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TO DETERMINE THE RADIX MOLAR PREVALENCE IN MANDIBULAR PERMANENT MOLARS

[1]Dr Attique Ur Rehman, [2]Dr Muaz Hafeez, [3] Dr Hassan Kamal

[1]BDS, FCPS, Registrar Department of Operative Dentistry, University College of Dentistry, Lahore., [2]Jinnah Medical and Dental College Karachi Muazhafeez@gmail.com, [3]BDS, Baqai Medical University Karachi.

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Abstract:

The root morphology importance is highlighted by analysis showing that canal morphological changes may affect endodontic results. In general, 2 roots are in the mandibular molars; though, the third root presence is an important anatomical variable amongst many people groups.

Objectives: *To report and determine the radix paramolaris or entomolaris prevalence in first, second and third permanent human mandibular molars.*

Study Design: *An Observational Study.*

Place and duration: *In the dental section of Lahore Medical and Dental College and Punjab Dental hospital Lahore for one-year duration from March 2018 to March 2019*

Methods: *2234 total permanent human mandibular molars were taken from various hospitals in Lahore. 359 teeth from 2234 teeth placid were not included in the analysis and for the study 1875 teeth were selected. Into 3 groups; Teeth were divided and to see radix molar (RP or RE) every tooth was inspected.*

Results: *The RE prevalence was 80 (4.2%) in first mandibular molars, 30 (1.6%) in second molars and 45 (2.4%) in third molars, RP 13 (0.7%) was in the first, 8 (0.4%) second and 11 (11%). 0.6) as the third molar. When relating the RP and RE presence in the first mandibular molars with the second and third molars, no significant difference was observed (p> 0.05).*

Conclusion: *The total Radix molar prevalence was 9.9% and in the 1st group was 4.9%, in the 2nd group it was 2% and the 3rdgroup it was 3%. There were no substantial differences between the 1st, 2nd and 3rd mandibular molars. These data on the morphology and appearance of Radix molars will offer beneficial evidence for the clinician to attain fruitful endodontic outcomes.*

Keywords: *Permanent mandibular molars, Human teeth, Radix Molar, Morphology, Identification.*

Corresponding author:

Dr. Attique Ur Rehman,

BDS, FCPS Registrar, Department of Operative Dentistry, University College of Dentistry, Lahore.

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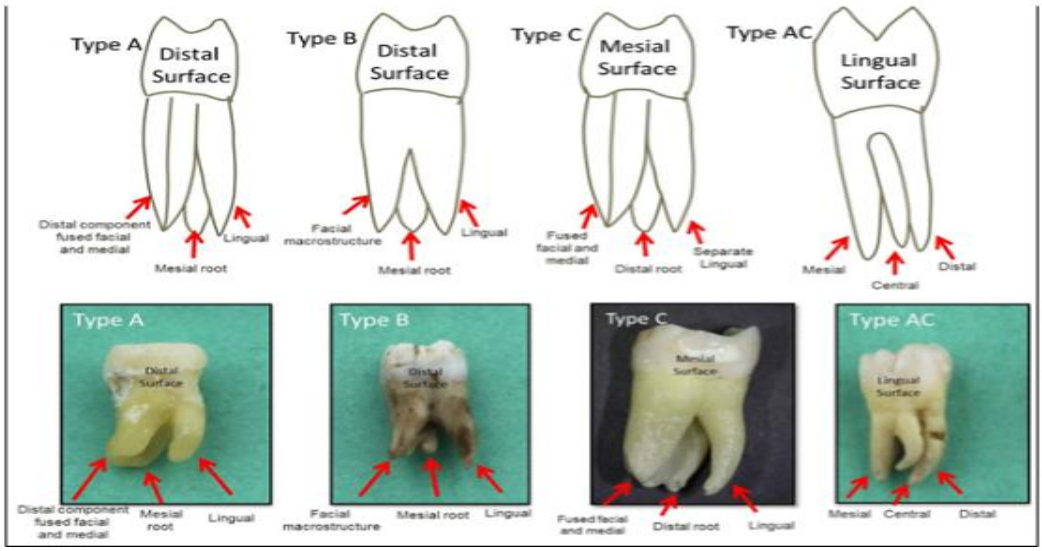
INTRODUCTION:

These data on the morphology and appearance of Radix molars will offer beneficial evidence for the clinician to attain fruitful endodontic outcomes [1-3]. The most common cause of root canal treatment failure is the canal is missed [4]. Thus, the infected pulp tissue and the rest of the bacteria might not permit comprehensive root canal system debridement, which disturbs the endodontically treated tooth prognosis in long-tenure. The roots of the permanent mandibular molars and the number of root canals may vary [5]. In general, there are 2 origins of mandibular molars, but an important anatomical variable is the third root detection which was first defined in 1844 by Carabelli. In human, in permanent mandibular molars the presence of 3rd third root can be traced facially (RP) or lingually (RE). In 1922; Mihaly Lenhossek invented Latin Radix Entomolaris (RE) [6]. Radix Entomolaris (RE) is usually placed distolingually by fixing the coronal third part partially or completely to the root distally. It may be provided as small conical postponement for the complete root length and may be separated or partially fused with the distal root. Bolk stated the appearance of RP in the first mandibular molars and proved to be less than RE. RP is usually mesiobuccally and like RE it have same dimensions. The formation of Radix Molar is associated generally with race, external factors and genetic during odontogenesis [7]. Various analysis have demonstrated the first mandibular molar variable prevalence (ER) of the three roots in various groups of population. Mandibular molar incidence of these first three root 3.4-4.2% in Europe, in Africa it is 3%, less than 5% in Asia and Indians, 5 to 40% in Mongolian characteristics such as China, Eskimos and Native Americans, and in Malaysian it was 8.2%. For the 1st mandibular molar the prevalence was noted 0%, for second molar it was 0.5% and the third molar has 2% incidence[8]. Only some analysis has described the RP ad RE prevalence in the 1st, 2nd and 3rd permanent mandibular molars. So, this study was conducted to determine and account the RP and RE prevalence in permanent 1st, 2nd and 3rd permanent mandibular molar in humans.

MATERIALS AND METHODS:

2234 total permanent human mandibular molars were taken from various dentistry hospitals in Lahore including Lahore Medical and Dental College and Punjab Dental hospital Lahore for one-year duration from March 2018 to March 2019. The informed consent was taken and the study was approved from the ethical committee. The teeth were checked and cleaned thoroughly to confirm morphological characteristics and type after collection. For the identification of radix entomolaris and paramolaris, only healthy mandibular molars with completely established roots were selected. Teeth which severely worn or very worsened or absorbed / immature roots are excluded. 359 teeth from 2234 teeth collected were excluded from the study and for analysis 1875 teeth were selected. . Into 3 groups; Teeth were divided and to see radix molar (RP or RE) every tooth was inspected. By two experienced endodontists; the groups were examined and (0.74) Kappa values were determined to measure reliability among the researchers. In the persistent mandibular molars; determination of RE presence, the following types were selected for this study (Figure 1).



Type A: The root distal part complex has 3 cone-shaped macro structures: facial, medial and lingual. In general, it is presented as fused medial, separate lingual structure and facial structures or 3 all fuses together. Type B: The root complex distal part has 2 conical-shaped macro structures of almost the similar size; facial and lingual. Structures are separated or joined. Type C: The root complex mesial part has 3 conical-shaped macro structures: facial, medial and lingual. It is presented as fused medially separate lingual structure and facial structures or 3 all fuses together. Type AC: The root complex lingual part has 3 conical-shaped macro structures: distal, core and central. These structures centre is joined or either separated. To define the RP presence in permanent mandibular molars; following criteria were used (Figure 2):

