

## Retrospective Demographic Study on Tooth Impaction In A Malaysian Sample

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### Abstract

Failure of tooth to erupt into the dental arch within expected time is referred to as impaction. The most common reasons for tooth impaction include tooth follicle displacement, impaction due to crowding, tooth may be missing and infrequent extraction of lower first and second molar. Other reasons include retention or premature loss of deciduous teeth and other causes. The most commonly affected teeth are the lower third molars, maxillary canines, maxillary second premolars and supernumerary teeth.

The aim of this study was to determine the prevalence of impacted tooth through Orthopantomograph (OPG) images among patients attending the Polyclinic Faculty of Dentistry (FOD), IIUM Kuantan Campus.

A retrospective study was carried using OPG images. Of the 2722 OPG images, 1248 OPGs that fulfilled the inclusion criteria which were taken from patients who attended at Polyclinic of FOD from 1<sup>st</sup> April 2009 until 31<sup>st</sup> May 2012. Then, it was classified into the types of tooth impaction according to their age, gender and race. All the collected data has been analyzed using SPSS Version 20.0.

Of the 1248 OPG images selected, the total OPGs with tooth impaction were 528. The most common impacted tooth was mandibular third molar (68%), followed by maxillary third molar (26%), maxillary canine (1.8%), mandibular supernumerary tooth (0.9%) and mandibular second premolar (0.7%). The tooth impaction also had significant differences ( $p < 0.05$ ) regarding to age, sex and race. The cases more common in age group of 18 to 24 years old (57%) and female (66%) population.

Prevalence of impacted tooth cases is relatively high in Polyclinic Faculty of Dentistry, IIUM Kuantan Campus that needs to be diagnosed as soon as possible. We hope this study may help students and clinicians in managing or planning treatment in early detection and prevention.

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### Introduction

Impacted tooth is one that fails to erupt and will not eventually assume its anatomical arch relationship beyond the chronological eruption time. The most commonly affected teeth are the lower third molars, maxillary canines, maxillary second premolars and supernumerary teeth. Although the tooth is impacted, not all

cases are indicated for removal, indications for removal are pericoronitis, <sup>1</sup>radiographic evidence of developmental of changes presence of caries and pulpal necrosis, root resorption of adjacent teeth and for orthodontic or prosthetic considerations. In contrast, removal is not advisable for extreme age patient, compromised medical status, and probable excessive damage to adjacent structures disease. <sup>2</sup>

The impacted tooth should be diagnosed as soon as possible because in general rules the impacted tooth should be removed unless removal is contraindicated. The dentist should typically not recommend that the impacted teeth to be left until the undesirable symptoms appear later on. In the teeth are left in place until problem arise, the patient may experiences

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incidences of local tissue morbidity, loss or damage to the adjacent teeth and potential injury to the adjacent vital structures.<sup>3</sup>

Every surgery has its own complications. Consequences of removal of impacted tooth are; dry socket, damage to inferior alveolar, lingual and mylohyoid nerves, infection, pyrexia, pain and swelling, and damage to adjacent tooth and fracture of mandible in deep impacted tooth. Excessive bleeding may occur, from either the buccal sulcus incision or tearing of the palatal tissue as the tooth is elevated. Therefore pressure and suturing should suffice.<sup>4</sup>

Grover and Lorton studied 5000 panoramic radiograph of army recruits to determine number and types of impacted tooth present.<sup>5</sup> The population ranged from 17 to 26 years of age, with the majority of subjects in the 18 to 20 year age group. The results are surveyed, 96.5% had radiographic evidence of one or more unerupted or impacted teeth and 98.95% of population had impacted mandibular third molars.<sup>6</sup>

The incidence of impacted permanent canine has been addressed in several studies. Previously, Grover and Lorton identified the maxillary canine as the tooth most likely to be impacted following maxillary and mandibular third molars.<sup>7</sup> Dachi and Howell 2016 found maxillary canine as the most commonly impacted teeth after maxillary and mandibular third molars. These studies are all similar in identifying the maxillary canine as the tooth most likely to be impacted following third molars.<sup>8</sup>

