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Prevalence of Radix Entomolaris & Radix paramolaris in the extraction of permanent mandibular first and second molar (5-year clinical study)

Dr. Emad H. Abdulla BDS, MSc.

Abstract

Aim: To determine the Prevalence of Radix Entomolaris & Radix paramolaris in the lower molar teeth during their extraction.

Introduction: mandibular molar is the earliest permanent posterior tooth to erupt, responsible for development of occlusion and important physiologic functions like chewing. Permanent molars was the most common teeth needing extraction in Iraq. Thus, it is of utmost importance that the clinician be familiar with variations in the root and root can Mandibular molars

Materials and Methods: A clinical Study for 5- years done On 842 extracted teeth. In the Department of oral and maxilla-facial surgery clinic, college of dentistry, university of Tikrit.

Results: Radix Entomolaris Radix& paramolaris was found in 38 of the extracted teeth with prevalence of 4.5 % with 95 % confidence ranging between (3.1-5.9 %). 1st molar consisted about 3 / 4 (76.7 %) of the study sampling . On over all the prevalence rate of this root variant was slightly higher among females. Also the position of this variation shows that the right side significantly higher.

Conclusion: The high frequency of an extra root in mandibular molars makes it essential for dentist to be familiar with this anatomical variation. . Further extensive research is warranted to detect the incidence of this anatomical variation in the complete Iraqi population

Keywords: Anatomical variations, Mandibular first molar, radix entomolaris, Three-rooted molar.

Introduction

The mandibular molars are usually two rooted one mesial and one distal⁽¹⁾, with roots of the first molar more widely divergent than those of the second molar. Additionally the roots may converge at the apical one third, which increases the difficulty of extraction. The roots are generally heavy and strong. The overlying alveolar bone is heavier than the bone on any other teeth in the mouth. The

combination of relatively long, strong, divergent roots with heavy overlying buccolingual bone makes the mandibular first molar the most difficult of all teeth to extract.⁽¹⁾ First permanent molar was the most common teeth needing extraction⁽²⁾ and most common in Iraq⁽³⁾. The roots of these teeth are wide and flat and often curved distally at the apices and widely separated. The investing bone

offers great resistance to expansion because the cortex is well developed on the buccal and lingual side reinforced by the internal and oblique ridges. ⁽¹⁾ The no. 17 forceps is usually used for extraction of the mandibular molars; it has small tip projections on both beaks to fit into the bifurcation of the tooth roots. The forceps is adapted to the root of the tooth in the usual fashion, and strong apical pressure is applied to set the beaks of the forceps apically as far as possible. Strong buccolingual motion is then used to expand the tooth socket and allow the tooth to be delivered in the bucco-occlusal direction. ⁽¹⁾ The extraction by using figure 8 movement give better result with fewer complications during and after extraction in comparison to the bucco-lingual movement. ⁽¹⁾ The linguoalveolar bone around the second molar is thinner than the buccal plate, so the second molar can be more easily removed with stronger lingual than buccal pressures. If the tooth roots are clearly bifurcated, the no. 23, or cow horn, forceps can be used. This instrument is; designed to be closed forcefully with the handles, thereby squeezing the beaks of the forceps into the bifurcation. This creates force against the crest of the alveolar ridge on the buccolingual aspects and literally forces the tooth superiorly directly out of the tooth socket ⁽¹⁾. Mandibular first molar is the earliest permanent posterior tooth to erupt, responsible for development of occlusion and important physiologic functions like chewing. Commonly, it is the most frequently in need of endodontic treatment lower first and second molar Thus, it is of utmost importance that the clinician be familiar with variations in the root and root can Mandibular molars ⁽⁴⁾. the major variant in this tooth type is the presence of an additional third root; a supernumerary root which can be

