

## Prevalence of Radix Entomolaris in population of Central region of Nepal: A radiographic study

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### Abstract

**Objective:** The objective of this study was to see the prevalence of Radix Entomolaris in population of Central region of Nepal using radiographs.

**Materials and Method:** A total of 200 patients were included in the study and digital radiographs(RVG) were taken for their mandibular 1<sup>st</sup> permanent molars bilaterally. These radiographs were evaluated for presence of radix entomolaris and its correlation between the genders and between right and left side.

**Results:** The overall prevalence of individuals with radix entomolaris was 12%. The prevalence of teeth with radix entomolaris for total number of teeth was 7.5%. The incidence of radix entomolaris on left side was 10% whereas on right side was 5%. The incidence was 75% for unilateral whereas 25% for bilateral.

**Conclusion:** So, practicing dentists especially endodontists should be well aware of the fact that there is high prevalence of radix entomolaris in mandibular 1<sup>st</sup> permanent molars before starting RCT.

**Keywords:** Radix entomolaris, Prevalence, Digital radiograph, RCT

### Introduction

The knowledge of morphology of roots of teeth is very important in dentistry especially in the field of endodontics. Most of the 1<sup>st</sup> permanent molars in mandible have 2 roots (mesial and distal) with 3 root canals. There are 2 root canals in mesial root whereas 1 root canal in distal root but 2<sup>nd</sup> root canal can also be sometimes present in distal root.<sup>(1)</sup> It is common to have difference in root morphology of mandibular 1<sup>st</sup> molars. An extra root present in distolingual aspect of mandibular 1<sup>st</sup> molar is known as radix entomolaris. An extra root present on mesiobuccal aspect of mandibular 1<sup>st</sup> molar is known as radix paramolaris.<sup>(2)</sup>

As mandibular 1<sup>st</sup> molars are first permanent teeth to erupt in oral cavity, these teeth are highly susceptible to caries and most commonly suggested for RCT. Inability to make the root canal microbe free due to missed root or root canal is most common factor for failure of RCT.<sup>(3)</sup> 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 RCT.<sup>(4)</sup> Therefore the aim of this study is to evaluate the prevalence of radix entomolaris in population of Central region of Nepal.

### Materials and Method

Bilateral radiographs of mandibular 1<sup>st</sup> permanent molars was done in 200 patients(124 males and 76 females) who visited the department of Oral Medicine and Radiology after taking informed consent selected randomly. The patients were of Nepalese origin and were aged between 15-70 years. The radiographs were

inspected by Oral Medicine and Radiology specialist. The radiographs were evaluated for total incidence of radix entomolaris and their occurrence in different genders. They were also evaluated for their occurrence on right and left side and also bilaterally. The result was formulated using chi square statistical analysis.

### Results

After interpretation of bilateral radiographs of 200 patients (124 males and 76 females), 24 patients(8 males and 16 females) had radix entomolaris. So, total prevalence of radix entomolaris was 12%. The prevalence in males was 6.5% whereas in females it was 21.1%.(Table 1) The difference in prevalence between genders was statistically significant( $p=0.030$ ).

**Table 1: Shows the incidence of radix entomolaris with gender**

Gender of patient examined	Number of patients examined	Patients with radix entomolaris	Percentage
Male	124	8	6.4%
Female	76	16	21.05%
Total	200	24	12%

The prevalence of radix entomolaris from total teeth examined was 7.5% (30 out of 400 teeth). The prevalence of radix entomolaris was higher on left side i.e. 10% as compared to right side i.e. 5% and the difference was statistically significant.(Table 2)

**Table 2: Occurrence of radix entomolaris according to side of jaw**

Side of jaw	Number of teeth examined	Number of radix entomolaris	Percentage
Right side	200	10	5%
Left side	200	20	10%
Total	400	30	15%

The prevalence of radix entomolaris unilaterally was 75%(18 out of 24 patients) and bilaterally 25%(6 out of 24 patients).(Table 3)

**Table 3: Patients with radix entomolaris unilaterally and bilaterally according to gender**

	Male	Female	Total	Patients with radix entomolaris
Number of patients	124	76	200	24
Unilateral	12	6		18(75%)
Bilateral	4	2		6(25%)

**Discussion**

The reason for the formation of this extra root is still not clear.(Fig. 1) 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.<sup>(5)</sup>



**Fig. 1**

When extra root is present in mandibular first permanent molar, it is mostly located below the cervical region of the tooth and in distolingual direction of the distal root. This extra root is very rarely same in size as the distal root and is more circular cross-sectionally as compared to distal root. It is projected distolingually at an angulation of 45° with type I canal system. This extra does not just divide from distal root but is a true root with separate apex and orifice.<sup>(6)</sup>

De Moor et al 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 3<sup>rd</sup> root even in cases of superimposition and that would also help to identify anatomy of chamber and root canal.<sup>(6)</sup>

In this study, after interpretation of bilateral radiographs of 200 patients(124 males and 76 females), 24 patients(8 males and 16 females) had radix entomolaris. So, total prevalence of radix entomolaris was 12%. The prevalence of radix entomolaris from total teeth examined was 7.5% (30 out of 400 teeth). The prevalence of radix entomolaris unilaterally was 75% (18 out of 24 patients) and bilaterally 25% (6 out of 24 patients).

