Pattern of impacted teeth among patients at MNH

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ARTICLE INFO	ABSTRACT
  *Corresponding author: *Karpal Singh Sohal* *Department of Oral and Maxillofacial Surgery, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania.* *Tel:* +255-712 723 917 *Fax:* +255-65014 *Email:* karpal@Live.com	**Introduction:** An impacted tooth is the one which fails to attain its normal functional position within the expected developmental period. They are associated with various pathologies. Hence, the aim of this study was to determine the pattern of occurrence, presentation, and management of impacted teeth among patients attending Muhimbili National Hospital. **Materials and Methods:** This was a cross-sectional hospital-based study that included all patients aged≥21 years and had impacted teeth. The patients were interviewed using a specially designed questionnaire and later examined clinically and radiographically. Data obtained was analyzed using SPSS version 23.0. **Results:** A total of 4,668 patients comprising of 1938 (41.5%) males and 2730 (58.5%) females were attended. Among these, 264 (5.6%) patients comprising of 152 (57.6%) males and 112 (42.4%) females had impacted teeth. The 21-25 years age group was the most (59.2%) commonly affected. Mandibular third molars were the most (64.9%) impacted teeth followed by 167 (33.4%) maxillary third molars. Pain was the most common complaint in 79.1% of patients. Mesio-angular impaction was the most common angulation in 196 (39.9%) impacted teeth, followed by vertical impaction in 142 (28.7%) and disto-angular 103 (21.0%) impacted teeth. A majority (66.6%) of impacted teeth were treated by open surgical removal followed by 53 (10.5%) impactions by closed disimpaction. **Conclusion:** The occurrence of impacted teeth among the patients attended at MNH was 5.6%. Mandibular third molars were the most commonly impacted teeth with mesio-angular being the commonest type of angulation of impacted teeth. Pericoronitis was the most common pathology associated with impacted teeth, others included dental caries, ameloblastoma, and dentigerous cysts. Surgical disimpaction was the most frequently used treatment method with good healing results. **Keywords:** Impacted tooth; Mesio-angular impaction; Pericoronitis; Vertical impaction; Disto-angular impaction.

Introduction

Tooth eruption entails axial or occlusal movement of a tooth from its developmental position within the jaw to its functional position in the occlusal plane [1–4]. When a tooth fails to attain its normal functional position within the expected developmental period, it is referred to as an impacted tooth [4–7]. Permanent teeth which are commonly impacted include the third molars in both jaws followed by maxillary canines and maxillary and mandibular second premolars [7–9].

The occurrence of impactions in females is more than in males [10,11]. Signs and symptoms associated with impaction of teeth include redness or swollen gums at the site of impaction, discomfort or pain, gingival bleeding, jaw pain, jaw swelling, bad oral breath, and trismus [7,12,13]. In the case of the impacted third molar, the impaction can be classified according to the radiological presentation using either Winter's classification and/or Pell and Grgory's classification [12].

Management of impacted teeth varies, ranging from observation and follow-up of impacted teeth, surgical removal of a whole tooth or coronectomy, and prophylactic extractions of asymptomatic impacted teeth [14]. However, when left untreated impacted teeth may result in several complications including dental caries, periapical lesions, periodontal disease, root resorption of adjacent tooth and jaw cysts, and tumors [15]. The aim of this study was to determine the pattern of occurrence, presentation, and management of impacted teeth among patients attending Muhimbili National Hospital.

Materials and Methods

This was a descriptive, cross-sectional and hospital-based study that was conducted in the Oral and Maxillofacial Surgery clinic at MNH which is a tertiary referral hospital with the only centre in Tanzania managing the majority of oral and maxillofacial pathologies including impacted teeth. The study was conducted for six months, from August 2018 to February 2019. A convenient sampling procedure was utilized, whereby all patients aged 21 years and above who attended for treatment at the Oral and Maxillofacial Surgery Department during this period were interviewed, clinically and radiographically examined, and those found with impacted teeth were included in the study after they had consented. All recruited patients were interviewed using a specially designed questionnaire to obtain sociodemographic data and presenting symptoms. Clinical, radiological findings and mode of treatment were recorded in specially designed clinical forms for analysis. Data were entered into the computer, analyzed, and coded appropriately, using SPSS 23.0. Frequency distribution of different variables was generated. Bivariate analyses were performed using Chi-square statistics to assess the association between two variables, for categorical variables and the T-test for continuous variables. The p-value of <0.05 was considered statistically significant and the confidence interval was set at 95%. Ethical clearance for this study was provided by the Institutional Review Board of the Muhimbili University of Health and Allied Sciences (MUHAS). Participation was voluntary and for each participant, a signed informed consent form was obtained before data collection. The participants were assured of confidentiality and their right to participate or withdraw without any conditions.

