. but in second premolars (67.2% had one canal both sides, (31.3%) two canals and (1.6%) had three canals.

Conclusion

CBCT scans proved an effective tool for the diagnosis of root canal morphology of maxillary first and second premolars. This diagnostic tool can be used to increase the success rate of root canal treatment: it is important to have perfect knowledge of the root canal morphology before curing it. The result of this study emphasizes that the dentist can obtain valuable information about the anatomy and morphology of the root canals based on the CBCT method.

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