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Prevalence and Pattern of Impaction of Third Molars (Wisdom teeth) among a Saudi Population

ALI SALEH A ALQAHTANI (Author)
Demonstrator, Prosthetic Dental Sciences Dept.
Dentistry faculty, Najran University, Najran, Saudi Arabia.

SYED AHMED TAQI (Co-author)
Lecturer, OMFS & Diagnostic Dental Sciences, Division of Oral Pathology Dept.
Dentistry faculty, Najran University, Najran, Saudi Arabia.

Abstract
Aims: This study was aimed to assess the pattern of third molar impaction among two different societies (Abha and Riyadh) in Saudi populations and also to observe the effect of life style and type of food eating habits on eruption of third molars in these two societies.
Methods and Material: History and dental records of OPG (Orthopantomograph) were recorded for 200 patients; 100 patients from Riyadh (King Saudi University; KSU) and 100 from Abha (King Khalid University; KKU). Data were collected randomly for both genders (18-30 years old).
Results: Among 200 patients, 127 (63.5%) were males and 73 (36.5%) were females. In Abha (both genders), 55.36% impacted teeth showed class II ramus relation with a p value of 0.451, which is not statistically significant. In Riyadh society (both genders), 43.07% impacted teeth showed class II ramus relation with a p value of 0.000 which is statistically significant. In Abha (both genders) 79.77% impacted teeth showed position C with respect to occlusal plane of second molar with a p value of 0.201, which is not statistically significant. In Riyadh society (both genders), 53.9% impacted teeth showed position C with respect to occlusal plane with a p value of 0.692, which is not statistically significant. In Abha males and females, 52.7% impacted teeth showed mesioangular impactions and in Abha females, 52.9% impacted teeth showed vertical impaction with a p value of 0.001, which is statistically significant. In Riyadh males, 66.2% impacted teeth showed vertical impaction and in Riyadh females, 55% impacted teeth showed mesioangular impaction with a p value of 0.000, which is statistically significant.
Conclusions: The number of impacted third molar teeth in Riyadh population was more than that of Abha (P value - 0.028). The results showed positive correlation between the eruption of third molar and the diet consumption in these two societies that is in harmony with other studies.
Keywords: Impacted third molars, pattern of impaction, diet types, life style, Abha and Riyadh population of Saudi Arabia.

Introduction:

Impacted teeth can be defined as those teeth that are prevented from eruption due to physical barrier within the path of eruption. Prevalence of third molar impaction ranges from 16.7% to 68.6%. Maxillary and mandibular third molars are most commonly impacted teeth. Third molars erupt between 17 and 21 years of age. The average age for the eruption of mandibular third molars in male is approximately 3 to 6 months ahead of females. There are considerable variations regarding sex. Review of literature states that incidence of mandibular third molar impaction is higher in females. [1] Study done by Syed KB, [2], Haider and Shalhoub [3] states that third molar impaction in Saudi population is more in males than in females. Complications associated with impaction include dentigerous cyst or odontogenic keratocyst formation and malignant transformation of cystic wall into squamous cell carcinoma or mucoepidermoid carcinoma. Genetic and environmental factors play a role in developmental disturbances. The incidence of impacted teeth is contradictory in different populations and ethnic groups. [4] Most often impaction of third molars is due to either insufficient maxillofacial skeletal development or a low correlation between maxillofacial skeletal development and third molar maturation leading to a lack of space between the second molar and ramus of the mandible. Transition from eating coarse to refined food and timely management of any dental pathology has been suggested as the main cause for this insufficient space. [5, 6]

Breakfast has been labelled as the most important meal of the day. Healthy breakfast on a daily basis consists of a variety of foods, especially high-fibre and nutrient-rich whole grains, fruits, and dairy products. [7] A study conducted by Farghaly NF [8] et al showed that breakfast was a regular meal for majority of primary school students from Abha. Diet history taken from our study showed that Abha patients (70%) consume a coarse, abrasive and attritive diet, whereas the patients from Riyadh (67%) skipped the breakfast meal and depend on chocolates, boiled potatoes, soft drinks and fast food low in fibers.

Several methods have been used to classify impaction based on the level of impaction, angulations of the third molars and the relationship to the anterior border of the ramus of the mandible. [9] The objective of this

study was to determine the effect of type of diet on third molar impaction and to evaluate as well as compare the pattern of impaction as seen on panoramic radiograph in samples of patients living in Abha and Riyadh regions of Saudi Arabia.

