

Original Article

Trends in Impacted Teeth among Patients at the Dental Center of Addis Ababa University, Ethiopia

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Abstract

Background: An impacted tooth is a tooth that fails to erupt to the normal anatomic level in the oral cavity within the expected time. There are local as well as systemic causes of teeth impaction. Impacted teeth have the possibility of impinging nearby vital structures as well as predisposing patients to pain and discomfort. Impaction of teeth can be partial or complete, soft tissue or bony. This study aimed to determine patterns of impacted teeth among patients presented to the Dental and Maxillofacial Surgery department of Addis Ababa University.

Methodology: A cross-sectional descriptive study with retrospective data collection was done from January 2019 to December 2021.

Results: A total of 184 patients (Female n=112, Male n=72) were included in the study. The mean age was 26.5 and the age range was 10-84 years. The study result revealed that the occurrence of teeth impaction was more common in females (60.86%) than males (39.4%). The mandibular third molar was the most commonly impacted tooth, comprising 152(82.61%) of all impacted teeth. Among the third molar impaction, 77 (50.65%) of the third molar impaction was mesioangular in position. The left mandibular third molar was the most impacted tooth in both males and females 78(42.39%). Among the patients with impacted canine in the majority (52.63%) of cases it was placed palatally. About 75% of patients with impacted third molar presented with caries lesions, toothache, and discomfort as primary indications for removal. Disimpaction by raising a flap was the mainstay of treatment and was done for 90% of the patients.

Conclusion: The most common type of impaction observed was third molar impaction, accounting for 82.61% of cases followed by maxillary canine impaction. Many patients sought treatments only after experiencing signs and symptoms related to their impacted teeth. It is crucial to raise awareness about early detection and management of impacted teeth to reduce the complexity of surgical procedures and minimize potential complications.

Keywords: Impacted tooth, disimpaction, patterns, Ethiopia

Introduction

Impacted teeth are teeth that have failed to fully erupt into the oral cavity within their expected development time period and also it has no hope for the particular tooth to erupt in the future (1-2). Factors that cause teeth impaction include both systemic and local Factors (3). The local factors include; inadequate space in the dental arch for eruption, obstruction of the tooth eruption because of pathology (cyst, supernumerary tooth, or other tumors), or the angulation of the erupting tooth (4). Among systemic factors, hereditary diseases and syndromes such as cleidocranial dysplasia, non-resorbable bone, endocrine deficiencies (hypothyroidism and hypopituitarism), febrile diseases, and Down syndrome can be mentioned (5-6).

Impacted teeth will dispose patients to different problems such as infection of the operculum over partially impacted teeth, dental caries of the tooth itself, caries to the adjacent teeth, periodontitis, cyst and different associated lesions formation, malocclusion, retarded jaw development and esthetic problem due to jaw discrepancy and alignment problems (7). There are several methods of classification of impacted teeth. They are classified based on the angulation, proximity to the vital structures, depth of impaction, and position of the teeth in the bone or the soft tissue (8). Diagnosis of impacted permanent teeth is straightforward, involving clinical inspection that discloses the absence of the tooth in its normal position combined with the radiographic assessment showing the position of the unerupted tooth (9,10).

Management of impacted teeth varies from simple observation to open surgery. It includes Oral hygiene instruction, operculectomy, coronectomy, non-surgical removal, and disimpaction. Surgical removal of the impacted teeth with curettage, osteotomy, or resection of

the associated tumor may be also indicated. Impacted teeth management is one of the most commonly encountered procedures in minor oral surgery and it is also part of major surgeries in maxillofacial surgery. One of the most common minor procedures performed at minor Oral surgery is the removal of impacted teeth. This procedure is often ranked among the top in terms of frequency, along with cyst enucleation, marsupialization, periapical procedures, biopsies, curettage, incision, and drainage (11).

An impacted tooth is one of the most common problems of patients that brings them to maxillofacial surgery and Dental clinics. Its prevalence and patterns are commonly studied especially in developed countries. Impacted teeth are also a problem for the productive age group of the population according to different studies. It is diagnosed accidentally when they come to the dentist for other related dental problems or the tooth itself may be symptomatic due to dental caries, periodontitis, and other related lesions (12-15).

