

Prevalence of Two-Rooted Permanent Mandibular Canines: A Preliminary Study

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Abstract

Aim: The aim of this study is to determine the prevalence of two roots of mandibular permanent canines on intraoral periapical radiographs (IOPARs). **Methods:** Two hundred and two IOPARs of patients in the age range 18–70 years were retrospectively analyzed for the presence of two roots in permanent mandibular canines. **Statistical Analysis and Results:** The data obtained were analyzed using Microsoft Excel (Version 2007) for Windows. Three patients out of 202 exhibited two roots, indicating the prevalence to be 1.48%. The mean age of the patients depicting two roots was 37 years. All the patients were females. In all the three patients, the additional root was noted on the left side canines. **Conclusion:** This study demonstrates the prevalence of two-rooted mandibular permanent canine.

Keywords: Additional root, double roots, mandibular canine, supernumerary

INTRODUCTION

A morphological variation not causing functional impairment of the individual but that which can be visualized in internal or external structures or organs has been termed as an anatomical variation.^[1] Anatomical variations of teeth are not uncommon. Developmental disturbances of teeth size, shape, and structure are recognized entities. One such rare anatomical variation is supernumerary roots of teeth. These supernumerary roots, also called as additional roots, are common in molars and are rare in the anterior teeth.^[2] The mandibular canine is a single-rooted tooth, but on rare occasions may exhibit an additional root.^[2-6] This observation, where two roots were observed on the mandibular canines, provoked to take-up this study. Hence, it was aimed at determining the prevalence of additional roots on mandibular canines.

METHODS

Two hundred and two intraoral periapical radiographs (IOPARs) of adult patients in the age group of 18–70 years were analyzed retrospectively. Institution ethical committee clearance was obtained for the study. The radiographs had been made for the assessment of periodontal status, regressive alterations, caries and squal, assessment of impaction, and for orthodontic purposes. All the IOPARs had been made at

70 kVp, 8 mA at 0.5–0.6 s exposure time with Endo Explor-X (Villa, India) IOPAR machine using bisecting angle technique and Snap-A-Ray film holders. The films were all subsequently processed in an automatic processor (Legitdent, China), dried and mounted for viewing. The inclusion criteria included IOPARS depicting the mandibular canine of either side, fairly well, with good visual characteristics. Exclusion criteria included partial images, radiographic artifacts, and IOPARS not depicting canines. All radiographs were viewed in a quiet room with ambient lighting using a magnifying glass and an LED view box, by a trained oral radiologist. Additional root was identified based on the presence of bifurcation of the root trunk. The additional root was identified and level of bifurcation was further noted. The prevalence and standard deviation were calculated using Microsoft Excel (Version 2007) for Windows 7.

RESULTS

Two hundred and two IOPARs of patients in the age range of 18–70 years were screened for the presence of two roots in

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the permanent mandibular canines of either the right or left side. The mean age of the patients was 38.53 years. There were 63 male (31.2%) and 139 female (68.8%). Three ($n = 3$) radiographs showed the presence of additional root, making the prevalence of 1.48%. The mean age of the patients depicting two roots was 37 years. Additional roots were identified in female patients only. The standard deviation and variance summarized in Table 1. Additional root was noted on the left side (100%) and bifurcation was noted at the level of cervical one-third in two cases (66.7%) and apical one-third in one case (33.3%). Figures 1 and 2 depict the IOPARs with additional roots in the patients. Graph 1 represents the total number of patients and those exhibiting two roots. Graph 2 shows the gender distribution of patients, Graph 3 shows the side distribution, and Graph 4 shows the level of bifurcation of roots.

