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RESEARCH ARTICLE

Distance of Apical Constriction to the Apical Foramen in Extracted Lower First Premolar Teeth Assisted by Per Apical Radio-graph in Kerbala City

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Abstract

The purpose of this study was to investigate the measurement of the site of apical constriction in the lower first premolar teeth of radio-graphically in Kerbala AL-Mukadissa samples of patients who's attending to the dental clinic for orthodontic treatment,62 lower premolar teeth were examined radio-graphically for the size of the apical constriction, all these teeth were sound and caries free, these teeth examined radio graphically for detection of the apical constriction and the radiographic apex by using size 20 K file inside the root canal and the difference between the two were calculated as a measurement for the apical constriction size, the size of apical constriction was found 0.4-1.5mm, the man was found = 0.864 mm for the whole sample.

Keywords: *Apical foramen, Apical constrictions, Per-apical radiograph.*

Introduction

Apical constriction is an important for during root canal treatment this point at which the pulp tissue is ended and the beginning of periodontal tissue is started , during root instrumentation the dentist a wear about this point and should be careful about keeping this area intact because it's the area at which the root canal filling is seated .

Studies the anatomy of the root apex are an area of interest to the dentist .The apical limit of root canal instrumentation and therapy as well as, The terminal part of the root canal is the center of most activity and concern in the treatment and filling of the root canal [1]. The success of endodontic treatment depends on removing bacterial from root canal system; three dimensionally sealing and placement of a good coronal seal to prevent communications between oral cavity and per radicular tissues.

Also stated that the anatomic apex was located 0-2mm short of the radiographic apex in 50% of the teeth. Therefore, if you filled to the radiographic apex 50% of the time the gutta percha would be over extended, usually this over extension of gutta percha means that it is now situated in the periodontal ligament or alveolar bone.

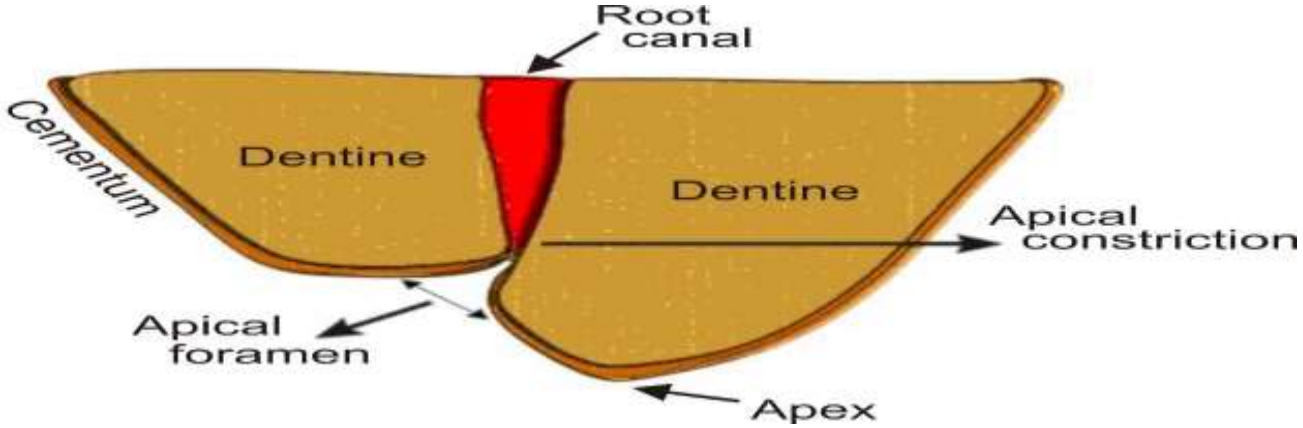


Figure 1: Apical formation (23)

In turn, this will often affect the success of root canal treatment [2].The apical site of the root canal having narrowest diameter is called apical constriction, it occurs about 0.5-1.0 mm from the apical foramen, it has also been called minor apical diameter [3]. Therefore, Root canal should be prepared up to the physiological foramen, also termed apical constriction, because of the results of experimental studies and biological principles, instrumentation and obscuration beyond the apical foramen should be avoided [4].