Subjects and Methods:
Data from OPGs (orthopantomographs) were recorded for 200 patients selected randomly, 100 from Riyadh and 100 from Abha. This study included both male 127 (63.5%) and female 73 (36.5%) from KSU College of Dentistry in Riyadh and KKU College of Dentistry in Abha. These data involved: age of the patients (18-30 years old), gender and the three classifications of third molar impaction.
All impacted third molars were categorized into three groups according to Geogery [9], Peterson [10] and Winter's classifications:
1- Related to the ramus (Class I= there is enough space for eruption, Class II= partially covered by the ramus, Class III= totally covered by the ramus);
2- Related to Occlusal level of second molar (A= at the level of occlusal plane, B= between occlusal plane and CEJ, C= below CEJ) and
3- Related to angulation of third molars classified into (mesioangular, distoangular, horizontal and vertical).
Radiographic findings were correlated with the age and gender of the patients and evidences were comprehensive in respect to the types of impaction, number of impacted third molars per person and the association of diet and life style in two different societies between Abha and Riyadh Saudi population.

Ethical consideration:
This study was approved by the King Saud and King Khalid University College of Dentistry Research Ethics Committee in Riyadh and Abha respectively. Informed consent was obtained from each patient.

Statistical analysis:
Data collected was entered into a spreadsheet (Excel 2000; Microsoft, US) and analyzed subsequently using Statistical Package for Social Sciences (SPSS) version 16.0. The prevalence of impacted third molars in relation to age, gender and type was assessed and displayed by frequency and percentage.p value assessed through Pearson Chi-square test.

Results:
The total numbers of impacted third molars found in 200 patients were 651. Riyadh showed higher third molar impaction (384) (59%) than Abha region (267) (41%) of Saudi Arabia (p value= 0.028) (Table 1). The numbers of impacted third molars in males were 369 (56.7%) and in females were 282 (43.3%). The prevalence of impacted third molars is more common in males than females in both Abha and Riyadh (p value = 0.028) (Table I). Mandibular third molars impaction (372) (57.16%) were higher than maxillary third molar impaction (279) (42.85%) (P value = 0.000) (Table 2). Majority of lower third molar impaction showed class II relation to the ramus (182) (48.92%) (P value = 0.006) (Table 3). Most of the third molars were positioned below the cemenoenamel junction (CEJ) (420) (64.5%) (P value = 0.000) (Table 4). Mesioangular type of impaction (279) (42.9%) was the most common followed by vertical position (273) (41.9%) (P value = 0.000) (Table 4). Mandibular right third molar was the most common impacted tooth in this study (198) (30.41%) (P value = 0.001) (Table 5).

Discussion:
Tooth impaction is generally asymptomatic and only a small number of patients seek treatment. It is very important to emphasize the importance of early detection and intervention to prevent possible harmful consequences. [11] Maxillary and mandibular third molar teeth and maxillary cuspids are most frequently impacted followed by premolars and supernumerary teeth. Third molars may show vertical, horizontal, buccal, lingual and even inverted type of impaction. Etiology includes rotation of tooth bud, lack of space due to crowding and premature loss of deciduous teeth. [2] In our study, we did not find any etiology other than difference in life style and food eating habits between the two regions. No history of any tumor, supernumerary teeth or odontoma was recorded within our sample. No history of trauma, or cystic lesion, no ankylosed or over-retained primary teeth, no early loss of primary teeth, or abnormality position of tooth bud, no alveolar cleft, no dilacerations of root, no cystic/neoplastic formation were evident.