DISCUSSION

Although the etiology for the development of supernumerary roots are not known, some factors that have been attributed for the development of this entity. This includes external environmental influence during odontogenesis, higher penetrance of atavistic gene, racial, and genetic causes.^[7]

The prevalence of double-rooted canine varies from 1% to 10%.^[1,3] Further details on gender, racial, or side preference is not known. A literature search on Medline/PubMed was conducted using key words “additional roots and mandibular canine,” “Supernumerary roots and mandibular canine,” “two rooted and mandibular canine” which yielded limited published material on two-rooted mandibular canines, consisting of case reports with no prevalence studies. Further, a manual search was conducted for the same. Based on this available literature, it can be derived that this anomaly seems to be more common in female gender and the right side involvement being more common than the left.^[1-6,8] The same is summarized in Table 2.^[1-6,8-10]

In the present research, supernumerary roots were noted in female patients only, all occurring on the left side. Interestingly, two out of three teeth were impacted. Hence, it can be hypothesized that impacted mandibular canines may show additional root.

It has been estimated that the level of bifurcation in a two-rooted canine usually lies in the cervical-third region in about 43%–57% of the cases and in the middle-third region in about 40%.^[1,4-6] In the present research, bifurcation was found in cervical third in two patients and apical third in

one patient. It is also found that when bifurcation is found, the labial root is supposedly larger compared to the lingual root.^[1]

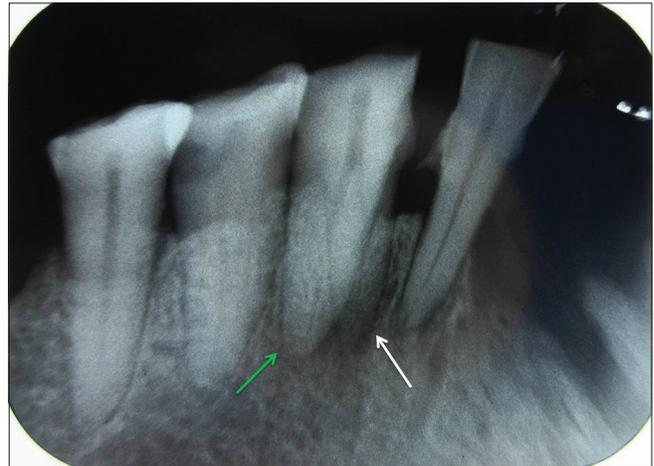
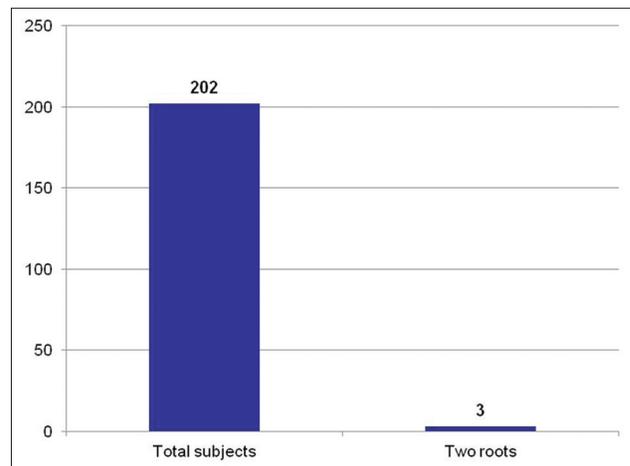


Figure 1: Intraoral periapical radiograph showing two roots in an attrited left canine

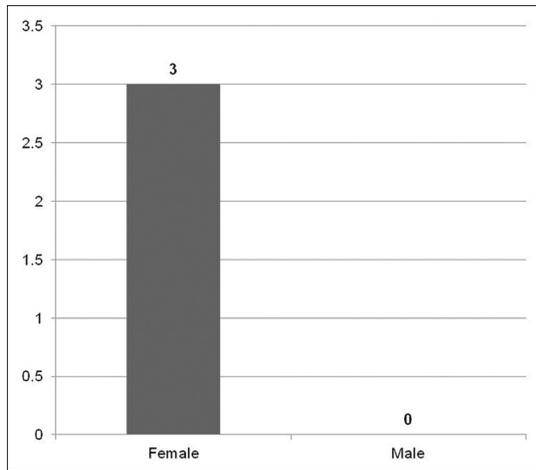


Figure 2: Intraoral periapical radiograph showing two roots in the impacted left canine