Several studies have been conducted concerning teeth impaction and their pattern in developed countries and the prevalence and patterns are well known. The epidemiological pattern and prevalence of teeth impaction are not well understood in our country which in turn created great problems in raising awareness and effectively utilizing resources for its management. This could serve as baseline data for further research.

Methods and materials

Study Area

The study was conducted at Addis Ababa University's Department of Dentistry and Maxillofacial Surgery, dental center. Data was collected from patients' charts visiting the dental

center from the period of January 2019 - December 2021. The Department of Dentistry and Maxillofacial Surgery is the pioneer and only center in the capital city where full dental and maxillofacial services are available and teaching undergraduate and postgraduate students.

Source population and sampling

This was a cross-sectional retrospective study. Addis Ababa University Dental Center provides comprehensive dental and maxillofacial surgery services to approximately 10 million residents of Addis Ababa and its surrounding areas. Throughout the study period, the center treated around 20,000 patients. A convenience sampling technique was utilized for this study.

Eligibility criteria

All patients with a diagnosis of impacted teeth that were treated from January 2019 - December 2021 were included. Patients diagnosed with any form of impacted teeth were eligible for participation in the study, while those with incomplete data were excluded.

Operational Definitions:

Impacted teeth: teeth embedded under the soft tissue or the bone, and fail to fully erupt.

Mesioangular impaction: impacted tooth with angulation towards the mesial side.

Distoangular impaction: impacted teeth with angulation towards the distal side.

Vertical impaction: impacted teeth with no angulation but still do not erupt to the occlusal plane.

Horizontal impaction: the impaction of the tooth which is in the horizontal plane.

Data collection and analysis

Data was collected from patient charts and the logbook of minor Oral and Maxillofacial surgery

rooms. The data collection checklist includes demographic information of patients, including age, gender, residency, patient complaints, side of and position of impactions, clinical features, type of impaction, and treatment received. The independent variables are age, gender, and place of residency, while the dependent variables are type of impaction and types of treatments.

Before actual data collection, the principal investigator ensured that the format and orientation were given to the data collectors. Necessary adjustments were made to the checklist after pretesting. Well-trained dental interns, supervised by the principal investigator, filled out the structure checklist format. At the end of each day, the principal investigator checked the collected data for completeness. The data was coded, entered into computer software, and analyzed using EPI Info version 7. Tables, ratios, numbers, percentages, and graphs were utilized to illustrate the outcomes.

Results

Demographic Characteristics

Over three years from January 2019 to December 2021, a total of 184 patients diagnosed with impacted teeth were treated at the Department of Dentistry and Maxillofacial Surgery of Addis Ababa University. This was 20% of the total number of 920 new patients treated in minor surgery rooms. The male-to-female ratio was 3:5 with female predilection. The mean age was 26.5 with the age range from 13-84 years old. Regarding age distribution 96(52.17%) of all the patients were between the age group of 21-30 years, followed by 31-40 years age group, 36 (19.66%). Teenagers from 13 to 20 years also visited the department for impacted teeth treatment which accounts for 32 (17.9%). Patients above 60 years of age comprised 10 (5.4%) and only 4(2.17%) of patients age group 41-50 visited minor surgery for cases related to impacted teeth. Almost all 176 (95%) patients

were from the city of Addis Ababa and very few patients received treatment from the neighboring regions of Oromia and Amhara (Table 1).

Table 1: Demographic characteristics of patients, diagnosed with impacted teeth at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia.