found lingual. This macrostructure, which was first mentioned in the literature by Carabelli (1844), is called Radix entomolaris (RE). 1An additional root at the mesiobuccal side is called theradix paramolaris (RP). ^(4, 5) The identification and external morphology of these root complexes, containing a lingual or buccal supernumerary root, are described by Carlsen and Alexandersen ^(7, 6). Radix paramolaris (RP) was first described by Bolk in 1915 ⁽⁸⁾.extraction of permanent first molar with RE is difficult compared with out RE. If rotational movement used, root fracture could occur. It is excepted that an extra lingual root would fracture during extraction due to its divergent and curved form ^(8,9). Three – rooted mandibular first molars occurs in less than 5 % of white persons Africans , Eurasians and Indians BUT IN Chines , South- East Asians., japans, Eskimos , and native Americans (Mongoloids), its frequency is higher and varies between 5 and 32 % . ⁽⁹⁾.According to in Tu et al, the extra distal root in permanent mandibular first molars differs reported that 20% of individuals classified as being of Mongolian descent have a significantly with race. The prevalence of permanent mandibular first molars with 3 roots, as detected in periapical radiographs, is reportedly high among Chinese populations (21.1%–26.9%). This study used 2-dimensional (2D) images (i.e., periapical radiographs) as a study tool. ⁽¹⁰⁾ In addition to anthropological interest, the 3RM1 has a role as genetic marker_ and also has significance in clinical_ dentistry. ^[11] A study suggested that molars are extracted more frequently than anterior and premolars among some races because those groups have a higher prevalence of three – rooted mandibular first molars, combined with the possibility of misinterpretation of extra

distolingual root aberrations during root canal treatment ^[8].

Material and Methods

A total of patients (642 male and 200 female) with mandibular permanent molar teeth; who visited the Department of oral and maxilla-facial surgery clinic, college of dentistry, university of Tikrit were studied from August 2006- June 2013. All patients, aged between 14 and 60 years, within average age of 37 years. Informed consent from every patient was taken. The study excludes any patients with history of any systemic diseases, all teeth were extracted under local anesthesia, using the forceps technique (closed method of extraction) while radiographic evaluation for the fractured teeth (fig 1).

And surgical separation and extraction used for complete extraction of fractured and for those shows resistant for extraction, the patients were treated by teaching staff and dental student's. A clinical evaluation done for successful extracted teeth. (Fig 2). The clinical records were reviewed and the findings were then tabulated and recorded, data were analyzed using students t-test. The results were calculated using the Cross tabs and Chi Square statically analysis.

Results

The results presented in this study where based on the analysis of the 842 extracted mandibular molar teeth (both 1st & 2nd, left & right)patient constituted from males 76.2 % of cases while females 23.8 % o with male-female ratio of 3-1.

All the molar teeth were extracted from the mandible the right side consist tied 53 % while the left side 47 %.

1st molar consisted about 3 / 4 (76.7 %) of the study sampling.(Table no 1).

On over all the prevalence rate of this root variant was slightly higher among females (8 %)with 95 % confidence ranging between 4.2 %-11.8 %)compared to male (3.4 %) with 95 % confidence ranging between (2-4.8 %)

The property of having this kind of root variation in the 1st molar was significantly higher (5.8 %) with 95 % confidence ranging between (3.6 %- 8 %) compared to 2nd molar (3 %) with 95 % confidence ranging between (1.3-4.7 %).

Also the position of this variation shows that the right side significantly higher (5.4 %) with 95 % confidence ranging between (3.7 %- 7.1 %)compared compared to the left side(1.5 %) with 95 % confidence ranging between (0.3-4.3 %).The total prevalence shows that the lower molars with three root be (4.5 %) with 95 % confidence ranging between (3.1 %- 5.9 %)) (table 2) .

Discussion

The lower molar teeth are the most common teeth extracted, and many complications occur during and after extraction of these teeth. ⁽³⁾

Tooth extraction may be a challenge in dentistry especially for those with little experience. Lower molar removal added another difficulty for oral surgery, presence of anatomical variation like a third root Make extraction a worse dream. Clinicians should be aware of their high racial prevalence Knowledge of its occurrence and its location hence every possible effort should e made in detecting an additional root. When in doubt a second radiograph should be taken ⁽⁴⁾.

the present study used a clinical method to determine occurrence of permanent three-rooted mandibular molars and found a significant prevalence of Radix Entomolaris & Radix paramolaris in Iraqi population noticed in this study specially in lower 1st molar (fig 2) also the sample survey shows a more chance for right side lower molar variation than left side (fig 5) and a certain prevalence in female than male. (Fig 6).

