

Prevalence of Impacted Third Molars Among Iraqi Patients Attending Al-Maghrib Specialized Dental Health Center in Relation to Age and Gender Using Panoramic Radiographs.

Dr. Hussain Sadiq Hussain BDS, MSc¹, Dr. Gharaa Amer Mohammed Taqi BDS, MSc²,

Dr. Shahbaa Ahmed Hadi BDS, MSc³

¹Head of radiology unit, Al-Maghrib specialized dental health center, Baghdad Health Directorate-Al-Rusafa, Ministry of Health

^{2,3}Senior at oral surgery unit, Al-Maghrib specialized dental health center, Baghdad Health Directorate-Al-Rusafa, Ministry of Health

ABSTRACT

Introduction: The most commonly impacted tooth is third molar.

Aim: To investigate the prevalence of pattern of third molar impaction among patients attending Al-Maghrib specialized dental health center in Baghdad city.

Materials and Methods: A cross-sectional analysis was conducted on digital orthopantomogram (OPGs) of high quality belonged to 519 patients referred to Al-Maghrib specialized dental health center in Baghdad city/Iraq between January 2023 to June 2023. Data include age, gender and angulation type.

Results: The age range was 20-70 years old. The prevalence of impacted third molar was 92%. The percentage of impacted lower third molar (51%) was higher than that of upper third molar (49%). Middle-aged patients (20-30, 31-40 years) recorded higher percentages of impaction than other age groups (31.7% and 32% respectively). Male gender revealed higher percentage (58%) of impaction than female gender (42%). Vertical and then mesioangular inclinations are the most prevalent types of lower third molar angulations (45% and 30% respectively).

Conclusion: Higher prevalence of impaction in third molars was recorded in the current study that was more prevalent in the middle-aged patients with male predilection. The impaction was more common in the mandible than the maxilla. The most prevalent lower third molar angulation is vertical followed by mesioangular.

KEYWORDS: Impaction, third molar, panoramic radiographs.

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INTRODUCTION

Impaction is a prevalent dental problem that is characterized by partial or complete failure of teeth to erupt into their correct position. (Malik, 2012) 98% of all of impacted teeth is the third molar with a prevalence range from 18.97% to 30.80%. (Hassan, 2010) Insufficient skeletal growth, mucosal thickness over the growing tooth, macrodontia, lack of space, deciduous teeth retention or systemic condition as Down's syndrome are etiological factors for third molar impaction. Various complications accompanying impaction may be crowding, caries, pericoronitis, adjacent root resorption, facial pain, temporomandibular joint dysfunction, and dentigerous

cyst. (Fayad et al, 2004) Cystic wall transformation into squamous cell carcinoma is one of the serious complications. (Carter and Worthington, 2016) The panoramic view of all the maxillofacial regions can be produced by digital panoramic radiography. It was used widely in the diagnosis of impacted of 3rd molars variations. Assessment of impaction facilitates the treatment plan and the proper surgical management. (Jose et al, 2011).

According to the aforementioned discussion, the current study was conducted to investigate the prevalence of third molars impaction in addition to its relation with age and gender in Iraqi patients attending Al-Maghrib Specialized Dental Health Center in Baghdad city/ Iraq.

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MATERIALS AND METHODS

-Study Design

This study was conducted at radiology department in Al-Maghrib Specialized Dental Health Center in Baghdad city/Iraq. The orthopantomograms (OPG) of 519 patients who aged 20-70 years in addition to their related data were collected during six months period from January to June 2023. The patients consent form and all necessary variables information were written in a Performa that obtained through historical, clinical examination and radiographic study. The age, gender, and number of impacted third molars were recorded. All OPGs had been taken using an extra-oral digital ORTHOPHOS XG X-ray system from Sirona imaging system with an exposure time of 14.1 s, a voltage of 64 kV, and a current of 8 mA. The exclusion criteria include, patients younger than 20 years, those with craniofacial anomalies, dento-alveolar pathology, those with Down syndrome, cleidocranial dysostosis, those with incomplete records or poor quality OPG and those with third molar with incomplete

root formation. Single examiner reviewed the OPGs (to get rid of the inter-examiner errors) in a dark room using suitable X-ray viewer to determine impacted third molars prevalence in the sample, their levels of eruption; and their angulations. Third molar was considered impacted if its roots were fully formed but it did not have functional occlusion.

Impacted third molar angulation was determined based on Winter's classification depending on the angle formed between the intersected longitudinal axes of the second and third molars:

- The vertical impaction (10° to -10°),
- mesioangular impaction (11° to 79°),
- horizontal impaction (80° to 100°),
- distoangular impaction (-11° to -79°),
- others (111° to -80°) and
- buccolingual impaction (Any tooth oriented in a buccolingual direction with crown overlapping the roots)] (Fig. 1). (Brann et al, 1999).