Supernumerary teeth are also known as hyperdontia, which is a term used to describe extra teeth that develop in addition to the 32 permanent teeth.<sup>9</sup> In survey of 2000 numbers of schoolchildren, supernumerary teeth were present in 0.8% of primary dentitions and 2.1 % of permanent. Topkar showed that 1.8% supernumerary involved in 13.7% patients who have impacted teeth.<sup>10</sup>

The management of supernumerary impacted tooth is nearly similar to impacted canine, including leaving the tooth if it is not resorbing the adjacent teeth and might damage adjacent structures, orthodontic alignment and transplantation.<sup>11</sup>

The lower third molars were common among the Malays (47.5%), followed by Chinese (44.4%), (5.7%) among Indians and (2.3%) among other race groups including foreigners. In

upper third molars, they found Malay were (54.5%), Chinese 27.3%, Indian (9.1%), and other races were (9.1%).<sup>12</sup>

The current study aimed to categorize the most common impacted teeth that can be found upon interpretation of radiographic images among patients presented to Polyclinic Faculty of Dentistry (FOD) and identified the relation of tooth impaction to location, gender and race.

## Materials and methods

A retrospective, cross-sectional, descriptive study. OPG taken at Radiology department, Polyclinic FOD, IIUM Kuantan within 3 years from 1st April 2009 until 31<sup>st</sup> May 2012.

## Inclusion criteria

The sample includes Good Quality orthopantomograph without any pathology or developmental defect detected. OPGs were taken from the subjects who were Malay, Chinese, Indian and other race group, dentulous and edentulous, adults, patients aged between 18 -60 years old.

## Exclusion criteria

OPGs with any pathology or developmental defect detected which were taken from the patients who were aged below than 18 and more than 60 years old.

OPGs Data has been quantitatively collected from Planmeca Promax 3D (SN: TPX355234) and the Planmeca Romexis 2.1.1.R version of digital x-ray viewing software from 1<sup>st</sup> April 2009 until 31<sup>st</sup> May 2012. Then, it was classified into the types of tooth impaction in relation to age and gender. The radiographs were examined to determine the number and type of impacted teeth (both normal and supernumerary) and their location (mandible or maxilla). A tooth was defined as impacted when it was obstructed on its path of eruption by an adjacent tooth, bone, or soft tissue. Data collected were subsequently analyzed using SPSS software version 20.0. The tests used for the evaluation and analyses of the results were the X<sup>2</sup> and the binomial distribution tests. Results underwent statistical analysis at a confidence interval of 95%.

## Results

A total of 2722 OPG were taken from 1<sup>st</sup> April 2009 until 31<sup>st</sup> May 2012, but only 1248 OPG that fulfill the inclusion criteria. Distribution OPG according to gender is shown in Table 1.

Gender	OPG (%)
Male	557 (45%)
Female	691 (55%)
Total	1248

**Table 1.** Distribution OPG according to gender.

The OPGs were categorized into age group and race as shown in Table 2 and 3.

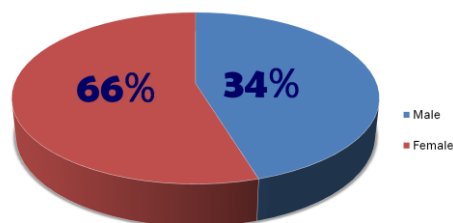
Age group	OPG (%)
18 – 24	388 (31 %)
25 – 34	270 (22%)
35 – 44	136 (10%)
45 - 54	244 (10%)
55 – 60	210 (20%)
Total	1248

**Table 2.** Distribution OPG according to age group.

Race	OPG (%)
Malay	1140 (91%)
Chinese	65 (5%)
Indian	20 (2 %)
Other	23 (2%)
Total	1248

**Table 3.** Distribution OPG according to race.

The total number of OPG with impacted tooth was 528. The total number of impacted tooth and distribution among patients, based on sex, are described in Figure 1. Total OPG with impacted tooth in male was 178 and 350 in female (Table 4). There was a statistically-significant difference between the two sexes ( $P = 0.000$ ,  $X^2 = 44.634$ ).

