Prevalence and Pattern of Impacted Wisdom Teeth among a Sample of Iraqi People, Part 1

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*Abstract--- **Background and objectives:** There is no doubt the impacted teeth play a major role in the healthy state of the patients because most of them associated with pain and odontogenic problems affecting both hard and soft tissues and so this study will throw light through their pattern and their behavior to emphases, facilitates and eases the researchers who concerned with impacted teeth and gives knowledge and complete picture to the oral surgeons to ease their access and manipulation and assists them to get proper design operation with little or get rid of complications. **Materials and methods:** a retrospective data of 2138 OPG of patients from Najaf city was reviewed and classified the pattern of third molar impaction according to Winter's classification and analyzed by one sample Kolmogorov-Smirnov test and Pearson chi-square test to compare data regarding age groups and gender. **Results:** the incidence of impaction represented 1/5 to 1/4 of the population, the rate of impaction was more common in patients with impactions in both jaws than patients with just mandibular or maxillary impactions. There was no significant difference between left and right side of jaws, the impaction was 1.5 times more occur in female than male and there was a highly significant difference among age groups. **Conclusion:** There was a high prevalence rate of impaction in Iraqi people in Najaf city, the high incidence of impaction pattern in maxilla was distoangular impaction followed by mesioangular and vertical, while in mandible was vertical impaction followed by mesioangular and distoangular.*

* **Keywords---** Iraq, Impacted Wisdom Teeth, Pattern, Winter's Classification.*

I. INTRODUCTION

Impacted wisdom tooth means any 3rd molar that cannot reach its normal physiological and functional position in the oral cavity[1]. Wisdom teeth become impacted by many reasons as lack of space because they were the last teeth erupted in the oral cavity, or due to change in the pattern of the eruption with the different direction [2,3]. The impacted wisdom teeth are either symptomatic which associated with pain, pericoronitis, and odontogenic problems or asymptomatic that discovered by routine dental examination and for both situations, the removal of these teeth was inevitable to avoid future complications. Their removal was done by a surgical procedure and so for that reason, there were many classifications designed to assume the position and angulation of impacted teeth to draw a treatment plan depends on different imaging technologies. The most accepted imaging technology was digital orthopantomography because it provided a wide field for examination and investigation with enhanced software tools. And the most common and current classifications was Winter's classification in which the angles that formed between the long axis of 2nd molar and the long axis of 3rd molar were the key for that classification.

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The Aim of the Study

Evaluate the incidence and pattern of 3d molar impaction among people in a Najaf city. And were there any relations between the pattern of impaction and the factors as age and gender.

II. MATERIAL AND METHODS

This study depended on a retrospective data collected from patients who arrived dental radiological clinic from August 2016 to February 2018 by using MyRay x-ray machine. All cases of impacted wisdom teeth with incomplete root formation and associated pathological diseases were excluded. And only 2138 OPG included in this study. The method that was used to evaluate the pattern of impacted 3rd molar and classification of their angulation was Winter's classification which depended on the angles formed by the long axis of 2nd molar and the long axis of 3rd molar, when the angle formed between these two axises was between 11º to 79º,-11º to -79º, 10º to -10º, 80º to 100º, 100º and - 100º; the impacts called mesioangular, distoangular, vertical, horizontal and others impaction respectively in addition to transverse (bucco-lingual) as shown in table(1).

All these measurements were done by software tools included with an x-ray machine. Data were analyzed by using the Statistical Package for the Social Sciences (SPSS)(version 21.0). One sample Kolmogorov-Smirnov test (Z-test) and Pearson chi-square test were used to compare data regarding age groups and Gender. All data, the age, gender, number of impacted third molars and classification of impaction were displayed by frequency and percentage. The levels of significance were 5% ($p < 0.05$) and 1% ($p < 0.01$).

Table 1: Winter's Classification of Impacted Wisdom Teeth

Winter's classification	Mesioangular 11º - 79º	Distoangular -11º - -79º	Vertical 10º - -10º	Horizontal 80º - 100º	Transverse	Others 100º- -100º
Maxilla						
Mandible						

