Original Article :

Prevalence of Impacted Third Molars in AZ-Zulfi Region of Saudi Arabia: A Cross-sectional Study

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Abstract

Background:
This study aims to evaluate the prevalence of the impacted third molars and their associated pathologies in the population of Az Zulfi, Saudi Arabia.

Method:
This study was conducted in the clinics of the College of Dentistry, Majmaah University, Saudi Arabia. A total of 1695 orthopantomograms (OPG) from December 2018 and December 2019 were evaluated using the third molar characteristics evaluation form (TMCEF).

Results:
Minimum of one impacted third molar had been found in 240 OPG among 1695 studied. Among the gender, males (15.6%) showed more impacted teeth prevalence than females (3.1%). The incidence of mandibular molar impaction (23%) is more when compared to that of the maxilla (14.3%). The mandible shows more prevalence of mesioangular impaction (50.44%) and in the maxilla, it is vertical impaction (49.39%). Depending upon the space available between the second molar distal surface and the mandibular anterior ramus, Class II (51.09%) pattern is

الملخص

الخلفية:
تهدف هذه الدراسة إلى تقييم مدى انتشار الأضراس الثالثة (العقل) المطمورة والأمراض المرتبطة بها في مجتمع الزلفي بالمملكة العربية السعودية.

طريقة البحث:
أجريت هذه الدراسة في عيادات كلية طب الأسنان، جامعة المجمعة، المملكة العربية السعودية. تم تقييم ما مجموعه
١٦٩٥ اشعة بانوراما من ديسمبر ٢٠١٨ حتى ديسمبر ٢٠١٩. باستخدام نموذج تقييم الخصائص المولية الثالث.

النتائج:
من بين ١٦٩٥ تمت دراستها. بين الجنسين، أظهر الذكور تم العثور على الاقل ضرس ثالث (عقل) مطمور في ٢٤٠
(١٥,٦٪) انتشار أسنان مطمورة أكثر من الإناث (٣,١٪). نسبة حدوث انطمار ضرس عقل في الفك السفلي (٢٣٪) هي أكثر عند مقارنتها بتلك الموجودة في الفك العلوي (١٤,٣٪). يُظهر الفك السفلي انتشارًا أكبر للانطمار المتعلق بالزاوية الأنسية (٥٠,٤٤٪) وفي الفك العلوي هو تأثير عمودي (٤٩,٣٩٪). اعتمادًا على مستوى الانطمار، وجد أن الموضع ب (٤٥,٩٥٪) والموضع ج (٥٩,٨٣٪) أكثر شيوعًا في الفك السفلي والعلوي، على التوالي. . من بين الأسنان المطمورة ١٨٧ كان لها بعض الأمراض المرتبطة بها وكان تسوس

found to be more common than the other two Classes. Depending on the level of impaction Position B (45.95%) and Position C (59.83%) were found to be more common in the lower and upper jaw, respectively. More than 66% of maxillary impactions had close approximation to the maxillary sinus floor on both sides. Among the impacted teeth 187 had some associated pathology and dental caries were the most frequent one among all the other pathology reported.

Conclusion:

The most common impacted tooth in Az Zulfi, Kingdom of Saudi Arabia is mesioangular and position B in the mandible and vertical and position C in the maxilla.

Keywords:

Mandible, Maxilla, Third molar, Tooth, Impacted.

الأسنان الأكثر شيوعًا بين جميع الأمراض الأخرى التي تم الإبلاغ عنها.

الخلاصة:

أكثر الأسنان المتأثرة شيوعًا في الزلفي بالمملكة العربية السعودية هي الأسنان المتعلق بالزاوية الأنسية والموضع ب في الفك العلوي والموضع ج في الفك السفلي.

Introduction:

The functional and topographical position of the third molar had made the prevalence of these teeth more variable and significant when compared to other teeth. Various theories had been put forward to explain the nature of eruption and prevalence of impacted third molar, but none of the theories hold good with all kind of impaction. Third molars were more commonly associated with the development of pathological cyst, TMJ disorders, cheek bite, etc. and hence the prevalence studies on the third molar in the specific region suggest the need for the specific dental care and needs of that region. The erupting pathway and position of the third molar can be related not only to the ethnicity of the population but also to the masticatory efficiency, and hereditary influences[1].

