

Prevalence and Angulation of Mandibular Third Molar Impaction in Zliten, Libya: A Retrospective Radiographic Study

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ABSTRACT

Objectives: This retrospective study investigates the prevalence and angulation of impacted mandibular third molars and the most affected sex in a sample of Libyan patients between the ages of (19 and 84) who live in Zliten, Libya.

Study Design: Sixty-nine patients between the ages of (19 and 84) referred to the Assalam Dental Centre were included in this retrospective study. Of the 69 patients, 30 females and 39 males were assessed for the prevalence and position of an impacted mandibular third molar on panoramic radiographs.

Results: Out of 124 mandibular third molars, seventy-six were found to be impacted on both right and left sides, from which mesioangular impaction was the most common angulation in females. In contrast, vertical impaction was the most common in males. In addition, the prevalence of impacted mandibular third molars were more in females.

Conclusion: The prevalence of impacted mandibular third molars is higher in females than males, and mesioangular impaction is the most common in females, while vertical angulation is frequently common in males.

KEYWORDS: Impacted third molar, angulation, Panoramic Radiographs, Libyan populations, Winter's classification.

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1. INTRODUCTION

If a tooth fails to erupt into its normal functional position, it is called an impacted tooth [1]. Third molars are considered the most impacted teeth compared with the rest of the teeth [2]. The occurrence of an impacted third molar was reported to be from 18 to 32% [3]. The mesioangular is the most common type of angulation in impacted teeth, and it is mostly found in males [4]. Studies reported many causes for third molar impaction, such as macrodontia, late maturation of the third molars, insufficient skeletal growth, and systemic and local factors, such as cleidocranial dysplasia and Down's syndrome [5, 6]. The consequences of the mandibular impacted third molars include pericoronitis, dental caries, and the development of cystic lesions [7, 8]. Therefore, mandibular third molar

extraction is considered the most common prophylactic treatment option to avoid further complications [9]. Although guidelines on managing third molars were issued by the National Institute for Health and Clinical Excellence (NICE) in 2000. These guidelines commended that specific clinical indications be obtained for the surgical removal of impacted third molars, furthermore stating that the routine removal of asymptomatic impacted third molars is discontinued [10]. Also, the NICE guidance reports the complications that may result from the surgical removal of the mandibular third molar, such as the risks of temporary or permanent nerve damage [11]. Impacted third molars can be classified using different classifications. For example, Winter's classification system measures the angle formed between the intersected longitudinal

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axes of the second and third molars, which can be mesioangular (Ma), distoangular (Da), vertical (V), horizontal (H), buccoangular (Ba), linguoangular (La), or invertedly (I) angulated [8, 12] and the Pell & Gregory classification system to deduce whether they are embedded or not [6]. The prevalence of impacted mandibular third molars may vary from region to region. However, most studies reported no sex predictions in Arabs [7, 13], Blacks [14, 15], and Caucasians [16, 17]. This retrospective radiographic study investigates the prevalence and pattern of mandibular third molar impaction in the Libyan population in Zliten.

2. MATERIALS AND METHODS

The recorded information of sixty-nine adult patients (30 Females and 39 Males) between the ages of 19 and 84 years obtained from the database of Assalam Dental Center in Zliten, Libya.

The exclusion criteria used in this retrospective study were patients under 19 years of age, poor quality orthopantomograms, incomplete records, orthodontic treatment, dentoalveolar trauma, and craniofacial anomalies and syndromes, for example, Down syndrome. These patients were introduced to the dental clinic seeking dental treatment, and as a part of routine clinical examinations, patients get panoramic radiographs taken before starting treatment. Soredex

is the panoramic radiographic brand used in the clinic and stores all radiographic information in a digital database. Two examiners viewed the panoramic radiographic information for the presence of mandibular impaction, position, depth, and angle. For this retrospective study, the following terms "Impaction and angulation of impaction" were used.

Impaction:

In this study, the mandibular third molar was considered impacted if the tooth was not fully erupted to its normal functional position [1].

Angulation of impaction

The angle formed between intersected longitudinal axes of the second and third molars was used to assess the impacted third molar. The long axes are represented by an imaginary line drawn through the midpoint of the occlusal surface and bifurcation of the mandibular second and third molars [18]. In the following classification, an orthodontic protractor was used (Figure 1 & Figure 2) to measure the angulation of third molar impaction [18, 19]. The classification of impaction was adapted from Winter's classification [12].