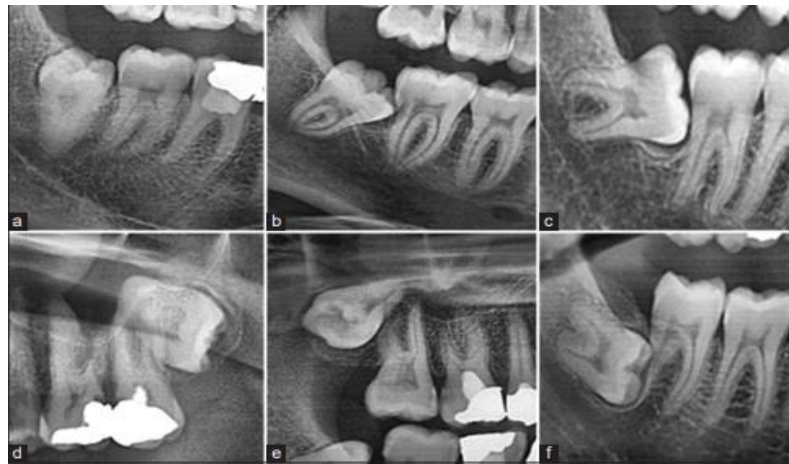


Figure 1: Winter's categorization depends on the relation of the impacted third molar tooth to the long axis of 2nd molar tooth. (a) Vertical. (b) Mesioangular. (c) Horizontal. (d) Distoangular. (e) Bucco/lingual. (f) The inverted

-Statistical analysis

Data analyses were done using Statistical Package for the Social Sciences (version 28.0; SPSS, Inc, Chicago, IL). The age, gender, number of impacted third molars and classification of impaction were presented by frequency and percentage. All information regarding patient identification and medical conditions were kept confidential.

RESULTS

Among 519 patients, 294 (56.6%) were male and 225 (43.4%) were female. The age range was from 15 to 69 years (**Table 1**). In the research work, there are five age groups including 15-25, 26-36, 37-47, 48-58 and 59-69 with the number of patients equal to 88(17%), 151 (29.1%), 172 (33.1%), 79 (15.2%) and 29 (5.6%) respectively (**Table 2**). Of 519 patients, 477 patients had at least one impacted third molar so the prevalence was 92%. The percentage of

impacted 3rd molars was slightly higher in the lower arch (730, 51%) than upper arch (704, 49%).

Table 3 revealed the percentage of impacted 3rd molars according to age groups. In the total sample the higher percentages of 3rd molar impaction were found in age groups of 31-40 years and 41-50 years (31.7% and 32% respectively) followed by the age group 20-30 years (295, 20.5%) and 51-60 years (174, 12%) while the least percentage represented by the age group 61-70 years (49, 3.4%). It is important to notice that the same findings were recorded for the four types of third molars (i.e. upper right, upper left, lower right and lower left) in relation to age groups. Another finding was observed in

Table 3, lower right third molar constituted the highest percentage of the total third molars (382, 27%) followed by upper left 3rd molar (357, 25%) whereas upper right and lower left constituted the lowest percentage that was 24% for both.

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The percentage of impacted third molar according to gender is shown in

Table 4. Male gender in the current study revealed higher percentage of impacted third molars (836, 58%) than female gender (598, 42%). According to the type of third molar, the four types of 3rd molars recorded higher percentages in male than females.

In the current study, impacted lower third molars constituted 747 of the total sample, with 335 (45%) revealed vertical angulation followed by 225(30%) were mesioangular, 101 (13.5%) were distoangular and finally 86 (11.5%) showed horizontal angulation. of the total sample 375 had lower right impacted third molars. Mesioangular and horizontal types of 3rd molars angulation constituted the higher percentages (133, 35.5% and 130, 34.7% respectively) followed by distoangular (68, 18.1%) and the least type is horizontal angulation (44, 11.7%). According to age groups, mesioangular, distoangular and vertical angulations constituted the higher percentage in the age groups (31-40 and 41-50 years) followed by 20-30 years and then 51-60 years, while the least percentage presented in the age group 61-70 years. Regarding horizontal angulation, the same percentage was recorded in the age groups 20-30 and 31-40 followed by the age group 41-50 years, whereas no impacted 3rd molars were recorded in the age groups 51-60 and 61-70 years (0.00%)

Table (5). For impacted lower left 3rd molars, the vertical angulation represented the highest percent (205, 55.1%) followed by mesioangular (92, 24.7%) then horizontal and distoangular inclinations (42, 11.3% and 33, 8.9% respectively). The age groups 31-40 and 41-50 years recorded higher percentages of mesioangular impacted lower left 3rd molar, followed by 20-30 years, then 51-60 and 61-70 years. Nearly the same finding was recorded for the remaining types of 3rd molars inclinations in relation to age groups as shown in

Table (6). Higher percentage of impacted lower right third molar was recorded in males (212, 56.6%) than females (163, 43.5%). Regarding the type of inclination, mesioangular, vertical and horizontal inclinations revealed higher percentages in males than females, while distoangular inclination showed higher percentage in females than males (**Table 7**).

