


# Prevalence Of Pathologies Caused By Mandibular Third Molar Tooth Positions

## Mandibular Üçüncü Molar Diş Pozisyonlarının Oluşturduğu Patolojilerin Prevelansı

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### Abstract

**Background:** The aim of this study was to evaluate the pathologies caused by mandibular impacted third molars in individuals living in the Şanlıurfa region.

**Materials and Methods:** In this retrospective study conducted at Harran University Faculty of Dentistry between 2018 and 2020, panoramic radiographs of 904 patients (525 females, 379 males) were analyzed. The prevalence, impaction and position of third molars, conditions and pathologies related to these teeth were evaluated.

**Results:** 1664 mandibular third molars of 904 patients were analyzed. When the distribution by gender is examined, 42.79% are men and 57.21% are women. In terms of mandibular third molar position, 60.34% of the teeth are vertical. In terms of mandibular third molar eruption level, 61.39% of the teeth are at level A. When we look at pathologies based on teeth, there is 16.81% caries.

**Conclusions:** While third molars may remain without any symptoms for a long period of life, they may cause caries, cysts and bone loss in adjacent teeth. Tooth extraction may be recommended prophylactically to prevent third molar teeth from causing greater pathology in later ages.

**Key Words:** Mandibular third molar, Pathology, Prevalence

### Öz (Türkçe özet eklenecek)

**Amaç:** Bu çalışmada Şanlıurfa bölgesinde yaşayan bireylerin mandibular gömülü üçüncü molar dişlerin meydana getirdiği patolojilerin değerlendirilmesi amaçlanmıştır.

**Materyal ve metod:** Bu retrospektif çalışmada; 2018 ve 2020 yılları arasında Harran Üniversitesi Diş Hekimliği Fakültesi'ne, çeşitli sebeplerle başvuran 904 hastanın (525 kadın, 379 erkek) panoramik radyografileri incelenmiştir. Üçüncü molar diş prevelansı, gömüklük durumu ve pozisyonu, bu dişlerle ilgili durumlar ve patolojiler değerlendirilmiştir.

**Bulgular:** Bu çalışmada 904 hastanın 1664 tane mandibular üçüncü molar dişi incelenmiştir. Cinsiyete göre dağılım incelendiğinde %42,79'u erkek ve %57,21'i ise kadındır. Mandibular üçüncü molar konumu bakımından dişlerin %60,34'ü vertikaldir. Mandibular üçüncü molar sürme seviyesi bakımından dişlerin %61,39'u A seviyesindedir. Diş bazında komplikasyona bakıldığında ise %16,81 oranında çürük bulunmaktadır.

**Sonuç:** Üçüncü molar dişler yaşamın uzun bir döneminde herhangi bir semptom vermeden kalabilirdiği gibi komşu dişlerde çürük, kist ve kemik kaybına yol açabilir. Üçüncü molar dişlerin ilerleyen yaşlarda daha büyük bir patolojiye sebebiyet vermemesi adına diş çekimi profilaktik olarak önerilebilir.

**Anahtar Kelimeler:** Mandibular üçüncü molar, Patoloji, Prevelans

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## Introduction

Mandibular third molars are the last teeth to erupt in the mandible, usually in the twenties (1,2). These teeth may erupt partially or remain completely impacted (3). Mandibular third molars have the highest impacted rate among all teeth. This rate is affected by demographic data as well as local and systemic factors (1). They may remain in the mouth for a long time without any symptoms and may cause infection, caries, cystic and tumoral formations (4). Treatment of third molars is difficult due to their location and different canal anatomies. Therefore, age, systemic status and oral hygiene must be evaluated in patients with mandibular third molars who are planned for treatment (5,6).

Panoramic radiographs are the most commonly used imaging technique to evaluate the pathologies that may be caused by impacted third molars. The low radiation dose in panoramic radiographs is an advantage for patients (7). Therefore, it has been preferred by most researchers (8,9).

In the literature, there are many studies showing third molars among the causes of caries of mandibular second molars (10,11). It has also been reported that impacted third molars predispose the second molar to periodontal problems (12).

The aim of this study was to evaluate the pathologies caused by mandibular impacted third molar positions.

## Materials and Methods

The ethics committee approval of the study was obtained from Harran University Clinical Research Ethics Committee with the ethics committee decision dated 26/12/2022 and numbered HRU/22.25.24. This study, in which panoramic X-rays were evaluated, was conducted on 904 patients who applied to Harran University Faculty of Dentistry, Department of Oral, Dental and Maxillofacial Surgery between 2018 and 2020. The panoramic X-rays were obtained with the Vatech PCH-2500 Digital Panoramic Imaging System (Gyeonggi-do, South Korea 65-90 kVp and 2.8 mm total aluminum filtering at 10 mA). It was ensured that at least one mandibular third molar was present in the x-rays examined. The inclusion criteria were third molars that had completed root development and the absence of missing teeth in the jaw in which these teeth were located, as well as clear radiographs.

Data from patients with syndromes, hereditary disorders, ongoing root development or missing teeth other than third molars for any other reason were excluded from the study.

