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A COMPARISON BETWEEN CLINICAL AND RADIOGRAPHICAL APPEARANCE OF LOWER THIRD MOLAR

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Abstract

Radiographical evaluation by orthopantomography (OPG) and surgical extraction of impacted lower third molar are done to 67 patients (32 male) and (35 female) visiting Basrah Dental College, department of oral and maxillofacial surgery (2013-2014). Thirty nine patients are between 18-29 years, 77.6% are partially impacted and 22.4% completely impacted, the main complaint is pericoronitis (55.2%). The OPG accuracy in this study was as follows: concerned with dilacerated roots, K-value was <0, which means: Less than chance agreement of the OPG radiography in compare with clinical appearance of the teeth, also in relation to the normal appearance of the roots radiographically show (0.64) which is substantial agreement with the clinical appearance. While K-value gives a perfect agreement of the OPG to both fused (0.97) and extra-root >1 morphology.

Introduction

Complex hereditary factors (like the patterns of facial growth, jaw development and tooth size) effect the third molar eruption and they differ among populations, races and genders. All these factors are playing a role in impaction of lower third molar[1]. An impacted tooth is one that fails to erupt into normal position, however they remains completely or partially embedded and covered by bone or gum tissue[2]. Wisdom teeth develop between the ages of 14 and 25. However, tooth movement can continue beyond the age of 25[3]. To assess the path of surgical removal of impacted tooth and thus for a successful surgery, it is important for the surgeon to know the classification of impacted molar teeth which include: classification of Winter's and Pell that are based on the inclination of the impacted tooth to the long axis of the second molar, this classification includes: horizontal, vertical, buccal, lingual, mesioangular or destoangular inclination[4]. Other classification is of Gregory that is based on the nature of the covering tissues either partial or complete bony impactions[5].

Surgical extraction of the third molar is the most common surgical procedure achieved in the clinical practice of oral surgery. Some impacted third molar are not associated with any abnormal changes, but surgeon becomes warred if there is a lack of the space for eruption, mal-positioning, or pathological changes. Detailed morphologic analysis of the third molar and its relationship to adjacent structures and surrounding tissues are important for preoperative assessment[6,7].

Impacted tooth assessment depends on history, examination and radiography. There are many techniques of radiographies, but the method of choice is orthopantomography (OPG), because one can evaluate the angulation of the third molar and its relation to the adjacent tooth and surrounding tissues[8], also help the surgeon to choose the most appropriate techniques (how to split tooth, where to

remove bone and in which direction the tooth should elevated) in order to evaluate the difficulty of operation[9]. Also its cheap and available, with low dose of radiation[10,11].

Aim of the study:

To assess the accuracy of ortho-pantomography (OPG) radiography to detect the morphology of the roots of the lower third molar and compare it with intraoperative findings.

Material and methods

A prospective study was done on 67 patients selected randomly attended college of dentistry in Basrah, department of oral and maxillofacial surgery between 2013-2014. On 67 Patients selected randomly, complete clinical assessment was done, history, extra, and intraoral examinations. Radiographical examination using (KOREA Digital x-ray imaging system, model:- Pax-400C. Power source:-100V/230V, 50/60 Hz,2.0 KVA. X-ray tube type: D-051/Toshiba, focal spot 0.5mm IEC 336). Precise radiographical assessment was done to determine the position of the tooth either (mesioangular, destoangular, horizontal or vertical), and also the morphology of the roots (dilacerated, normal, fused, or extra-root), which were then compare to the tooth after surgical removal.

Surgical procedure: local anesthesia injection (inferior alveolar, lingual and long buccal nerves block) are given to the patients, then reflection of buccal muco-periosteal flap and lingual flap, the removal of the tooth done carefully by cutting of bone or sectioning of the crown or root, if needed, the pieces of the sectioned teeth then reposition carefully to its normal place in order to camper it with the radiographies Fig. 1 & 2.

The statistical analysis of data were done by SPSS version (16) by using Kappa measure of agreement test, depending on the true positive, false positive, true negative, and false negative and according to agreement measeurs[12]as demonstrated in Table I.

Table I: Interpretation of Kappa agreement

< 0	Less than chance agreement
0.01–0.20	Slight agreement
0.21–0.40	Fair agreement
0.41–	Moderate

Figure 1: Morphol up to down as follow (Norma xtra-root).

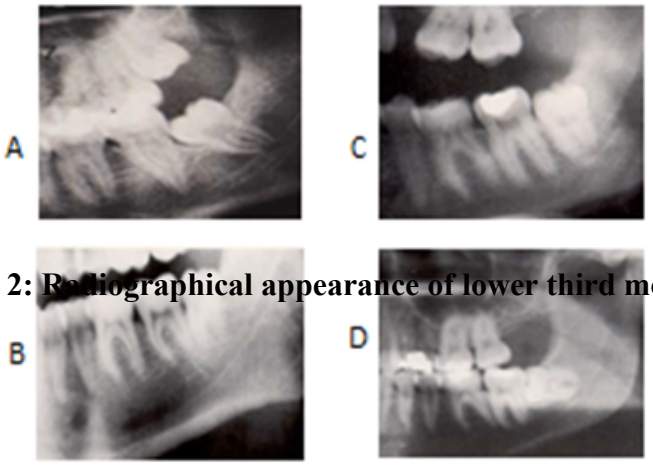


Figure 2: Radiographical appearance of lower third molar

(A) mesioangular, (B) destoangular, (C) vertical, (D) horizontal.