According to the present results, there was a significant difference between 1st and 2nd (p=0.022) occurrence. A gender predilection for females over males was seen (p = 0.007) for Radix Entomolaris & Radix paramolaris in our study this was the same in the results found by Sujatha et al 2012 [7]. This was in contrast to the results of a study done by Ming-Gene et al where they concluded there was no statistical gender related difference [7]. Topological predilection for the right side was seen also in this study (p=0.052). according to the present results, there was significant difference between right and left occurrence (right via left side. p= 0.052) this finding is similar to recent reports on Taiwanese. However, other studies on German and Chinese reported that three-root mandibular molars occurred more frequently on the left side than the right side specially the mandibular molars. This contradictory findings may be explained by marked differences in the sample size and in the methods used. (29)

According to the results of our study Compared with the prevalence of the permanent three-rooted mandibular molars in the recent studies in table (3) the result was similar to their results with Senegalese, Saudi Arabia, Sudanese, Sirlinkin, Kuwait, (15,16,19,20, 22) lower than that the percentages found in Asian subjects Chinese, (Singapore), Chinese, Brumes, Thai

,Hong Kong, Gordian, Taiwanese, Korean, Indian (13,14,15,10,18,22, 24,26,27)

In our study the prevalence is more than that in united kingdom, German, Iranian and turkey studies (11,23,25,29)

On the other hand our result look less than the other Iraqi one done on 2006 by Rashid et al-in the North of our country, Al-Mosul city, this open the conclusion for the needed for more large sample study in the different parts of IRAQ and with specific concentration on genetics specific surveys.

Conclusion

The above study remained us that during each procedure we must accept variations which may affect the treatment outcome.

Knowledge of both normal and abnormal anatomy of the molars dictates therefore, practitioners must be familiar with all molar abnormalities, as well as their prevalence in the Iraqi population. Further extensive research is warranted to detect the incidence of this anatomical variation in the complete Iraqi population.

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Table 1: Frequency distribution of the study sample by selected variables.

	N	%
Molar order and position		
lower right first Molar	336	39.9
lower left first Molar	310	36.8
lower right second Molar	110	13.1
lower left second Molar	86	10.2
Total	842	100.0
Order of molar tooth		
First	646	76.7
Second	196	23.3
Total	842	100.0
Molar position		
Right side	446	53.0
Left side	396	47.0
Total	842	100.0
Gender		
Female	200	23.8
Male	641	76.2
Total	841	100.0

Table 2: The prevalence rate of having 3 roots for mandibular molar teeth.

	Having three roots							P
	Negative		Positive			Total		
	N	%	N	%	95% confidence interval for proportion (%)	N	%	
Molar tooth order and position								0.017
lower right first Molar	312	92.9	24	7.1	(4.4 - 9.8)	336	100.0	
lower left first Molar	299	96.5	11	3.5	(1.5 - 5.5)	310	100.0	
lower right second Molar	108	98.2	2	1.8	(0.2 - 6.4)	110	100.0	
lower left second Molar	85	98.8	1	1.2	(0.03 - 6.4)	86	100.0	
Molar position								0.052[NS]
Right side	611	94.6	35	5.4	(3.7 - 7.1)	646	100.0	
Left side	193	98.5	3	1.5	(0.3 - 4.3)	196	100.0	
Order of molar tooth								0.022
First	420	94.2	26	5.8	(3.6 - 8)	446	100.0	
Second	384	97.0	12	3.0	(1.3 - 4.7)	396	100.0	
Gender								0.007
Female	184	92.0	16	8.0	(4.2 - 11.8)	200	100.0	
Male	619	96.6	22	3.4	(2 - 4.8)	641	100.0	
Total	803	95.5	38	4.5	(3.1 - 5.9)	841	100.0	

TABLE 3: Prevalence of Radix Entomolaris & Radix paramolaris, survey of recent available studies.

author/Year	Population	Percentage of three-root (%)
Taylor (1899) [11]	United Kingdom	3.4
Loh 1990 [12]	Chinese (Singapore)	7.9
Ferraz& pecore-1992 [13]	Japanese Negroid Caucasian	11.4 2.8 4.2
Yew &chan-1993 [14]	Chinese	21.5
Sperber moeau-1998 [15]	Senegalese	3.0
AL- Naazhan.1999 [16]	Saudi Arabia	5.97
Gulabivala et al (2001)[17]	Burmes	10
Gulabivala et al (2002)[18]	Thai	12.7
Rashid et al (2006)[5]	IRAQI	8.1
Ahmed et al (2007)[19]	SUDANESE	3
Peiris et al (2007)[20]	SIRLANKAN	3
Jayasinghe et al (2007)[21]	HONG KONG	22
pattanshetti et al (2008)[22]	KUWAIT	4
Shahi et al (2008)[23]	IRANIAN	1.44
Al-Qudah et al (2009)[24]	JORDIAN	20
Edger et al (2009)[25]	GERMAN	1.35
Huang et al (2010)[26]	TAIWANESE	25.3
Song et al (2010)[27]	KOREAN	24.5
Garg et al (2010)[28]	INDIAN	24.5
Colack et al (2012)[29]	Turkey	1.41