In this study a total of 651 (81.37%) impacted third molars were found among 200 patients from Abha and Riyadh. The total number of impacted third molars in Abha and Riyadh were 267 and 384 respectively with a p value of 0.028 (Table 1), which is statistically significant. From other literature we found out that when the diet is more fibrous and coarser, greater muscular activity is needed during mastication. Higher degree of muscular activity stimulates full jaw growth providing space to the third molars to erupt. [12] From our study we

noticed that the diet of Abha is coarser and fibrous than Riyadh similar to other studies. [7, 8]

The male to female ratio with impacted third molars in Abha was 165:102 (1.61:1) with a p value of 0.712 (Table 2) which is not significant statistically. The male to female ratio with impacted third molars in Riyadh was 204:180 (1.13:1) with a p value of 0.774 (Table II) which is not statistically significant. This result is similar to the study conducted by Syed KB et al [2] (p=0.707) and Ioannis G et al [13] (p=0.651). Majority of patients included in this study were males (63.5%). However in a study conducted by Eshghpour M et al [14] 944 patients were female and 489 were males and study showed female predominance. Males have a higher prevalence of third molar impaction in Abha than in Riyadh, whereas females have a higher prevalence of impaction in Riyadh than in Abha (p value = 0.028) (Table I) (Figure 1).

Prevalence of tooth impaction was found to be higher in the mandible [372 (57.14%)] than in maxilla [279 (42.85%)] with a p value of 0.000, which is statistically significant (Table 2). This result is identical with the study conducted by Syed KB and Hassan AH. [2, 15] In Abha in both males and females, the impacted third molars were more prevalent in mandibular arch (65.5% and 67.6%) (P value= 0.712) (Table 2). This is similar to other studies. [2, 13, 16] The ratio of mandibular to maxillary third molar impaction was 1.96:1. In Riyadh in both males and females, the impacted third molars were more prevalent in mandibular arch (51.5% and 50%) (P value = 0.774) (Table 2). This is similar to other studies. [2, 13, 16] The ratio of mandibular to maxillary third molar impaction was 1.03:1.

In Abha and Riyadh society, 55.36% and 43.07% of impacted lower third molars respectively had class II relation with ramus of the mandible with a p value of 0.451 and 0.000 (Table 3). The result was similar to the study conducted by Eshghpour M et al [14]

In Abha and Riyadh society, 79.77% and 53.9% of impacted third molars respectively showed position C with respect to occlusal plane of second molar with a p value of 0.201 and 0.692 (Table 4). Position C was most common with mandible (Abha – 75.70%, Riyadh – 51.28%) as well as in maxilla (Abha – 77.77%, Riyadh – 58.20%) (Figure 2). The result was dissimilar to the study conducted by Hassan AH [15] and Hashemipour MA et al [17] in which position B was most common. In a study conducted by Al-Anqudi SM [18] and Kumar Pillai A [19] Position A was most common.

In Abha society, 48.31% of impacted third molars showed mesio-angular impaction which constitutes the majority, 42.69% showed vertical impaction and only 7.86% of the patients had disto-angular impaction (p=0.001) which is statistically significant. (Table 4). The most common angulation of impaction in the mandible was the mesioangular (65.53%) followed by vertical (31.63%), while the most common angulation in the maxilla, was the vertical (44.44%) followed by horizontal (27.77%) (Figure 3). The result was similar to the study conducted by Syed KB [2] Hassan AH [15], Hashemipour MA et al [17], Al-Anqudi SM. [18] A study conducted by Kumar Pillai A [19] showed vertical impaction most common in mandible as well as in maxilla.

In Riyadh society, 41.40% of the impacted third molars showed vertical impaction which constitutes the majority, 39.06% showed mesioangular impaction and only 19.5% of the patients had disto-angular impaction (p=0.000) which is statistically significant. (Table 4). The most common angulation of impaction in the mandible was the mesioangular (56.41%) followed by vertical (30.76%), while the most common angulation in the maxilla, was the vertical (52.91%) followed by distoangular (31.74%) (Figure 3). The result was similar to the study conducted by Syed KB [2] Hassan AH [15], Hashemipour MA et al [17], Al-Anqudi SM. [18] A study conducted by Kumar Pillai A [19] showed vertical impaction most common in mandible as well as in maxilla.

