

## Prevalence of Radix Entomolaris in an Indian Population

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### Abstract

**Aim:** Many multi racial epidemiological studies have highlighted the importance of watching out for a Radix Entomolaris (RE) while performing endodontic treatment on mandibular molars. However, data is scarce in relevance to an Asian Indian population. This study therefore evaluated the frequency of RE in an Indian Dental hospital visiting population.

**Methodology:** A total of 640 patients above the age of 18 years, who visited the Department for endodontic treatment between January 2008 and December 2009 were screened for RE using full mouth periapical radiographs.

**Results:** High bilateral occurrence (60%) was detected in the sample population, though the overall occurrence was less (2.19%) compared to other previously studied Asian populations.

**Conclusion:** The frequency of a third root and fourth canal in mandibular first molars makes it necessary to carefully interpret radiographs to identify anatomy.

**Key words:** Radix Entomolaris, Asian Indian, bilateral occurrence.

### Introduction

Successful endodontic treatment depends upon the complete removal of micro organisms as well as pulp tissue, for which complete information of internal morphology of radicular canals and possible variations is important.<sup>1</sup> Mandibular first molars typically have two roots but sometimes present with a supernumerary root. If this root is placed distolingually it is called radix entomolaris (RE), and in very rare cases when it may be located mesio-buccally it is called radix paramolaris.<sup>2</sup> The formation of radix entomolaris is generally related to racial, genetic and external factors during odontogenesis.<sup>1</sup> Knowledge of its occurrence is important for endodontic considerations as well as the additional root being a contributing cause to localised periodontal destruction at distolingual sites.<sup>3</sup>

Individuals with mongoloid traits have been reported with the highest incidence of RE (5%-30%), with a frequency of less than 4% recorded in European decent and 2.8% in African populations.<sup>4,5</sup> Despite the occurrence of RE being considered an Asiatic trait, its prevalence has hardly been investigated in an Asian Indian context.<sup>6,7</sup> The aim of this retrospective study was therefore to evaluate its frequency in a population visiting an Indian Dental hospital.

### Material and methods

The study was conducted jointly in the Department of Endodontics and Prosthodontics, Faculty of Dental Sciences, CSM Medical University, Lucknow, U. P., India. After obtaining clearance from the Institutional Ethics Committee and individual informed consents, a total of 640 patients (330 males and 310 females) above the age of 18 years, who visited the Departments for endodontic treatment between January 2008 and December 2009 were screened. The subject had to have at least 1 mandibular molar to be considered for the study. Age, sex and race of the subjects were recorded to rule out non Indian origin. One thousand two hundred and sixty five mandibular first molars present in these subjects were evaluated using full mouth periapical radiographs at 30° mesial angulation

(Endos AC, Villa Sistemi Medicali Spa, Buccinasco, Italy). The radiographs were developed and fixed using standard procedure (Eastman Ultra speed film, Kodak, Rochester, NY, USA) followed by independent evaluation on a viewing box under optimal conditions, using magnifying glasses (2X) by at least two authors. A consensus decision was reached in case of disagreement in any case. The criteria used to indicate RE presence was clear distinction of an extra root, indicated by the crossing of translucent lines defining the pulp space and periodontal ligaments, originating in the upper half of the distal root.<sup>8,9</sup> The overall incidence and occurrence of the extra root in relation to sex and quadrant were then analyzed using SPSS software (version 12.0, SPSS Chicago IL) for chi squared test and p values (the level of significance set at  $p < 0.05$ ).

### Results

Six hundred forty subjects comprising 330 males and 310 females formed the study sample. A total of 1265 mandibular first molars of this sample were evaluated, 640 of which were right sided and 625 left sided (Table 1,3). Fourteen subjects were found to have radix entomolaris with prevalence of RE subjects being 2.19%, and number of females recorded with RE being higher (Tables 1.2). The number of bilaterally occurring RE's was non significantly higher compared to the unilateral RE's.<sup>8,10</sup> The prevalence of RE in all first molars examined was 1.58%, and the right first molar had a higher prevalence of RE compared to left molars ( $p=0.691$ , Table 3). While females had higher prevalence of unilateral RE, males recorded equal prevalence of unilateral and bilateral RE's (non significant).

### Discussion

The study reported an RE prevalence of 2.19% in all subjects and 1.58% in all mandibular first molars. This was much higher than the figure quoted by Tratman (1939) of 0.2% for Indians, though the prevalence was lower than reported for Asian populations by other studies (5.8 to

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	Total No. of subjects	Subjects with Unilateral RE		Subjects with Bilateral RE		Total subjects with RE	
		N	%	n	%	N	%
Female	310	5	1.61	3	0.97	8	2.58
Male	330	3	0.91	3	0.91	6	1.82
Total	640	8	1.25	6	0.94	14	2.19
$\chi^2$		0.641		0.006		0.434	
p		0.423		0.939		0.510	

Table 1: Prevalence of subjects with Radix Entomolaris

	No. of Teeth	n	%
Female	612	11	1.8
Male	653	9	1.38
Total	1265	20	1.58

 $\chi^2=0.357$ ;  $p=0.550$ 

Table 2: Division of Mandibular first molars with RE according to sex

	Total No. of first molars examined	Total No. of RE	%
Right	640	11	1.72
Left	625	9	1.44
Total	1265	20	1.58

 $\chi^2=0.158$ ;  $p=0.691z$ 

Table 3: Division of Mandibular first molars with RE according to quadrant

43.6%).<sup>11,12</sup> The differences could be because of genuinely lower RE prevalence in the Indian race, though variations in sample size and methodology may account for the differences. Most previous studies report an RE predilection to the right side as in this study.<sup>10</sup> Our survey recorded a slightly higher percentage of RE in females (non significant) though literature review did not reveal a predisposition of RE to either sex.<sup>8</sup> In conformance with previous studies on RE in Asians, was the high incidence of bilateral occurrence recorded as 60% in this study.<sup>6</sup> Further research would be needed to investigate the higher recorded prevalence of bilateral RE in males and unilateral RE in females.

A limitation of the study was using a single horizontal angle two dimensional radiograph for RE assessment. De Moor et al., stated that the presence of a third root in mandibular first molars makes it essential to anticipate and

find all canals during molar root canal treatment. Radiographs exposed at two different horizontal angles would help to identify chamber and root anatomy. They also stated that in the case of an RE the conventional triangular opening cavity must be modified to a trapezoidal form in order to better locate and access the distolingually located orifice of the additional root.<sup>13</sup> This approach could not be practiced in consideration of the very large number of patients seen daily in the concerned government dental hospital. Also, previous studies report that even a panoramic radiograph may be accurate in diagnosing a third root up to 90%.<sup>14</sup> Future research on RE in Asian Indians could study a more large and varied population, utilizing computed tomography images.

### Conclusion

The prevalence of RE in the Indian population was less

than reported for other Asian populations and had a higher occurrence on the right side and in females. Bilateral occurrence of RE was found to be 60%. The frequency of a third root and fourth canal in mandibular first molars makes it necessary to carefully interpret radiographs to identify anatomy, alter access opening and avoid 'missing' a canal.<sup>1,15</sup>

Refinements in endodontic cavity preparation and radicular inclination should be given due consideration in teeth presenting with radix entomolaris, so as to prevent procedural accidents during endodontic procedures. The most important factor central to successful instrumentation are knowledge, training and competency in selecting the best technique. The best antidote is always prevention!<sup>16,17</sup>

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