Variables	Category	Frequency (%)
Gender	Female	112(60.86%)
	Male	72(39.13%)
Age (years)	< 20	32(17.9%)
	21 – 30	96(52.17%)
	31 – 40	36(19.56%)
	41 – 50	4(2.17%)
	51 – 60	6(3.2%)
	>60	10(5.4%)
Region	Addis Ababa	176(95.6)
	Amhara	4(2.7)
	Oromia	4(2.7)

Distribution of impacted teeth

The majority of the patients visited the center for impacted mandibular third molar treatment comprising 152(82.61%) of total impacted teeth cases, followed by maxillary canine 19(10.32%). Impacted maxillary third molar accounts for 11(5.97%), and mandibular premolar was the least impacted teeth in the oral cavity, only 1.08% of the total cases. The left mandibular third molar was the most commonly impacted tooth in both males and females, 48(26.08%) and 30(16.31%) respectively. Bilateral mandibular third molar impaction accounted for, 22(11.95%) in both male and female patients. Right mandibular wisdom teeth impaction was 32(17.39%) in females and 20(10.86%) in males. An impacted maxillary canine is common on the left side in both males 9(4.89%) and females 5(2.71%). No bilateral impacted canine in both genders. Again, impacted maxillary third molar was more frequent on the left side and in males,

6(3.26%). Mandibular premolar impaction was identified on the left side in 2(1.08%) patients (Table 2)

Patterns of maxillary third molar impaction

Majority, 6(54.54%) of maxillary third molars had sufficient bone between the root apex and the maxillary sinus however, about 5 (45.45%) of the impactions had less than 2mm of bone between the sinus and the root apex (Figure 1).

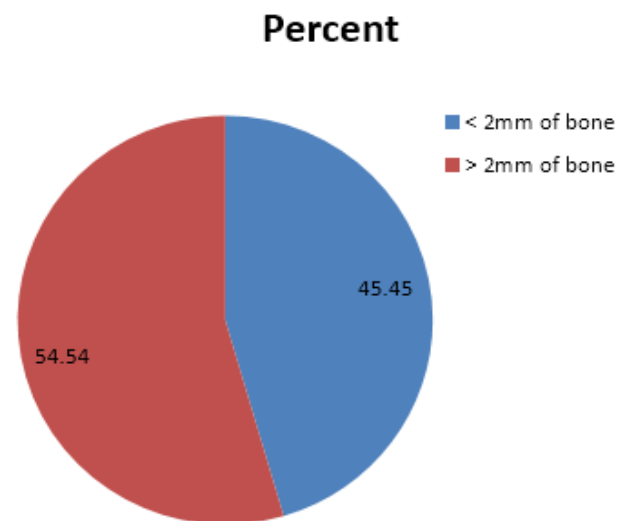


Figure 1: Patterns of maxillary third molar impaction to sinus proximity for patients treated at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia.

The position of most of impacted maxillary canines were palatal, 11(52.63%) and the rest 8(42.11%) were labial placed (p=0.49) (Figure 2).

More than half, 50.54 % of patients with third molar impaction presented with dental caries, 17.93% for orthodontic reasons. About 13.54 % and 10.87% of patients with impacted teeth visited the department with a chief complaint toothache and discomfort respectively. Prophylactic indication and accidental periapical finding were account only to 3.26 % each (Table 4).

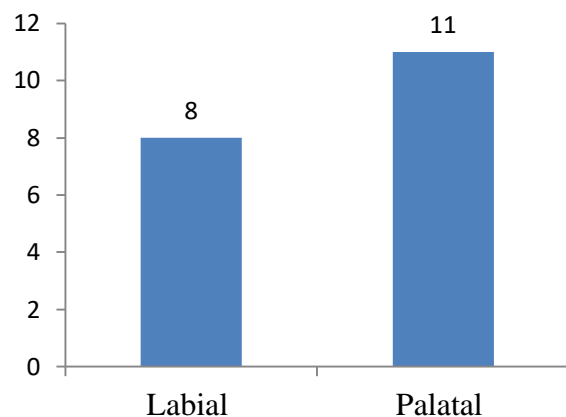


Figure 2: Positions of impacted maxillary canine for patients treated at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia

In this study, surgical removal was the mainstay of treatment. The majority, 166(89.67%) of patients with impacted teeth were managed surgically under local anesthesia and the rest 4 (4.3%) were treated by non-surgical removal without raising a flap. Surgical exposure without

extraction of the teeth was done in 4(4.3%) patients. Only 2(1.08%) patients were treated by operculectomy and medication (Figure 3).