The higher frequency of vertical impaction in maxilla may be due to the fact that the maxillary third molar develops in the maxillary tuberosity and generally erupt vertically as the maxillary bone enlarges, impaction against the second upper molar may therefore occur where maxillary growth is inadequate. [12]

In Abha and Riyadh society, among the impacted third molars, 34.83% of mandibular right third molars and 27.34% of mandibular right third molars respectively showed impaction with a p value of 0.496 and 0.988 (Table 5). There was no significant difference in the frequency of impaction between the right and left sides in both jaws. The result was similar to the study conducted by Hassan AH [15], Hashemipour MA et al [17], Al-Anqudi SM [18] and Kumar Pillai A [19]

Conclusions

1. Third molar impaction was more common in Riyadh than in Abha region. Difference in diet seems to be an important contributing factor for tooth/jaw disproportion and third molar impaction.
2. Males showed a higher prevalence of impacted third molars than the females.
3. Mandibular third molar impaction was found more than maxillary third molar impaction.
4. Class II relation was most common in Abha and Riyadh.
5. Position C (below CEJ) was most common in both regions.
6. Mesioangular impaction was most common in Abha and vertical impaction most common in Riyadh.
7. Mandibular right third molar impaction was most common in both regions.
8. From our study and different studies mentioned above, we can conclude that there is a strong correlation

between types of diet consumption and third molar impaction.
9. Present study was hospital based, and therefore, may not be a complete representative of the exact situation in the two societies. A population base study of this nature is therefore recommended.

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Table 1: Showing the relation of 651 impacted teeth with gender and area.

Area	Gender		Total No. (%)	P - value
	Male No. (%)	Female No. (%)		
Abha	165 (61.79)	102 (38.20)	267 (100)	0.028,
Riyadh	204 (53.12)	180 (46.87)	384 (100)	P<0.05

Table 2: Showing the impaction teeth within jaw in related to area and gender.

Area	Gender	Jaw Total No. (%)		Total No. (%)	P - value
		Maxilla	Mandible		
Abha	Male	57 (34.5)	108 (65.5)	165(100)	0.712
	Female	33 (32.4)	69 (67.6)	102(100)	
	Total	90 (33.7)	177 (66.29)	267	
Riyadh	Male	99 (48.5)	105 (51.5)	204(100)	0.774
	Female	90 (50)	90 (50)	180(100)	
	Total	189 (49.2)	195 (50.8)	384	
Abha + Riyadh	Male + Female	279(42.85)	372(57.14)	651	0.000

Table 3: Showing the ramus relation of impacted tooth with gender and area.

Area	Gender	Classification in relation to ramus No. (%)			Total	P - value
		I	II	III		
Abha	Male	25(23.14)	59(54.46)	24(22.22)	108	0.451
	Female	11(15.94)	39(56.52)	19(27.53)	69	
	Total	36(20.33)	98(55.36)	43(24.29)	177	
Riyadh	Male	45(42.85)	54(51.42)	6(5.71)	105	0.000
	Female	30(33.3%)	30(33.3%)	30(33.3%)	90	
	Total	75(38.46)	84(43.07)	36(18.46)	195	
Abha+Riyadh	Male + Female	111(29.83)	182(48.92)	79(21.23)	372	0.006

Table 4: Showing the impaction teeth in both gender in related to position, angulation.

Area	Gender	Position No. (%)			P-Value	Angulation No. (%)				P-Value
		A	B	C		D	H	M	V	
Abha	Male	3 (1.8)	33 (20)	129(78.2)	0.201	18 (10.9)	0 (0)	87 (52.7)	60 (36.4)	0.001 P<0.05 Significant
	Female	0 (0)	18 (17.6)	84(82.4)		3 (2.9)	3(2.9)	42 (41.2)	54 (52.9)	
	Total	3 (1.12)	51 (19.1)	213(79.77)		21 (7.86)	3 (0.0)	129(48.3)	114 (42.69)	
Riyadh	Male	45(22.1)	45 (22.1)	114(55.9)	0.692	18 (8.8)	0	51 (25)	135 (66.2)	0.000 (P<0.05 Significant)
	Female	45 (25)	42(23.3)	93 (51.7)		57 (31.7)	0	99 (55)	24 (13.3)	
	Total	90(23.4)	87(22.65)	207(53.9)		75 (19.5)	0	150(39.06)	159 (41.40)	
Abha+ Riyadh	Male + Female	93(14.28)	138(21.19)	420(64.51)	0.000	96(14.74)	3(0.4)	279(42.9)	273(41.93)	0.000

Table 5: Showing the impaction in relation to area and gender.

Area	Gender	Tooth No# (%)				Total	P - value
		T18	T28	T38	T48		
Abha+Riyadh	Male + Female	129(19.81)	150(23.04)	174(26.72)	198(30.41)	651	0.001

Figure legends:

Figure 1: Illustrating the difference between tooth impaction in relation to gender and area.