Panoramic radiographs of the mandibular third molars were analyzed considering their anatomical position, Winter and Pell-Gregory classification. When evaluating the impacted third molars according to the Pell-Gregory classification; A if the third molar and the second molar were at the same level, B if the second molar was higher than the

occlusal plane of the third molar, and B if the third molar was higher than the enamel cementum level of the second molar.

## Statistical Analysis

The data of this study were evaluated with the licensed IBM SPSS 21 package program. Chi-Square analysis was used to evaluate the relationships between groups of nominal variables. In 2x2 tables, Fisher's Exact Test was used in cases where the expected values in the cells did not have sufficient volume, and in RxC tables, Pearson Chi-Square analysis was performed with the help of Monte Carlo Simulation. When evaluating the results, 0.05 was used as the significance level.  $p < 0.05$  indicates that there is a significant relationship and  $p > 0.05$  indicates that there is no significant relationship.

## Results

In this study, 1664 mandibular third molars were evaluated in panoramic radiographs of 904 patients. Of the patients examined, 379 were male and 525 were female. When evaluated according to gender, 41.92% were male and 58.08% were female (Table 1). The age of the patients ranged between 10 and 86 years (Table 2 and Table 3). Of the mandibular third molars examined, 171 were in horizontal, 384 in mesioangular, 1091 in vertical, 3 in buccolingual and 2 in distoangular position (Table 4). When the eruption levels of the mandibular third molars were evaluated, 1110 were in Class A, 195 in Class B and 359 in Class C (Table 5). In terms of mandibular third molar position, 60.34% of the teeth were vertical and 61.39% were in Class A.

There was a statistically significant relationship between pathologies and gender ( $p < 0.05$ ). While 51.97% of those with caries, 52.94% of those with cystic formation and 39.65% of those without pathologies were male; 48.03% of those with caries, 100% of those with bone loss, 47.06% of those with cystic formation and 60.35% of those without pathologies were female (Table 1).

There is a statistically significant relationship between pathologies and mandibular third molar position ( $p < 0.05$ ). The mandibular third molar position was vertical in 48.36% of those with caries, 44.12% of those with cystic formation and 63.28% of those without pathologies, while the mandibular third molar position was distoangular in 2.94% of those with cystic formation and 0.07% of those without pathologies (Table 3).

There is a statistically significant relationship between pathologies and mandibular third molar eruption level ( $p < 0.05$ ). While 62.83% of those with caries, 41.18% of those with cystic formation and 61.65% of those without pathologies had mandibular third molar eruption level A; 17.11% of those with caries, 8.82% of those with cystic formation and 9.54% of those without pathologies had mandibular third molar eruption level B.

**Table 1.** Results of the Analysis on the Relationship between Pathologies and Gender

Gender		Pathologies										Chi-Square Test	
		Caries		Bone Loss		Cystic Formation		None		Total		Chi-Square	p
		n	%	n	%	n	%	n	%	n	%		
Male		79	51,97	0	0	9	52,94	291	39,65	379	41,92	*	0,015
Female		73	48,03	1	100	8	47,06	443	60,35	525	58,08		
Total		152	100	1	100	17	100	734	100	904	100		

**Table 2.** Distribution of Pathologies in Terms of Age Values

Pathologies		Age					
		n	Mean	Median	Min	Max	Sd
	Caries	152	31,45	29	15	63	10,39
	Bone Loss	1	22	22	22	22	.
	Cystic Formation	17	35,65	34	15	64	15,23
	None	734	30,9	27	10	86	12,44
	Total	904	31,07	27,5	10	86	12,18

**Table 3.** Result of the Analysis on the Relationship between Age Values and Pathologies

Pathologies		Age group								Chi-Square Test	
		≤29		30-39 age		40 ≤		Total		Chi-Square	p
		n	%	n	%	n	%	n	%		
	Caries	80	15,78	42	20,1	30	15,96	152	16,81	*	0,302
	Bone Loss	1	0,2	0	0	0	0	1	0,11		
	Cystic Formation	7	1,38	3	1,44	7	3,72	17	1,88		
	None	419	82,64	164	78,47	151	80,32	734	81,19		
	Total	507	100	209	100	188	100	904	100		

**Table 4.** Results of the Analysis on the Relationship Between Pathologies and Mandibular Third Molar Position

Mandibular Third Molar Position		Pathologies										Chi-Square Test	
		Caries		Bone loss		Cystic Formation		None		Total		Chi-Square	p
		n	%	n	%	n	%	n	%	n	%		
	Bukkolingual	0	0	0	0	1	2,94	2	0,14	3	0,17	*	0,007
	Distoanguler	0	0	0	0	1	2,94	1	0,07	2	0,11		
	Horizontal	41	13,49	0	0	4	11,76	126	8,58	171	9,46		
	Mezioanguler	88	28,95	1	50	8	23,53	287	19,55	384	21,24		
	Vertikal	147	48,36	0	0	15	44,12	929	63,28	1091	60,34		
	Other	1	0,33	0	0	3	8,82	9	0,61	13	0,72		
	None	27	8,88	1	50	2	5,88	114	7,77	144	7,96		
	Total	304	100	2	100	34	100	1468	100	1808	100		