III. THE RESULTS

From 2138 investigated OPG only 486 subjects affected by at least one impacted tooth either in maxilla or mandible, 126 (26%) were in the maxilla, 160 (33%) in the mandible and 200 (41%) for both jaws, figure (1) showed the distribution of impacted wisdom teeth among patients. Of the 1019 impacted teeth, 475 (47%) were in the maxilla where 248 (52%) at left side and 227 (48%) at right side, and 544 (53%) were in the mandible where 276 (51%) at left side and 268 (49%) at right. Mandibular impaction was 1.1 times more than maxillary impaction, as

shown in the table (2). Table (3) showed the distribution of third molar impactions by angulation, in which the distribution of impactions of the left side of maxilla was distoangular (39.5%) followed by vertical (27.8%), mesioangular (24.2%), others (8.1%), transverse (0.4%) and there was no horizontal impaction in this sample, while the right side pattern was with little difference in which mesioangular and distoangular were same in frequency (33.9%) and they were followed by vertical (20.7%), others (10.1%), transverse (1.3%) and also there was no horizontal impaction, the statistical analysis showed no significant difference between left and right side, and the pattern of impaction in the left side of mandible was vertical (35.5%) followed by mesioangular (30.1%), horizontal (22.1%), distoangular (8.0%), others (3.3%) and transverse (1.1%) and for the right side was vertical (36.6%) followed by mesioangular (29.9%), horizontal (25.4%), distoangular (6.0%), others (1.55%) and transverse (0.7%) and also the statistical analysis showed no significant difference between left and right side of the mandible. From 1019 impacts, 622 (61%) was presented in female and the others 397(39%) was for a male.

The impaction was 1.5 times more occur in female than male as shown in the table (4). The presented study showed that the incidence of maxillary impactions was more at ages younger than 25 yrs., while the incidence of mandibular impactions was more at age group 25-34 yrs. And there was a highly significant difference among age groups as shown in the table (5).
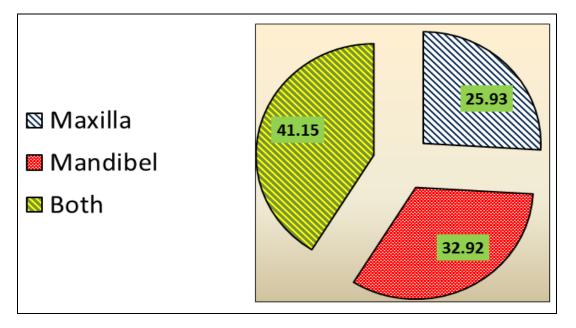

Figure 1: Distribution of Impacted Wisdom Teeth among Patients

Table 2: Frequency of Impaction of Maxilla and Mandible

Arch	Side		Total	Asymp. Sig. (2-tailed)
	Left	Right		
Maxilla	248(52.21)	227(47.79)	475(46.61)	0.561
Mandible	276(50.74)	268(49.26)	544(53.39)	NS
Total	524(51.42)	495(48.58)	1019(100)	

Table 3: Distribution of Third Molars Impaction by Angulation

Arch	Side	Angulation						Total	Asym. Sig (2-tailed)
		Vertical	Distoangular	Mesioangular	Transverse	Horizontal	Others		
Maxilla	Left	69 (27.8)	98 (39.5)	60 (24.2)	1(0.4)	0(0.0)	20 (8.1)	248 (52.2)	0.351 NS
	Right	47 (20.7)	77(33.9)	77(33.9)	3(1.3)	0(0.0)	23 (10.1)	227 (47.8)	
	Total	116 (24.4)	175(36.8)	137(28.8)	4(0.8)	0(0.0)	43 (9.1)	475	
Mandible	left	98 (35.5)	22(8.0)	83(30.1)	3(1.1)	61(22.1)	9(3.3)	276 (50.74)	0.984 NS
	Right	98 (36.6)	16(6.0)	80(29.9)	2(0.7)	68 (25.4)	4(1.5)	268 (49.26)	
	Total	196 (36.0)	38(7.0)	163(30.0)	5(0.9)	129 (23.7)	13 (2.4)	544	
BOTH		312 (30.6)	213(20.9)	300(29.4)	9(0.9)	129 (12.7)	56 (5.5)	1019	

Table 4: Frequency of Impaction According to Gender

Parameters	Maxillary		Mandibular		Total
	Left side	Right side	Left side	Right side	
Male	84(21.16)	83(20.91)	112(28.21)	118(29.72)	397(38.96)
Female	164(26.37)	144(23.15)	164(26.37)	150(24.11)	622(61.04)
Total	248	227	276	268	1019

Table 5: Frequency of Types of Impaction According to Winter's Classification with Age Groups

