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Investigation of the impact pattern of maxillary third molars in Ardabil population

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ABSTRACT

Purpose: The aim of present investigation was to evaluate frequency of different angles, numbers of roots, depth of impaction in maxillary third molarsand their damages to nearby structures-by analyzing panoramic radiography.

Materials and Methods: This study was conducted by analyzing panoramic radiography 382 (124 men & 258 women) patients who referred to baser radiography center, rad radiography center and Ardabil dental school between year 2014 to 2015.

Results: The most frequent angle of impacted teeth in maxillary third molar in both genders was vertical (48/9%), and the most frequent depth was class C according Winter Classification System (46/8%), in approximately 85% of cases No space between teeth and sinus was observed and according to numbers of roots 54% of teeth had 2 roots, 22% 3 roots and 8% had only one root. The most important damage to nearby structures was angular periodontal lesions which were demonstrated in radiography (52%), making caries on second molars (100%), root resorption on second molars (6%) and in 18% no harmful lesions on molar 2 or radiographic lesions were detected.

Conclusions: Within the limitations of this study, most of third impacted maxillary molars had enough space to maxillary sinus and most of them were vertically, thus extraction of these impacted teeth seems simple and possible.

Keywords: Panoramic radiographs; Maxillae; Mandible; Impacted tooth; Ankylosis, Dilaceration; Alveolar clefts; Cleidocranial dysplasia; Amelogenesis imperfecta; Dentigerous cyst; Supernumerary teeth.

Introduction

Impacted tooth is a tooth that cannot be erupted because of physical barrier. Impacted tooth hasn't been erupted completely and is surrounded by bone, gingiva or other teeth witch never let this tooth to be erupted in future [1-2]. The most prevalent teeth are: third molars, maxillary canine, second mandibular premolar, second maxillary premolar and maxillary centrals respectively [3]. Among them impaction can be occurred most between third molars because they are the last teeth witch erupt and lack of eruptional space for their eruption is more common. Despite racial differences in eruptional sequel, in most races, third molars are the last teeth to erupt and this is why their impaction has high prevalence [6]. Prevalence of third impacted molars in different researches has

high prevalence [6]. Prevalence of third impacted molars in different researches has been reported 18-73% [7-10]. Average age for eruption of third molar is 20, while its complete eruption can be last up to age 25. Natural growth of third molar is initiated by horizontal movement and then changes to vertical movement. And the most important reason of impaction isno change in the direction of the tooth from the mesial to the vertical axis.

Typically, the teeth begin to grow when 1/2 to 3/4 of the root of the tooth is formed. The impaction of the tooth is usually diagnosed after this period and is generally asymptomatic [12]. The most commonly reported causes of tooth impaction are divided into three groups. First, systemic reasons such as: hypothyroidism, radiotherapy, cleidocranial dysplasia, amelogenesis imperfecta. Second, local reasons such as: unsuccess fulresorption in primary teeth, early loss of primary teeth, Long-term maintenance of primary teeth, unusual path in tooth eruption, presence of supernumerary teeth, crowding, early extraction of milky teeth, dentigerous cyst, thickness of gingiva after extraction or after trauma, dental trauma, odontoma, dental anomalia, primary molar ankylosis, root dilaceration, alveolar clefts. Third, genetic reasons: dentine buds in unusual situation or presence of alveolar clefts. In most cases, extracting of impacted teeth should be advised. In these cases impacted teeth should be extracted: prevention of periodontal disease, prevention of dental decay, prevention of pericronitis, prevention of root resorption, impacted teeth under denture, prevention of odontogenic cyst and tumors, Treatment of unknown pain in the jaw and mouth, prevention of Jawbone fracture, Facilitating orthodontic treatment.

Material and Methods

This study was conducted by analyzing panoramic radiography 382 (124 men & 258 women) patients who referred to Baser radiography center, Rad radiography center and Ardabil dental school between year 2014 to 2015.

Sex	*Number*	*Percentage*	*Cumulative frequency*
Male	*124*	*32/5*	*32/5*
Female	*258*	*6/5*	*100*
Overall	*382*	*100*	

Table 1. Amount of male and female Inclusion criteria:

Patients age between 18-40 years old.

Exclusion criteria:

1- Uncompleted apex.

2- History of Maxillary Third molar tooth extraction.

3- Lack of maxillary second molar.

4- Low quality of radiography.

5- Syndromic diseases like down and Cleidocranial Dysplasia.

6- Presence of pathology or trauma which disturbs teeth alignment.

Following these criteria, patients were classified to four different groups according to Pell & Gregory classification system

Class A: lower part of third molar's crown is equal to the occlusal surface of the second molar.

Class B: lower part of third molar's crown is between occlusal surface and cervical line of the second molar.

Class C: lower part of third molar's crown is between cervical line and middle 1/3 of second molar root.

Class D: lower part of third molar's crown is equal or upper than apical 1/3 of second molar root.

In this study, teeth called impacted which are located in class B, C or D. To investigate angle of impaction Winter Classification was used. Angle of classification was determined by calculating angle of third and second molar vertical axis.