In mongolian population, previous studies have reported a prevalence of 5-30% and this is a high frequency. The Caucasian population has the prevalence of 3.4-4.2% which is less as compared to mongloids.<sup>(6)</sup> The results concluded from our study came out to be higher than previous studies. The prevalence of radix entomolaris came out to be higher in females as compared to males and this difference was significant statistically whereas results of study by Ming Gene et al were different which stated that difference was insignificant.<sup>(7)</sup>

Successful endodontic treatment in a tooth with radix entomolaris requires detailed radiographic and clinical examination.(Fig. 2) 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. To avoid the missing of some cases due to superimposition, a second image was taken at 30° angulation towards mesial side.<sup>(8)</sup>



**Fig. 2**

These days, use of advanced imaging modalities have led to significant increase in detection of morphological alterations in teeth. CBCT is a very useful imaging modality to find out these extra roots because it is non invasive, accurate and cost effective method. It can also tell us the true anatomy of tooth structure in 3-D. So, these modalities can be of great help in carrying out endodontic procedures.<sup>(9)</sup>

Analyzing the crown of tooth and cervical morphology clinically with the help of periodontal probe can help in identification of extra root. There should be good understanding about the anatomy of

roots and root canals so as to locate the orifices. If the orifices are not visible, the pulp chamber floor should be properly inspected specially in distolingual region. An additional root canal is indicated by a dark line on pulp chamber floor.<sup>(10)</sup>

### Conclusion

The prevalence of radix entomolaris in the population of Central region of Nepal came out to be 12% in our study which is higher than other non-mongloid population. This prevalence of radix entomolaris in population has a very important role in dentistry specially endodontics. So, clinicians should be well aware of this fact and should have knowledge about their prevalence and take every possible measure using the advanced imaging modalities to avoid any endodontic failure leading to high rate of treatment success and patient satisfaction.

### References

1. Rodrigues Clarissa Teles et al: Prevalence and morphometric analysis of three-rooted mandibular first molars in a Brazilian subpopulation: *J Appl Oral Sci.* 2016;24(5):535-42.
2. Colak H et al: Prevalence of three-rooted mandibular permanent first molars among the Turkish population: *Nigerian Journal of Clinical Practice* • Jul-Sep 2012 • Vol 15 • Issue 3.
3. Garg Amit Kumar et al: Prevalence of Three-Rooted Mandibular First Molars among Indians Using SCT: *International Journal of Dentistry* Volume 2013.
4. Mukhaimer Raed, Azizi Zafer: Incidence of Radix Entomolaris in Mandibular First Molars in Palestinian Population: A Clinical Investigation: *International Scholarly Research Notices* Volume 2014.
5. Bains Rhythm et al: Prevalence of radix entomolaris and fused roots in mandibular permanent molars of a North Indian population: A hospital-based retrospective radiographic study: *Indian Journal of Oral Sciences* □ Vol. 7 □ Issue 1 □ Jan-Apr 2016.
6. Dube Moulshree et al: Incidence of Radix Entomolaris in the Indian Population - An In-vitro and In-vivo Analysis: *JIOH* Volume 3; Issue 5: October 2011.
7. Tu Ming Gene et al: Prevalence of Three-rooted Primary Mandibular First Molars in Taiwan: *J Formos Med Assoc* | 2010 • Vol 109 • No 1.
8. Bharti Ramesh et al: Prevalence of radix entomolaris in Indian population: *Indian J Stomatol* 2011;(2)3:165-67.
9. I. Sujatha et al: Prevalence of three rooted mandibular permanent first molars in South Indian population - radiovisiographic evaluation: *Archives of Oral Sciences & Research*.
10. Saberi Ishagh Ali et al: Prevalence of Radix Entomolaris in Mandibular First Molars in south-eastern Iranian Population and series of case reports: *Sch. J. Dent. Sci.*, 2015;2(7):401-408.
11. Calberson Filip L. et al: The Radix Entomolaris and Paramolaris: Clinical Approach in Endodontics: *JOE*—Volume 33, Number 1, January 2007.