Higher percentage of impacted lower left third molar was recorded in males (217, 58.3%) than females (155, 41.7%). Regarding the type of inclination, mesioangular, vertical and horizontal inclinations revealed higher percentages in males than females, while distoangular inclination showed higher percentage in females than males (**Table 8**).

Table1: distribution of the total sample according to gender.

| Gender | N | % |
|--------|-----|------|
| Male | 294 | 56.6 |
| Female | 225 | 43.4 |
| Total | 519 | 100 |

Table 2: distribution of the total sample according to age group.

| Age group | N | % |
|-----------|-----|------|
| 20-30 | 88 | 17 |
| 31-40 | 151 | 29.1 |
| 41-50 | 172 | 33.1 |
| 51-60 | 79 | 15.2 |
| 61-70 | 29 | 5.6 |
| Total | 519 | 100 |

Table 3: distribution of the total sample according to the third molars impaction by age group.

| Impacted third molar | Age groups (year) | | | | | | | | | | | |
|----------------------|-------------------|----|-------|----|-------|----|-------|----|-------|---|-------|----|
| | 20-30 | | 31-40 | | 41-50 | | 51-60 | | 61-70 | | Total | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Upper right | 75 | 22 | 121 | 35 | 102 | 29 | 38 | 11 | 11 | 3 | 347 | 24 |
| Upper left | 76 | 21 | 114 | 32 | 113 | 32 | 40 | 11 | 14 | 4 | 357 | 25 |
| Lower right | 72 | 19 | 117 | 31 | 134 | 35 | 48 | 12 | 11 | 3 | 382 | 27 |

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|--------------|-----|------|-----|------|-----|----|-----|----|----|-----|------|-----|
| Lower left | 71 | 20 | 104 | 30 | 112 | 32 | 48 | 14 | 13 | 4 | 348 | 24 |
| Total | 295 | 20.5 | 456 | 31.7 | 461 | 32 | 174 | 12 | 49 | 3.4 | 1434 | 100 |

Table 4: Distribution of the total sample according to the impaction of third molars by gender.

| Impacted third molar | Gender | | | | | |
|----------------------|--------|----|--------|----|-------|-----|
| | Male | | Female | | Total | |
| | N | % | N | % | N | % |
| Upper right | 202 | 58 | 145 | 42 | 347 | 24 |
| Upper left | 210 | 59 | 147 | 41 | 357 | 25 |
| Lower right | 217 | 57 | 165 | 43 | 382 | 27 |
| Lower left | 207 | 59 | 141 | 41 | 348 | 24 |
| Total | 836 | 58 | 598 | 42 | 1434 | 100 |

Table 5: Distribution of the total sample according to lower right third molars inclinations by age group.

| Lower right third molar inclination | 20-30 | | 31-40 | | 41-50 | | 51-60 | | 61-70 | | Total | |
|-------------------------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Mesioangular | 26 | 19.6 | 35 | 26.3 | 45 | 33.8 | 22 | 16.5 | 5 | 3.8 | 133 | 35.5 |
| Distoangular | 14 | 20.6 | 29 | 42.6 | 19 | 27.9 | 5 | 7.4 | 1 | 1.5 | 68 | 18.1 |
| Vertical | 16 | 12.3 | 38 | 29.2 | 51 | 39.2 | 21 | 16.1 | 4 | 3.1 | 130 | 34.7 |
| Horizontal | 16 | 36.4 | 16 | 36.4 | 12 | 27.3 | 0 | 0.00 | 0 | 0.00 | 44 | 11.7 |
| Total | 72 | 19.2 | 118 | 31.5 | 127 | 33.9 | 48 | 12.8 | 10 | 2.7 | 375 | 100 |

Table 6: Distribution of the total sample according to lower left third molars inclinations by age group.

| Lower left Third molar inclination | 20-30 | | 31-40 | | 41-50 | | 51-60 | | 61-70 | | Total | |
|------------------------------------|-------|------|-------|------|-------|------|-------|------|-------|-----|-------|------|
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Mesioangular | 18 | 19.6 | 35 | 38 | 25 | 27.2 | 13 | 14.1 | 1 | 1.1 | 92 | 24.7 |
| Distoangular | 9 | 27.3 | 12 | 36.4 | 8 | 24.2 | 2 | 6.1 | 2 | 6.1 | 33 | 8.9 |
| Vertical | 1 | 0.49 | 54 | 26.3 | 72 | 35.1 | 32 | 15.6 | 11 | 5.4 | 205 | 55.1 |
| Horizontal | 13 | 31 | 15 | 35.7 | 12 | 28.6 | 2 | 4.8 | 0 | 0 | 42 | 11.3 |
| Total | 41 | 11 | 116 | 31 | 117 | 31.5 | 49 | 13.2 | 14 | 3.8 | 372 | 100 |

