Investigation Variety of Canals in the Lower Part Teeth Among Ills at Jondi Shapoor University, Ahwaz (Using the CBCT method)

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Abstract

One of reasons of unsuccessfully curing canal of premolar teeth is quitting extra canal. So having sufficient information about canal morphology is important in curing successfully. It is reported well that there is a wide variety in number, shape through in each root, number of roots and fusion exhibit. Many methods such as Cone Beam Computer Tomography (CBCT) are used to considering anatomy and morphology of teeth systems. The best benefit of this method is that two dimensional radiography limitations are decreased, also has lower rays rather than other three dimensional tomography. The main purpose in this research is investigating morphology of first premolar and second mandible teeth in ills using images produced by CBCT method in Ahwaz. Statistical society of the research is 150 instants including 75 teeth mandible first premolar and 75 mandible second premolar. During the research, canal types in premolar teeth in CBCT images were studied and analyzed in three dimensions, and all of teeth were one root type. T test was used to analyze the results.

Keywords: Tooth, Canal, Root, CBCT, first premolar, second premolar.

Introduction

Tooth is a main organ in body. It helps to eat food better and easier. We believe that teeth are very important in the body. They help healthy would be got. Cone beam CT (CBCT) has become an increasingly important source of three dimensional (3D) volumetric data in clinical orthodontics since its introduction into dentistry in 1998. Two-dimensional (2D) diagnostic imaging, including traditional radiographs, cephalometric tracings, photographs and video imaging, has been a part of the orthodontic patient record for decades. One of the reasons of the failure in the dental root canal treatment is the lack of enough knowledge of the pulp anatomy and canal variation. The type of the normal anatomy of the pulp and the possible different changes in its anatomy should be known. In addition of knowing the different types of normal and abnormal pulp; a dentist should be able to use the special techniques to choose the type of anatomy inside the pulp during the treatment. The limitations in analysis of these imaging modalities are well known, and include magnification, geometric distortion, superimposition of structures, projective displacements (which may elongate or foreshorten an object's perceived dimensions), rotational errors and linear projective transformation. This paper includes findings got through a wide and applied research clinically to improve dentistry in a very important aspect. The complexity of the root
canal system and internal morphology is directly correlated with endodontic treatment planning, therapy, and outcome. Mandibular first molars are the first permanent teeth to erupt, often requiring endodontic treatment because of early caries. Regarding the anatomic features of the C-shaped root and canal, our knowledge was mainly derived from investigations on mandibular second molars. Clinicians face similar problems when performing endodontic treatment on mandibular first premolars. However, few scholars have measured the wall thickness of the canals in this tooth type.

**Tooth Structure and its Configuration**

Although all teeth are anatomically complex, first lower molars are the first permanent posterior teeth to erupt and are those that most often suffer from caries, so they are highly likely to require endodontic treatment. These molars normally have two roots, one mesial and one distal, and their usual canal distribution is two in the mesial root and one or two in the distal root. Nonetheless, other possibilities exist. However, the complexity of the root canal anatomy presents clinical challenges and difficulties that often jeopardize the primary goal of such therapy. Therefore, variations in the root canal systems and characteristic features in different races should be recognized before or during endodontic treatment. Root canal treatment can be highly guaranteed when all root canals are identified, thoroughly cleaned and shaped, and obturated with an inert filling material. The clinician should be able to mentally visualize the pulp spaces from the coronal aspect to the apical foramen and should always be aware of the common internal root morphology and the possible variations which might be encountered. Otherwise, these anatomical variations may complicate endodontic treatment and compromise therapy outcomes. An applied method to collecting well useful data about tooth structure is cone beam computed tomography (CBCT). CBCT images had been taken because of the patients’ previous dentomaxillofacial problems. Teeth were selected according to the following criteria: (i) permanent molars with no periapical lesions; (ii) no root canals with open apices, resorption or calcification and (iii) the CBCT images of good quality. An instant of an image got of CBCT method is as the following one.

![Cone-beam computed tomography images](image_url)
seen concurrently in the first molars bilaterally. (e) Cases of mandibular left second molar with mesiobuccal 2-distobuccal 2 roots. (f) Cases of mandibular right second molar with four roots and left second molar with two roots- two canals. (g) Cases of mandibular right second molar with mesiobuccal 2-distolingual 2 roots. (h) Cases of bilateral mandibular first molars with five-canal and three roots. (i,j) Cases of bilateral mandibular first and second molars with C-shaped canals.

Measurements on CBCT Scans

CBCT slices were first reformatted to vertically position the root canal of each analyzed tooth to visualize the tooth cusp or incised edge, pulp chamber, AF, and, when possible, the whole length of the canal in 1 single slice. The cursor of the z-plane was moved to have an overview of the number and the direction of curvatures of the roots. Then, the image was sliced again with the y-axis in the curvature direction, making the angle of the root curvature larger in the y-plane and smaller in the x-plane. These alignments optimized the visualization of complete root canal anatomy. Alignment and measurements of CBCT images were performed by a radiologist experienced in reading CBCT scans using specialized software. Although anecdotal observations, published case reports on topics ranging from impacted teeth to temporo-mandibular joint (TMJ) morphology, and treatment outcomes suggest that important information is obtained through CBCT imaging, scientific evidence that the use of CBCT alters diagnosis and improves treatment plans or outcomes has yet to be established for many of its purported applications. In areas where the use of CBCT is logical, supported by scientific evidence or both, the specific indications for acquiring CBCT images and protocols to be used for imaging and extracting appropriate information have not been fully resolved. Finally, the information obtained from CBCT imaging requires a substantial level of expertise for interpretation. This implies that the untrained clinician is likely to have a substantial error rate in the interpretation of CBCT images resulting in a high percentage of missed or false-positive diagnoses.

Conclusions

One of the predominant causes of the failure of root canal treatment in mandibular second molar is the variations in root canal anatomy. An accurate knowledge of the morphology of the pulp cavity is rationally crucial before any endodontic procedure. Radiographs, exposed at two different horizontal angles and their careful interpretation, would facilitate finding the additional root canals.

So among 75 studied teeth, three instances (4%) were double canal, 1.33% had separated foramen epical. 0% of 0 teeth had no double canal.

CBCT scans are at least as accurate and reliable as periapical radiographs for tooth-length and root-length determinations. Number of canals in mandible first premolar was estimated using the Wein division as: type I, 96% - type II, 2.66% - type III, 1.33% - type IV, 0% and for the mandible second premolar, it was: type I, 97.33% - type II, 2.66% - type III, 0% - type IV, 0%. It is important for a dentist to know about morphology of root canal before curing teeth illnesses. Root cure needs cleaning and shaping all spaces of canals three dimensional and having sufficient informations about canal morphology and teeth roots. Also it is necessary to have a good information about varieties of anatomy system. There are a variety in number of roots and canals shape for each tooth. Mandible premolars are constituents of one root and one canal teeth, generally, and their roots are elliptical. To analyze morphology of root canal, we could use methods such as painting canal and cleaning teeth, normal radiography, and digital radiography techniques and in recent years, CT techniques. From a genetic and ethnicity perspective, the current Brazilian population is very diverse and considered to be one of the most heterogeneous populations in the world.
Fig. 2 Axial plans of CBCT images in 3 part, cronal-middle and 1/3 root apical
(A-C teeth 4 and 5 in type I, D-F teeth 4 in type II, G-I teeth 4 in type III and teeth 5 type II)

References
