



## Prevalence of lower Third Molar Angulations in Duhok Province of Kurdistan Region- Iraq

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### Abstract

**Aims:** The current retrospective radio-graphical study aimed to find the prevalence of lower third molar impactions and angulations in a sample population of Duhok Province -Kurdistan region, Iraq. **Materials and Methods:** The study included randomly chosen Orthopantomograms (OPGs) of 1316 adults; "682 males and 634 females" with ages ranging between (21 – 50 years) old who were referred to the College of Dentistry / Oral and Maxillofacial Surgery Department / University of Duhok between the years (2020 and 2023). A total of 502 OPGs were included in the study with impacted lower wisdom teeth (344 bi-lateral impactions, 158 uni-lateral impactions), Analysis was made according to the classifications of Pell and Gregory and Winter's categories of radiographic images (OPGs) to determine the prevalence and angulations of impacted lower wisdom teeth. **Results:** The data was collected from 502 patients "183 males and 319 females" OPGs, with a total of (846) impacted lower wisdom teeth (344 bi-lateral impactions, 158 uni-lateral impactions). The prevalence of mesioangular impactions was 28.2% being the most common. Vertical angulations were significantly lower than other impactions 3.7%. There was a significant difference between female and male-impacted third molars "18.8% in females and 10.4% in males" (577 teeth in females and 269 teeth in males). **Conclusion:** Mesioangular lower wisdom teeth impactions were recorded to be the most common type found with females being more than in males.

مدى انتشار انحشار الرحى الثالثة السفلية وميلانها بين السكان الذين يعيشون في إقليم كردستان , مدينة دهوك  
الملخص

**الأهداف:** كان الهدف من الدراسة الشعاعية الحالية بأثر رجعي هو العثور على مدى انتشار انحشار الرحى الثالثة السفلية وميلانها لدى السكان الذين يعيشون في إقليم كردستان – مدينة دهوك. **المواد وطرائق العمل:** شملت هذه الدراسة صور العظام (OPGs) التي تم اختيارها عشوائياً لـ 1316 بالغاً "682 ذكراً و 634 أنثى" محصورة في عمر المرضى الذين تتراوح أعمارهم بين (21 50) والذين كانوا يزورون أو يرسلون إلى كلية طب الأسنان - قسم جراحة الفم والوجه والفكين في جامعة دهوك بين الأعوام (2020 و 2023). قمنا بتضمين 502 OPGs في الدراسة مع ضروس العقل السفلية المنظرة (344 انحشاراً ثنائي الجانب، 158 انحشاراً أحادي الجانب)، وتم التحليل وفقاً لتصنيفات فئات بيل وجريجوري ووينتر للصور الشعاعية (OPGs) لتحديد مدى انتشار أسنان العقل المتأثرة السفلية. **النتائج:** تم جمع البيانات من 502 مريض "183 ذكر و 319 أنثى" OPGs، مع إجمالي (846) ضروس عقل سفلية مدفونة (344 انحشار ثنائي الجانب، 158 انحشار أحادي الجانب). كان معدل انتشار الانحشار الزاوي المتوسطي 28.2% الأكثر شيوعاً ( $P < 0.05$ ). لكن النزوي العمودي كان أقل بكثير من الاصطدامات الأخرى (3.7%). كان هناك فرق كبير بين الأنثى والذكر في تأثير الأضراس الثالثة 18.8% في الإناث و 10.4% في الذكور" (577 سنناً في الإناث و 269 سنناً في الذكور،  $P < 0.05$ ). **الاستنتاجات:** إن انحشار ضروس العقل السفلية المتوسطة الميلان هي أكثر الأسنان انحشاراً في إقليم كردستان- مدينة دهوك من حيث عدد السكان والإناث أكثر من الذكور.

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## INTRODUCTION

An impacted tooth is a tooth that does not reach its normal jaw position after passing its time for normal eruption. Impacted lower third molars are widespread in ordinary dental practice. The impacted lower third molars rate is greater than other teeth <sup>(1)</sup>. An impacted tooth is outside of the physiological eruption stage and has a fully developed root that is partly or entirely covered by hard or soft tissues <sup>(2)</sup>.

The lower wisdom teeth are the most frequently impacted teeth overall, with the mandibular second premolar and maxillary canine coming in second place <sup>(3)</sup>. This is especially true of teeth located in the jaw. Numerous systemic and local causes, including cleidocranial dysplasia, down syndrome, and arch-length inadequacy, could be the cause of this eruption's failure <sup>(4)</sup>. There is a connection between the emergence of caries, cystic lesions, and pericoronitis in teeth that are impacted by Al-Anqudi <sup>(3)</sup>.