Winter Classification System

Vertical impacted tooth	*+10 to -10*
Mesioangular impacted tooth	*11 to 79*
Horizontal impacted tooth	*80 to 100*
Distoangular impacted tooth	*-79 to -11*
Buccolingual and reversed impacted tooth	*100 to -80*

Results

The most frequent angle of impacted teeth in maxillary third molar in both genders was vertical (48/9%). Table 1. But other frequency of angles in maxillary impacted third molars was significantly different in two genders. In second stage for men, mesioangular angle stand (20/9%) while, for women distoangular angle was in second stand (29/8%). Frequency of horizontal and buccolingual was the same in both genders.In this study there was a Meaningful relationship between angles of impaction in each sex. (p=0/018 & p< 0/05) The most depth of impaction in both genders was class C (46/8%) and in the next step was class B (32/5%) and class D (20/7%) . there was no any meaningful relationship between depth of impaction in both sexes by using chi-square statistical analysis (p=0/093 & p> 0/05).

Frequency of different angles of impaction in maxillary third molars according to depth of impaction has been shown in table 2. According to statistics, in position of vertical, mesioangular and distoangular, most teeth were located in depth of C. and all teeth in horizontal position, were located in depth of D and all buccolingual teeth were in depth of C and D. Table 3 In table 4 position of maxillary impacted third molar toward to maxillary sinus according to genders has been investigated. No space between teeth and sinus was observed in approximately 85% of cases. 2mm of space was shown between teeth and sinus in about 11% and just in less than 3% of cases the space was more than 3mm Table 4.

Chi square statistical analysis didn't adumbrate meaningful relationship between proximity of impacted teeth to maxillary sinus and different genders (p=0/30 & p>0/05). Generally, 54% of teeth had 2 roots, 22% 3 roots and 8% had only one root. In about 15% of teeth roots were unclear and number of roots was undetermined Table 5. Chi square statistical analysis showed meaningful differences between number of roots and genders (p=0/04 & p<0/05). About 46/4% of roots in both genders were straight form,27% were curved form in single way and 7/6% were curved like in double ways Table 6.

Chi square statistical analysis showed no any meaningful differences between forms of the roots and different sexes (p=0/20 & p>0/05). In this study, relationship between roots of maxillary impacted third molars were determined in table 7, and about 83% of these teeth had attached roots while only 16% had sharp and separated roots. In this study, damages to nearby structures have been considered. The most important damage was angular periodontal lesions which were demonstrated in radiography (52%), making caries on second molars (100%), root resorption on second molars (6%) and in 18% no harmful lesions on molar 2 or radiographic lesions were detected. Statistics showed no meaningful relationship between genders (p=0/67 and p>0/05) Table 8.

Sex	Angles	Vertical		Mesioangular		Distoangular		Horizontal		Buccolingual		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		69	55/6	26	20/9	18	14/5	3	2/4	8	6/6	124	100
Female		118	45/8	39	15/2	77	29/8	10	3/8	14	5/4	258	100
Overall		187	49	17	95	95	24/8	13	3/5	22	5/7	382	100

Table 1. Frequency of angles of impacted teeth according to sex.

Sex	Position	B		C		D		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		35	28/2	68	54/8	21	17	124	100
Female		89	34/4	111	43/1	58	22/5	258	100
Overall		124	32/5	179	46/8	79	20/7	385	100

Table 2. Frequency of depth of impacted teeth according to sexes.

Depth	Angles	Vertical		Mesioangular		Distoangular		Horizontal		Buccolingual		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
B		81	43/4	8	12/4	35	36/8	0	0	0	0	124	32/4
C		97	51/8	35	53/8	37	39	0	0	0	45/4	179	46/8
D		9	4/8	22	33/8	23	24/2	13	100	12	54/6	79	20/8
Overall		187	100	65	100	95	100	13	100	22	100	382	100

Table 3. Frequency of different angles of impacted teeth according to depth of impaction.

Sex	Position	More than 2mm		Less than 2mm		No space		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		4	3/2	15	12	105	84/8	124	100
Female		9	3/5	29	11/2	220	85/2	258	100
Overall		13	3/4	44	11/5	325	85/1	382	100

Table 4. Frequency of position of maxillary impacted third molar toward to maxillary sinus according to genders.

Sex	Position	Single root		2 roots		3 roots		Unclear root		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		10	8	56	45/2	40	32/2	18	14/6	124	100
Female		22	8/5	142	55	55	21/3	39	15/2	25/8	100
Overall		32	8/3	198	52	95	24/8	57	14/9	382	100

Table 5. Frequency of number of roots according to different genders.

Sex	Position	Straight		One way curved		2 ways curved		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		73	58/9	41	33/1	10	8	124	100
Female		175	67/8	64	24/8	19	7/4	258	100
Overall		248	64/9	105	27/5	29	7/6	382	100

Table 6. Frequency of shape of the roots according to genders.