Impacted teeth has been defined as a tooth that doesn't reach the anatomical position because of insufficient space, bony interference, or any trauma leading to deviation in the path of the eruption [2]. In Saudi Arabia, recently more studies have been done on the impacted third molar prevalence, because of its clinical and functional significance. However, there are no such studies found in the literature specific to the Az Zulfi region of Saudi Arabia. The primary objective of this study was to assess the prevalence of impacted third molars and also to evaluate any associated pathology with the impacted third molar among the patients attending the dental clinic, College of Dentistry, Majmaah University in Al-Zulfi region, Kingdom of Saudi

Arabia,

Materials and methods:

This cross-sectional retrospective radiographic study was done in the clinics of the College of Dentistry, Majmaah University after getting approval from the Deanship of Scientific Research with project number HA-01-R-088. A total of around 1695 orthopantomograms (OPG) of the patients who were reported to the Maxillofacial Department of College of dentistry, Majmaah University from December 2018 and December 2019 were evaluated based on the classifications of Pell & Gregory and Winter. Only those records with panoramic radiographs were selected by simple random sampling method. The medical records of patients who did not have panoramic radiographs and those who did not exhibit complete root formation of the third molars were considered not eligible for the study. The two experts in dental radiology with more than fifteen years of experience were given the third molar characteristics evaluation form (TMCEF) to evaluate all the records included in the study.

(Appendix 1)

The evaluation criteria for typing the impaction in the present study were Pell and Gregory classification [3] and Winter's Classification [4,5]. The earlier classification was based on the occlusal plane level as A, B, C, where the third molar occlusal plane was at the same level or between the occlusal surface and the cementoenamel junction of the second molar or the occlusal surface of the third molar was apical to the cementoenamel junction of the second molar respectively. Based on the space available between the posterior part of the second molar and the anterior border of the ramus, the impaction can be typed as Class I (third molar tooth present in front of the ramus), Class II (ramus have partially embedded teeth) & Class III (fully embedded in the ramus).

Winter's classification of impaction is based on the angle formed by the longitudinal axis of the impacted third molar with the second molar. They are classified as vertical impaction (10° to -10°), Mesioangular impaction (11° to 79°), Horizontal impaction (80° to 100°), Distoangular impaction (-11° to -79°), other categories (111° to -80°), Buccolingual impaction (if in buccolingual direction).

For this study, the proposed null hypothesis was that there exists no difference in the third molar impactions types and the related features (age group, vertical position to the second molar, mandibular canal, and maxillary sinus) in Al Zulfi in comparison to other studies from different locations of the world. The collected data were statistically analyzed using

SPSS version 21(SPSS Inc; Chicago, IL, USA). The prevalence of the third molar impactions and its type, age predilection, and root abnormalities, and its relation to inferior alveolar nerve canal was assessed by percentage and frequency.

Results:

One thousand six hundred and ninety-five (1695) Orthopantomograms (OPG) of patients ranging in age from 18 to 83 years were evaluated to determine the prevalence of impacted third molars in their population. Among 1695 OPG studied 240 OPGs showed a minimum of one impacted third molar impacted. Among the gender, males (15.6%) showed more impacted teeth prevalence than females (3.1%) (Table 1.A). The impacted mandibular molar prevalence (780, 23%) was more when compared to that of the maxilla (486, 14.3%). The mandible shows more prevalence of mesioangular impaction (50.44%) and in the maxilla, it was vertical impaction (49.39%). The left side of the mandible (23.9%) showed more impaction than the right side (22.1%). But in the maxilla, there is no great difference between the right (14.5%) and left side (14.2%) (Table 1.B).

Table 1

Table 1.A: Impaction Prevalence in relation to gender			
Gender	Impaction Prevalence		Total
	Maxilla	Mandible	
Male	424	631	1055
	12.5%	18.6%	15.6%
Female	62	149	211
	1.8%	4.4%	3.1%
Total	486	780	1266
	14.3%	23%	18.7%

Table 1.B: Prevalence of Third Molar Status and the type of impaction according to Winter's Classification:								
		Distoangular	Horizontal	Mesioangular	Vertical	Buccolingual	Total	Percentage
UPPER	Right	83	6	23	120	11	246	14.5
	Left	78	9	25	120	8	240	14.2
LOWER	Right	17	74	182	101	1	375	22.1
	Left	10	80	212	101	2	405	23.9

Table: 1.C: Prevalence of A, B, C types according to Pell & Gregory's Classification:					
		A	B	C	TOTAL
UPPER	Right	15	82	149	246
	Left	15	82	143	240

LOWER	Right	126	184	65	375
	Left	169	174	62	405

Table: 1.D: Prevalence of different classes of impaction in the lower third molar according to Pell & Gregory's Classification

