(RESEARCH ARTICLE)

Prevalence and distribution of impacted maxillary third molar odontectomy at the dental and oral teaching hospital (RSGM-P) of Airlangga University

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Abstract

Background: Impacted maxillary third molar does not always cause complaints. However, if the tooth is infected, damages another tooth, or has other dental problems, it must be removed. The removal is done through a process known as odontectomy. In Indonesia, especially in Surabaya, research on odontectomy in cases of impacted maxillary third molars is still rarely conducted. This underlies the author's research on the prevalence and distribution of impacted maxillary third molar odontectomy at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University.

Purpose: To determine the prevalence and distribution of odontectomy in cases of impacted maxillary third molar tooth in patients at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University.

Method: This study used medical record data from patients with impacted maxillary third molar odontectomy at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University from January 2019 - December 2021. The data results were processed and analyzed based on sample inclusion and exclusion criteria using descriptive statistical tests.

Result: The prevalence of impacted maxillary third molar odontectomy at RSGMP Airlangga University from January 2019 - December 2021 was 8.48% with the largest group in female patients (70.3%), age group 20-24 years (37.4%), B SA classification (46.2%), vertical angulation type (46.2%), accompanied by complaints of orofacial pain as the main reason for odontectomy (28.6%).

Conclusion: Odontectomy is most often performed in patients with female gender, age group 20-24 years, B SA classification, vertical angulation type, and additional complaints of orofacial pain.

Keywords: Odontectomy; Maxillary third molar impaction; Gender; Age; Archer classification; Additional complaint

1. Introduction

Impaction is a condition where tooth eruption occurs imperfectly, either partial eruption or completely not erupted. It is located opposite the antagonist tooth, bone, or other soft tissue so that further eruption is not possible [1]. The third molar is the most frequently impacted tooth with the incidence of impaction varying greatly in different populations, ranging from 9.5% to 39%, impaction of the maxillary third molar is in the second position for the incidence of impaction that occurs most often after impaction of the mandibular third molar [2, 3]. The results of a retrospective study conducted from January 2014 to January 2016 at the Dental Department of Hospitals and Dental Clinics in New Delhi showed that 250 out of 960 patients aged 20 to 55 had impacted third molars [4]. Based on data obtained from the

Department of Oral Surgery, Faculty of Dentistry, Padjajaran University, Bandung, the prevalence of impacted third molars is 16-73% in young adults accompanied by pericoronitis, caries, odontogenic cysts, periodontal disorders, and crowded teeth [5]. Impacted maxillary third molars do not always cause complaints. However, if the tooth is infected, damages other teeth, or has other dental problems, it must be extracted [6]. The extraction is carried out through a process known as odontectomy. Odontectomy can be defined as a tooth extraction. Tooth extraction in patients with impaction is a prophylactic or preventive measure because it can prevent the formation of pathologies originating from follicles and infections due to slow and imperfect eruption [7].

Classification of impacted tooth is needed so that the operator can determine the level of impaction and the best methodology for the surgical process. This classification can be useful in determining the type and level of retention, as well as assessing the difficulty of the procedure [8]. Classification of impacted third molars is based on the direction and depth of impaction, the amount of space available for tooth eruption, and the amount of soft tissue or bone (or both) covering it [9]. Some of the most commonly used classifications for classifying impacted third molars are Winter's, Pell & Gregory, and Archer's classifications [8, 10]. The most common classification of impacted maxillary third molars is vertical [11]. The classification for impacted maxillary third molars is basically the same as the classification for impacted mandibular third molars, but several additional parameters must be considered for successful treatment such as tooth angulation, eruption status, depth of impacted teeth, root shape, and the relationship between impacted third molars and the maxillary sinus, and conditions. Management of odontectomy on maxillary third molars is relatively less complicated when compared to odontectomy on mandibular third molars because the position of the maxillary third molars tends to be better so that it is easier to extract unless the maxillary third molars are not fully erupted and embedded in the bone [11]. In Indonesia, especially in Surabaya, research on odontectomy in cases of impacted maxillary third molars is still rarely conducted. This is the basis for the author to conduct research on the prevalence and distribution of impaction odontectomy of maxillary third molars at the Dental and Oral Teaching Hospital (RSGM-P) Airlangga University.