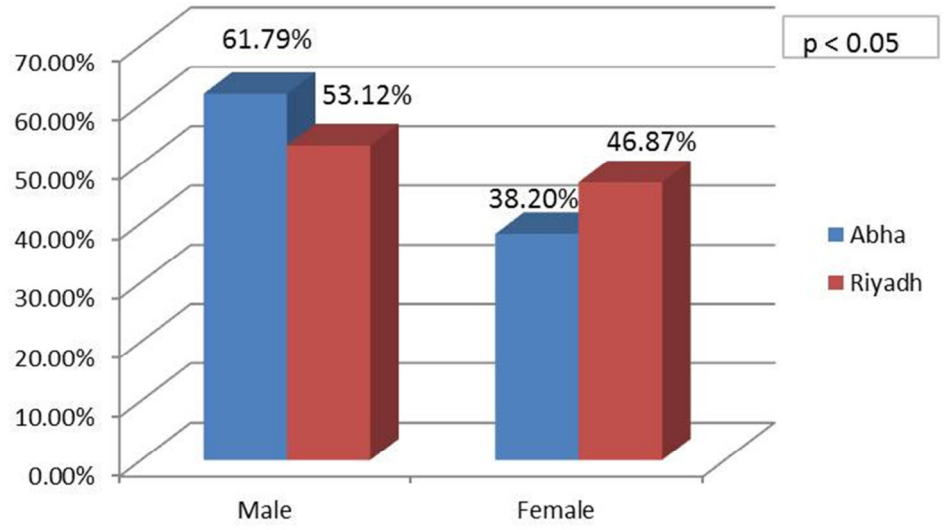

Figure 2: Illustrating the difference between third molar impaction in Abha and Riyadh in relation to occlusal plane of second molar.

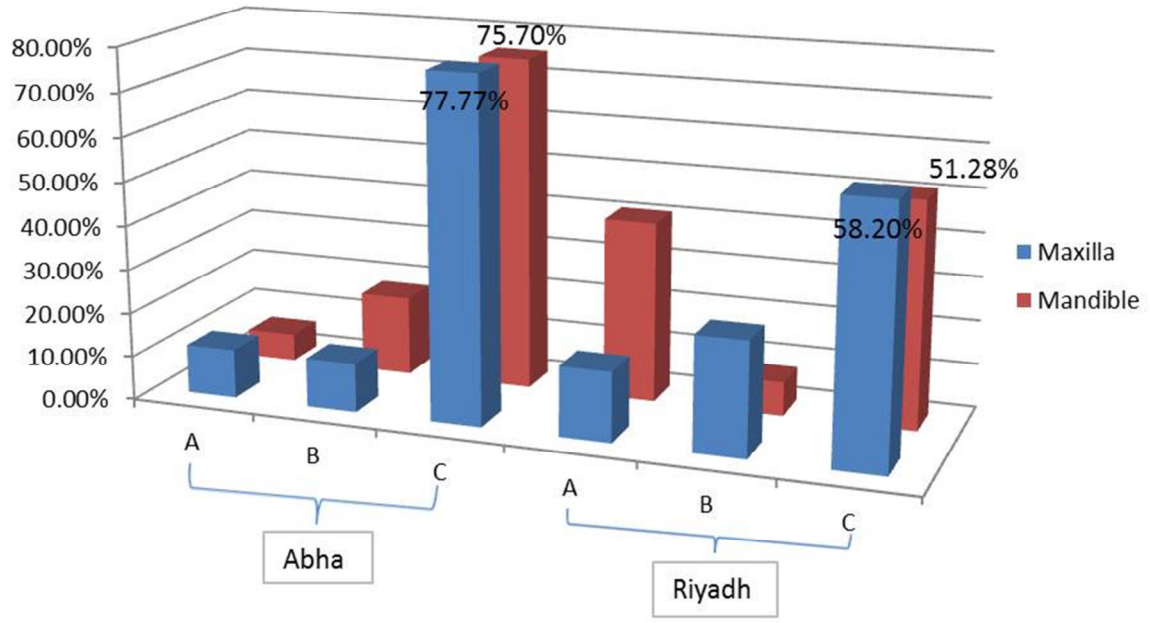

Figure 3: Illustrating the difference between third molar impaction in Abha and Riyadh in relation to angulation.