1. Vertical impaction: 10 to -10
2. Mesioangular: 11 to 79
3. Horizontal impaction: 80 to 100
4. Distoangular impaction: -11 to -79
5. Others: 111 to -80

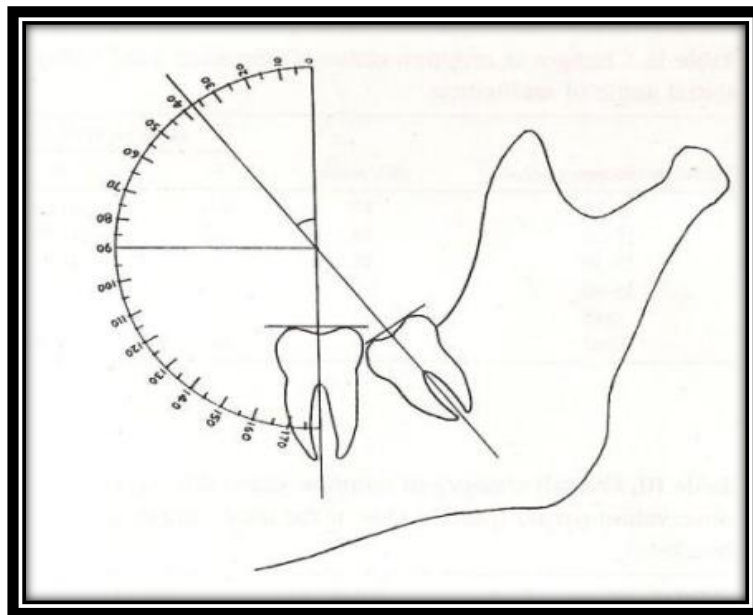


Figure 1: Classification of Angulation of Third Molar Impaction [18]

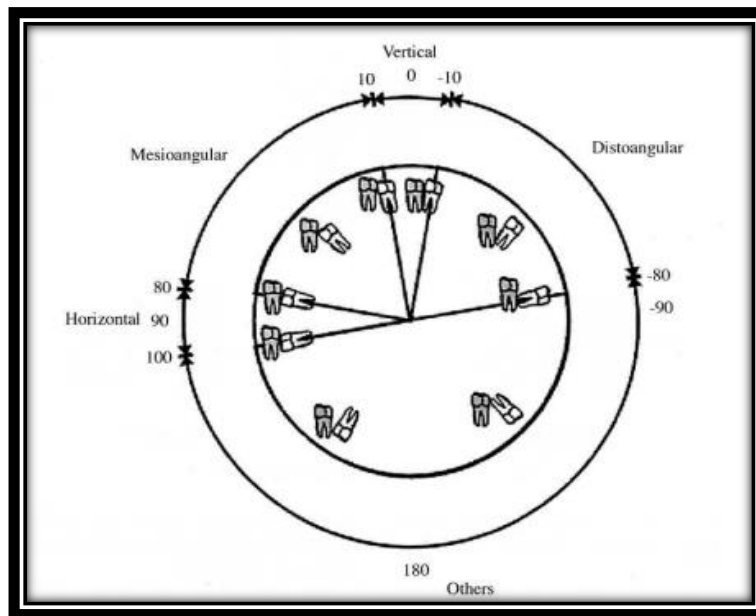


Figure 2: Classification of Angulation of Third Molar Impaction [19]

Vertical	Mesioangular	Distoangular
	Horizontal	
Buccoangular	Linguoangular	Inverted

Figure 3: Winter's Classification of Impacted Mandibular Third Molar Angulation.

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3. STATISTICAL ANALYSIS

Descriptive statistics gives mean \pm standard deviation with minimum and maximum for continuous variables and numbers with valid percentages for categorical variables. Pie and Bar charts were used to display the clinical variables and classifications. Statistical analyses were performed using IBM SPSS Statistics (Version 28; IBM Corporation 1989, 2021).