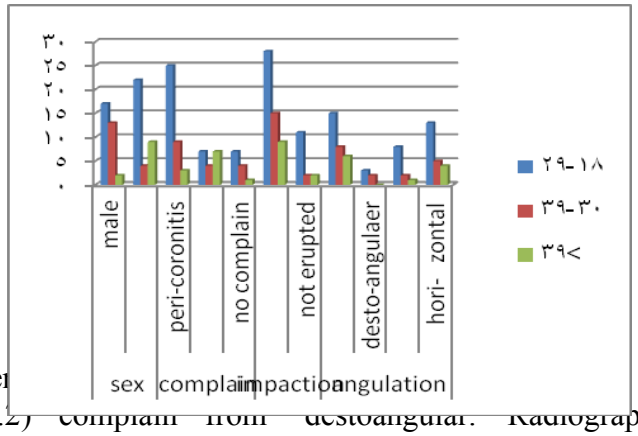
Results

The sample group was formed by 67 patients, 35 (47.8%) were female and 32 (52.2%) were male. The age between (18-46 years), the mean is 28y, the patients were divided in to three groups: the first one from (18-29 y) which includes the majority of the cases about 39 (58.2%), second group between (30-39y) includes 17(25.4%), and the third group includes patients above 39y, 11(16.4%),Table II and Figure 3.

Table II: The relation between the age groups and the sex, complain, type of impaction, and angulation.

age groups	Sex		complain			impaction		angulation				Total
	male	female	peri-coronitis	caries	no complain	partial erupted	not erupted	mesio - angular	desto-angular	vertical	hori-zontal	
18-29	17	22	25	7	7	28	11	15	3	8	13	39
	25.4%	32.8%	37.3%	10.4%	10.4%	41.8%	16.4%	22.4%	4.5%	11.9%	19.4%	58.2%
30-39	13	4	9	4	4	15	2	8	2	2	5	17
	19.4%	6.0%	13.4%	6.0%	6.0%	22.4%	3.0%	11.9%	3.0%	3.0%	7.5%	25.4%
>39	2	9	3	7	1	9	2	6	0	1	4	11
	3.0%	13.4%	4.5%	10.4%	1.5%	13.4%	3.0%	9.0%	0.0%	1.5%	6.0%	16.4%
Total	32	35	37	18	12	52	15	29	5	11	22	67
	47.8%	52.2%	55.2%	26.9%	17.9%	77.6%	22.4%	43.3%	7.5%	16.4%	32.8%	100%

Figure 3: The relation between the age groups and the sex, complain, type of impaction, and angulation



According to patien and 5(57.5%) study shows 37(55.2) complain from pericoronitis, 18 (26.9%) caries teeth, and 12(17.9) has no complain. While in references to impaction patterns: 52 (77.6%) was partially erupted, which is higher than completely impacted teeth 15 (22.4%). The study explains four types of angulations includes: 29 (43.3%) mesioangular, 22(32.8%) horizontal, destoangular. Radiographical examinations show that dilacerated are 33(49.3%), fused 12(17.9%), normal 21(31.3%), and the extra-root 1(1.5%), while clinically and after extraction of the teeth the result shows: dilacerated 39(58.2%), fused 13(17.4%), normal 12(17.9%), and the extra-root 3(4.5%) as in Table III and Figure 4.

Table III: Comparison between the clinical and radiographical appearance of the lower impacted third molars.

		Clinical				Total
		dilacerated	fused	normal	extraroot	
Radiographically	Dilacerated	32	0	0	1	33
		47.8%	.0%	.0%	1.5%	49.3%
	Fused	0	12	0	0	12
					.0%	17.9%
					1	21
					1.5%	31.3%
					1	1
					1.5%	1.5%
					3	67
					4.5%	100.0%

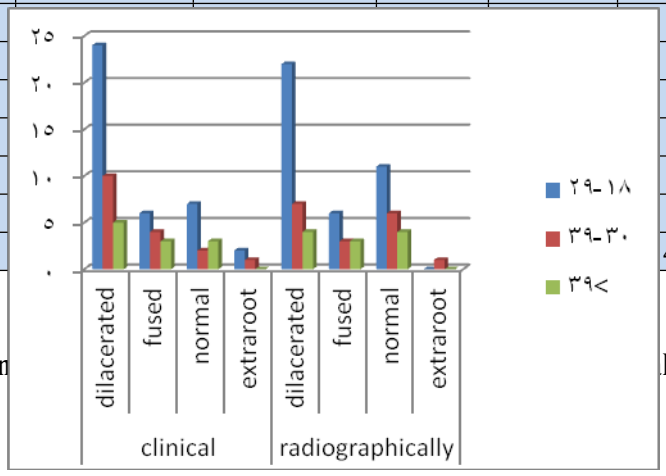


Figure 4: Con l appearance.