Figure 1: Radiographic periapical- x-ray of three-root lower molar



Figure 2 : Different lower molars teeth with Three-root

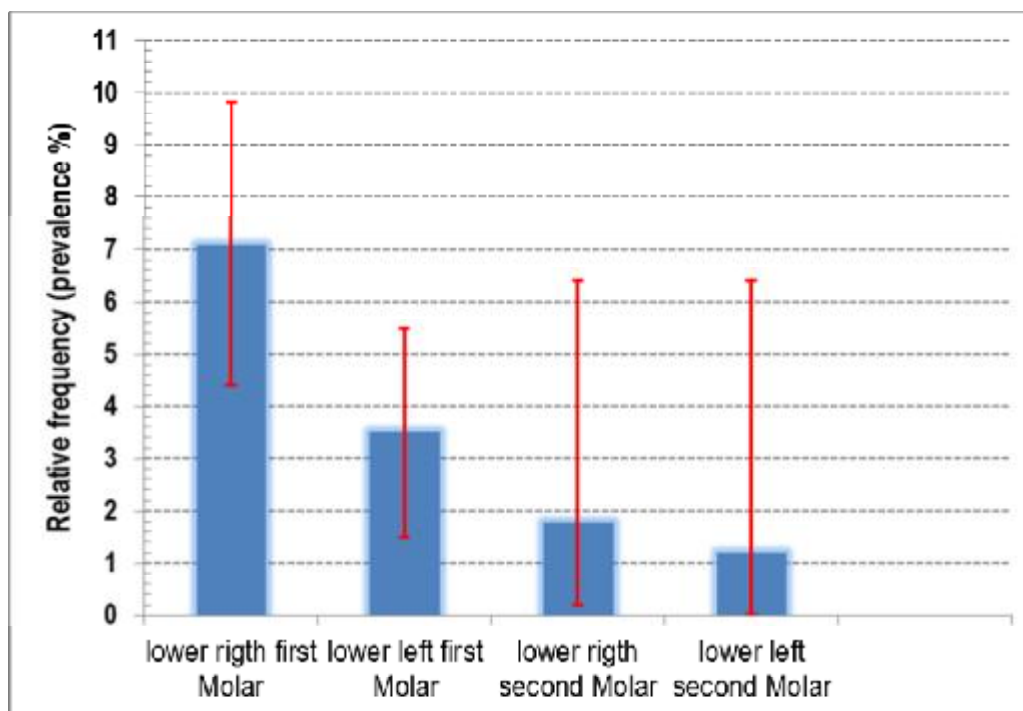


Figure 3: prevalence according to tooth position

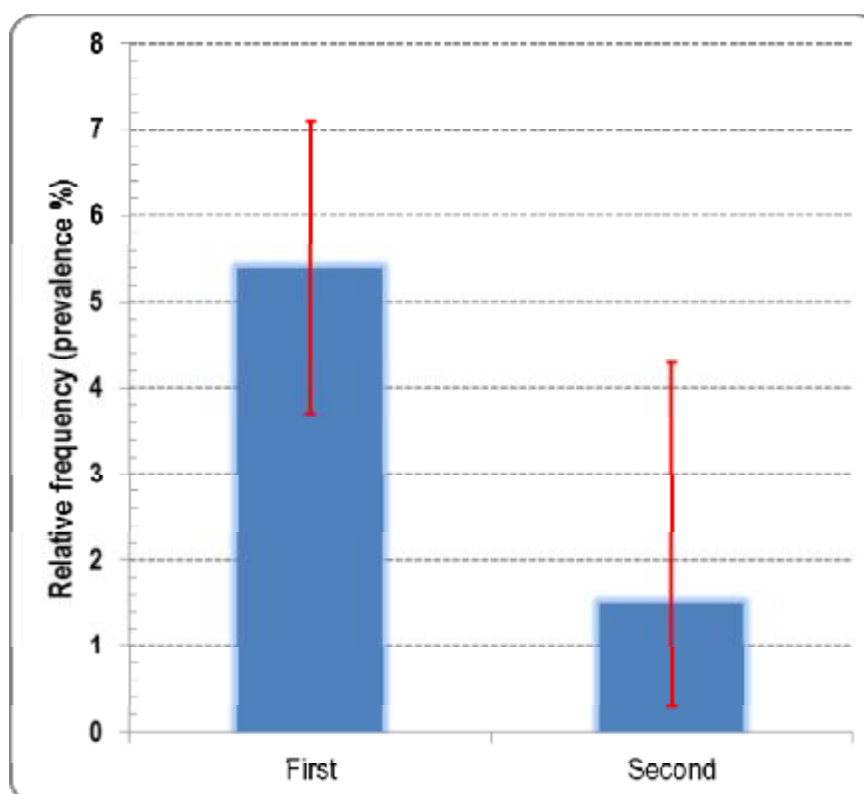