**Table 5.** The Result of the Analysis on the Relationship Between Pathologies and Mandibular Third Molar Erosion Level

Mandibular Third Molar Level		Pathologies										Chi-Square Test	
		Caries		Bone Loss		Cystic Formation		None		Total		Chi-Square	p
		n	%	n	%	n	%	n	%	n	%		
	A	191	62,83	0	0	14	41,18	905	61,65	1110	61,39	*	0,001
	B	52	17,11	0	0	3	8,82	140	9,54	195	10,79		
	C	34	11,18	1	50	15	44,12	309	21,05	359	19,86		
	None	27	8,88	1	50	2	5,88	114	7,77	144	7,96		
	Total	304	100	2	100	34	100	1468	100	1808	100		

**Discussion**

Third molars can cause caries, cysts and periodontal loss in the teeth and structures they come into contact with. Therefore, it is important to know the impacted status and position of the third molars and their level in the mouth. These data are important for the prognosis of third molars (13). Extraction of third molars without any pathology is defined as prophylactic tooth extraction. Some researchers advocate prophylactic extraction of impacted third molars because of the possibility of causing pathology such as caries,

cysts and periodontal disorders (8,14). There are also researchers who think that prophylactic extraction of impacted third molars is exaggerated. They stated that pathologies such as nerve damage, jaw fractures, and adjacent tooth injury should be kept in mind after such operations (8). Winter and Pell-Gregory classifications used to evaluate the position and eruption levels of third molars are the methods used by most researchers (13). In this study, we aimed

to examine the pathologies caused by mandibular third molars with panoramic radiographs.

Most literatures have reported that impacted teeth are more common in females than males (15). In our study, 58.08% were female and 41.92% were male. The higher incidence of impacted teeth in females can be explained by the insufficient size of their jaws. We can also think that this difference is due to the variability between the growth ages of men and women. In other words, in women, the eruption of third molars continues when growth-development ends, while in men, there is more space for third molars because bone growth continues at the time of eruption of third molars. However, there are also studies in the literature reporting that there is no statistical difference between the sexes (16).

In a study by Çimen et al., it was found that the teeth that caused the most bone loss were semi-implanted teeth (17). It is difficult to provide the desired oral hygiene in posterior areas. Therefore, there is a high likelihood of bone loss in second molars and third molars due to plaque accumulation and periodontal problems (18). In a study conducted by Nunn et al. on 416 patients, it was reported that third molars increased the risk of pathology in second molars in older men (19). In our study, we found that the development of pathology was most common in individuals under the age of 29. The fact that bone loss is more common at early ages may be explained by the fact that third molars are present in the mouth at these ages and these teeth are extracted in later periods.

In a study by Moss et al. evaluating 818 patients, they reported that 28% of the patients examined had caries associated with the third molar tooth (20). In the literature, it has been reported that a large proportion of third molars may have caries originating from the adjacent second molars (11,21). Most researchers have evaluated the risk of caries formation in the third molar position and reported that the frequency of caries formation is high in third molars in the mesioangular position (2,11). In a study, it was reported that third molars in the mesioangular position had a higher risk of caries formation in the adjacent tooth compared to teeth in other positions (22). In addition, it has been reported in the literature that third molars in the mesioangular and horizontal positions cause more bone loss in adjacent teeth in other positions (3,21). In our study, the highest caries incidence rate was in the vertical position with a rate of 48.36% and the mesioangular position was in the second place with a rate of 28.95%. In addition, 62.83% of those with caries in our study had mandibular third molar eruption level A. This discrepancy with the literature may be related to the patient's oral hygiene and habits, cultural differences, socioeconomic status of the patient and the diagnostic methods used.

Sumer et al. argued in a study that third molars may have a high rate of pathologic changes in the absence of a pathologic symptom and therefore extraction decision may be

made for these teeth (23). In another study in the literature, it was stated that two percent of third molars may cause pathologies such as cysts and these are mostly seen in the mandible (24). Patil et al. reported a low incidence of cysts and tumors in their study of 5486 third molars. In our study, the incidence of pathologies such as cysts associated with third molars was found to be 1.88%, which is consistent with the literature. Cystic formations were mostly associated with vertically positioned third molars with a rate of 44.12%. The level of the third molars with the same rate was C. Although the likelihood of pathology development is not high; it is recommended to extract third molars at an early age (25).

## Conclusion

Third molars may remain asymptomatic for a long period of life or may cause caries, cysts and bone loss in adjacent teeth. In order to prevent these pathologies in third molars, prophylactic extraction may be the right decision. Finally, extraction may be recommended prophylactically to prevent the third molars from causing a greater pathology at a later age.

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**Ethical Approval:** The ethics committee approval of the study was obtained from Harran University Clinical Research Ethics Committee with the ethics committee decision dated 26/12/2022 and numbered HRU/22.25.24.

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## Author Contributions:

Concept: M.B.B.

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Design : M.B.B.

Data acquisition: M.B.B.

Analysis and interpretation: M.B.B.

Writing manuscript: M.B.B.

Critical revision of manuscript: M.B.B.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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