Results

A total of 4,668 patients comprising of 1938 (41.5%) males and 2730 (58.5%) females were attended. Among these, 264 (5.6%) patients, 152 (57.6%) males, and 112 (42.4%) females were diagnosed to have impacted teeth and therefore recruited in the study. The age ranged from 21 to 44 years with a mean age of 27.4 (SD 5.9) years. The 21-25 years age group was the most (59.2%) commonly affected by impacted teeth. Among the 264 patients, there were a total of 501 impacted teeth. Mandibular third molars were the majority (324, 64.7%) of impacted teeth followed by maxillary third molars (167, 33.3%) (Table 1).

Pain was the most common presenting complaint in 209 (79.1%) patients followed by gingival swelling in 85 (32.1%) patients, and jaw swelling in 70 (26.5%) patients. Others included halitosis, paraesthesia, and trismus (Table 2). Pericoronitis was the most observed associated pathology involving 185 (36.9%) impacted teeth followed by dental caries on 102 (20.3%) and 83 (16.5%) adjacent second molars and impacted teeth respectively. Regarding tumors and tumor-like lesions, Dentigerous cysts were found in association with 10 (2%) impacted teeth while ameloblastoma was found associated with 8 (1.6%) impacted teeth. Both left and right impacted mandibular third molars were the most commonly associated with almost all types of pathologies (Table 3).

According to Winter's classification of impacted third molars, this study revealed the mesio-angular to be the most common angulation in 196 (39.9%) impacted third molars, followed by vertical in 141 (28.7%) and disto-angular 141 (28.7%) impacted third molars. Other presentations, were transverse, inverted, and horizontal impactions (Table 4). However, according to Pell and Gregory's classification of impacted teeth, Position B was the most common level of depth of 251 (50.0%) impacted teeth followed by Position A in 188 (37.5%) and Position C in 52 (10.3%) impacted teeth (Figure 1). Regarding ramus relationship, Class II was the most common followed by classes I and III of mandibular impacted third molars (Figure 2 & 3). Surgical removal was the frequently used treatment modality for the management of the majority 334 (66.6%)

impacted teeth followed by closed disimpaction of 53 (10.5%) teeth and for 114 (22.7%) impactions patients were either treated by antibiotics, analgesics or kept under observation (Table 5).
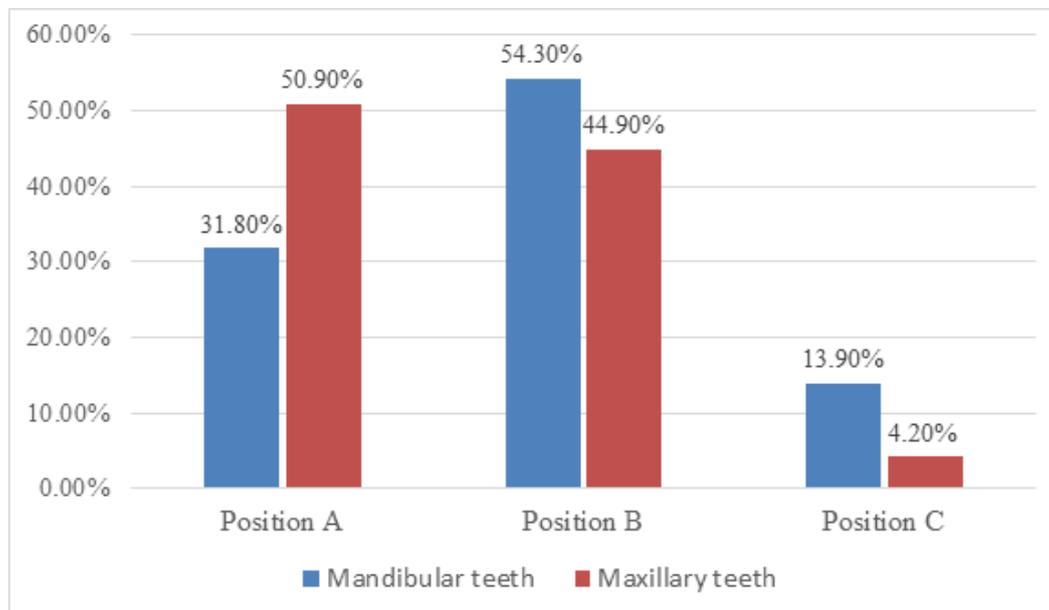

