Occurrence of Additional Canals in Mandibular Lower Anteriors In Between Male and Female Patients

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Abstract: The endodontic treatment with excellent outcomes depends on the critical identification of the root and its canals anatomy. The successful identification of these anatomies guaranteed the pulp tissue extirpation completely, with efficiency in chemo-mechanical cleaning and shaping. All these lead to the most proper three-dimensionally root canal obturation with the most reliable inert filling. The purpose of this study is to provide clinical data on the presence of additional canals in mandibular anterior teeth among males and females. Patients reported from June 2019 to March 2020 were reviewed. 82000 patient records were reviewed and data related to patients undergone Root canal therapy in mandibular lower anteriors. Data includes age, gender and number of additional canals in lower anteriors. The collected data was tabulated in the excel sheet. Statistical analysis was done using SPSS software (version 9.0.3). The prevalence of patients with additional canals in mandibular anteriors was 8.1%. For females, the prevalence of additional canals was 3.24% whereas in males it is 4.86%. However, there is no relation between the gender and presence of additional canals in mandibular anteriors.

Keywords: Gender; Innovation technique; Mandibular anteriors; Root canal morphology; Root canal treatment.

INTRODUCTION

Success of an endodontic treatment largely depends on proper cleaning and shaping of the entire root canal system.(Vertucci, 2005) Detailed understanding of the root canal anatomy and configuration is important. Many of the problems encountered during and after root canal treatment occur because of inadequate understanding of the pulp space anatomy.

Studies on the internal and external anatomy of teeth have shown that anatomic variations can occur in all groups of teeth and can be extremely complex. (Borah and Bhuyan, 2011) However, an important challenge is the complexity of the root canal system and anatomical variations. (Rahimi and Ghasemi, 2013) Therefore, the clinician should be aware of typical configuration and potential anatomical variations. In this case, the possibility of treatment failure due to untreated canals decreases. Dentists must be familiar with the various root canal configurations and their characteristic features in different racial groups. Such awareness can help locate and negotiate canals, as well as in their subsequent management. (Rahimi et al., 2008) A good anticipation of their possible anatomical variation will help lessen endodontic failure. (Siqueira and Rôças, 2008) For each tooth in the permanent dentition, there is a wide range of variation reported in the literature.

There are many in vitro studies and clinical methods used in studies for evaluating the root canal morphology such as ex vivo radiography, decalcification, (Okumura, 1927) dye injection, (Yew and Chan, 1993) in vitro macroscopic examination, examination of the pulp floor with electron microscope and ground sectioning. Clinical methods include evaluation of endodontic access openings during endodontic treatment using magnification with a surgical operating microscope, or during endodontic treatment where magnification was not specified, or retrospective evaluation of endodontically treated teeth in patient records, or radiography of all teeth and in vivo radiographic examination.

Conventional periapical radiographs are valuable diagnostic tools for assessing root canal morphology in vivo. Nevertheless, these radiographs are not absolutely reliable because of inherent limitations such as the distortion and superimposition of bony and dental structures that can occur in the taken images. There are a number of...
ways in order to decrease the possibility of missed root canals starting with good pre-operative radiographies. There are several limitations in conventional radiographies. In order to overcome that, cone-beam computed tomography (CBCT) can be used in identifying the presence of additional canals.

A correct access cavity preparation is also very important in localizing the orifices of the root canals. Apart from that, ultrasonics are very important devices to identify missed canals. Increasing magnification and illumination enhance the possibility of finding all root canals during root canal treatment.

Previously our team had conducted numerous studies which include in vitro studies (Siddique and Jayalakshmi, 2019) (Website, no date; Rajendran et al., 2019) and clinical trials (Ravereence of additional canals in mandibular anteriors. The outcome data reveals that the majority of the mandibular incisors had a single root canal with 63.75% and only 36.25% of the roots had the presence of additional canals in mandibular anteriors (P>0.05) [Figure 3]. The results show that there is no significant difference between genders and the presence of additional canals in mandibular anteriors.