4. RESULTS

A total of sixty-nine patients (30 female and 39 male) between the ages of (19 and 84) years old who presented with impacted mandibular third molars were included in this retrospective

study. The participants in this study were referred to the clinic for routine dental treatment. The patient's classification is ASA I. Seventy-six impacted mandibular third molars out of one hundred and twenty-four third molars were found on both right and left sides. The distribution of the lower third molars in terms of sex, the total number of impactions, missing or not impacted, and the percentage is shown in (Table 1). The main age of patients is 29.5 \pm 9.92, and participants are divided into two age groups, the first group being 30 years or less and the second $>$ 30 years. The first group comprised most of the patients with impacted third molars, as listed in (Table 2)

Table 1: The Distribution of the Lower Third Molars in Terms of Sex, Total Number of Impactions, Missing or Not Impacted, and Percentage.

Impaction	Sex			
	Female		Male	
	Count	%	Count	%
No (not impacted)	19	31.7%	29	37.2%
Missing 3 rd molar	7	11.7%	7	9.0%
Yes (Impacted)	34	56.7%	42	53.8%

Table 2: The Distribution of the Angulation of Mandibular Third Molars as Per Age Groups.

Angulation	Age Group				P-Value
	30 or less		$>$ 30 years		
	Count	%	Count	%	
DA	9	18.0%	8	18.0%	0.812**
H	3	6.0%	1	3.8%	
MA	19	38.0%	9	34.6%	
V	17	34.0%	7	26.9%	
I	1	2.0%	0	0.0%	
LA	1	2.0%	1	3.8%	

** Fisher's Exact Test

Different angulations of mandibular third molar impaction (Figure 3) are listed in (Table 2) and. Mesioangular impaction was the most common angulation in females (50.0%) followed by vertical impaction (32.4%), while distoangular (11.8%), Horizontal (2.9%), linguoangular (2.9%), and inverted (0.0%)

were seen less often. In males, the vertical impaction and distoangular are the same (31.0%), followed by mesioangular impaction (26.2%), horizontal (7.1%), and both inverted and linguoangular (2.4%), as shown in (

Table 3) and (Figure 4).

Table 3: Prevalence of Various Angulations of The Impacted Lower 3rd molar Based on Different Sex.

Angulation	Sex				P-value
	Female		Male		
	Count	%	Count	%	
DA	4	11.8%	13	31.0%	0.131**
H	1	2.9%	3	7.1%	
MA	17	50.0%	11	26.2%	
V	11	32.4%	13	31.0%	
I	0	0.0%	1	2.4%	
LA	1	2.9%	1	2.4%	