2. Material and methods

This type of research is a descriptive observational study with a retrospective study design. The population and sample in this study were medical record data of patients with impacted odontectomy treatment of the maxillary third molar recorded in the medical records of the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University from January 2019 to December 2021 which were in accordance with the inclusion and exclusion criteria of the study.

The inclusion criteria in this study were medical record data of patients with impacted odontectomy of the maxillary third molar based on the classification of third molar impaction accompanied by the reasons for odontectomy such as distal caries in the second molar, caries in the third molar, dentigerous cyst, odontogenic tumor, pericoronitis, periodontitis, orofacial pain, preventive measures, pre-orthodontics, and others recorded in the medical records of the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University. The exclusion criteria in this study were medical record data of patients with impacted third molar odontectomy at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University with incomplete medical records, with craniofacial and congenital abnormalities found in patients.

The sampling technique in this study was total sampling. The variables in this study were impacted third molar odontectomy, prevalence of impacted third molar odontectomy, and distribution of impacted third molar odontectomy. The type of data in this study is secondary data in the form of medical record data. The medical record data obtained will be examined based on gender identity, age, impaction classification, and reasons for odontectomy such as distal caries in second molars, caries in third molars, dentigerous cysts, odontogenic tumors, pericoronitis, periodontitis, orofacial pain, preventive measures, pre-orthodontics, and others. Data collection was obtained from medical records at the Dental and Oral Teaching Hospital (RSGM-P), then collected in a database table in the form of a Microsoft Excel file. The collected data will then be processed using IBM SPSS 26.0, the data is presented in the form of tables, distributions, and frequencies. Data analysis was carried out descriptively by making a description of the conditions of the research results.

3. Results

This study used medical record data of maxillary third molar impaction odontectomy patients recorded from January 2019 - December 2021 in the medical records of the Dental and Oral Teaching Hospital (RSGM-P) Airlangga University. From the research data that has been collected, 91 data of maxillary third molar impaction odontectomy patients were obtained from 1073 data of maxillary and mandibular odontectomy patients.

Table 1 Cross Tabulation Types of Impacted Maxillary Third Molars Based on Gender and Age Group

Groups		Type of impaction				Total	
		Partial Eruption		Total Impaction			
		Total	%	Total	%	Total	%
Gender	M	20	74.1	7	25.9	27	29.7
	F	43	67.2	21	32.8	64	70.3
Age	16-19	12	52.2	11	47.8	23	25.3
	20-24	24	70.6	10	29.4	34	37.4
	25-29	18	85.7	3	14.3	21	23.1
	30-34	1	33.3	2	66.7	3	3.3
	35-39	2	66.7	1	33.3	3	3.3
	40-44	5	100	0	0	5	5.5
	>= 45	1	50	1	50	2	2.2
Total		63	69.2	28	30.8	91	100

Note: M: male; F: female

Based on the table, it is known that males experience more partial eruption 74.1% (20 people) than those who experience total impaction 25.9% (7 people). Females were found to have more partial eruption 67.2% (43 people) than total eruption 32.8% (21 people). Age 16-19 years, 20-24 years, 25-29 years, 35- 39 years and 40-44 years were more likely to have partial eruption than total impaction, while age 30-34 years were more likely to have total impaction than partial eruption.

Table 2 Cross Tabulation of Impacted Maxillary Third Molar Locations Based on Gender and Age Group

Groups		Locations of impaction				Total	
		18		28			
		Total	%	Total	%	Total	%
Gender	M	17	63.0	10	37.0	27	29.7
	F	33	51.6	31	48.4	64	70.3
Age	16-19	11	47.8	12	51.2	23	25.3
	20-24	20	58.8	14	41.2	34	37.4
	25-29	13	61.9	8	38.1	21	23.1
	30-34	2	66.7	1	33.3	3	3.3
	35-39	1	33.3	2	66.7	3	3.3
	40-44	2	40.0	3	60.0	5	5.5
	>= 45	1	50.0	1	50.0	2	2.2
Total		50	54.9	40	44.0	91	100