Arch	Side	Angulation	Age groups				Total	P -value
			< 25 yrs.	25 - 34 yrs.	35 - 44 yrs.	> 45 yrs.		
Maxilla	Left	Vertical	33(31.7)	24(24.5)	8(25.0)	4(28.6)	69(27.8)	<0.001**
		Distoangular	46(44.2)	43(43.9)	7(21.9)	2(14.3)	98(39.5)	
		Mesioangular	22(21.2)	22(22.4)	14(43.8)	2(14.3)	60(24.2)	
		Transverse	0(0.00)	0(0.00)	1(3.1)	0(0.00)	1(0.4)	
		Others	3(2.9)	9(9.2)	2(6.3)	6(42.9)	20(8.1)	
		Total	104(41.9)	98(39.5)	32(12.9)	14(5.6)	248	
	Right	Vertical	19(21.1)	18(20.0)	4(13.3)	6(35.3)	47(20.7)	<0.001**
		Distoangular	32(35.6)	34(37.8)	10(33.3)	1(5.9)	77(33.9)	
		Mesioangular	38(42.2)	22(24.4)	12(40.0)	5(29.4)	77(33.9)	
		Transverse	0(0.00)	1(1.1)	0(0.00)	2(11.8)	3(1.3)	
		Others	1(1.1)	15(16.7)	4(13.3)	3(17.6)	23(10.1)	
		Total	90(39.6)	90(39.6)	30(13.2)	17(7.5)	227	
Mandible	Left	Vertical	26(32.9)	58(39.7)	14(35.0)	0(0.00)	98(35.5)	<0.001**
		Distoangular	2(2.5)	17(11.6)	3(7.5)	0(0.00)	22(8.0)	
		Mesioangular	32(40.5)	37(25.3)	11(27.5)	3(27.3)	83(30.1)	
		Horizontal	14(17.7)	32(21.9)	12(30.0)	3(27.3)	61(22.1)	
		Transverse	2(2.5)	1(0.7)	0(0.00)	0(0.00)	3(1.1)	
		Others	3(3.8)	1(0.7)	0(0.00)	5(45.5)	9(3.3)	
		Total	79(28.6)	146(52.9)	40(14.5)	11(4.0)	276	
	Right	Vertical	28(34.1)	52(38.8)	15(41.7)	3(18.8)	98(36.6)	<0.001**
		Distoangular	3(3.7)	8(6.0)	3(8.3)	2(12.5)	16(6.0)	
		Mesioangular	31(37.8)	37(27.6,)	10(27.8)	2(12.5)	80(29.9)	
		Horizontal	18(22.0)	35(26.1)	8(22.2)	7(43.8)	68(25.4)	
		Transverse	1(1.2)	0(0.00)	0(0.00)	1(6.3)	2(0.7)	
		Others	1(1.2)	2(1.5)	0(0.00)	1(6.3)	4(1.5)	
		Total	82(30.6)	134(50.0)	36(13.4)	16(6. 0)	268	

IV. DISCUSSION

a. Gender

The incidence of impaction of this study was more in females(61%) than males(39%) and it was correlated with many studies that reported gender predilection in third molar impactions[4-12]. Results of the present study were in agreement with previous reports since there was statistical significance in the distribution of impacted teeth between females and males. The growth pattern of jaws was different between female and male in which growing of jaw stop at the time of 3rd molar eruption while the growth continues in the male during eruption so creating more space for a wisdom tooth to erupt[13]. Pillai AK et al. & Schneider T et al.[14,15] in 2014 showed other results were male predilection more than female.

b. Angulation

This study was in correlation with other studies[5,6,8,16-19] where the vertical angulation (36%) was the most predominant in the mandible. And it was not in accordance with other studies[4,10-12,17,20-25].These studies showed that the mesioangular impaction was predominant. This study demonstrated that the vertical angulation (36%) followed by mesioangular (30%) and it came with other studies[26-28]. As shown in the table (3). These results in regard to varies among the population races, genetics, and lifestyle. In the present study, the most predominant angulation in maxilla was distoangular (36.8%) followed by mesioangular (28.8%) and it disagreed with[4,12] where they demonstrated the vertical impaction was predominant, while Kruger E et al in 2001 [29] showed the mesioangular impaction was predominant.

c. Frequency

This study showed a frequency of occurring of 3rd molar impaction 23% among the population, and it was with ranges from 9.5 to 68% according to different studies[4,30-32]. This percent was less than Iranian study[12] But higher than 15.2% V Raj Kumar et al [33], may be due to different jaw sizes, races and early mineralization with delay eruption.

d. Age

The ages younger than 34 yrs. presented with the highest rate of impaction than older ages, this result came along with V Raj Kumar et al 67.4% [33] And Abu-Hussein Muhamad &Watted Nezar 63.6% [34] And more than 50 % [6,20,35]. The decrease in impaction incidence was decreased with advancing age this may due to changes occurring in angulation of 3rd molar that took place up to 32 yrs.[33,36]. And also the normal mesial physiological migration of teeth may provide additional sufficient space that allowed wisdom teeth to erupt.