Some studies that the apical limit of canal instrumentation and obscuration is the apical constriction which is not only the narrowest part of the canal but morphologic landmark that can help to improve the apical seal when the canal is obturated, Cemento dentinal junction the point where the cementum meets the dentin, is where the pulp tissue end and periodontal tissue begins [5].

The first premolar teeth erupted at the age of 10-11 years and the root completion at the age of 12-13 years, and the apex of the tooth is closed, the size of apical constriction is changed by the age because of dentin deposition inside the canal, An apical constriction is often present,in immature teeth the root is not fully formed leading to an open apex , this is also seen in some pathological teeth [6].

The mandibular premolars are typically described in textbooks as single-rooted tooth with a single root canal system, studies the anatomy of the root apex are an area of interest to the endodontists , The apical constriction is defined as a part of root canal with the smallest diameter ,and considered the reference point for apical termination of root canal treatment[7]. The root canal system is the dentist cannot directly visualize a part of the tooth. Radiographs are helpful for the visualization of root anatomy, but limited because they provide two-dimensional images of three- dimensional object .Therefore, accurate knowledge of root anatomy is an important ally to radiographic resources [8]. Show some researcher that careful interpretation of the radiograph , close clinical inspection of pulpal floor and proper modification of access opening are essential for successful treatment outcome along with accurate knowledge of anatomical variation [9].

Material and Method

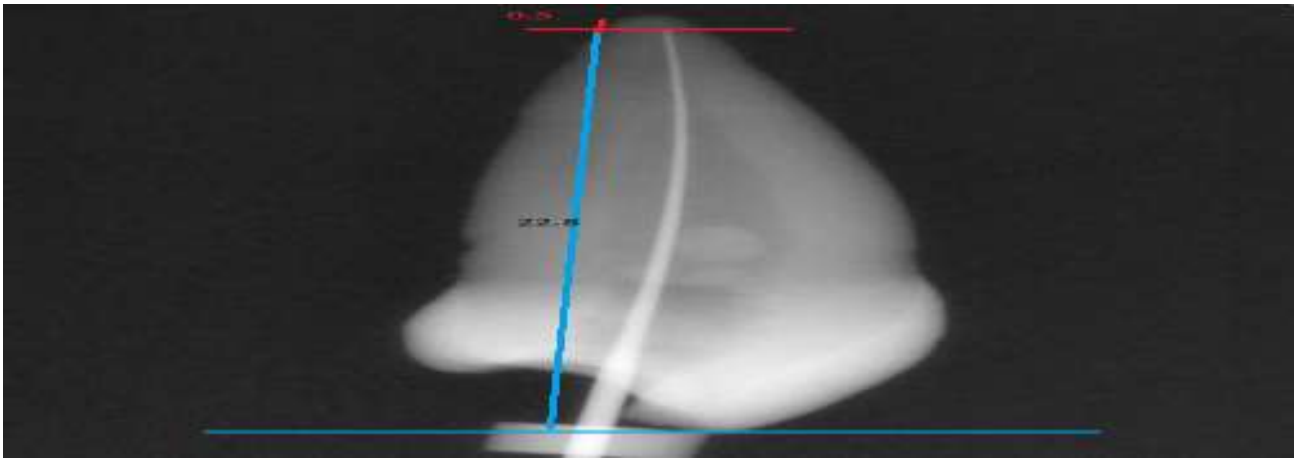
During this study for period from January 2017 till October 2017, This study an extracted 62 lower first premolar teeth were extracted for orthodontic purposes , Patients was between 15-25 years of age, these teeth examined by using a digital x-ray machine (CSN) type made in Italy and the receptor was My Ray sensor type connected to a hp computer , the radiographic method used is parallel technique and the exposure time was 0.3 seconds and 60 Kvp ,each tooth is placed directly on the sensor and the x-ray beam vertically directed on the sensor [10].