Note: M: Male; F: Female

Based on the table. More males had an impaction location on tooth 18, 63% (17 people) than those who had an impaction location on tooth 28, 37% (10 people). In women, there were also more people who had impaction location on tooth 18, namely 51.6% (33 people) compared to those who had impaction location on tooth 28, namely 48.4% (31 people). Age 16-19 years, 35-39 years and 40-44 years had more impaction location on tooth 28 than tooth 18, while age 20-24 years, 25-29 years, 30-34 years had more on tooth 18 than tooth 28.

Table 3 Cross Tabulation of Impacted Maxillary Third Molar Position Levels Based on Gender and Age Group

Groups		Level of Position										Total	
		A NSA		A SA		B NSA		B SA		C SA			
		n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Gender	M	0	0.0	6	22.2	3	11.1	13	48.1	5	18.5	27	29.7
	F	4	6.3	12	18.8	2	3.1	29	45.3	17	26.6	64	70.3
Age	16-19	0	0.0	1	4.3	2	8.7	11	47.8	9	39.1	23	25.3
	20-24	0	0.0	6	17.6	1	2.9	18	52.9	9	26.5	34	37.4
	25-29	3	14.3	7	33.3	1	4.8	9	42.9	1	4.8	21	23.1
	30-34	0	0.0	2	66.7	0	0.0	0	0.0	1	33.3	3	3.3
	35-39	1	33.3	0	0.0	0	0.0	2	66.7	0	0.0	3	3.3
	40-44	0	0.0	2	40.0	1	20	1	20	1	20.0	5	5.5
	>= 45	0	0.0	0	0.0	0	0.0	1	50	1	50.0	2	2.2
Total		4	4.4	18	19.8	5	5.5	42	46.2	22	24.2	91	100

Note: M: Male; F: Female

More men have a level of impaction position of B SA molar as many as 48.1% (13 people), A SA is 22.2% (6 people) and C SA is 18.5% (5 people). Whereas more women have the level of impaction position of B SA molar as many as 45.3% (29 people), C SA is 26.6% (17 people) and A SA is 18.8% (12 people). At the age of 16-19 years, 20-24 years, 25-29 years, 35-39 years and ≥ 45 years more had the level of impaction position of maxillary molar B SA, while age 30-34 and age 40-44 years more had the level of impaction position of molar A SA.

Table 4 Cross Tabulation of Impacted Maxillary Third Molar Angulation Based on Gender and Age Group

Groups		Tooth Angulation												Total	
		Buccoangular		Distoangular		Horizontal		Mesioangular		Transversal		Vertical			
		n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Gender	M	0	0.0	7	25.9	2	7.4	4	14.8	1	3.7	13	48.1	27	29.7
	F	1	6.1	24	37.5	0	0.0	10	15.6	0	0.0	29	45.3	64	70.3
Age	16-19	0	0.0	8	34.8	0	0.0	2	8.7	0	0.0	13	56.5	23	25.3
	20-24	0	0.0	13	38.2	1	2.9	6	17.6	0	0.0	14	41.2	34	37.4
	25-29	1	4.8	7	33.3	1	4.8	3	14.3	1	4.8	8	38.1	21	23.1
	30-34	0	0.0	1	33.3	0	0.0	0	0.0	0	0	2	66.7	3	3.3
	35-39	0	0.0	0	0.0	0	0.0	1	33.4	0	0	2	66.7	3	3.3
	40-44	0	0.0	1	20.0	0	0.0	2	40.0	0	0	2	40	5	5.5
	>= 45	0	0.0	1	50.0	0	0.0	0	0.0	0	0	1	50	2	2.2
Total		1	1.1	31	34.1	2	2.2	14	15.4	1	1.1	42	46.2	91	100

Note: M: Male; F: Female

Based on the table. More males have vertical tooth angulation as much as 48.1% (13 people). Female patients also have more vertical tooth angulation as much as 45.3% (29 people). Patients aged 16-19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years, 40-44 years and ≥ 45 years had more vertical tooth angulation.