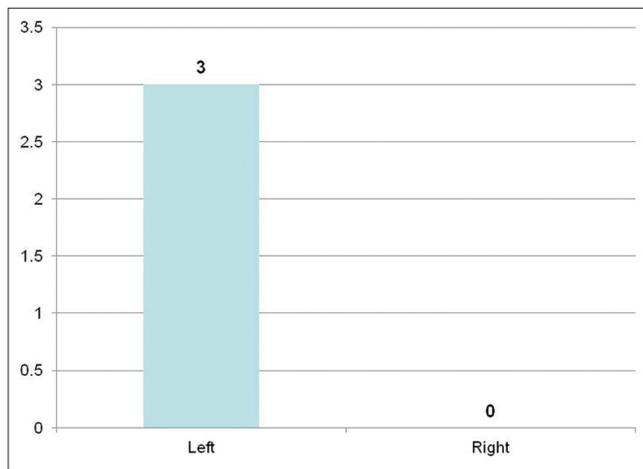


Graph 1: Distribution of number of subjects

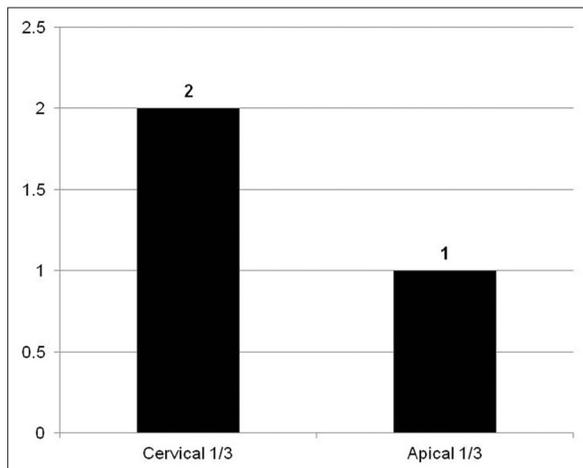
Table 1: Descriptive statistics	
Total number	202
Mean (average)	38.53
Standard Deviation	14.71
Variance (SD)	216.49
Population standard deviation	14.67
Variance (Population Standard Deviation)	215.42



Graph 2: Gender distribution of two rooted canines



Graph 3: Side distribution of two rooted



Graph 4: Distribution of level of bifurcation of roots

Radiographically, it is said that when bifurcations are noted in the cervical- and middle-third regions, the labial and the lingual roots do not superimpose.^[5] If the second root is suspected to have superimposed, then the change of horizontal

Table 2: Gender and Side preference of two rooted mandibular canines

Gender	Side preference	Reference
F	Right	2
F	Bilateral	3
F	Left	4
F	Right	5
NA	Right	1
F	Left	6
F	Right	9
F	Right	8
F	Left	10

F=Female; NA=Not available

angulation of the X-ray beam by 15° may help visualize the additional root.^[2]

Importance of knowledge about additional roots cannot be overemphasized. Identification of root canal morphology is extremely important for the success of endodontic treatment. One common cause for failure of endodontic treatment is nonidentification of the additional roots or root canals.^[1,5] Hence, knowing the prevalence and characteristics of this rare anomaly may be a useful tool in clinical practice.

CONCLUSION

Mandibular canines showing additional roots are very uncommon. Although the chance of finding an addition root in a mandibular canine is rare, one should be aware of the occurrence of such rare anomaly. Recognizing additional root plays a key role in endodontics, periodontics, and orthodontics. The present research has been successful in depicting the demographic features of this rare anomaly. Further research with larger sample size needs to be undertaken to know more about this anomaly, in depth.

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Conflicts of interest

There are no conflicts of interest.

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