The etiology of impaction is unclear, but some theories imply that systemic and local genetic variables may be involved <sup>(5)</sup>. Third molar impaction can be caused locally by crowding, by having too many teeth, or by lesions related to different pathologies like odontomas, and ameloblastic fibro-odontogenic tumors **(6)**. Consequently, the extraction of lower

wisdom teeth is the most frequent surgical operation performed by dentists <sup>(7)</sup>.

Impacted teeth classifications allow for the definition of kind and degree of impactions, in addition to the assessment of the procedure's complexity <sup>(8)</sup>. Impacted molars can be analyzed by using the Pell and Gregory classification which is based on the depth level of the impacted tooth and its connection to the occlusal surface of the neighboring second molar <sup>(9)</sup>. Radiological evaluations are thought to be crucial in determining problems during and after surgery <sup>(6)</sup>.

## MATERIALS AND METHODS

The study was approved at the Oral and Maxillofacial Surgery Department -College of Dentistry / University of Duhok by the Commission of Ethics and Research. The study included males and females born in the city of Duhok / Duhok province / Kurdistan region. The retrospective data was reviewed using orthopantomogram (OPG) radiographs of **1316** OPGs “males **682** and females **634** OPGs” ages between (21–50) years old who were referred to the Oral and Maxillofacial Surgery department / College of Dentistry / University of Duhok between the years (2020 and 2023). Out of **1316** OPGs, **814** OPGs were excluded for the following reasons;

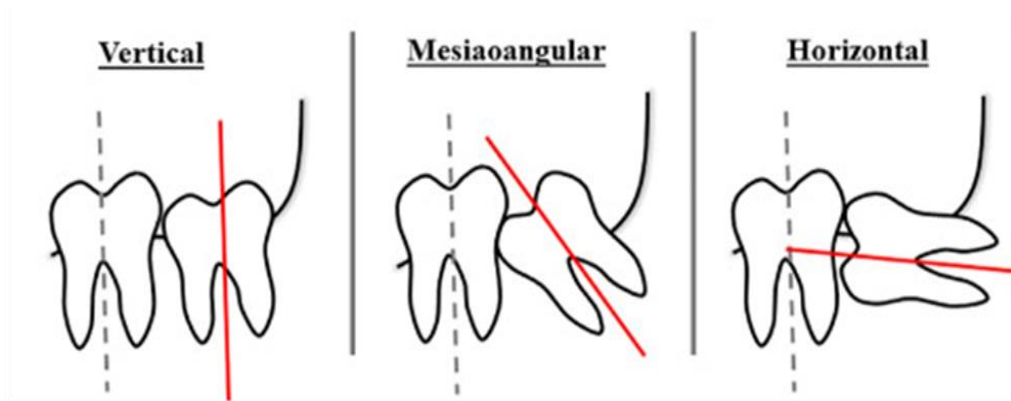
- 1- Showing fully erupted lower third molars.
- 2- Poor quality images.

The remaining radiographs (502 OPGs) were included in the study belonging to genders of “183 males and 319 females”. These (OPGs) were taken and analyzed using a portable Carestream CS 8100 OPG Machine (manufactured in India).

1. Analysis of impactions was done using Winter's Classification and Pell and Gregory's classification as follows:

2. Winter's Classifications

This classification is based on the relationship of the long axis of the impacted lower wisdom tooth to the long axis of the second lower molar tooth to determine the type of angulation (Figure 1)



**Figure 1:** Winter's classification <sup>(11)</sup>.

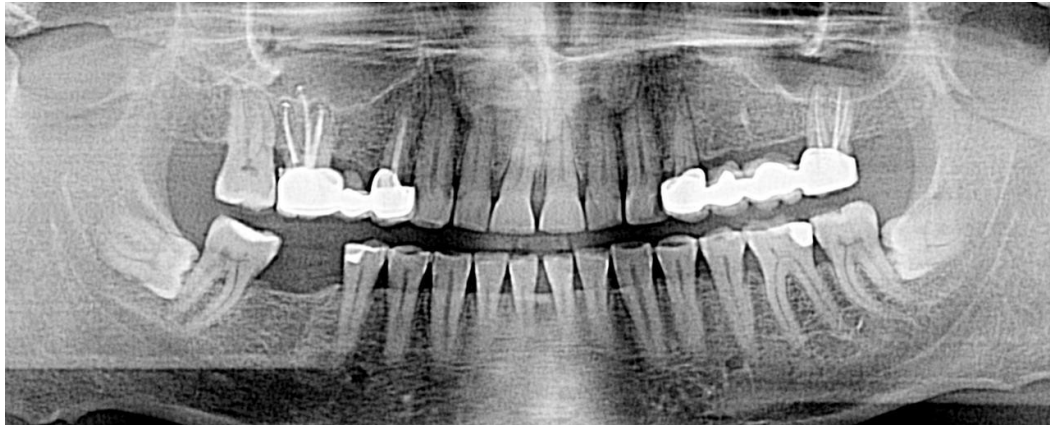
➤ Mesioangular impaction: The long axis of the impacted lower wisdom tooth is tilted toward the long axis of the second molar in a mesial direction (Figure 2)

