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ANALYTIC STUDY OF ENDODONTIC WORKING LENGTH VARIATION OF MAXILLARY CANINE IN BASRAH GOVERNORATE

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ABSTRACT

Any dental practitioner aims to successful endodontic treatment. To achieve this, an accurate working length should be determined. This descriptive study was carried out to determine the variation in the working length of the maxillary canine in patients attending the main Basrah city dental clinics. 40 patients, 20 males, and 20 females were included in this study. Endodontic treatment for the maxillary canine was performed after working length determination using a periapical x-ray and electronic apex locator. The results were analyzed by SPSS software version 10, using descriptive statistics to measure the mean and SD (standard deviation). The mean of working length was 26.95 mm among males and 24.72 mm among females but there was a non-significant difference between them. According to the current results, it was convenient to suggest that the knowledge of the variation in the maxillary canine working length affect the method of canals obturation and the outcomes of the treatment.

Keywords: Canine, Working length, Variation, Endodontic, Males, Females.

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INTRODUCTION

Endodontic treatment had been practicing a long time as a major branch of clinical dentistry, as a procedure, it requires complete extirpation of the dental pulp that is infected or irreversibly damaged combined with a thorough cleaning to remove microorganisms, shaping and obturation of the root canal system that composed of the main canals and ramifications in certain situations which communicate laterally, furcally and apically with the periodontal attachment apparatus (1).

A milestone step to pave the way for successful endodontic treatment is the determination of the correct working length for the aimed root canal system (2).

Determination of the correct working length is critical to perform correct extent of canal preparation up to the cement-dentinal junction, an obstacle to estimate this landmark is the difficulty to locate clinically, therefore the clinical landmark used is the apical constriction up to which root canal preparation and obturation is achieved(3).

Once failed to accurately measure working length, it could lead to ledge formation, apical perforation, and overextension of the irrigation solutions through the apical foramen which could end with peri-radicular inflammation and pain and eventually failure of the treatment (4).

When the working length is underestimated, the root canals are under-prepared and under-filled lead to persistence of the periapical lesion by fluid stagnation reservoir formation and recontamination (5).

The dental anatomy studies showed wide variation in the mean working lengths of different teeth, especially maxillary canine length that has been reported to be 26.5 mm, 27,3 mm, 26,8 mm for the mean working length,

however additional reports revealed different unusual working lengths in several cases as 33.5 mm, 39 mm, 39.5 mm, 41 mm, and even 47mm, also the cervical area of maxillary canines is more flattened so they should be flared to perform adequate instrumentation (6).

For these reasons, the working length should be calculated carefully and skillfully by using methods that showed success in giving accurate results and at the same time, these methods are efficacious and practical (7).

There are many techniques for working length determination including radiographic method, tactile sensation and the use of electronic apex locator, each one of these methods has limitations and advantages and a combination of both radiographs with the use of apex locator give more accurate measures of the working length (8).

There is insufficient studies regarding the endodontic working length in Iraq in general and especially in Basrah governorate and presence of great variation in maxillary canine length was seen in clinical practice , these reasons motivated us to carry out this study that aimed to analyze the variation in maxillary canine endodontic working length and compare the results between males and females.

Materials and method

Forty patients participated in this research and subjected to root canal treatment for the upper canine in Basrah city dental clinics in the period between August 2019 to August 2020. Teeth with attrition, severely carious crowns, those with a fixed prosthesis, and teeth with open roots apices are excluded. The clinical and radiographical examination was performed to all the patients after thorough medical and dental history

registration, access opening for the pulpal chamber was prepared under local anesthesia, the pulp was extirpated using barbed broaches (DiaDent) and the root canal was irrigated with 5.25% concentration of sodium hypochlorite. Working length was determined using K-file #15 (DENTSPLY), introduced to the canal, and paralleling x-ray technique was used by portable x-ray machine. Following the tooth isolation by rubber dam, the working length confirmation is achieved using an electronic apex locator (NSK). Data from 20 males and 20 females were

collected and analyzed using SPSS software package version 10.

Result

The result of this study reveals that the mean of working length of maxillary canine was 26.95 mm among males and 24.72 mm among females.

Statistical analysis of the working length measurements of both groups showed that mean length in males is greater than females but the difference was non-significant as shown in table (1,2).

Table (1): Descriptive statistics of mean endodontic working length of canine.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
male	20	26.9500	2.55415	.57113	25.7546	28.1454	21.00	31.00
female	20	24.7250	2.23886	.50062	23.6772	25.7728	20.00	29.00
Total	40	25.8375	2.62480	.41502	24.9980	26.6770	20.00	31.00

Table 2: One-way ANOVA test for comparison of the mean endodontic working length of canine between males and females.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49.506	1	49.506	8.583	.006
Within Groups	219.188	38	5.768		
Total	268.694	39			

Discussion

The endodontic working length measuring is a crucial step for the better outcomes of the endodontic treatment since the correct length will help optimizing the outcome of treatment preventing failure caused by over instrumentation with subsequent peri-radicular tissues damage and failure that caused by deficient instrumentation (9).

Studies about dental anatomy reported different mean lengths for different teeth, mean length of upper canine has been recorded from 25_27.5 mm, however it may reach to above 30 mm unusually. However, G.V Black in 1902 stated that 32 mm was the maximum length of the maxillary canine (10).

In 2019, Kayembe *et al.* reported that the endodontic working length varies among the different population, in their study the working length of the upper canine was 24.5 mm among Asians and Caucasians longer than Bantu 23.4mm (p= 0.12), also the teeth length varies within the same race and there is no specific study to each race but the dental practitioners aware that the lengths mentioned in the textbooks are related to teeth of Caucasians only (11).

In this study the mean working length in male 26.95 mm greater than the mean working length in female 24.72 mm but no significant difference seen between genders, this was consistent with Kim *et al.*, 2013 who reported that there was a gender correlation with the root length based on CBCT measurement of roots of different teeth,

but they found that the maxillary canine was the longest tooth in both sexes with no significant difference between them (12).

As a result of the lack of the studies regard the endodontic working length in Iraqi patients to compare the data with them, the studies which were reviewed in this study is limited to the reports that were carried out in distant regions. Other studies can be achieved to analyze and compare the whole length of the maxillary canine and also another teeth.

Conclusion

In Basrah governorate, the mean working length of maxillary canine was larger in males which was 26.95 mm and 24.72 mm among females but there was non-significant difference between them. The current study highlights the significance of awareness of the variation in the maxillary canine endodontic working length.

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