Prevalence of radix entomolaris in the mandibular molar teeth in Kashmiri population

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Abstract

Introduction: An awareness and understanding of the presence of unusual root canal tooth morphology and its possible variations is valuable for successful endodontic treatment.

Objective: The objective of this study was to see the prevalence of Radix Entomolaris in population of Kashmir using radiographs.

Materials and Method: A total of 100 patients were included in the study and digital radiographs (RVG) were taken for their mandibular 1st permanent molars bilaterally. These radiographs were evaluated for presence of radix entomolaris and its correlation between the genders.

Results: The overall prevalence of individuals with radix entomolaris was 24%. The incidence was 75% for unilateral whereas 25% for bilateral.

Conclusion: Presence of radix entomolaris in high proportion of Kashmiri population needs careful clinical and radiologic evaluation to ensure high long term success of endodontic treatment of permanent molars.

Keywords: Radix entomolaris, Prevalence, Digital radiograph, Root canal treatment

Introduction

Cleaning and shaping refers to the removal of all organic substrate from the root canal system and the development of a purposeful form within each canal for the reception of a dense and permanent filling. So, shaping implies the development of a unique shape for each root canal directly related to the length, position and curvature of the root. The goal of instrumentation is to produce a continuously tapering funnel from the root apex to the coronal access cavity.[1]

An awareness and understanding of the presence of unusual root canal tooth morphology and its possible variations is fundamental because the no treatment of one canal can lead to endodontic treatment failure.[2]

Permanent mandibular first molars usually have two roots mesial and distal and three root canals, but variations in the number of roots and in canal morphology are not uncommon.[3] The additional third root, (i.e. the super-numerary root) in permanent mandibular first molar variants that have three roots is typically distributed lingually. This was first described by Carabelli in 1844[4] and was termed radix entomolaris (RE) by Bolk in 1915.[5] Similarly an additional root at the mesiobuccal side of the mandibular molar is called the radix paramolaris (RP). A RE can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. Incidence of bilateral occurrence of RE varies between 50 to 67%.[6]

The extensive study of endodontic literature revealed that the prevalence of RE has a genetic and ethnic predilection and ranges from 0-33.1%. The prevalence of RE is said to be highest among the population of Asian and Mongolian origin. Radix entomolaris is not very common in African, Eurasian, Caucasian population.[7, 8]

There is genetic variation in number of roots and root canals in various individuals based upon race and ethnicity. This is why a clinician should identify all the variations before procedure so as to result in successful endodontic treatment.[9] Therefore, aim of the present study was to evaluate the prevalence of radix entomolaris in Kashmiri population.

Materials and Methods

Bilateral radiographs of mandibular 1st permanent molars was done in 100 patients (76 males and 24 females) who visited the Department of Conservative Dentistry & Endodontics after taking informed consent and selected randomly. The patients were of Kashmiri origin and were aged between 15-50 years. The radiographs were evaluated by two endodontists for total incidence of radix entomolaris and their occurrence in different genders. They were also evaluated for their occurrence unilaterally and bilaterally. The result was analyzed statistically (Chi square test) with $p<0.05$ considered statistically significant.

Results

After interpretation of bilateral radiographs of 100 patients (76 males and 24 females), 24 patients (8 males and 16 females) had radix entomolaris. The prevalence in males was 10.5% whereas in females it was 66%. (Table 1). The difference in prevalence between genders was statistically significant ($p=0.030$). The prevalence of unilateral RE(75%) was higher than bilateral RE(25%) (Table 2)

Table 1: Radix Entomolaris in the mandibular molar teeth of Kashmiri population

Gender of patient examined	Number of patients examined	Patients with radix entomolaris	Percentage
Male	76	8	10.5%
Female	24	16	66%
Total	100	24	24%

Table 2: Patients with radix entomolaris unilaterally and bilaterally according to gender

	Male	Female	Total	Percentage of patients with radix entomolaris
Total number of patients	76	24	100	24%
Unilateral radix entomolaris	6	12	18	75%
Bilateral radix entomolaris	2	4	6	25%

Discussion

The clinician must have thorough knowledge and skills for management of radix entomolaris to get the successful endodontic outcome. Radix entomolaris is one of the major variants observed in human permanent mandibular molars and failure to recognize this variant may jeopardize the prognosis of root canal therapy.[10] Studies have shown that a large number of general dentists failed to appreciate this anatomic variant especially in mandibular molars.[11,12]

The reason for the formation of this extra root is still not clear. This can be attributed to some external factors during tooth formation or due to reappearance of a trait after many generations known as atavism. The morphology of the extra root is variable which can present as a full length root or a root with smaller size and different shape.[13]

Fig 1: Intraoral periapical radiograph taken at 90 degree vertical angulation

Fig. 2: Intraoral periapical radiograph taken at 30 degree mesial angulation

De Moor et al[6] stated that it is important to find all the roots of the mandibular first molars because of the presence of third root in some cases. So, it is convenient to do the x-rays from different horizontal angulations so as to find out the third root even in cases of superimposition and that would also help to identify anatomy of chamber and root canal.[14]

Radix entomolaris is a common finding in Asian/Mongolian populations, where up to 30% of mandibular molar teeth can show additional roots. In our study, after interpretation of bilateral radiographs of 100 patients (76 males and 24 females), 24 patients (8 males and 16 females) had radix entomolaris. So, total prevalence of radix entomolaris in Kashmiri population which is in the north of the India was 24% in first molars is higher than reported rates in European or Caucasian populations where the prevalence is typically less than 2%.[15-18] The prevalence of radix entomolaris unilaterally was 75% (18 out of 24 patients) and bilaterally 25% (6 out of 24 patients).

Successful endodontic treatment in a tooth with radix entomolaris requires detailed radiographic and clinical examination. That is why digital radiographs were taken because they involve less usage of x-rays as well as images can be magnified so that most of radix entomolaris cases can be detected (Fig. 1). To avoid the missing of some cases due to superimposition, a second image was taken at 30 degree angulation towards mesial side (Fig. 2).[19]

Three-dimensional imaging techniques based on computed tomography (CT) and cone beam computed tomography (CBCT) are useful for visualizing or studying the true morphology of an RE in a noninvasive manner using less radiation. However, cost and access to them are said to be the limiting factors.[8,20]

Conclusion

The prevalence of radix entomolaris in the population of Kashmir region of Jammu and Kashmir

was observed to be 24% in our study which is higher than other population. The higher prevalence of radix entomolaris in Kashmiri population has a very important role in dentistry specially endodontics. Therefore, the clinicians should be well aware of this fact and should have knowledge about their prevalence and take every possible measure using the advanced diagnostic and imaging modalities to avoid any endodontic failure leading to high rate of treatment success and patient satisfaction.

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