➤ Horizontal impaction: The long axis of the lower wisdom is horizontal (Figure 3)

➤ Vertical impaction: The long axis of the wisdom is parallel to the long axis of the second molar (Figure 4)



**Figure 2:** Mesioangular impaction



**Figure 3:** Horizontal impaction



**Figure 4:** Vertical impaction

3. **Pell and Gregory classifications**

(Figure 5)

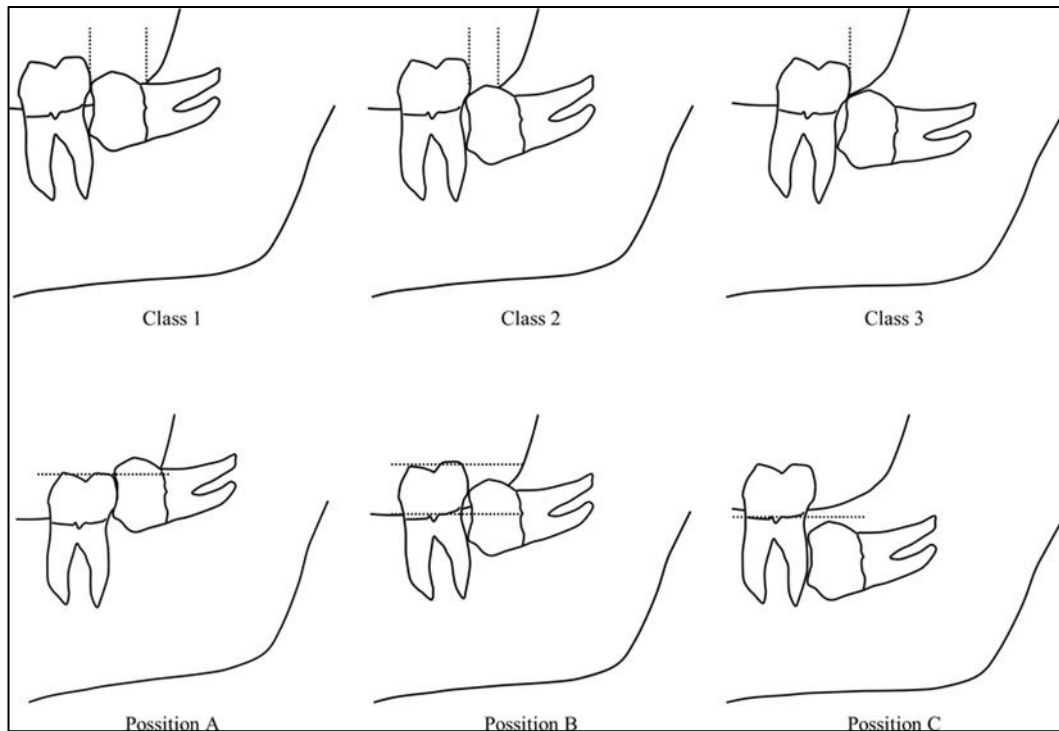
This classification specifies the level and type of impaction lower third molar in the horizontal and vertical dimensions.

**i. According to the occlusal plane: (vertical dimension)**

- A: Occlusal surface of lower third molars is either higher or at the level of the occlusal plane.
- B: Occlusal surface of the lower third molar is located between the occlusal plane and the second molar's neck.
- C: Occlusal surface of lower third molar lies below the second molar's neck.

**ii. According to mandibular ramus: (horizontal dimension)**

- Class 1: The anteroposterior dimension of the crown of the third lower molar is bigger than the distance between the distal surface of the second molar and the anterior edge of the mandibular ramus.
- Class 2: The anteroposterior dimension of the crown of the third lower molar is shorter than the distance between the distal surface of the second molar and the anterior edge of the mandibular ramus.
- Class 3: The lack of space between the distal surface of the second molar and the anterior border of the mandibular ramus <sup>(12)</sup>.



**Figure 5:** Pell and Gregory Classification

## RESULTS

**SPSS for Windows release 16.0 (10)** was used for statistical analysis. Descriptive statistics were obtained. To assess differences and correlations between groups, the student's t-test and Pearson's Correlations test ( $r$ ) were utilized. Significance was set at  $P \leq 0.05$ . The total number of Duhok city population according to the last statistic from the Duhok health directorate was 1.772.367 individuals.