** Fisher's Exact Test

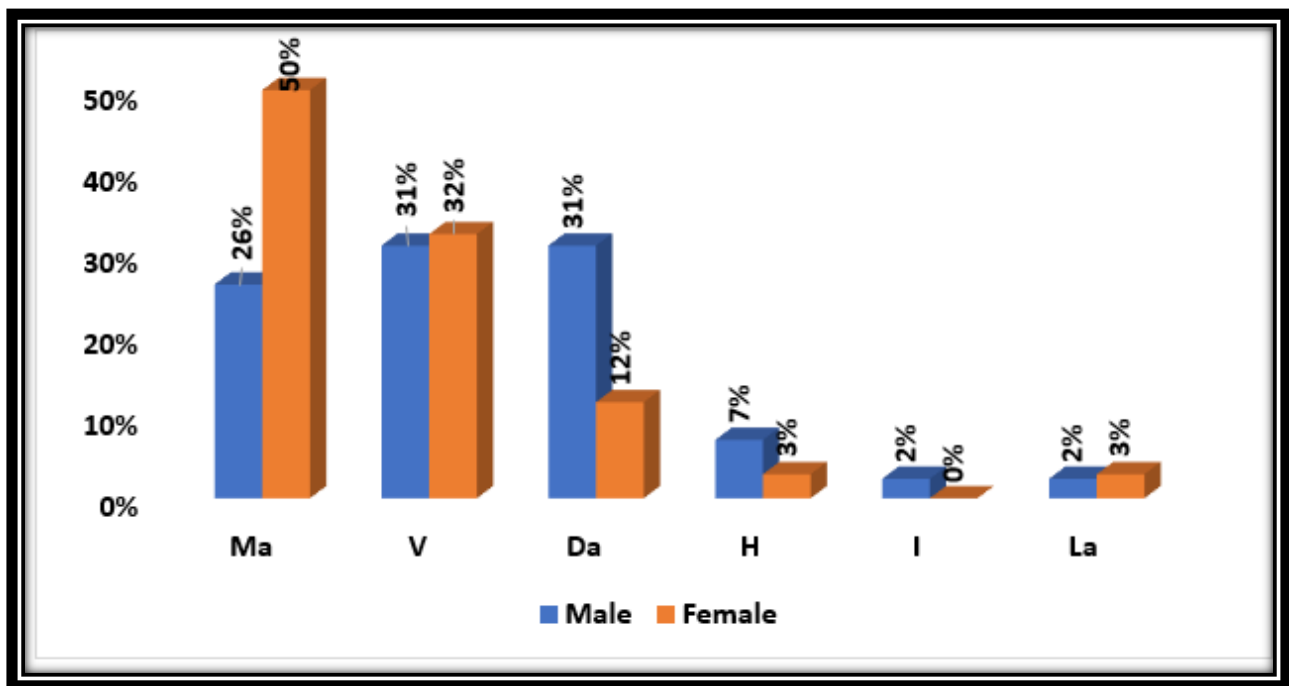


Figure 4: Prevalence of Various Angulations of Impacted Mandibular Third Molars in different sexes.

5. DISCUSSION

Studies reported that lack of space, including insufficient space in anterior-posterior dimensions, late third molar mineralization, and early physical maturity, are the aetiological causes of mandibular third molar impaction [20]. The impacted mandibular third molar should be evaluated clinically and radiographically before extraction to avoid pre- and postoperative complications such as inferior alveolar nerve injury [11]. The clinical examinations include pain, infection, swelling, and soft tissue surrounding the impacted third molars

[21]. In contrast, the radiographic evaluations include the spatial relationship of impacted third molars to the ramus of the mandible & second molars and the depth of impacted teeth in the bone following the classification of Winter and Pell & Gregory [21, 22]. The main age of patients in our retrospective study is 29.5 +/- 9.92 years (Table 4), and patients below the age of 19 were excluded because human growth continues beyond this age [23]. Schersten, et al. (1989) reported that ages between 20 to 25 years are the best age to study the mandibular third molar and its impaction [24]. The change in angulation in

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the mandibular third molar may continue up to 32 years old [25]. This situation may explain why the number of impaction cases decreased after the age of 30. As we found in our study, more impactions are seen at the age of 30 or younger, as shown in (Table 2). Patients with any medical condition that may interfere with the eruption of the lower third molar were also excluded. The angulation of the impacted mandibular third molar can be measured by an orthodontic protractor, as shown in (Figure 1 & Figure 2). In this retrospective study, the percentage of impacted mandibular third molars was higher in females than in males, but it was not statistically different. The smaller jaw size in females might be considered one of the reasons for the higher prevalence of third molar impaction in females [26]. Also, it can explain the phenomenon that jaw

growth in females stops while the third molars are erupting. On the other hand, the jaw growth of males continues even after the eruption [27]. Some international studies have reported that mesioangular pattern was more common in the mandible [8, 26, 28]. However, several studies reported that vertical impaction is more common than mesioangular and other patterns of impactions [29-31]. This study found that mesioangular was the most frequent angulation pattern in impacted mandibular third molars in females (50.0%). On the other hand, vertical impaction and distoangular were the most common angulations in males (31.0%). Understanding the pattern of impaction of the mandibular third molar helps to predicate the difficulty of extraction, the need for a surgical procedure, its expected time, and pre and postoperative complications.

Table 4: Mean and Standard Deviation of Age in Both Groups (Impacted/ Not Impacted).

IMPACTION				P-value*
No (Not Impacted)		Yes (Impacted)		
N	Age (Mean +/- SD)	N	Age (Mean +/- SD)	
48	43.15 +/- 13.80	76	29.50 +/- 9.92	<0.001

* Independent t-test

6. CONCLUSION

In this retrospective study, the prevalence of impacted mandibular third molars is higher in females than in males, but it was not statistically significant. The mesioangular impaction was the most common angulation in females, while the distoangular and vertical angulation was most common in males. However, further studies with more patients need to be conducted to accurately represent the Libyan population in Zliten.

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Conflict of interest

There is no conflict of interest from either of the Authors.

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