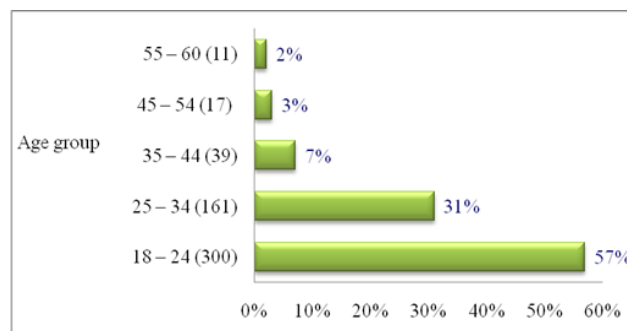


**Figure 1.** Tooth impaction according to gender.

Gender	OPG (%)
Male	178 (34%)
Female	350 (66%)
Total	528

**Table 4.** Tooth impaction according to gender.

In this study, minimum and maximum age of the subjects were 18 years old and 60 years old respectively. Age group of the subjects with impacted tooth was presented in Figure 2. There was a statistically-significant difference between the age group ( $P = 0.000$ ,  $X^2 = 513.7$ ). The age range of patient between 18 to 24 years of age had the highest prevalence on tooth impaction (57%) followed by 25 to 34 years old (31%), 35 to 44 years old (7%), 45 to 55 years old (3%) and 55-60 years old (2%).



**Figure 2.** Tooth impaction according to age group.

From the 528 OPGs, 1147 total impacted teeth were identified. Most commonly impacted was third molar with 1086 (94.7%) followed by canine with 28 (2.4%), supernumerary: 15 (1.3%), second premolar: 9 (0.8%), first premolar: 5 (0.4%), second molar: 2 (0.2%) and central incisor with 2 (0.2%). third molar, canine, supernumerary and second premolar were statistically significant difference with p value less than 0.005 (Table 5).

Type of tooth	Frequency	Percentage (%)	P value
Third molar	1086	94.7	0.000
Canine	28	2.4	0.000
Supernumerary	15	1.3	0.003
Second premolar	9	0.8	0.003
First premolar	5	0.4	0.065
Second molar	2	0.2	0.097
Central incisor	2	0.2	0.324
First molar	0	0.0	. <sup>a</sup>
Lateral incisor	0	0.0	. <sup>a</sup>
Total	1147	100	

**Table 5.** Distribution of impacted teeth according to the type.

The number of OPG with impacted tooth in the mandible was reported to be higher than those in the maxilla ( $P < 0.001$ ). The third molars and canines showed the greatest frequency of impaction in the maxilla, whereas in the mandible, the reported order was third molars, supernumeraries, second premolars, canines, first premolars and second molars (Table 6).

Jaw/ Tooth	Maxilla	Mandible
Central Incisor	2	0
Lateral Incisor	0	0
Canine	21	7
First Premolar	0	5
Second Premolar	1	8
First Molar	0	0
Second Molar	0	2
Third Molar	301	785
Supernumerary	5	10
Total/ Jaw	330 (29%)	817 (71%)
<b>Grand Total</b>	<b>1147</b>	

**Table 6.** Distribution of impacted tooth according to location.

## Discussion

Regarding sex-related impaction, a statistically-significant difference was found ( $P = 0.000$ ,  $X^2 = 44.634$ ). It comes in agreement with Ali Murat Aktan 2010 in Turkey.<sup>13</sup> Ioannis in Greek population and Ali H. Hassanin Saudi population 2010 did not find any difference in the frequency of impaction in different gender.<sup>14</sup> The higher frequency reported in females was explained as a consequence of the difference between the growth of males and females. Females usually stop growing when the third molars just begin to erupt, whereas in males, the growth of the jaws continues during the time of eruption of the third molars, creating more space for third molar eruption.<sup>15</sup>