The data was collected from **502** patients' OPGs; the numbers of impacted lower third molars were **846** teeth {**577** female and **269** males} with "**158** unilateral and **344** bilateral" impactions. The ages of patients ranged between "21 and 50 years". The prevalence of impacted lower wisdom teeth was **38.14%**. According to population, mesioangular impactions recorded the majority (**28.2%**) of cases followed by horizontal impactions (**6.2%**) with vertical impactions being the least (**3.7%**) as in (Table 1)

**Table (1):** Prevalence of impacted lower wisdom teeth distribution of Angulation.

<b>Lower third molar impaction</b>	<b>Mesioangular</b>	<b>Horizontal</b>	<b>Vertical</b>	<b>Total</b>
Male and female	629	135	82	846
Prevalence in the study	74.1%	16.1%	9.8%	100%
*Prevalence in Duhok population	28.2%	6.2%	3.7%	38.14%

\* Prevalence means the ratio of this study to the total number of patients included in the current study (1316).

According to the sample study, the prevalence of mesioangular impactions (**74.1%**) was significantly higher than all other angulations as revealed by the t-test (Table 1,  $P \leq 0.05$ ). Lower wisdom teeth impactions more likely occurred at the mesioangular position. This was followed by horizontal impactions (**16.1%**) with

vertical impactions being the least common (**9.8%**), (Table 1). In the current study, the angulations and the number of impacted lower third molars according to gender showed significant differences with “**577** in females (**65.5%**) and **269** in males (**35.5%**)” as in (Table 2)

**Table (2):** Angulation and gender distribution of lower third molars impactions

<b>Gender</b>	<b>Mesioangular</b>	<b>Horizontal</b>	<b>Vertical</b>	<b>Total</b>
Male	201	42	26	269
Female	428	93	56	577
Total	629	135	82	846

According to the Duhok population, the prevalence of impacted lower wisdom teeth

and angulations showed significant differences in gender with “female **24.6%** and male **13.5%** as in (Table 3)

**Table (3):** Angulation and gender distribution of lower third molars impactions in (Duhok population)

<b>Gender</b>	<b>Mesioangular</b>	<b>Horizontal</b>	<b>Vertical</b>	<b>Total</b>
Male	10.4 %	2.4 %	1.7 %	13.5%
Female	18.8 %	3.8 %	2 %	24.6%
Total	28.2 %	6.2 %	3.7 %	38.1%

## **DISCUSSION**

Based on the population sample and to the best of our knowledge, it is the first study conducted to evaluate the prevalence of impacted lower wisdom teeth in the Duhok City population /

Kurdistan Region. The evaluation of impacted lower third molars should be investigated radiographically together for accuracy. Radiographic evaluation should include determining the angulation of impacted wisdom teeth by winter’s classification<sup>(13)</sup> and

the tooth's spatial connection to the mandibular ramus and the second molar, as well as the third molar's relative depth in the bone according to the Pell and Gregory classification <sup>(12)</sup>. Clinically, evaluation of any pain, infection, edema, and the presence of soft tissue overlaying the impacted teeth should be investigated <sup>(1)</sup>. The current study investigated the prevalence of impacted lower wisdom teeth in a sample population and the results assume that several etiological reasons for this disease are hypothesized. This investigation should assist in evaluating whether tooth impaction is merely a result of the population's ethnic heritage, or if it is a new concern. In the current study, the prevalence of impacted lower wisdom teeth was **38.14%**. In a regional study conducted in **the** Saudi Arabia – Asir region, a high prevalence was also recorded at **18.76%**, <sup>(14)</sup>. According to gender, the current study disclosed significant differences between females **18.8%** and males **10.4%**. The higher prevalence of impactions in females might be caused by the small jaw size in females compared to the larger male jaw size <sup>(15,16)</sup>. According to angulation, mesioangulation of lower wisdom teeth was predominant, and similar studies from the United States of America, Europe, Singapore, China, and Turkey showed the same findings <sup>(17,18)</sup>. Vertical impactions in the current study were found to be significantly less common at **3.7%**. In a sample Swedish population, for example, vertical impactions were found to be most common indicating varying regional and ethnic backgrounds <sup>(19)</sup>. In addition, other studies in Turkey and India showed that vertical

impactions were the most common and this disagreed with the current study <sup>(16,20-22)</sup>.

## CONCLUSION

The patterns of impactions in the current study on a sample population of Duhok City / Kurdistan region revealed that mesioangular impaction was found to be the most common at **28.8%**, horizontal impactions at **6.2%** with vertical impaction being the least (**3.7%**) with a higher percentage of recorded impactions in females compared to males.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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