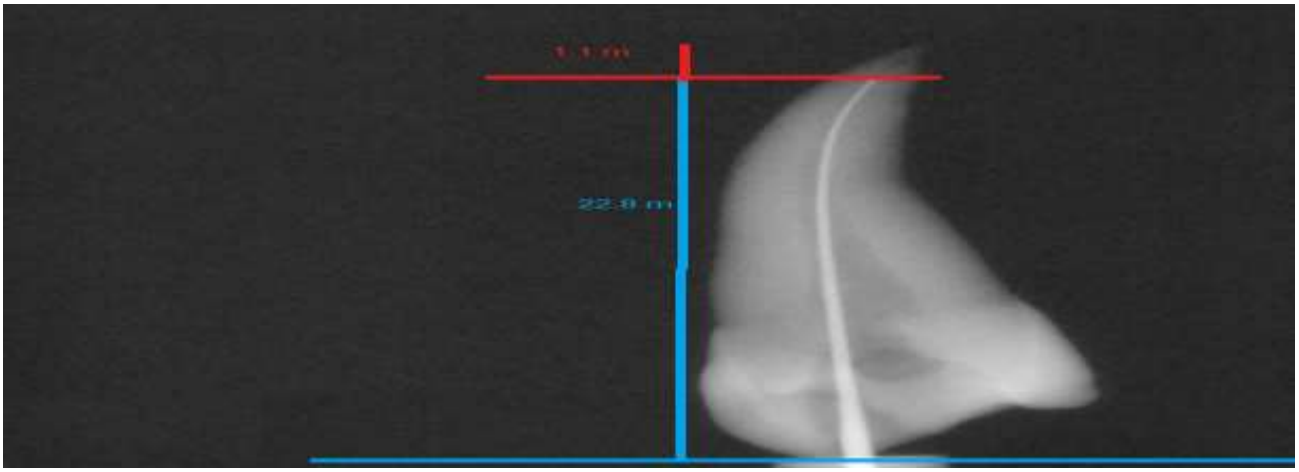
These 62 premolar teeth were examined for the determination of the working length by an occlusal opening using dental high speed turbine and the cavity reaches the pulp champers then by using a K file size 20 the file was inserted in the canal until it reaches to the apical constriction , each tooth was examined radio graphically by placing the tooth with K file inside the canal on the x-ray sensor to assure that the K file end reaches the apical constriction , the length of the canal was measured by dental root canal ruler and the teeth length [11].

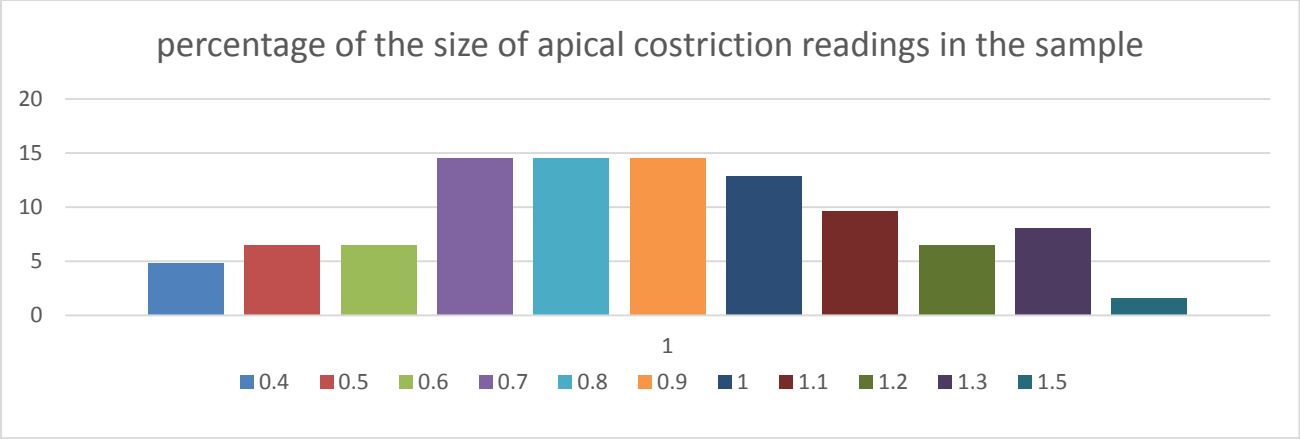
Each tooth length was measured by using digital caliper by placing the tooth between the two edges of the external measuring faces of the caliper. Then the working length was subtracted from the tooth length and the result is distance from the apical constriction to the apical foramen.

Results and Discussions

During this study the distance from apical constriction to the apical foramen was found between 0.4-1.5 mm, the mean was found for the whole sample examined 0.864 mm. The length of the lower first premolar teeth was range between 19.59 – 24.07 mm and the mean for the lower first premolar teeth length was found 21.59 mm.