Of paramount importance was the fact that the majority of patients (57%) with one or more impacted teeth were from 18 to 24 years of age. There was a statistically-significant difference between the age group ( $P = 0.000$ ,  $X^2 = 513.7$ ). The phenomenon of impaction is steadily reduced as age increases, and after the age of 54 years, remains constant (2%). Ioannis in 2010 revealed a similar tendency of the phenomenon of impaction where impaction was common in young age up to 30 years old and decreasing cases as age increases.<sup>16</sup> This also similar to the results of study done by Ali Murat 2011 in Turkish population who stated that the age range of the patients was 15–80 years and

mean value was 29.73 years, with those between 15 and 29 years of age having the highest prevalence of tooth impaction, which was statistically significant ( $P < 0.05$ ).<sup>17</sup>

In the present study, race was recorded in demographic finding which include Malay, Chinese, Indian and other race group. But it was not included in prevalence finding because the total patients attended polyclinic according to race did not reflect to actual total of that race. The total of patient bias to Malay population with 93% (491), meanwhile Chinese only 3% (18), Indian 2% (10) and another race group 2% (9).

This current study showed that the most commonly impacted teeth was mandibular third molar and followed by maxillary third molar, maxillary canine, supernumerary tooth and mandibular second premolar. This come in agreement with the previous studies who found that the incidence of mandibular third molar impaction was the highest followed by maxillary third molar, maxillary canine and mandibular premolar.<sup>5,14</sup> In addition, FCS Chu et al and Ioannis 2013 also showed that there was predilection on impacted lower third molar in Hong Kong population and Greek population. 330 of the 1147 impacted teeth were localized at the maxilla (29%), and 817 in the mandible (71%). This was a statistically-significant difference concerning the number of impacted teeth per maxilla or mandible ( $P < 0.001$ ).<sup>18</sup> It is worth mentioning the fact the Ioannis and Kamberos in 2015 provided a similar statistical relationship between the mandible and the maxilla.<sup>19</sup> However, research groups, such as Boboc and Dibbets and Haug 2015 have indicated a higher impaction rate in the maxilla.<sup>20</sup>

## Conclusions

Overall, in the present study, impacted tooth were relatively high among the patients who indicated to take OPGs at Polyclinic Kuliyyah of Dentistry, IIUM Kuantan Campus. The major outcome of this study has to do with the frequency of impaction per tooth type where lower third molars revealed the highest frequency of impaction followed by upper third molar, upper canine, supernumerary tooth, lower second premolar, lower canine, lower first premolar and upper central incisor. The number of the impacted teeth of the mandible was remarkably larger than that of the maxilla. The prevalence of

impacted tooth is highest in young adult patients ranged from 18 to 24 years old with 57 % impacted teeth and the least is tooth impacted found is within age group ranged from 55 to 60 years old with 2% of impacted teeth. The number of impacted teeth was higher among the female population the compared to male.

Impaction is a frequently encountered clinical problem for both dentists and oral surgeons. They should know the signs and symptoms of this condition intimately and familiarize themselves with some of the interceptive treatments. Only with a thorough evaluation will the incidence of iatrogenic damage of adjacent structures can be reduced and valid support in planning suitable treatment be provided. Therefore, there is a clear need for data from longitudinal observational studies of population-based samples, so that information on the natural history of impacted teeth, especially third molars, in adults can be brought into the ongoing debate on their prophylactic removal. Besides, the clinical intraoral examination is needed for confirmation of the location and condition of impacted tooth should be implied for future study. In addition, if possible dental history of common sign and symptom, removal of previous impacted and its complications tooth should also be noted for each patient involved in this study.

### Declaration of Interest

The authors report no conflict of interest.

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