

# Effect of Impacted Third Molars on the Overjet of Central Incisor Teeth

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## ABSTRACT

**Background:** Overjet considered one of the most important parameters to evaluate the status of occlusion, therefore any disturbances in overjet will affect the occlusion improperly and causing malocclusion. The early detection and diagnosis of overjet discrepancies help in the early treatment of malocclusion. So many studies were achieved to observe the effect of different factors on overjet extent.

**Aim:** To observe whether the presence of impacted third molars affects the overjet extent.

**Materials and methods:** The study was done on (200) patients with impacted third molars, aged between 18–25 years, for both genders who referred to the radiology department in some dental centres in Baghdad for taking orthopantomograms (OPGs) to evaluate the status of impacted third molars from June 2017 to November 2018. The measurements of overjet were done by a graduated metal ruler on each patient with impacted third molars and the metal ruler is covered by a disposable dental sleeve after each measurement. Overjet estimated from the labial surface of the more lingual positioned mandibular incisor and the incisal edge of the more labial positioned maxillary incisor. A normal overjet range considered in the study was measured between 2-4 mm.

**Results:** The study showed that there were only (20) cases of patients with partially impacted third molars had increased overjet and only (5) cases of patients with fully impacted third molars had found with an increased overjet. The statistical analysis showed that there was no significant relationship between the presence of impacted third molars and overjet extent ( $p < 0.05$ ). The results also showed that there was no any significance between males and females regarding the effect of impacted third molars on the overjet distance.

**Conclusion:** The study concluded that there was no relationship between the presence of impacted third molars and overjet extent.

**Key words:** Third molar, Impacted third molar, Molar, Overjet, Central incisor, Teeth

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## INTRODUCTION

Overjet was defined as the anterior-posterior space measured through the incisal edge of the most protruded maxillary central incisors to the labial surface of opposing mandibular central incisors. An overjet larger than (3 mm) was decided to be increased [1].

The status of the maxillary and mandibular incisors in harmony to each other and to their related bones is an important characteristic in the analysis of the case, stabilization prognosis of treatment, coordination and, regularity of the facial profile [2,3].

Overjet considered one of the measurable factors used to evaluate the sagittal correlation of the upper and lower dentition. The variation of overjet extent could be skeletal, dental, or incorporation of both. In addition to the facial profile, overjet in adolescents is a significant parameter

where the peak of development and determination of surgical or orthodontic treatment is critical. In general, if the overjet is more than 10 mm, surgery is the most suitable decision [4].

## The proportion of impacted third molars

Tooth impaction is an abnormal condition in which a tooth cannot or will not emerge into its natural functioning status [5]. The dental impactions are mostly asymptomatic and usually have no clear unusual appearance excluding maxillary incisors [6]. About 25% to 50% of the people are vulnerable to impacted teeth [7,8]. In this way, any tooth in the jaws may be vulnerable to impaction. It was reported that the most commonly dental impactions in jaws are third molars and canines, followed by upper premolars, second lower premolars or upper incisors respectively [9,10]. It was reported that the impacted maxillary impactions found to be about 0.92%-4.3% [7,8]. Some authors stated that if the impacted teeth repositioned into the proper alignment, this will produce a complete

anterior dentition with a proper alignment of gingival margins and a good smile [11]

On the other side, the predominance of third molar impaction found to be ranged from 16.7%- 68.6% [12-19] and it considered the most common impacted teeth that can be found in jaws [20]. The only possible interpretation for high incidence rate might be due to the incomplete expansion of the retromolar space [21-23]. Others stated that the third molar impaction in Europe is up to 73% of young adults. (24) In general, third molars found to be emerged in about [17-21] years-old [25,26]. In addition, the emergence period of third molars have been found to differ with ancestries [25-27]. For instance, in Europeans and Nigerians, mandibular third molars may emerge up to 26 years of age and up to 14 years old respectively [27,28].

Many studies observed the incidence of impacted third molars in males and females and they found no gender predilection in the impaction of third molars [12,13,15,17]. But other studies found a females predilection of third molar impaction rather than males [19,27,29,30]. The rate of emergence of mandibular third molars in male is about 3-6 months prior to females [31].

The eruption time and the different positions of third molars following eruption are not only associated with ancestries but also may be due to with dietary components intake, the force on using the muscular system and hereditary effect [32].