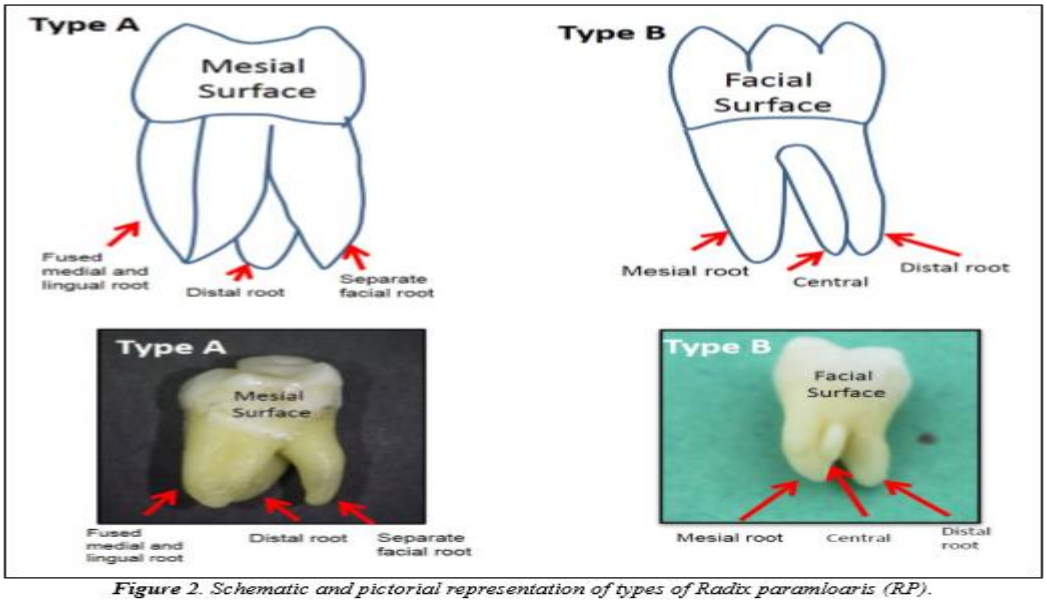


***Figure 2**. Schematic and pictorial representation of types of Radix paramloaris (RP).*

Type A: The root complex mesial part have 3 conical-shaped macro structures: facial, medial and lingual. In general, it is presented as fused medial, separate lingual structure and facial structures or 3 all fuses together. Type B: The root complex facial part have 3 conical-shaped macro structures: distal, central and mesial. These structures center is joined or either separated. Using SPSS version 18.0; the data was collected. Results are stated in proportional, chi-square test; for comparison, the confidence interval of 95% was applied. The statistically significant was taken $p < 0.05$.

RESULTS:

Total 1875 mandibular molars were selected, the first molars were 890 (47.5%), second molar were 437 (23.3%) and 3rd molars were 548 (29.2%). In 187 (9.9%) molars Radix molars (RP and RE) were observed whereas first mandibular were 93 (4.9%), second molar 38 (2%) and third molars 56 (3%). While the RE prevalence was 80 (4.2%) in the first mandibular molar, 30 (1.6%) in the second molar and 45 (2.4%) in the third molar, RP 13 (0.7%) was the first, 8 (0.4% in the second) and the third molar was 11 (0.6%). When relating the RP and RE presence in the first mandibular molars with the second and third molars, no significant difference was observed ($p > 0.05$). (Tables 1-4).

Table 1. Comparison of prevalence of RE and RP in Mandibular first, second and third molars.