V. CONCLUSION

The incidence of 3rd molar impaction represented one-fifth to one-fourth of the population in Najaf city and most of them with age younger than 34 yrs. The vertical impaction represented the most common impaction among mandibular impactions while the most common impaction in maxilla was distoangular impaction. The rate of 3rd molar impaction was 1.5 times more in women than men.

REFERENCES

[1]   Abu-Hussein M., Watted N., Watte A., Abu-Hussein Y., Yehia M., Awadi O., Abdulgani A.(2015). Prevalence of Tooth Agenesis in Orthodontic Patients at Arab Population in Israel. *International Journal of Public Health Research*,Vol. 3, No. 3, pp. 77-82.

[2]   Miranda Pedro, F. L., Bandéca, M. C., Ricci Volpato, L. E., Corrêa Marques, A. T., Borba, A. M., De Musis, C. R., & Borges, Á. H. (2015). Prevalence of impacted teeth in a brazilian subpopulation. *Journal of Contemporary Dental Practice*, *15*(2), 209–213.

[3]   Bishara SE, Andreasen G. (1983).Third molars: a review. *Am J Orthod* ,83:131-7

[4]   Quek, S. L., Tay, C. K., Tay, K. H., Toh, S. L., & Lim, K. C. (2003). Pattern of third molar impaction in a Singapore Chinese population: A retrospective radiographic survey. *International Journal of Oral and Maxillofacial Surgery*, *32*(5), 548–552.

[5]   Hugoson, A., & Kugelberg, C. F. (1988). The prevalence of third molars in a Swedish population. An epidemiological study. *Community Dental Health*, *5*(2), 121–138.

[6]   Ma'aita, J., & Alwrikat, A. (2000). Is the mandibular third molar a risk factor for mandibular angle fracture? *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*, *89*(2), 143–146.

[7]   Almendros-Marqués, N., Berini-Aytés, L., & Gay-Escoda, C. (2006). Influence of lower third molar position on the incidence of preoperative complications. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology*, *102*(6), 725–732.

[8]   Šečić, S., Prohić, S., Komšić, S., & Vuković, A. (2013). Incidence of impacted mandibular third molars in population of Bosnia and Herzegovina: a retrospective radiographic study. *Journal of Health Sciences*, *3*(2), 151-158.

[9]   Upadhyaya, C., Chaurasia, N. K., Neupane, I., & Srivastava, S. (2017). Incidence and Pattern of Impaction of Mandibular Third Molars : A Single Institutional Experience in Nepal. *Kathmandu University Medical Journal (KUMJ)*, *15*(57), 67–70.

[10]   Saad Mohamednagib Alfergani Khurram Latif Yousef Musarrah Alanazi (2014). Pattern Of Impacted Mandibular Third Molars In A Saudi Population. *Pakistan Oral & Dental Journal,*Vol 37, No. 3.

[11]   Al-Anqudi SM, Al-Sudairy S, Al-Hosni A, Al-Maniri A. (2014). Prevalence and pattern of third molar impaction. *Sultan Qaboos University Med J.*,14(3): 388-92.

[12]   Hashemipour, M.-A., Tahmasbi-Arashlow, M., & Fahimi-Hanzaei, F. (2013). Incidence of impacted mandibular and maxillary third molars: a radiographic study in a Southeast Iran population. *Medicina Oral, Patologia Oral y Cirugia Bucal*, *18*(1), e140-145.

[13]   Bishara, S. E. (1992). Impacted maxillary canines: a review. *American Journal of Orthodontics and Dentofacial Orthopedics*, *101*(2), 159–171.

[14]   Kumar Pillai, A., Thomas, S., Paul, G., Singh, S. K., & Moghe, S. (2014). Incidence of impacted third molars: A radiographic study in People's Hospital, Bhopal, India. *Journal of Oral Biology and Craniofacial Research*, *4*(2), 76–81.

[15]   Schneider, T., Filo, K., Kruse, A. L., Locher, M., Grätz, K. W., & Lübbers, H.-T. (2014). Variations in the anatomical positioning of impacted mandibular wisdom teeth and their practical implications. *Swiss Dental Journal*, *124*(5), 520–38.

[16]   Bataineh, A., Albashaireh, Z., & Hazza'a, A. (2002). The surgical removal of mandibular third molars: A study in decision making. *Quintessence International*, *33*, 613–618.

