Elective Project Study

Course No. 703

Prevalence of Impacted Teeth in Adult Patients: A Radiographic Study of Kuwaiti Population

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ABSTRACT

Aim: To determine the prevalence of impacted teeth in an adult Kuwaiti population, in relation to angulation of impaction, sex, age and medical history.

Methods: A retrospective study of panoramic radiographs of 1,004 patients from Kuwait university dental center (KUDC) was carried out. The investigation was done to relate the impaction to the angulation of tooth and patient's age, sex and medical history. Patients dental records were randomly selected by computerized selection and data collected. Data collected and entered into a spreadsheet (Excel 2010; Microsoft) and analyzed subsequently using the Statistical Package for Social Science (version 21).

Results: Panoramic radiographs of 1,004 patients aged 21 to 60 years were examined. The prevalence of teeth impaction was 18.5% among Kuwaiti population. A total of 124 patients presented with at least one impacted tooth (12.3%). Two hundred and one impacted teeth found. Mandibular left third molars were the most commonly encountered impactions 53 (26%).The vertical angulations was the most common pattern of impaction (39.3%). Prevalence was higher among those less than 40 years 17.9% compared to above 40 years 6.4% ($p < 0.001$).

Conclusion: The prevalence of teeth impaction was 18.5% among Kuwaiti population. The teeth impaction was more commonly seen in younger population. The mandibular third molars were the most frequent impacted teeth. The most common orientation of teeth impaction was the vertical orientation. No correlation was found between teeth impaction and medical history.

INTRODUCTION

An impacted tooth is a tooth that is prevented from erupting into the dental arch by overlying gum, bone or another tooth[1]. Any permanent tooth can be impacted. Several systemic and local factors may cause tooth impaction[2,3]. Local factors that cause tooth impaction are supernumerary teeth, dense overlying bone, prolonged deciduous tooth retention, malaposed tooth germs, arch-length deficiency, odontogenic tumors, and cleft lip and palate. Less common, systemic factors such as Cleidocranial dysplasia, Down syndrome, febrile diseases, and endocrine deficiencies[4,5].

Tooth impaction is a frequent phenomenon as reported in different studies [3-19]. However, there is a discrepancy in the prevalence of teeth impaction in different population and ethnic groups, as well as, variation in the prevalence and distribution of impacted teeth in different regions of the jaw. Selected age group, eruption time of teeth and radiographic criteria are some of the factors that affect the prevalence of teeth impaction[19].

The classification of impaction is described in different studies by several methods, such as level of impaction and angulation. Tooth impaction was considered if the tooth was not in functional occlusion. The angulation was assessed by measuring the angle formed between the long axis of the impacted tooth relative to the long axis of the teeth adjacent to it. Different angulations of impaction are present: mesioangular, distoangular, horizontal, vertical and bucco-lingual angular (table 1).

Several complications may result due to tooth impaction, such as, caries, periapical lesions, periodontal disease, temporomandibular joint disorder, root resorption of adjacent teeth and oral cysts and tumors[21].

Management and diagnosis are important to both patient and dentist. Panoramic radiograph and computed tomography are used to provide accurate localization for diagnosis and treatment of impacted teeth. Often, the initial radiograph used is panoramic radiograph which provides information about the whole dentition and surrounding bony structures. A major advantage of panoramic radiograph is that it helps in evaluating the whole oral cavity and shows teeth in their normal places as well as in ectopic sites in the maxilla and mandible[22].

The aim of our study was to evaluate the prevalence and pattern of teeth impaction according to angulation of impaction, age, sex and medical history of patient in Kuwaiti population by using panoramic radiographs of patients from Kuwait university dental clinics.

METHODS

A retrospective study reviewing records of 1,004 patients randomly selected from Kuwait University Dental Center (KUDC). Ethical clearance was provided from the ethical committee in Kuwait University and records of patients were used after obtaining approval from the clinical director of KUDC. All patients selected in this study were seen and treated at KUDC between (2008 -2012). Computerized randomization was done by the Information Technology (IT) team in KUDC. Patients enrolled for study group were at least 21 years of age or older at the time of admission. Inclusion criteria of the study group were patients between 21-60 years of age, because the accepted view is that all teeth are erupted by the age 21. Exclusion criteria were patients who have had surgical extraction of impacted teeth, who are completely edentulous and those who do not have a panoramic radiograph.