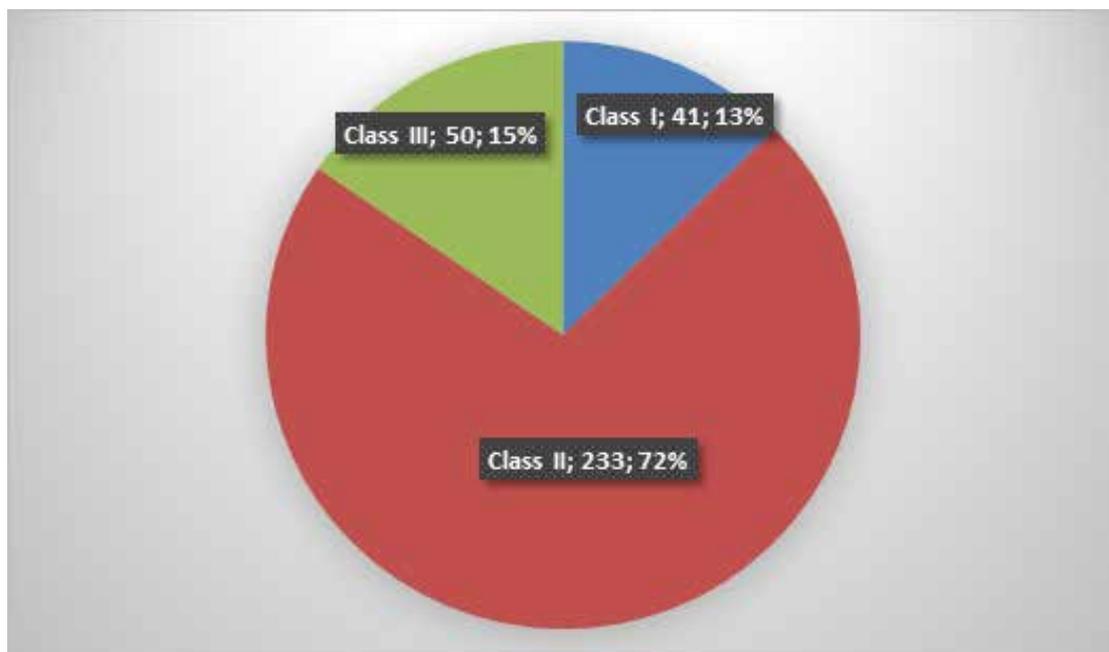*Figure 1.* Distribution of impacted third molars according to Pell and Gregory's classification.