	RIGHT		LEFT	
	Frequency	Percent	Frequency	Percent
Class I	174	42.96	158	42.02
Class II	206	50.86	193	51.33
Class III	25	6.17	25	6.65
Total	405	100	376	100

Table: 1.E: Approximation of maxillary sinus in relation to the impacted upper third Molars

APPROXIMATION TO MAXILLARY SINUS	RIGHT		LEFT	
	Frequency	Percent	Frequency	Percent
YES	230	67.25	223	66.77
NO	112	32.75	111	33.23
Total	342	100	334	100

There was no significant difference in the status of the molar impaction according to the age of the group (upper left P<0.08, lower right P<0.65, lower left P<0.36) except the upper right side status of molar (P<0.02) (Table: 2.A, 2.B, 2.C, 2.D) and hence the null hypothesis was rejected as there was a difference in the prevalence of impacted teeth in upper right side impacted teeth.

Table 2

Table 2.A Anova test to compare age and types of impaction for upper left

TYPE OF IMPACTION	Mean age	SD	ANOVA						
			95%CONFIDENCE INTERVAL						
			Lower Bound	Upper Bound	Sum of Squares	df	Mean Square	F	Significance
Distoangular	28.1	8.9	26.1147	30.1417					
Horizontal	32.1	10.4	24.0452	40.177					
Mesioangular	25.5	5.9	23.0116	27.9484					
Vertical	25.9	7.7	24.5282	27.3218	543.136	4	135.784	2.088	0.083
Buccoangular	25.4	6.4	19.9581	30.7919					
Total	26.8	8.1	25.7737	27.843					

Table.2. B Anova test to compare age and types of impaction for lower left

Distoangular	31.5	8.80	27.0617	36.1147					
Horizontal	28.9	7.31	27.2513	30.6406	280.672	4	70.168	1.074	0.369
Mesioangular	28.3	8.40	27.0838	29.5425					

Vertical	27.5	7.89	25.9563	29.0734					
Buccoangular	26	.	.	.					
Total	28.3	8.08	27.5444	29.1863					

Table:2.C Anova test to compare age and types of impaction for lower right									
Distoangular	28.9	7.35	23.63	34.161					
Horizontal	28.4	7.98	26.660	30.214					
Mesioangular	28.853	7.92873	27.7803	29.9272	171.569	4	42.892	0.608	0.657
Vertical	27.5	9.697	25.61	29.439					
Buccoangular	23.5	4.94	20.971	67.971					
Total	28.4	8.38	27.595	29.233					

Table 2.D Anova test to compare age and types of impaction for upper right									
Distoangular	29.1	8.98	27.1587	31.0823	Sum of Squares	df	Mean Square	F	Sig.
Horizontal	27.5	7.55	19.57	35.43	866.342	5	173.268	2.699	0.022
Mesioangular	25.3	7.31	22.1846	28.5111					
Vertical	25.4	7.15	24.1646	26.752					
Buccoangular	28	9.44	21.655	34.345					
Total	33.6	13.05	1.2457	66.0876					

The status of the right side molar influences the status of the left side molar (P<0.00) (Table 3.A, 3.B).

Table 3

Table 3.A. Cross Tabulation with Chi Square test to evaluate whether status of upper right side molar is independent with upper left side molar									
Status of upper right third molar * Status of upper left third molar Cross-tabulation									
			Status of upper left third molar						
			Missing	Present	Impacted	Total	Pearson Chi Square	df	p
Status Of upper right third molar	Missing	Count	238	103	36	377	9.245	4.00	0.00
		% within Status of upper right third molar	63.10%	27.30%	9.50%	100.00%			
		% within Status of upper left third molar	53.70%	10.20%	15.00%	22.20%			
	Present	Count	166	855	51	1072			

		% within Status of upper right third molar	15.50%	79.80%	4.80%	100.00%			
		% within Status of upper left third molar	37.50%	84.50%	21.20%	63.20%			
	Impacted	Count	39	54	153	246			
		% within Status of upper right third molar	15.90%	22.00%	62.20%	100.00%			
		% within Status of upper left third molar	8.80%	5.30%	63.80%	14.50%			
Total		Count	443	1012	240	1695			
		% within Status of upper right third molar	26.10%	59.70%	14.20%	100.00%			
			100.00%	100.00%	100.00%	100.00%			

Table:3. B Cross Tabulation with Chi Square test performed to evaluate whether status of lower right-side molar is independent with lower left side molar

Status of lower left third molar * Status of lower right third molar Crosstabulation