Table 1. Type of tooth orientation and related radiographic appearance

Tooth orientation	Radiographic appearance
Distoangular	
Mesioangular	
Vertical	
Horizontal	
Bucco-lingual	 http://www.exodontia.info/Wisdom_Tooth_Impaction_Classification.html

A total of 1,173 patients were elected and 1,004 patients were enrolled in the study. Following the radiographic evaluation, patient's records were reviewed in terms of age, sex and medical history and presence of teeth impaction. The presence of tooth impaction was then correlated to patient's sex, age and medical history. All collected data was then entered a spreadsheet (Excel 2010; Microsoft) and analyzed subsequently using the Statistical Package for Social Sciences (version 21).

RESULT

Panoramic radiographs of 1,004 patients aged 21 to 60years (mean age ± standard deviation =40.7±10.3) were examined: 509 male and 495 female patients (table 2). A total of 124 patients presented with at least one impacted tooth (12.3%). There was no significant difference among males 13% compared to females 10.9% (p=0.315) (table3) nor in the presence of impacted tooth in healthy patients 12.3% to unhealthy patients 10 %(p=0.352) (table 4). Prevalence was higher among those less than 40 years 17.9% compared to above 40 years 6.4% (p<0.001) (table 5 and 6).

In our study 201 impacted teeth were found (table 6), of those: mandibular left third molars were most commonly encountered 53 (26%), followed by mandibular right third molars 48 (23.9%). Forty five (22.4%) each for maxillary right and left third molars, three (1.5%) maxillary right canine, one (0.5%) maxillary left canine, one (0.5%) mandibular right canine, and one (0.5%) mandibular right first premolar were present (table 7) .

Table 2.

Gender	Frequency	Valid percentage	Cumulative percentage
Male	509	50.7%	50.7%
Female	495	49.3%	100.0%
Total	1004	100%	

Table 3 Distribution of impacted teeth according to patients' sex

Sex	Teeth impaction		total	P value
	0	1		
Male count	443	66	509	
% percentage	87%	13%	100%	
Female count	441	54	495	
% percentage	89.1%	10.9%	100%	0.315
Total count	884	120	1004	
% percentage	88%	12%	100%	

0= absent   1= present

Table 4. Distribution of impacted teeth according to patients' Medical history

Medical history	Teeth impaction		Total	P value
	Presence	Absence		
Healthy count	81	575	656	
% Percentage	12.3%	87.7%	100%	
Unhealthy count	28	253	281	
% Percentage	10.0%	90%	100%	0.352
Total count	109	828	937	
% Percentage	11.6%	88.4%	100%	

Table 5. Distribution of impacted teeth according to patients' age

Age group		Impacted teeth		total	P VALUE
		0	1		
< 40					
	Count	399	87	486	
	% percentage	45.1%	72.5%	48.4%	
≥40					
	Count	485	33	518	O.OO1
	% percentage	54.9%	27.5%	51.6%	
Total					
	Count	884	120	1004	
	% percentage	100.0%	100.0%	100.0%	

0= absent   1= present

Table 6. Distribution of impacted teeth according to patients' age

Age group		Impacted teeth		Total	P value
		0	1		
<30	count	145	46	191	
	%percentage	75.9%	24.1%	100%	
30-39	count	254	41	295	
	% percentage	86.1%	13.9%	100%	
40-49	count	257	22	279	
	% percentage	92.1%	7.9%	100%	0.001
≥50	count	228	11	239	
	% percentage	95.4%	4.6%	100%	
Total	count	884	120	1004	
	% percentage	88%	12%	100%	

0= absent   1= present

Table 7. Number of impacted teeth

Tooth number *	Tooth impaction	
	Count	% percentage
#13	3	1.5%
#18	45	22.4%
#23	4	2%
#28	45	22.4%
#33	1	0.5%
#38	53	26.4%
#43	1	o.5%
#44	1	0.5%
#48	48	23.9%
total	201	100%

*FDI (Federation Dentaire Internationale) dental numbering system.