Sex	Position	Sharp and Separation		Attached		Overall	
		Number	Percent	Number	Percent	Number	Percent
Male		29	23/4	95	76/6	124	100
Female		35	13/6	223	86/4	258	100
Overall		64	16/7	318	83/3	382	100

Table 7. Frequency of root relationship and different genders.

Sex	Harm	Second molar caries		Resorption of second molar		Angular lesions		Caries and resorption		Caries and angular lesions		Resorption and angular lesions		No detectable lesions		Overall	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male		16	13	8	6/5	53	4	3	13	10/5	5	4	25	25	20	124	100
Female		21	8	15	6	149	7	3	16	6	7	3	43	43	16	258	100
Overall		37	10	23	6	202	11	3	29	8	12	3	68	68	18	382	100

Table 8. Damages to nearby structures.

Discussion

Third molars are the last teeth which are grown. In some cases, because of lacking of enough space, barriers or unusual positioning, all or some parts of third molars remain impacted. They are observed in radiography by chances or because of pain. They are the main cause of some problems such as pericronitis, abscess, cellulitis, damage to adjacent teeth, cysts and pain with unknown cause [1]. In this study, based on the assumption that growth at the age of 17 is complete, group aged between 18 to 40 years old were selected [35]. Therefore, at age 18, identifying a third molar with inadequate space or inadequate position to grow is more confident [36]. Moreover, changes in the angle of the tooth to the age of 32 can be seen [37]. From the age of 40, some of the third molars have been extracted [38]. As a general rule, all impacted teeth should be extracted unless extraction is unlawfully. Any time a denture is detected as an impacted tooth, it must be removed as soon as possible. Surgery with impaired teeth is difficult when the patient›s age rises. The dentist should not advise that the teeth do not get out when the complications of the implanted teeth are not encountered. If impacted teeth remains, they will cause local injuries such as loosing of adjacent teeth, periodontitis and local injuries to nearby structures. In this study frequency of impacted third molar was not studied but 67% of referrals were females, Which coincided with studies by Abdul Razaqi et al in Qom [29], Quek et al. In Singapore [20]. The growth of the jaw in women is stopped by the onset of growing of third molar teeth, while in men, the growth of the jaw continues during the growth of the teeth. Therefore, there is more space for the growth of the teeth [39]. But the Sigarudi research in Rasht [28], Mattam et al. In Jordan [34], Schersten et al. In Sweden [32], did not show any difference in the incidence of latency between men and women. Comparison of the incidence of different angles of impaction is difficult, as it is different in the studies of different class-bearing systems. In this study, the largest laceration in maxillary third molars was 49% vertical, which corresponded to the results of most researches, including Sigarudi in Rasht [28], Abdul Razaqi in Qom [29], Asber and colleagues in the United States [19], Someet et al., In India [31]. In order to study the depth of impaction, there are several methods that in this study, the depth of impaction was compared to the second molar, and only the teeth that were at level B, C and D were considered. The results showed that the highest degree of impaction depth of the maxillary third molars is a C-type impaction with an abundance of 46.8%.

Sigarudi in Rasht examined the depth of impaction according to bone and CEJ of the impacted teeth and in their study the highest degree of latency was also level C [28]. Someet and colleagues in India investigated the depth of impaction in comparison with the second molar and the highest degree of depth of impaction in the jaw was level C [31]. However, research by Asber et al. In the United States [19] and Quek et al. In Singapore [20] the highest degree of latency was the type B level, which differed from our results. In this study, we investigated the incidence of latencies in terms of the depth of impaction, and the results showed that most of themaxillary third molars in the vertical and mesioangular angles at the level C, while in the study

of Sigarudi, the highest vertical position was in level C and most frequent mesioangular state was in level B [28]. In this study, the position of the third maxillary molar according to the maxillary sinus was examined and the results showed that in 85% of the impacted teeth there was no space between the sinus and the tooth and the teeth were located adjacent to or inside the sinus. Further, the number, shape, and relationship of third molar roots were investigated and the results showed that 54% of the teeth had two roots and about 22% had three roots and 8% had single rooted teeth.

In 15% of the teeth studied, the number of roots was unclear and not detectable. About 69% of teeth had direct roots and 83% had roots attached. It is clear that as the number of roots is less and shorter and the roots are more straight and stick together, the degree of surgical severity and the probability of breaking the roots when extracted from the teeth are getting lower. Finally, due to the possible complications caused by the loss of these teeth, due to the combination of cystic and tumoral lesions with impacted teeth, recognition of these teeth and attention to the treatment of these teeth is noteworthy.

Conclusion

Within the limitations of this study, and the small number of cases, most of third impacted maxillary molars had enough space to maxillary sinus and most of them were vertically with two straight roots and connected roots. The most important lesions regarding these teeth were, periodontal lesions or bone resorption with deep periodontal packet. There were no statistical differences between genders in numbers of impacted teeth in both jaws, while meaningful differences were observed in angle of impacted maxillary third molars. In case of numbers of roots, meaningful differences between genders were shown.

Conflict of Interest

There is no conflict of interest to declare.

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