Figure 2. Distribution of impacted third molars according to Pell and Gregory's classification.
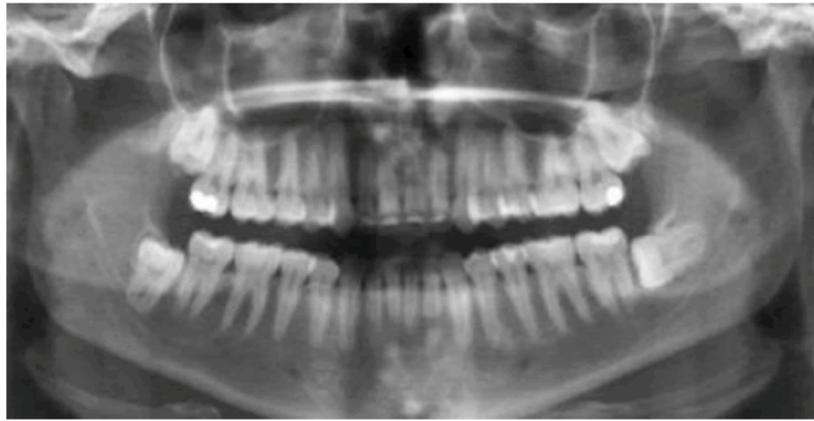
Figure 3. OPG showing multiple impacted teeth according to Winter's classification of impacted third molars: (a) and (d) vertical impaction, (b) distal angular and (c) horizontal impaction.

Jaws	Impacted tooth	Sex				Total	
		Male		Female			
		n	*(%)*	*n*	*(%)*	*n*	*Total*
Upper jaw	18	49	(54.4)	41	(45.6)	90	(100)
	13	-	-	2	(100)	2	(100)
	23	-	-	2	(100)	2	(100)
	28	43	(55.8)	34	(44.2)	77	(100)
Lower jaw	38	103	(57.9)	75	(42.1)	178	(100)
	37	1	(100)	-	-	1	(100)
	35	1	(50)	1	(50)	2	(100)
	45	1	(50)	1	(50)	2	(100)
	47	1	(100)	-	-	1	(100)
	48	86	(58.9)	60	(41.1)	146	(100)
	Total	285	(56.9)	216	(43.1)	501	(100)

Table 1. Distribution of impacted teeth among patients according to site and gender (N=501).

Sign and symptoms	Sex				Total
	Male		Famale		
	n=152	(%)	n=112	(%)	n
Pain	123	(80.9)	86	(76.8)	209
Halitosis	40	(26.3)	21	(18.7)	61
Parasthesia	5	(3.3)	1	(0.9)	6
Jaw swelling	37	(24.3)	33	(29.5)	70
Gingival swelling	46	(30.3)	39	(34.8)	85
Aesthetics	2	(1.3)	2	(1.8)	4
Trismus	3	(2.0)	2	(1.8)	5

Table 2. Distribution of patients with impacted teeth according to signs and symptoms and sex (N=264).

Table 3. Distribution of pathologies associated with impacted teeth (N=501).

Pathologies	Impacted teeth				
	18	28	38	48	Total
	n (%)	n (%)	n (%)	n (%)	n (%)
Carious impacted tooth	4 (4.7)	5 (5.9)	43 (50.6)	33 (38.8)	85 (100)
Carious adjacent tooth	4 (3.9)	10 (9.8)	47 (46.1)	41 (40.2)	102 (100)
Pericoronitis a/w impacted tooth	3 (1.6)	1 (0.5)	99 (53.6)	82 (44.3)	185 (100)
Tumor a/w impacted tooth	--	--	5 (62.5)	3 (37.5)	8 (100)
Cyst a/w impacted tooth	--	2 (20)	5 (50)	3 (30)	10 (2.0)

Key: a/w =associated with.

Table 4. Distribution of impacted third molars according to tooth angulations (Winter's classification (N=491).

Teeth angulations (Winter's classification)	Upper jaw		Lower jaw		Total
	18	28	38	48	
	n (%)	n (%)	n (%)	n (%)	n (%)
Mesial angular	11 (12.2)	12 (15.6)	99 (55.6)	74 (50.7)	196 (39.9)
Distal angular	43 (47.8)	43 (55.8)	10 (5.6)	7 (4.8)	103 (21.0)
Vertical	36 (40)	22 (28.6)	48 (26.9)	35 (23.9)	141 (28.7)
Horizontal	--	--	19 (10.7)	29 (19.9)	48 (9.8)
Inverted	--	--	1 (0.6)	1 (0.7)	2 (0.4)
Total	--	--	1 (0.6)	--	1 (0.2)
	90 (100)	77 (100)	178 (100)	146 (100)	491 (100)

Table 4. Distribution of impacted third molars according to tooth angulations (Winter's classification (N=491).