Table 5 Cross Tabulation of Reasons for Impacted Odontectomy of Maxillary Third Molars by Gender and Age Group

		Reasons for Maxillary Third Molar Impaction Odontectomy								*Total*
		Second Molar Distal Caries	*Third Molar Caries*	*Pericoronitis*	*Periodontitis*	*Orofacial Pain*	*Prevention*	*Pre-Orthodontics*	*Others*	
Gender	M	1	0	4	4	3	3	7	5	27
		3.7	0.0	14.8	14.8	11.1	11.1	25.9	18.5	29.7
	F	1	1	3	9	23	15	12	0	64
		1.6	1.6	4.7	14.1	35.9	23.4	18.8	0.0	70.3
Age	16-19	0	0	5	0	6	4	5	3	23
		0.0	0.0	21.7	0.0	26.1	17.4	21.7	13.0	25.3
	20-24	1	0	0	3	9	7	13	1	34
		2.9	0.0	0.0	8.8	26.5	20.6	38.2	2.9	37.4
	25-29	1	0	1	6	6	6	0	1	21
		4.8	0.0	4.8	28.6	28.6	28.6	0.0	4.8	23.1
	30-34	0	0	1	1	1	0	0	0	3
		0.0	0.0	33.3	33.3	33.3	0.0	0.0	0.0	3.3
	35-39	0	0	0	2	1	0	0	0	3
		0.0	0.0	0.0	66.7	33.3	0.0	0.0	0.0	3.3
	40-44	0	0	0	1	3	1	0	0	5
		0.0	0.0	0.0	20.0	60.0	20.0	0.0	0.0	5.5
	>=45	0	1	0	0	0	0	1	0	2
		0.0	50.0	0.0	0.0	0.0	0.0	50.0	0	2.2

Note: M: Male; F: Female

Based on the table, more males had a reason for odontectomy in the form of pre-orthodontic at 25.9% while more female patients had orofacial pain 35.9% as the reason for odontectomy. Patients aged 16-19 years had more orofacial pain 26.1%, 20-24 years had more pre-orthodontics 38.2%, 25-29 years had the most periodontitis, orofacial pain and pre-orthodontics with 28.6% each. 30-34 years old had more pericoronitis, periodontitis and orofacial pain with 33.3% each. Patients aged 35-39 years had more periodontitis with 66.7%. Patients aged 40-44 years had more orofacial pain with 60%. The patients aged ≥ 45 years had more second molar distal caries and pre-orthodontic with 50% each.

Table 6 Cross Tabulation of Reasons for Performing Impacted Odontectomy of Maxillary Third Molars Based on Tooth Angulation

		Reasons for Performing Odontectomy for Impaction of Maxillary Third Molar								
		Second Molar Distal Caries	Third Molar Caries	Pericoronitis	Periodontitis	Orofacial Pain	Prevention	Pre-Orthodontics	Others	Total
Angulation	Buccoangular	0	0	0	1	0	0	0	0	1
		0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	1.1
	Distoangular	1	0	2	1	8	8	9	2	31
		3.2	0.0	6.5	3.2	25.8	25.8	29.0	6.5	34.1
	Horizontal	0	0	1	0	0	0	1	0	2
		0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	2.2
	Mesioangular	1	0	0	0	9	2	2	0	14
		7.1	0.0	0.0	0.0	64.3	14.3	14.3	0.0	15.4
	Transversal	0	0	0	0	0	1	0	0	1
		0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	1.1
	Vertical	0	1	4	11	9	7	7	3	42
		0.0	2.4	9.5	26.2	21.4	16.7	16.7	7.1	46.2
Total		2	1	7	13	26	18	19	5	91
		2.2	1.1	7.7	14.3	28.6	19.8	20.9	5.5	100.0

The majority of patients who had buccoangular angulation had a complaint of pericoronitis with a total of 1 patient. Patients who had Distoangular and Horizontal angulation had the majority of odontectomy reasons in the form of pre-orthodontic with 9 and 1 patients respectively. The majority of patients with mesioangular angulation had complaints of orofacial pain with a total of 9 patients. The majority of patients with transverse angulation had preventive reasons with a total of 1 patient. Patients with vertical angulation had a majority of periodontitis complaints with 11 patients.