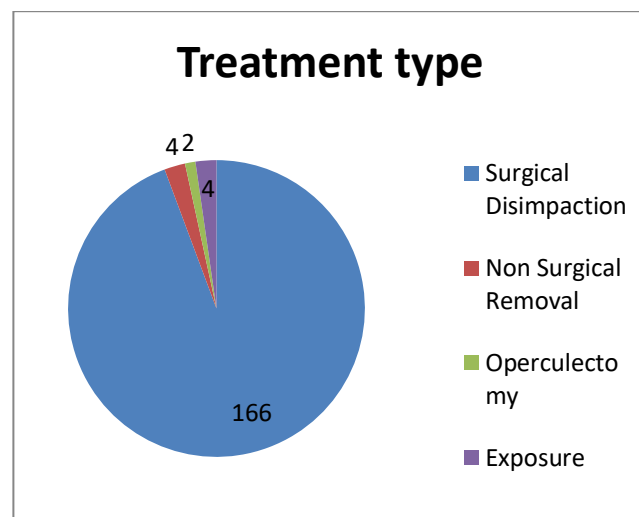


Figure 3: Type of treatment received for patients with impacted teeth at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia

Table 2: Distribution of impacted teeth according to gender and involved side among patients treated at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia.

Characteristics	Side						Frequency (%)		p-value
	Right		Left		Bilateral		Male	Female	
	M	F	M	F	M	F			
Impacted tooth									
Mandibular 3 rd molar	20	32	48	30	10	12	78(51.31%)	74(48.68%)	0.03
Maxillary 3 rd molar	0	5	6	0	0	0	6(3.26%)	5(2.71%)	
Maxillary canine	2	3	9	5	0	0	11(5.97%)	8(4.34%)	
Mandibular premolar	0	0	2	0	0	0	2(1.08%)	0(0.00%)	
Total	22	40	65	35	10	12	184(100%)		

Table 3: Patterns of mandibular third molar impaction vs. gender for patients treated at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia

Variables	Mesioangular impaction	Distoangular impaction	Horizontal impaction	Vertical impaction	p-value
Sex					
Male	41(53.25%)	11(37.93%)	8(61.53%)	18(40.90%)	0.35
Female	36(46.75%)	18(62.06%)	5(38.46%)	26(59.09%)	

Table 4: Complaints of participants with impacted teeth among patients treated at Addis Ababa University, Dental Center from 2019 - 2021, Addis Ababa, Ethiopia

Variable	Number (N= 184)	Percent
Complaints		
Dental caries	93	5.54%
Toothache	25	13.54%
Discomfort	10	10.87%
Prophylactic indication	6	3.26%
Orthodontic reason	33	17.93%
Pericoronitis	11	5.97%
Periapical lesions	6	3.26%

Discussion

This was a retrospective study conducted on patients' chart review over the period of three years by listing out the chart numbers from residents' log book and then retrieving all relevant files of the patients from the record office. The mean age of patients was 26.5, which was lower than reported in previous studies in Tanzania and Turkey which was 28.9, 30.58 respectively (16-17). Among the total study participants, the occurrence of impacted teeth was more common in females than males (female 60.86%; male 39.13%). This could be because female patients visit Dental or maxillofacial Clinic more frequently than male patients for aesthetic purpose. This result is in contrast with other reports which is either male predilection or no sex difference (18-19). The study conducted at University of Turku, no difference in sex in the prevalence of third molars (20). In this study, the most frequent age group was from 21-30 years, 96(52.17%) which is in line with previous study done in Indonesia (21) . It is also similar with study reports in Eritrea and Tanzania, 67.4% (7, 9). This time period is appropriate time to remove the tooth before it causes complications and also it helps

easy to remove the teeth before the root is fully formed.