Table 8. Distribution of impacted teeth according to angulation of impaction

| Tooth orientation	Impacted tooth		P value
	Count	% percentage	
Distoangular	23	11.4%	
Mesioangular	44	21.9%	
Vertical	79	39.3%	0.385
Horizontal	55	27.4%	
Total	201	100%	

Table 9.Distribution of impacted teeth according to patients' sex in relation to angulation of impaction

Tooth orientation	Sex		Total	P value
	Male	Female		
Distoangular count	9	5	14	
% percentage	64.3%	35.7%	100%	
Mesioangular count	15	11	26	
% percentage	57.7%	42.3%	100%	
Vertical count	22	28	50	0.215
% percentage	44%	56%	100%	
Horizontal count	21	11	32	
% percentage	65.6%	34.4%	100%	
Total count	67	55	122	
% percentage	54.9%	45.1%	100%	

figure 1. Distribution of impacted teeth according to patients' age

- <30
- 30-39
- 40-49
- ≥50
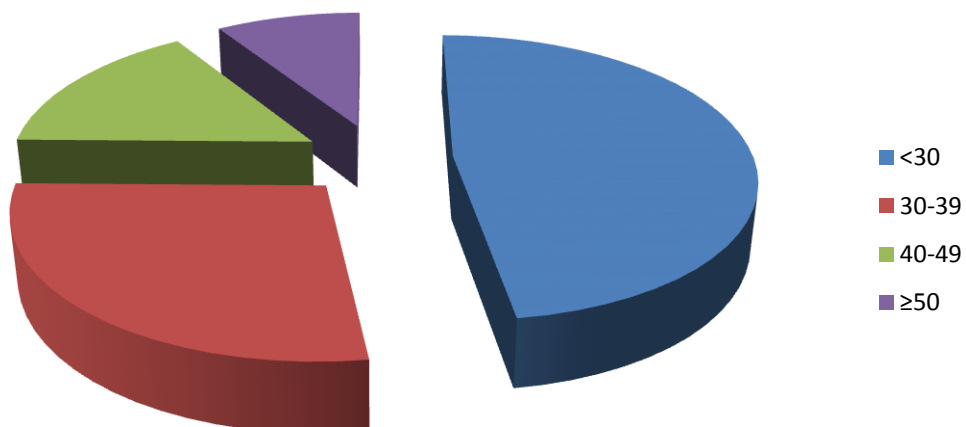
Analysis of the orientation of the impacted tooth showed statistically not significant results (p=0.385). The vertical angulation was the most common pattern of impaction (39.3%), followed by horizontal (27.4%), mesioangular (21.9%), and lastly distoangular (11.4%). No bucco-lingual angulation found (table 8). The differences in tooth orientation between male and female were not significant (p=0.215) (table9).
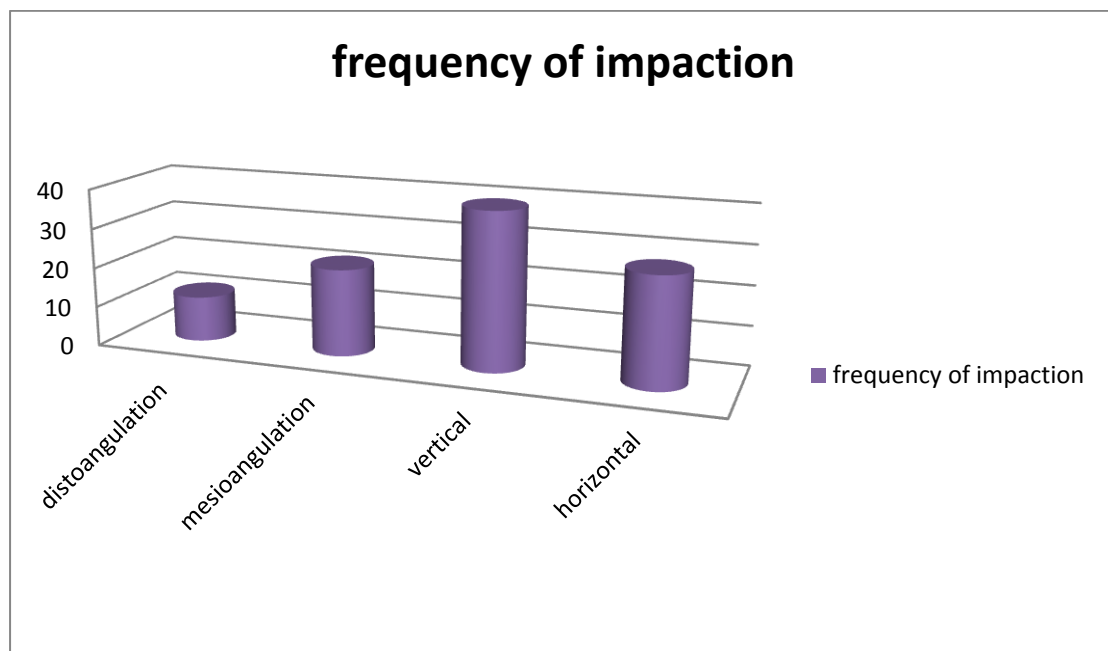
DISSCUSION

The frequency and etiology of teeth impaction has been investigated in many different studies. Several factors were reported as possible causes for impaction: including lack of space; early physical maturation; and delayed mineralization[23-26].