4. Discussion

In this study, it was found that the female gender was 70% (64 people) more when compared to male patients who were 30% (27 people). This data can show that the incidence of maxillary third molar impaction is more common in women than men. The female gender is more likely to experience third molar impaction because women experience earlier third molar growth and physical growth that stops earlier so that it can cause jaw growth to stop faster so that the space for third molar becomes inadequate [12].

Based on the age distribution in maxillary third molar impaction odontectomy patients, the youngest patient was 16 years old and the oldest was 60 years old. This data is in line with previous research which states that the prevalence of tooth impaction reaches 88.8% in those aged 16-30 years. The prevalence of impaction which tends to be higher in this age group is caused by maxillary third molar that erupt during the age range of 17-21 years generally cause complaints such as orofacial pain so that immediate retrieval is needed, and at a young age tend to be more aware of oral health compared to the elderly [13].

Based on the type of impaction, it was found that the number of odontectomy patients with partial eruption impaction of the maxillary third molar was 69% (63 people) more than patients with total impaction which amounted to 31% (28 people). Partially impacted tooth more often have complaints compared to completely impacted tootth because they can cause food deposits, plaque, and debris in the tissues around the tooth to cause complaints [14].

Based on the teeth that often experience impaction, most of the impactions most often occur in tooth 18 or the right side of the jaw, as much as 50 data (55%) while in tooth 28 or the left side of the jaw as much as 41 data (45%). This is in line with previous research which states that there is no significant difference between maxillary third molar impaction on the right side of the jaw and the left side of the jaw [15].

The picture of impaction on the maxillary third molar can be different in each individual, to find out these differences, classification is carried out based on panoramic radiographic images using the Archer classification system based on the level of impaction position of the maxillary third molar and classification based on the relationship of the maxillary third molar impaction with the maxillary sinus. The most data in this study was the B SA position which amounted to 42 data (46.2%), followed by the C SA and A SA positions which amounted to 22 data (24.2%) and 18 data (19.8%) respectively. Tooth with sinus approximation (SA) position level is one of the etiologies of oroantral communication. In a study conducted by Lim et al showed that patients with SA position level tended to experience more oroantral communication compared to NSA but there was no significant relationship between the level of tooth position and the incidence of oroantral communication [10].

Based on the angulation of maxillary third molar impaction, the most data in this study is vertical angulation with 42 data (46.2%), these data are in line with research on the population in Iran in 2013 [15] and research on the population in Turkey which states that in cases of maxillary third molar impaction, the most common type of angulation is vertical (62%) [16].

Impacted tooth are usually accompanied by pathological conditions associated with tooth impaction, to perform curative measures of these pathological conditions, odontectomy is required. In this study, odontectomy patients with maxillary third molar impaction had the most complaints of orofacial pain, totalling 26 data (28.6%). Orofacial pain is a complaint of pain that can be felt in the oral cavity area and can also be felt in the face, neck, and ear area [17]. The pain that arises can cause discomfort so that it can reduce the quality of life of the patient because it affects the function of opening the mouth of the patient, therefore in this study, the majority of patients performed odontectomy on the impaction of maxillary third molar because there were complaints of orofacial pain.

After orofacial pain, pre-orthodontics occupied the second position as an indication for odontectomy of maxillary third molar impaction at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University. The patient was referred by an orthodontist to perform odontectomy on the impacted maxillary third molar. The odontectomy has the aim that the teeth that have been positioned do not return to malposition due to the pressure of the impacted teeth [18].

5. Conclusion

The prevalence of odontectomy for maxillary third molar impaction at the Dental and Oral Teaching Hospital (RSGM-P) of Airlangga University from January 2019 to December 2021 was 8.48% with the largest group of patients being female, age group 20-24 years, class B SA classification, vertical angulation type, accompanied by complaints of orofacial pain as the main reason for odontectomy.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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