**Material and Methods**

**Study design**

The study was done on (200) patients (106 males and 94 females) with impacted third molars, aged between 18–25 years. in regardless of gender, who referred to the radiology department in some dental centres in Baghdad for taking orthopantomograms (OPGs) for detecting or evaluating the presence and position of impacted third molars from June 2017 to November 2018.

All patients have been informed for the purpose of the study and all data and information will be used for research purposes and they were agreed to conduct the study.

The radiographical examinations showed that 160 patients have bilateral maxillary and mandibular partially impacted third molars and forty patients have bilateral maxillary and mandibular fully impacted third molars.

The impacted third molars included in this study were distributed according to the classification of Pell et al. [33]. According to their positions in the bone; whether not impacted, partially impacted and fully impacted in the bone (the non-impacted third molars not included in this study) and Winter’s classification [34] according to their angulation in the bone; whether the impactions were a vertical, horizontal, mesioangular, distoangular and others) Figures 1 and 2.

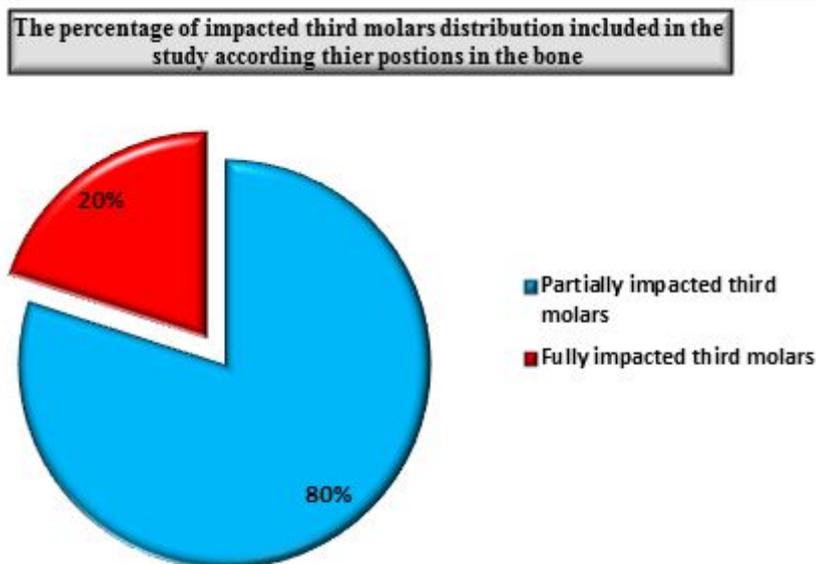


Figure 1: A pie chart shows the distribution of maxillary and mandibular third molars position in the study according to Pell & Gregory classification.

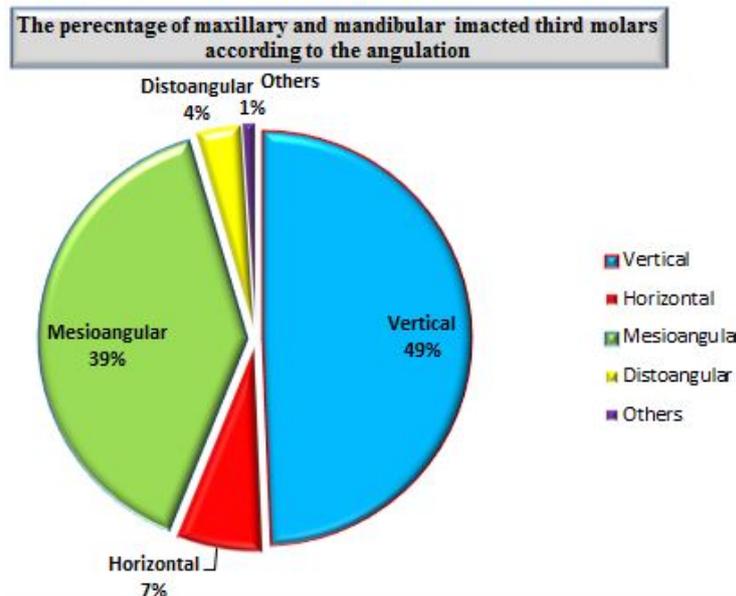


Figure 2: A pie chart shows the distribution of maxillary and mandibular third molars angulation in the study according to Winter's classification.