[17]   Yilmaz, S., Adisen, M. Z., Misirlioglu, M., & Yorubulut, S. (2016). Assessment of Third Molar Impaction Pattern and Associated Clinical Symptoms in a Central Anatolian Turkish Population. *Medical Principles and Practice*, *25*(2), 169–175.

[18]   Sasano, T., Kuribara, N., Iikubo, M., Yoshida, A., Satoh-Kuiriwada, S., Shoji, N., & Sakamoto, M. (2003). Influence of angular position and degree of impaction of third molars on development of symptoms: long-term follow-up under good oral hygiene conditions. *The Tohoku Journal of Experimental Medicine*, 200:75-83

[19]   Khawaja NA.(2006). Third molar impaction: a review. *J Pak Dent Assoc.*,15:97-101.

[20]   Hassan, A. H. (2010). Pattern of third molar impaction in a Saudi population. *Clinical, Cosmetic and Investigational Dentistry*, *2*, 109–113.

[21]   Morris, C. R., & Jerman, A. C. (1971). Panoramic radiographic survey: a study of embedded third molars. *Journal of Oral Surgery (American Dental Association : 1965)*, *29*(2), 122–125.

[22]   Ramamurthy, A., & Pradha, J. (2012). Prevalence of mandibular third molar impaction and agenesis: a radiographic south Indian study. *J Indian Aca Oral …*, *24*(September), 173–176.

[23]   Byahatti, S., & Ingafou, M. S. H. (2012). Prevalence of eruption status of third molars in Libyan students. *Dental Research Journal*, *9*(2), 152–157.

[24]   Jaffar, R. O., & M.M., T.-O. (2009). Impacted mandibular third molars among patients attending Hospital Universiti Sains Malaysia. *Archives of Orofacial Sciences*, *4*(1), 7–12.

[25]   Kanneppady SK1, Balamanikandasrinivasan, Kumaresan R, S. S. (2013). A comparative study on radiographic analysis of impacted third molars among three ethnic groups of patients attending AIMST Dental Institute, Malaysia. *Dent Res J (Isfahan).* , *10(3)*(3), 353–8.

[26]   Padhye, M. N., Dabir, A. V., Girotra, C. S., & Pandhi, V. H. (2013). Pattern of mandibular third molar impaction in the Indian population: A retrospective clinico-radiographic survey. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, *116*(3):161-6.

[27]   Gupta, S., Bhowate, R. R., Nigam, N., & Saxena, S. (2011). Evaluation of Impacted Mandibular Third Molars by Panoramic Radiography. *ISRN Dentistry*, *2011*, 1–8.

[28]   Hazza'a AM, Albashaireh ZS, Bataineh A.(2006). The relationship of the inferior dental canal to the roots of impacted mandibular third molars in a Jordanian population. *J Contemp Dent Pract*.,7:71–8

[29]   Kruger, E., Thomson, W. M., & Konthasinghe, P. (2001). Third molar outcomes from age 18 to 26: Findings from a population-based New Zealand longitudinal study. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*, *92*(2), 150–155.

[30]   Lima, C. J., Silva, L. C. F., Melo, M. R. S., Santos, J. A. S. S., & Santos, T. S. (2012). Evaluation of the agreement by examiners according to classifications of third molars. *Medicina Oral, Patologia Oral y Cirugia Bucal*, *17*(2), 281–286.

[31]   Hattab, F. N., Rawashdeh, M. A., & Fahmy, M. S. (1995). Impaction status of third molars in Jordanian students. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology And*, *79*(1), 24–29.

[32]   Haidar, Z., & Shalhoub, S. Y. (1986). The incidence of impacted wisdom teeth in a Saudi community. *International Journal of Oral and Maxillofacial Surgery*, *15*(5), 569–571.

[33]   Raj Kumar, V., Yadav, P., Kahsu, E., Girkar, F., & Chakraborty, R. (2017). Prevalence and pattern of mandibular third molar impaction in Eritrean population: A retrospective study. *Journal of Contemporary Dental Practice*, *18*(2), 100–106.

[34]   Muhamad, A.-H., & Nezar, W. (2016). Prevalence of Impacted Mandibular Third Molars in Population of Arab Israeli: A Retrospective Study. *IOSR Journal of Dental and Medical Sciences*, *15*(1), 2279–861.

[35]   Breik, O., & Grubor, D. (2008). The incidence of mandibular third molar impactions in different skeletal face types. *Australian Dental Journal*, *53*(4), 320–324.

[36]   Ventä I, Turtola L, Ylipaavalniemi P. Radiographic follow-up of impacted third molars from age 20 to 32 years: *Int J Oral Maxillofac Surg*. 2001 Feb; 30(1):54-57.