0.4mm was found in 4.83% of the sample 0.5 mm was found in 6.45%
0.6 mm was found in 6.45% 0.7 mm was found in 14.51%
0.8 mm was found in 14.51% 0.9 mm was found in 14.51%
1.0 mm was found in 12.90% 1.1 mm was found in 9.67%
1.2 mm was found in 6.45% 1.3 mm was found in 8.06%
1.4 mm was not found and 1.5 mm was found in 1.61%

During this study for period January 2017 till October r 2017,the distance from apical constriction to the apical foramen was found between 0.4 – 1.5 mm, the mean was found for the whole sample examined 0.864 mm. The length of the lower first premolar teeth was range between 19.59-24.07 mm and the mean for the lower first premolar teeth length was found 21.59 mm the apical instrumentation is one of the most critical aspects of endodontic treatment, mainly in curved canals. Studies aimed at establishing more adequate parameters for biomechanical preparation of the apical third have stated a relationship between cervical pre flaring of root canals and more accurate determination of the initial apical file [12].

Knowledge of the apical anatomy is necessary for the successful surgical and nonsurgical endodontic treatment. Many researchers have done on the morphology of permanent teeth but very little researches take the importance of the apical constriction in consideration, the best root canal treatment is best apical seal , and the gutta percha filling is seated on the apical constriction, The apical constriction is structure or region that the endodontics cannot be seen directly [13].

So, Clinical practice, the physiological foramen (Apical constriction) is the most consistent anatomical characteristic and the point of reference as the apical end point in root canal treatment. It is a structure or region that the clinician cannot observe directly [14]. Show that the (Apical constriction is an ideal spot for working length determination, it is a narrowest spot of root canal having lowest diameter of blood vessels ,known as minor diameter of the canal , It is proved that the distance between apical constriction al foramen is 0.5-1 mm) [15].The minor constriction of the apical foramen at its initial size and position after endodontic cleansing and shaping procedures, then excellence in endodontic treatment can result the converse is also true[16].

As well as, that The apical constriction can longer be thought to be a reliable landmark in endodontic [17].And the apical constriction is a logical location for working length since it regularly coincides with the narrowest diameter of the root canal However the apical constriction clinically is problematic [18]. If minor constriction is violated and transported in some fashion, then cleanliness iscompromised and obturation is significantly harder to carry out well.

Even if the apical is not transported, if any portion of the canal is mismanaged in some fashion, the entire result is put at risk, and the focal point of this failure is ultimately the apical foramen [10]. So, that the foramen to apical constriction is approximately 0.5 in the younger group and 0.8 in the older group for all teeth types [8].

Many endodontic determined that the best working length to be 1-2 mm short of the anatomic apex as its seen on a radiograph and this is achieved because that the apical constriction is has the narrowest diameter for

the root blood supply and this give a large opportunity for wound healing in the apical part of the tooth ,the problem clinicians face is how to accurately identify and prepare to the apical constriction to achieve maximum success, healing would be desirable and the wound to the periapical tissues is supposed to be minimum [19].

The canal without proper debridement and has been suggested to extent the root canal instrumentation to 1mm short of the radiographic apex , which would be ensure closer proximity to position of apical foramen [20]. Also, the foramen (anatomic apex) was short of the apex(radiographic)in 88% of the canals , and in 5% of the canals the foramen was more than 2mm short of the apex showing that root filling extending to the radiographic apex are actually over fillings in most of the canals[21]. It also could be referred as cement-dentinal junction zone and not cement-dentinal junction limit. This zone is located on average 1to 1.5 mm from apical radiographic apex but this length may vary [22]. So, prior to root canal treatment at least one undistorted radiograph is required to assess canal morphology, the apical extent of instrumentation and final root filling have a role in treatment success , and are primarily determined radio graphically [23] as well as,

Some reported that one of the reasons a radio graphically determined working length lacks accuracy is that based on the radiographic apex rather than the canal terminus (the minor foramen). Working length is obtained with a radiograph by positioning the tip of a file a certain distance (usually 1mm) from the radiographic apex [24]. Knowing the exact location of the apical constriction is very important for dentist during nonsurgical endodontic treatment for accurate working length determination Root length determination is crucial for a successful treatment, because of the need for complete debridement and disinfection without traumatizing the periapical tissue

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