Type of Radix Molar	Mandibular 1st Molar Number (Percentage)	Mandibular 2nd Molar Number (Percentage)	Mandibular 3rd Molar Number (Percentage)	Total Number (Percentage)
RE	80 (51.6%)	30 (19.4%)	45(29%)	155 (100%)
RP	13 (40.6%)	8 (25%)	11 (34.4%)	32 (100%)
Total	93 (49.73%)	38 (20.32%)	56 (29.95%)	187 (100%)

RE-Radix Entomolaris; RP-Radix Paramolaris; X^2=1.31, df=2, p=0.519; X^2 for linear trend=0.929; p=0.335.
*Here p value <0.05 was considered as significant

Table 2. Comparison of prevalence of RE and RP in Mandibular first to second and third molars.

Type of Radix Molar	Mandibular 1st molar Number (n)	Mandibular 2nd molar/3rd molar Number (n)	Chi-square	Odd ratio	95%Confidence value	p-value
RE	80	75	0.88	1.56	0.68-3.62	0.348
RP	13	19				

*Here p value <0.05 was considered as significant

Table 3. Comparison of prevalence of RE and RP in Mandibular second to first and third molars.

Type of Radix Molar	Mandibular 2nd molar	Mandibular 1st molar/3rd molar	Chi-square	Odd ratio	95% Confidence value	p-value
RE	30	125	0.23	0.77	0.39-1.53	0.630
RP	8	24				

*Here p value <0.05 was considered as significant

Table 4. Comparison of prevalence of RE and RP in Mandibular third to first and second molars.

Type of Radix Molar	Mandibular 3rd molar	Mandibular 1st molar/2nd molar	Chi-square	Odd ratio	95%Confidence value	p-value
RE	45	110	0.15	0.85	0.49-1.45	0.697
RP	11	21				

*Here p value <0.05 was considered as significant

DISCUSSION:

The data on the morphology and appearance of Radix molars will offer beneficial evidence for the clinician to attain fruitful endodontic outcomes. The most common cause of root canal treatment failure is the canal is missed [9-10]. Various analysis have shown that many dentists cannot appreciate this anatomical variant in mandibular molars. In previous studies, two main methods have been used to evaluate the prevalence of this anatomical macrostructure. Some authors examined this deviation using a radiographic approach and others directly examined the extracted teeth. In this study, the morphology of the teeth was examined directly using the extracted teeth, because it provides a three-dimensional image of the tooth and allows the exact identification of any morphological variation [11]. This study observed 9.9% of RE and RP in the mandibular molar which was consistent with the study by Tratman in Malaysia in 1938 and Laband in 1941 in Malay in northern Borneo. According to Jones similar to previous studies by Carlsen and Alexandersen in the Danish population, type A RE and RP were found to be the most common variant and type RE and type B were the least common [12]. The cause of this high-level root is still unclear, but few theories have been proposed as odontogenesis and the external factor causing the atavistic gene or polygenic system. This study showed the maximum percentage of RE present in the first mandibular molar, which can be explained by field development theory [13]. The first permanent molar is the main region of the genes affecting the field. Therefore, it can be assumed that an additional root formation is controlled by certain genes affecting the site and is first transcribed in the first permanent molar area. According to Tratman in China, Malaysia, Java, Asia and Eurasian Indians, the additional root is four to eight times more common in the first permanent molar than in the second deciduous, and this is a gene that affects the largest permanent molar [14]. To obtain the best endodontic outcome of these molar radicals, it is essential to have a robust clinical approach as described by Calberson et al. analyse the cervical morphology of the roots by periodontal probing, the use of an angled radiograph in the presence of an additional pointed or more prominent distolingual lobe, with the use of an angled radiograph. SLOB technique for identifying a root and using advanced radiographic technology such as cone beam computed tomography (CBCT)) is the way to identify this morphological variant [15].

CONCLUSION:

The total Radix molar prevalence was 9.9% and in the 1st group was 4.9%, in the 2nd group it was 2% and the 3rdgroup it was 3%. There was no substantial differences between the 1st, 2nd and 3rd mandibular molars. These data on the morphology and appearance of Radix molars will offer beneficial evidence for the clinician to attain fruitful endodontic outcomes.

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