Impacted tooth	Treatment modality			Total
	Open surgical Removal	Closed disimpaction	Observation and close follow-up	
	n (%)	n (%)	n (%)	
18	2 (0.6)	23 (43.4)	65 (12.9)	90 (17.9)
28	6 (1.8)	22 (41.5)	49 (9.7)	77 (15.3)
38	175 (52.4)	3 (5.7)	-	178 (35.5)
48	141 (42.2)	5 (9.4)	-	146 (29.1)
13	2 (0.6)	-	-	2 (0.3)
23	2 (0.6)	-	-	2 (0.3)
35	2 (0.6)	-	-	2 (0.3)
45	2 (0.6)	-	-	2 (0.3)
37	1 (0.3)	-	-	1 (0.1)
47	1 (0.3)	-	-	1 (0.1)
Total	334 (100)	53 (100)	114 (100)	501 (100)

Discussion

A slight predominance of impacted teeth in males observed in this study matched with findings in several studies [7,16–18], but was contrary to others which reported a higher prevalence of impacted teeth in females [19–21]. The reason for male preponderance in this study could have been due to the delay by males to seek treatment at a younger age compared to females [7]. The patient's mean age of 27.4 (SD 5.9) years observed in this study was slightly higher than that which has been reported in Poland [22]. This could be explained by the fact that in developed countries impacted teeth are discovered early during routine dental examinations and treated at younger ages [23]. Therefore, not many adult patients with impacted teeth may be encountered in these developed countries.

Results in this study revealed that the most commonly encountered impacted teeth were mandibular third molars, followed by maxillary third molars and canines, mandibular second premolars and second molars. Similar findings have been reported in other studies [17,20]. General factors such as genetics, socioeconomic factors, craniofacial morphology and various systemic diseases have been suggested as reasons for such an occurrence [12]. Slightly more than a half (53.8%) of the patients in this study had one impacted tooth, followed by 23.5% with two impacted teeth and 18.6% of patients with four impacted teeth. Msagati et al. [7] reported similar findings. The reason for the presence of multiple impacted teeth in a person could be due to small jaw size, which could be attributed to many factors such as genetic, hereditary, and environmental factors. The main reasons for patient's attendance to the hospital were pain, followed by jaw swelling, halitosis, trismus, and several others related or not necessarily related to impacted teeth. Pain was mostly related to pericoronitis and pulpitis on the impacted teeth, the adjacent ones, or both. In addition, pain could have resulted from the impacted tooth compressing the adjacent tooth during eruption. Pain mainly due to infection was the commonest symptom across all age groups and in both sexes mainly as a result of delay in seeking oral health care. Similar to several other studies this study showed a high prevalence of impacted third molars in the mesial -angular mesio-angular [7,19,24]. Other studies, however, have reported the vertically impacted mandibular third molars to be the most common [5,25]. Based on Pell and Gregory's classification of impacted third molars this study revealed that among the impacted mandibular third molars, class II ramus relationship was the most

common followed by classes I and III. This was in concurrency with another study that had reported class II ramus relationship to be the most prevalent followed by classes I and III [24]. Regarding the depth of impacted teeth, similar to what has been reported in a study by Eshghpour et al. (2014) majority of impacted third molars were in Position B [24].

Dental caries on either the impacted third molars or adjacent teeth or both was the pathology that patients presented with and was most commonly associated with mesial angular impacted teeth. Other pathologies included dentigerous cysts and ameloblastoma. These results were in agreement with some other studies which reported similar findings [4,6,26]. The majority of carious lesions on adjacent second molars occurred on the cervical areas of distal surfaces when associated with mesio-angular impacted third molars. Most probably this was due to the relative inaccessibility to this area for routine cleanliness that could lead to accumulation of food debris and plaque and hence development of dental caries.

Position B and Class II types of impactions were the most commonly associated with development of carious lesions on both impacted third molars and adjacent second molars. In position B, the impacted tooth was usually below the cervical line of the adjacent tooth with the distal cusp erupted into the oral cavity. This caused difficulty in cleaning the impacted tooth and the distal surface of the adjacent tooth resulting in accumulation of plaque, with the eventual development of dental caries. The incidence of pericoronitis of 36.9% as observed in this study was similar to that in other studies which reported a prevalence range of 20% to 70% [6,13,20,27,28].