Figure 4: prevalence of three-root lower molars according to order of tooth site

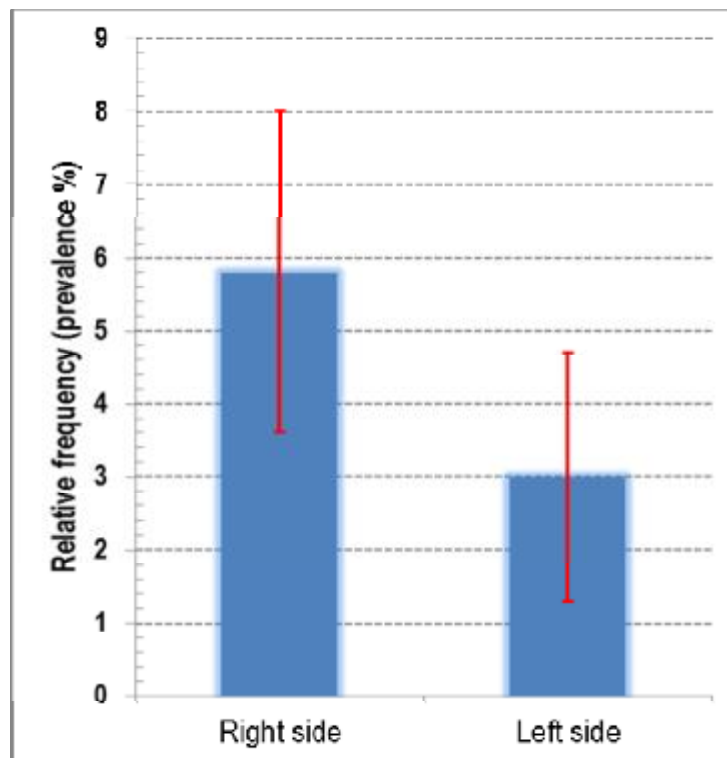


Figure 5: prevalence of three-root lower molars according to side

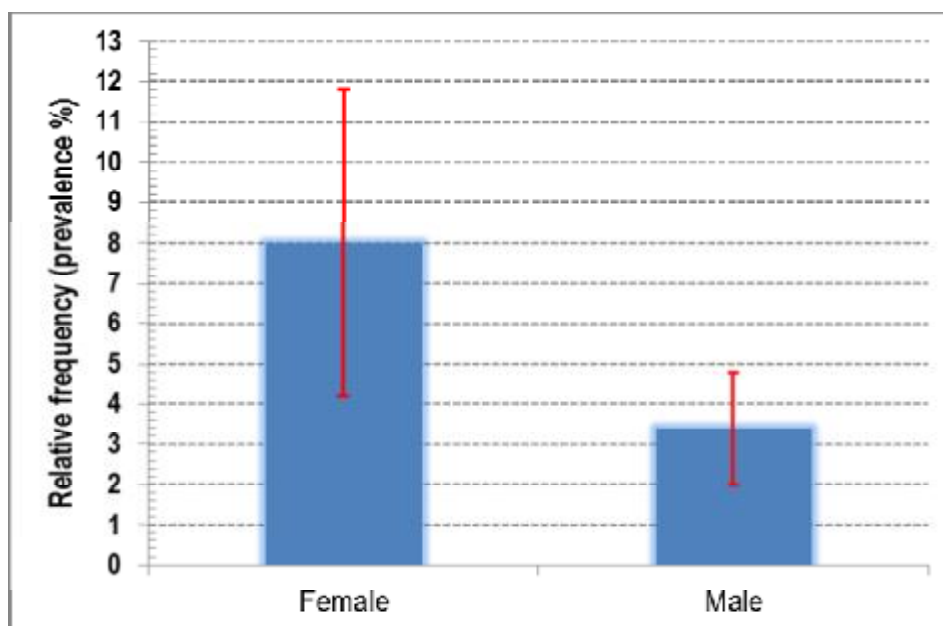


Figure 6: prevalence of three-root lower molars according to gender.