**Inclusion criteria**

The following conditions were included in the study

- Patients with bilateral maxillary and mandibular partially and fully impacted third molars.
- Patient with normal occlusion.
- Patient with good oral hygiene.

**Exclusion criteria**

The following conditions were excluded from the study

- Patient without third molar impactions or with normally erupted third molars.
- Extensive pathology in the jaws and dentition which may affect the occlusion.
- Patients with fractured anterior teeth or class IV restorative filling.
- Posterior or anterior missing teeth.
- Patient with moderate to severe mobility of teeth.
- Any craniofacial anomaly.
- Patients with orthodontic treatment or dental appliance.
- Patients with malocclusion or crowding.
- Patients with dental attrition.
- Patients with presence of parafunctional habits.

**Measurement of overjet**

The measurements of overjet were done by a graduated metal ruler on each patient with impacted third molars. The metal ruler was covered by a disposable dental sleeve after each measurement. Overjet is estimated as the extent between the upper and lower incisors at the point of utmost severity. It is estimated from the labial

surface of the more lingual positioned mandibular incisor and the incisal edge of the more labial positioned maxillary incisor. A normal overjet range considered in the study was measured between 2-4 mm [35].

**Statistical analyses**

Data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, version 19). The relations between the groups were analyzed using the Pearson Chi-square test. The level of significance was 0.05 and p-value considered significant if it is <0.05.

**Results**

The study showed that among two hundred patients, there were only twenty cases of patients with partially impacted third molars had increased overjet and only five cases of patients with fully impacted third molars had found with an increased overjet.

The relationship between the presence of impacted third molars and overjet extent was tested by using Pearson's chi-squared test and the p-value was accepted as significant if it is <0.05. The statistical analysis showed that there was no significant relationship between the presence of impacted third molars and overjet extent.

The results also showed that there was no any significance between males and females regarding the effect of impacted third molars on the overjet distance. The chi-square statistic is (0) and the p-value is (1). This result is not significant at p<0.05 Table 1.

**Table 1: Distribution of patients samples with impacted third molars position and overjet status.**

Patients samples	Increased overjet	Normal overjet	Total
Patients with partially impacted third molars	20 [11 males 9 females]	140 [73 males 67 females]	160
Patients with completely impacted third molars	5 [3 males 2 females]	35 [19 males 16 females]	40
Totals	25	175	200

The chi-square statistic=0 and the p-value is 1. This result is not significant at  $p < 0.05$ .

### Discussion

Overjet measurements are very important because of its value in analysis and treatment plan in case of overjet discrepancies where orthodontic or surgery is necessary.

Harrison et al. stated that it is particularly important to obtain an accurate measurement of overjet to detect the malocclusion [36].

So, many studies discussed the importance of overjet parameter in the development of malocclusion while some studies have been observed different factors which have a major or minor effect on the overjet; Kaisa et al. used the overjet parameter to find whether there is a relationship between the changes in the overjet and arch width between the ages (7-32) years [37].

Ingrid et al. observed the association between the overjet and overbite linear measurements and the inter-incisal space restricted by the upper and lower incisors morphology [38].

Terie et al. studied the effect of sever malocclusions (as in sever overjet) on the alveolar bone height [39].

Livia et al. found that the increased exposure to the risk of dental trauma was associated to increased overjet [40].

This study is unique because it is observed whether the presence of impacted third molars may be affected the overjet extent and it found there was no significant relationship between the presence of impacted third molars and overjet extent.

This conclusion is consistent with the explanation stated that the increase in overjet was due to defect in the growth of jaw rather than it was caused by the malposition of the teeth, but till now, no significant data has been published [41].

But on the other hand, and in regard to the increase in overjet in some patients with partially impacted third molars, it has been observed that the most cases associated with this increase in overjet were mesio-angulated maxillary third molars rather than other cases, so this type of impaction may cause impact on the adjacent teeth in causing an increase in the mesial shifting, in turn to the maxillary anterior teeth causing some discrepancy and an increase in overjet. So this explanation may lead to the assumption that if we increase the sample size of maxillary mesio-angulated impacted third molars, we may get a significant effect regarding the overjet extent.

### Conclusion

The study concluded that there was no relationship between the presence of impacted third molars and overjet extent.

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