This study was done to determine the prevalence of impacted teeth according to angulation of impaction, sex, age and medical history of patients. The age of patients selected was between 21 to 60 years of age. As by the age 21, growth is essentially completed and will allow involvement of all impacted teeth including third molars. The prevalence of impacted teeth among 1,004 patients in the Kuwait

university dental clinic was 18.5% (table 6) .To our knowledge no study was done or published about the impaction of teeth in Kuwaiti population.

A frailty of using dental panoramic radiography as the only diagnostic tool for the study of impacted teeth is the validity of assessment. In this study dental records in addition to radiographic findings were used to establish diagnostic validity. However, not all dental records were completed. The medical history of patients taken from the dental records that are related with teeth impaction showed no correlation.

The difference in teeth impaction between males 13% and females 10.9% was not statistically significant (P=0.315). Several researches, such as Dachi and Howell,[12] Hattab et al,[13] Brown et al,[14] Kramer and Williams,[15] Montelius [24], Morris and Jerman,[27] and Aitasalo et al.[30] found no difference in the frequency of impaction between genders. However, Quek et al[7] Hugoson and Kugelberg,[10] Hellman[25] and Murtomaa et al [34] showed higher frequency among females than males, and Haidar and Shalhoub[8] reported higher rate of impaction among males than females especially for third molars.

The majority of patients (24.1%) with single or multiple impacted teeth were up to 30 years old. Ventä I et al.[9] reported continues clinical changes of third molar until the age of 32. The prevalence of impaction is reduced as the age increases. This phenomenon is probably due to increased extraction of impacted teeth in older patients. Hugoson and Kugelberg[10] revealed that 23% of 20 years old and 68.3% of 30 years old had one or more third molar extraction.

In dentistry, the most common surgical intervention is extraction of third molars in patients 20 years and older[11,21]. The need for prophylactic removal of impacted third molar due to incidence of pathologic conditions associated with the impaction remains a controversy.[28,29] Recent literature related to third molars

recommend observation of asymptomatic impacted wisdom teeth instead of prophylactic removal as the appropriate treatment, because some impacted third molar erupt after the age of 18, and low incidence of pathology associated with impaction.[9]

Of paramount importance of this study was the frequency of impaction per tooth type: third molars, canines and premolars and incisors. In a statically significant manner, the frequency of impaction of the third molar was high, especially the mandibular third molar. Previous reports showed the same results.[2,8,10,11,17,18]

In our study, the vertical angulation was the most common pattern of impaction (39.3%), followed by horizontal (27.4%), mesioangular (21.9%), and lastly distoangular (11.4%). No bucco-lingual-angulation was found. According to Hugoson and Kugelberg,[10] vertical angulation was found to be the most common orientation in the Swedish population. Quek et al,[7] Kramer and Williams,[15] and Moris and Jerman[27] reported that mesioangular impaction was the most common impaction.

The impaction of the canine is worthy of attention because the canine has an essential role in occlusal stability and esthetics. Maxillary canine impaction is more frequent than mandibular canine impaction and is the second most frequently impacted tooth after third molars.[2,8,10,17,18] In our study, the prevalence of maxillary canine impaction was 3.5%, which was higher than the prevalence of mandibular canine impaction 0.5%. The incidence of mandibular canine impaction in the Turkish population was 1.29% as reported by Yavuz et al.[29]

Lower premolars have a tendency of impaction. A few cases of mandibular second premolar impaction as reported by McNamara et al.[31] However in our study impaction of premolars was 0.5% and no central or lateral incisors impaction was found. Kamberous et al[32] and Haug et al[33] revealed similar findings.

CONCLUSION

The prevalence of teeth impaction was 18.5% among Kuwaiti population with no sex prediction. The teeth impaction was more commonly seen in younger population. The mandibular third molars were the most frequent impacted teeth. The most common orientation of teeth impaction was the vertical orientation. To our knowledge no previous study was done for Kuwaiti population and this will serve as data base for future references. Unfortunately, the etiology of teeth impaction has never been investigated in Kuwaiti population. Future studies are needed to evaluate the etiology of teeth impaction in Kuwait.

Acknowledgement

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