Table 7: distribution of the total sample according to lower right third molars inclinations by gender.

| Lower right Third molar inclination | Male | | Female | | Total | |
|-------------------------------------|------|------|--------|------|-------|------|
| | N | % | N | % | N | % |
| Mesioangular | 78 | 58.6 | 55 | 41.4 | 133 | 35.5 |
| Distoangular | 27 | 40 | 41 | 60 | 68 | 18.1 |
| Vertical | 77 | 59 | 53 | 41 | 130 | 34.7 |
| Horizontal | 30 | 68 | 14 | 32 | 44 | 11.7 |
| Total | 212 | 56.5 | 163 | 43.5 | 375 | 100 |

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Table 8: distribution of the total sample according to lower left third molars inclinations by gender.

| Lower left Third molar inclination | Male | | Female | | Total | |
|------------------------------------|------|------|--------|------|-------|------|
| | N | % | N | % | N | % |
| Mesioangular | 49 | 53.3 | 43 | 46.7 | 92 | 24.7 |
| Distoangular | 16 | 48.5 | 17 | 51.5 | 33 | 8.9 |
| Vertical | 125 | 61 | 80 | 39 | 205 | 55.1 |
| Horizontal | 27 | 64.3 | 15 | 35.7 | 42 | 11.3 |
| Total | 217 | 58.3 | 155 | 41.7 | 372 | 100 |

DISCUSSION

Third molar impaction is a common problem affecting a large proportion of population through the world. The prevalence of 3rd molar impaction in the current study was 92% that was higher than that reported by Daramanja and Jing in 2016 among 50 Chinese students, also higher than the Iraqi study conducted in 2016, the prevalence was 46.7%, among patients attending a hospital of surgical specialization/Baghdad Medical city. The prevalence of 3rd impacted molars was 34.71% as reported by Shaari et al (2023) among 2150 patients referred to a maxillofacial radiology private clinic in Karbala City/ Iraq. In another study the prevalence was 57% among Iranian people (Hashemipour et al, 2013). KalaiSelvan et al [10] in 2020, reported that the prevalence of third molar impaction among the population in Madura, India was 64%. This variation in the prevalence among studies is related to difference in study design particularly sample size, criteria of selection, age range, etc.

The percentage of impacted 3rd molars was slightly higher in the lower arch (730, 51%) than upper arch (704, 49%). This result agreed with that of Hashemipour et al (2013), Hasan et al (2016) and Shaari et al, 2023. The rate of impaction is higher in mandible compared to maxilla probably related to remodeling process imbalance at the ramus region causing either an elevation or reduction in mandibular plane angle. The nature of diet and masticatory apparatus usage degree also affect jaw and tooth size, incidence, and prevalence of impacted third molars in different populations.

Regarding the prevalence of impacted 3rd molar in relation to age, the highest prevalence was found in the two age groups 31-40 years and 41-50 years probably the constitutes the highest proportion of the total sample than the remaining age groups. It is difficult to compare the current study result with other studies due to difference in the age range. This study showed that the pattern of third molar impaction in the present sample is characterized by a high prevalence in male. This finding disagreed with that reported by other studies (Hashemipour et al, 2013; Shaari et al, 2023) that was higher in females. However, agreed with KalaiSelvan et al (2020). Whereas, in Saudi Arabia, Alfadil and Almajed (2020) found no gender predilection.

Concerning the type of angulation, in the current study the most prevalent type of angulation was vertical type followed by mesioangular, then distoangular and finally horizontal angulation. In other studies, the mesioangular impaction

(60%) was the most common followed by vertical impaction (KalaiSelvan et al, 2020). The majority of impactions were mesioangular (66.1%), followed by vertical impactions (18.8%) and horizontal ones (15.1%) as recorded by Ryalat et al (2018). Hashemipour et al in 2013, reported that the most common angulation of impaction in the mandible was mesioangular impaction (48.3%) followed by horizontal (29.3%), vertical (15.5%) and distoangular impaction (6.3%). All the differences between the present study and other investigations might owe to the ethnic and genetic divergences.

CONCLUSION

Higher prevalence of impaction in third molars was recorded in the current study that was more prevalent in the middle-aged patients with male predilection. The impaction was more prevalent in the mandible than the maxilla. The most prevalent lower third molar angulation is vertical followed by mesioangular.

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