Similar to a report by Hazza et al. [21] the occurrence of pericoronitis in this study decreased with the increasing age of the patients. This could be explained by the fact that at young ages impacted teeth are usually still deeply situated in the jaw than in older individuals whose impactions were slightly erupted into the oral cavity. Pericoronitis observed in this study was more commonly associated with mesio-angular, followed by vertical and less commonly inverted types of impacted teeth, similar to findings by others [27,28]. For teeth, in such an angulation it is difficult for the patients to clean or remove food or plaque that forms between the impacted and adjacent teeth hence triggering the growth of microorganisms with the eventual inflammation of pericoronal tissues. In this study, dentigerous cysts were associated with 10 (2.0%) impacted teeth and ameloblastomas were found in a rela-

tionship with 8 (1.6%) impacted teeth. Such results are in agreement with some studies which reported that the development of dentigerous cysts in association with impacted teeth ranged from 2% to 6.2% [29,30]. The majority (62.5%) of ameloblastomas were associated with left mandibular third molars, while, among the ten dentigerous cysts five occurred in association with left mandibular third molars. Both ameloblastomas and dentigerous cysts were commonly associated with mesio-angular impactions. Conspicuously, in this study, the left impacted mandibular third molars were the most commonly associated with all types of pathologies that were encountered.

Management plan of impacted teeth was influenced by several factors such as weakening of the crown due to gross caries, amount of overlying bone, proximity to the adjacent tooth, presence of infection, cyst, tumor, and other pathological conditions. Treatment included closed disimpaction, open surgical removal of impacted teeth, observation, and follow-up. It was challenging when patients presented with infection accompanied by pain, swelling, and trismus. Despite the severe pain, the impacted teeth could not be removed until the infection was controlled and trismus resolved. Patients had to remain in duress for several days before disimpaction, which compromised their health. The treatment modality that was frequently used in this study was open surgical removal of impacted teeth similar to what has been reported in other studies [22,31]. Almost all impacted mandibular third molars were surgically removed through the removal of the overlying bone using a handpiece and bur or a chisel and hammer. Open surgical removal was carried out in all horizontal, inverted, and transverse types of impacted teeth while only 84.6% of mesio-angular impacted third molars were treated by the same approach. This was because in these types of angulations the teeth were almost completely covered by bone and some of them were locked against the adjacent second molars which made it difficult to elevate the impacted teeth without removing the covering bone. Closed disimpaction was mainly carried out to remove disto-angular or vertically impacted maxillary third molars, which were not locked against second molars. According to Pell and Gregory's classifications of impacted third molars open surgical removal was done to all impacted third molars, which were in positions B and C and those in classes II and III ramus relationship. This was because the teeth were deeply impacted in the bone and it was difficult to be removed without removing the covering-bone. Closed disimpaction was done in a few impacted

third molars all of which were in position A and class I. Observation and close follow-up which was used in the management of patients with impacted teeth were decided on mainly in situations where patients had no complaints. In most of these patients, the diagnosis of impactions was a coincidental finding made during examinations of other complaints. Most of the patients managed by observation and close follow-up had impacted maxillary third molars. In this study, all patients were given both analgesics and antibiotics after surgical removal of the impacted teeth. No patient reported infection after surgery, which was similar to a study by Martín-Ares et al. [32].

Study limitations

This was a hospital-based study that captured only those patients who reported to the dental clinic. Some patients did not give consent for various reasons. Some patients failed to turn up for treatment although they were initially registered and went through all the basic investigations. Short study period.

Conclusion

In this study, the occurrence of impacted teeth was 5.6%. Mandibular third molars were the most common impacted teeth with mesio-angular being the most common type of angulation of impacted teeth. Pericoronitis was the most common pathology associated with impacted teeth, others included dental caries, ameloblastoma, and dentigerous cysts. Most of the impacted teeth were removed by open surgical methods with good healing.

Conflict of Interest

There is no conflict of interest to declare.

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