Compared to other impacted in the oral cavity, the incidence of impacted mandibular third molars were four folds (82.6%) in this study. Less than 20% of all impactions have affected mandibular premolars, canines, and maxillary third molars. Most probably, this can be due to patients' visit of the center and hospitals for symptomatic teeth only. They might go to private clinics for esthetic problems associated with canine impaction as well as any missing anterior teeth. The occurrence of third molar impaction was found to be slightly higher in males (51.31%) compared to females (48.68%). However, a recent study conducted in Ethiopia revealed that higher percentage (61.1 %) of females had impacted third molars. This discrepancy may be attributed to the convenience sampling method used to select study participants (22). Furthermore, other research findings indicate females have a higher incidence of mandibular third molar impaction when compared to males (23 - 24).

The most commonly impacted teeth in the present research were the left mandibular third molar (78, or 42.39%), followed by the right side (52, or 34.21%). This finding is in contrast with the study done Tanzania in which right side (44.7%) was more predominant than left side (39.7%) (25) . The present study also found a higher prevalence of impacted maxillary canines on the left side, (73.68%) compared to the right side, (26.31%). This outcome is in agreement with that done in south western Saudi Arabian Population (26). Presently there is no scientific explanation for left side predominance of impacted maxillary canine.

Most of the mandibular third molar impactions were mesioangular, 77(50.65%) in relation to second mandibular molar. This finding is in harmony with previously reported results in Libya (27) and Eritrea (28).In the maxilla, canine

were most commonly impacted according to the study (10.3%). Most, 52.63%) of the impacted maxillary canine were palatal, the remaining positioned labial. This result is in agreement with previously reported in Saudi Arabia (29). Several methods have been used to locate the exact position of the impacted canine, the suitable one is CT. In the current study, postoperative diagnosis was used to categorize the impacted canines' palatal or labial positions.

This study also revealed that, 75% of the cases with mandibular third molar impaction were presented with dental caries, primary complaint of toothache and discomfort. This is similar with the previous study done (30). This could be the effect of difficulty of the area around the tooth to clean properly and it harbors microorganisms. In current study only 3.26 % patients visited the dentist for prophylactic removal of the impacted teeth. On the contrary the study done in Saudi Arabia, 66.8% patients received a treatment as means of prophylactic indication (31) . This indicates that awareness creation about late complications of impacted teeth is mandatory. Concerning the treatment provided for patients with impacted teeth, 90% of patients with impacted teeth were managed surgically at the minor operation room of the center under local anesthesia this is in harmony with the study result in Baltic Population. The rest 4.3% were treated by non-surgical removal of the teeth. Opeculectomy with medication was done for 2% of the patients with recurrent pericoronitis.

Limitations

The major limitation of this study was incomplete patient record documentation with some unclear and missed information. In addition, since the study was conducted in Addis Ababa it may not be generalized to the national setting. Another limitation to consider is the retrospective nature of the study, which could introduce bias and a lack of information regarding potential confounding factors.

Conclusion

In our study, most of the patients who visited the dental center due to tooth impaction were young productive group within the age range of 21-30. Most of the patients with impacted teeth were female with mandibular third molar being the most commonly impacted teeth. Mesioangular impaction of the mandibular third molar is the most common pattern of impaction followed by maxillary canine. The majorities of the patients visited the department and were treated by surgical removal after developing some signs and symptoms concerning the impacted teeth. Awareness creation by health professionals, early detection, and management of impacted teeth minimize the difficulty of the surgery as well as lessen complications is recommended. The department should be aware of these and preparedness in terms of the material, professional patient schedule and possible training are mandatory.

Acknowledgment

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Ethical considerations

Ethical Approval was obtained from the Research and Ethics Review Committee (RERC) of the Department of Dentistry, College of Health of Addis Ababa University. A formal letter requesting permission to conduct this study was sent to the minor oral surgery and records-keeping units. The data used in this study were obtained from secondary records, ensuring that there was no direct interaction with patients. Patient information was coded and anonymized to ensure privacy and confidentiality. The need for consent is not applicable in this study.

Data availability statement

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of interest

The authors declare no competing interest

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