The descriptive statistics were used to determine the frequencies and percentage of the gender and age of the patients who had undergone root canal therapy in mandibular lower anteriors. The collected data was tabulated in the excel sheet. Statistical analysis was done using SPSS software (version 9.0.3).

RESULTS AND DISCUSSION

A total of 740 patients were seen during the study period. The prevalence of patients with additional canals in mandibular anteriors was 8.1% (60 of 740). For females, the prevalence of additional canals was 3.24% (24) whereas in males it is 4.86% (36) [Figure 1,2]. The results show that there is no significant difference between genders and the presence of additional canals in mandibular anteriors (P>0.05) [Figure 3].

Based on the previous article, a research conducted by Borual LC et al.,(Boruah and Bhuyan, 2011) reveals that the majority of the mandibular incisors had a single root canal with 63.75% and only 36.25% of the roots had additional canal which is similar to our study.

In another study by Al-Qudah et all.(Al-Qudah and Awawdeh, 2006) the majority of the mandibular incisors had a single root canal (73.8%) and 28.22% only had two canals,correlating to our study. Similarly a study...
conducted by Al Fouzan KS et al (Al-Fouzan et al., 2012) showed that 70% of the mandibular central and lateral had more than one main canal and one apical foramen while 30% of the sample had two separate canals merged into one canal before exiting.

Jia Liu et al reported that permanent mandibular incisors with two canals had a relatively low incidence in this Chinese population. The incidence of a second canal did not differ between males and females. (Liu et al., 2014)

In a study done by Ezoddini et al it was found that 55.9% of the teeth had two canals that in 51.5% of them the canals merged into one canal before exiting the tooth through one apical foramen. (Ezoddini, Mohammadi and Tabrizizadeh, 2008).

Mohsen Aminsobhan et al reported the majority of mandibular central, lateral incisors and canines had one canal which is 72.7%, 70.6% and 71.8%, respectively. (Aminsobhani et al., 2013)

Shape of the root canal is highly specific to each individual. Automated identification methods of the medial line of dental root canals and the reproduction of their 3D shape can be beneficial for endodontic interventions planning as severely curved root canals or multi-rooted teeth may pose treatment challenges. Accurate shape information of the tooth root canals may also be used by manufacturers of endodontic instruments in order to make more efficient clinical aids.

Present Study has a limitation of sample size, unicentric study (Saveetha Dental College). In Future scope, similar study with larger sample size and multicentered study has to be conducted to attain appropriate results.

CONCLUSION
In this study there is no relation between the gender and presence of additional canals in mandibular incisors. However, it is necessary to carefully interpret radiographic images prior to the root canal treatment. Anatomical identification is necessary to avoid the missed canal which leads to root canal failure.

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Conflict of Interest
The authors declare no conflicts of interest

REFERENCES
Dhinesh Kumar, S et al / Occurrence of Additional Canals in Mandibular Lower Anteriors In Between Male and Female Patients


Fig. 1: Bar chart shows the presence of additional canals in female patients. X-axis represents the number of canals in mandibular anteriors among female patients and Y-axis represents the total number of patients who had undergone root canal treatment in mandibular anteriors. The number of additional canals in mandibular anteriors is 7% (24) in females.

Fig. 2: Bar chart shows the presence of additional canals in male patients. X-axis represents the number of canals in mandibular anteriors among male patients and Y-axis represents the total number of patients who had undergone root canal treatment in mandibular anteriors. The number of additional canals in mandibular anteriors is 9% (36) in males.

Fig. 3: Bar graph depicts the occurrence of additional canals in mandibular anterior teeth based on gender distribution. The X-axis represents gender distribution, Y-axis represents percentage of patients who have undergone root canal treatment in mandibular anteriors. Chi-Square test shows $p=0.121$ ($p>0.05$-statistically not significant). There is no relation between the gender and presence of additional canals. However, the majority of the patients with additional canals were males.