			Missing	Present	Impacted	Total	Pearson Chi-Square	df	p
Status of lower left third molar	Missing	Count	262	109	63	434	1.016E3a	4.00	0.00
		% within Status of lower left third molar	60.40%	25.10%	14.50%	100.00%			
		% within Status of lower right third molar	67.90%	12.10%	15.60%	25.60%			
	Present	Count	88	712	86	886			
		% within Status of lower left third molar	9.90%	80.40%	9.70%	100.00%			
		% within Status of lower right third molar	22.80%	78.80%	21.20%	52.30%			
	Impacted	Count	36	83	256	375			

		% within Status of lower left third molar	9.60%	22.10%	68.30%	100.00%			
		% within Status of lower right third molar	9.30%	9.20%	63.20%	22.10%			
Total		Count	386	904	405	1695			
		% within Status of lower left third molar	22.80%	53.30%	23.90%	100.00%			
		% within Status of lower right third molar	100.00%	100.00%	100.00%	100.00%			

The prevalence of impacted third molars according to level of eruption shows that Position B (45.95%) in the mandible and Position C (59.83%)in the maxilla were more common
(Table 1.C).

The order of occurrence of the level of impaction A, B, C types was analyzed and was found to be C>B>A in the maxilla, and in mandible, it was B>A>C. The Class II (51.09%) pattern is found to be more common than the other two classes (Table 1.D). The less common type of impaction found in the maxilla were horizontal and buccolingual types, whereas in mandible the less commonly found impaction was the buccolingual type (Table 1.B). More than 66% of maxillary impactions had close approximation to the floor of the maxillary sinus on both sides (Table 1.E). Of the impactions, 187 had some pathology associated with the impacted tooth (Table 4) and dental caries were found to more common among all the other pathologies.

Discussion:

A large number of patients visit dentists seeking treatment for tooth impaction as it is a more common clinical finding in day-to-day practice. The early detection of the impaction and necessary intervention plays an important role to prevent the various harmful consequences of the impacted teeth. Among the radiographic methods available, OPG is commonly preferred to assess the impacted tooth in detail including their angulations, amount of bone covered, and their depth of impaction within the bone, their association with the adjacent normal anatomic structures like maxillary sinus and the mandibular canal and the presence of pathologies associated with them.

In the AZ-Zulfi Region of Saudi Arabia,

mesioangular impacted mandibular molar and vertically impacted maxillary molar were found to be the most common among all the other angulations (Table 2). This result was similar to the study conducted by Syed KB [6], Hassan AH [7], Hashemipour MA et al [4]. A study conducted by Kumar Pillai A [8] showed vertical impaction most common in both maxilla and mandible in contrary to this study which had found that the mesioangular type was more common in mandible whereas the vertical type more common in maxilla signifying the region-specific nature of the type of impacted teeth. The maxillary third molar tooth bud normally develops and erupts in the maxillary tuberosity region in the vertical pattern favoring the vertical type of impaction. If the maxillary growth is inadequate, the maxillary third molar gets impacted against the second upper molar [9]. The proximity of 66% impacted maxillary third molar to the floor of maxillary sinus had suggested taking proper surgical care and precaution on attempting the removal of those teeth.

In the Al-Zulfi Region of Saudi Arabia, the prevalence of the impacted teeth was more in mandible which was similar to the results of the study conducted by Hassan AH[7], Hashemipour MA et al [4] , Kumar Pillai A[8], and Kamran Bokhari Syed [6].

Among our study group, the most common pathology that was seen in association with the impacted tooth was dental caries (75.94%). This result was like the results of the study by Al-Khateeb TH[10]. The second commonly encountered problem was the close association with the inferior alveolar canal. Injury to the Inferior alveolar nerve during impacted third molar removal had been more prevalent [11, 12]. So, all possible care should be taken to prevent any damage to the nerve in all such cases (8.56%). The other problems encountered are caries involving the pulp with or without periapical pathology and pericoronitis like problems. The study results had rejected the proposed null hypothesis as there was a statistically significant difference in the type of impacted teeth and the associated features like age, vertical position to the second molar, mandibular canal, and maxillary sinus position.

Conclusion:

Until now there is no prevalence study done in the region of Az Zulfi, Riyadh Province in Kingdom of Saudi Arabia regarding the third molar impaction status. Understanding the prevalence of impaction among our population helps in the deeper understanding of the incidence of different types of impaction based on different classifications and their association with the pathologies. Methodical and sys-

tematic evaluation of each case in the right way using the radiograph helps in providing the necessary proper intervention when required on a case-by-case basis in the specific region.

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