The comparison between appearance of the teeth radiographycally and after extraction, the result was as follows: indilacerated roots, K-value was (<0), which means: Less than chance agreement of the radiography in compere with clinical appearance of the teeth, also in relation to the normal appearance of the roots radiographically show (0.64) which is substantially agree with the clinical appearance. While K-value give a perfect agreement to both fused (0.97) and extra-root (>1) morphology, as show in Table IV.

Table IV: Kappa Agreement to the morphological appearance (clinically and radiologically).

morphology	Radiog-raphical	clinical	TP	FP	FN	k-value	agreement
dilacerated	33	39	33		6	< 0	Less than chance agreement
fused	12	13	12		1	0.97	Almost perfect agreement
normal	21	12	12	9		0.64	Substantial agreement
extraroot	1	3	1		2	>1	Almost perfect agreement

Discussion

In this study 58% of the patients are in the first group, 25% in the second group, and 11% in the third group, that means there are an oral health awareness for the early treatment of the impacted lower third molar, this result correlates with Arsalan Wahid et al[13],but dos not correlate with the study of Hashemipour et al[14], which show that the impactions are more in third decade and in patients above 40y.

This study shows no significant difference between male and female, female 52.2%, male 47.8%, which agrees with Yahya A Ali et. al.[15] (47.72%, 52.28%) and with Ali H Hassan[16](47.4%, 52.6%), but disagrees with other studies like Hashemipour et. al. in Iran, Quck Sl. Et al[17,18] in Singapore and Chinese population , Al-Anqudi SM et.al.[19] in Oman and Sumeet Sandhu et.al.[20] in India, that may be related to growth deference between male and female, in male the growth continue in mandible after the third molar eruption, while it stops in female that's explains why the impaction are more in females Bishara SE et. al.[21],Arsalan Wahid et al[13].

Pericoronitis was the common complain, 55.2%, followed by caries 26.9%, and 17.9% without complain in this study, which agrees with Yahya A Ali et.al. (55%, 25%, 20%) respectively, this result explain why partially erupted teeth are more than un erupted molars as the study will show later, but disagrees with Al-Bahrani et. al.[22] that shows 34% pericoronitis and 88% of impacted teeth extracted with no complain. In clinical examination this study show 77.6% of impacted lower third molars are partially

erupted and 22.4% are not erupted (completely impacted), this agrees with Saraswati FK. et. al.[23] 86%, 14%, Al-Bahrani et. al. 74%, 13% respectively Table III. The studies of the angulation of the impacted lower third molars in different countries demonstrate that mesioangular impaction is the most common one, for example, 80% in Chinese showed mesioangular impaction, 46.5%in Korean population Haug RH et. al.[24], 48% in southeast Iran population[14], 70% in Karnataka, India[23], 33.4% in KAU[16], also there are studies in Iraq 70% in Baghdad[22], 43.3% in Misan[15], in this study 43.3% was mesioangular impactions, the explanation of this is usually related to the mesial inclination of

the third molar, (progressively becomes more upright up to the age of 25 and the teeth may erupt normally, between 14-25) or impacted because of lack of space[25,26]. Horizontal impaction comes secondlyin this study about 32.8% which agrees with yahya et. al. 27.14%, Hashemipour etal 29.3%,Ali H Hassan[16]27.5%, but it is disagrees with Saraswati FK. Et. al. 11%. Vertical impaction comes thirdly in this study about 11%, which agrees with Al-Bahrani et. al. 12%, Yahya et. al. 8.57%, Ali H Hassan 20.5%, the lesser type of impaction in this study is the distoangular about 5%, which is nearby yahya et. al. 8.57%, but less than Al-Bahrani et. al. 18%, Ali H Hassan 16.6%,Saraswati FK. Et. al. 32%. In this study the majority 94% of the teeth are two roots, the extra-roots6% are seen (three impacted teeth 4.5% with three root, and one impacted tooth 1.5% with five roots) its less than Al-Bahrani et. al. 12%, but same as Saraswati FK. et. al. 7%.

Kappa measure shows disagreement between dilacerations and normal morphology of the impacted teeth between clinically and radiographically, which agrees with Al-Bahrani et. al. and Saraswati FK and this is due to that dilacerations was not accurately detected by radiography, this related to the path of the x-ray beam Westesson and Carlsson. Wanzel et. al.[27] study that the inward root bent are more than the outward bent and this explain the difference between the morphology of the tooth radiography and clinically after extraction.

Conclusion

Orthopantomography (OPG)provide less reliable information regarding dilacerated teeth, so a good assessment can be reached by using 3D radiography that provide powerful tool to evaluate the morphology of the roots of impacted teeth.

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