

## Five-year span prevalence of post-extraction complications in Tabora municipality between January 2004 and December 2008

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### Abstract

**Objective:** The objective of the study was to determine the magnitude of post extraction complications and related diagnoses among patients who had attended dental clinics in Tabora Municipality from January 2004 to December 2008. **Materials and Methods:** A retrospective study involved a total of 218 eligible patients, who re-attended at Kitete Hospital and urban health facilities. Information source was from the dental records as detailed in register books and in the out patient cards. The relevant pre-operative information recorded for each patient included diagnosis leading to extraction, tooth/teeth removed and post extraction complication acquired. The collected data were processed and analyzed using SPSS program files, Chi Square statistic was used to test for statistical significance. **Results:** Out of the eligible 218 patients, 90.4%, (n=197) were evaluated. The most frequent diagnosis was dental caries 93% (n=183); followed by periodontal diseases 5.1% (n=10) and trauma 2.0% (n=4). The most frequently affected tooth was the left lower first molar 12.7% (n=25); followed by the lower right first molar 12.2% (n=24); lower right second molar 11.7% (n=23) and lower left second molar 11.2% (n=22). The most frequent post extraction complication was an infected socket in 90.9% (n=179), followed by alveolar osteitis and bleeding socket 4.6% (n=9). **Conclusion:** The majority of post extraction complications were infected sockets with prevalence 90.9% and they are not associated with initial diagnosis and type of tooth extracted. However, the problem of record keeping was obvious.

**Key words:** Initial diagnosis, tooth extracted, post-extraction complications, hospital records.

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### Introduction

Complications following the extraction of teeth can be serious and sometimes fatal including; haemorrhage, ecchymosis and haematoma, swelling, pain, septic periostitis, alveolar osteitis (dry socket) and infection. These complications can be minimized by adequate diagnostics and planning sufficient time for treatment (1).

The extraction of tooth requires the separation of its attachment to the alveolar bone via the crestal and principal fibers of the periodontal ligament. After the tooth has been removed, the form of the alveolar process is restored by finger pressure. Bleeding is arrested by means of a pressure pack placed between the jaws, and the wound is allowed to fill with a blood clot.

There are various reasons for tooth extraction. For instance: carious teeth beyond repair, extra-numerally teeth and severe gum disease with loos of bone attachment. Other reasons can be as preparation for orthodontic treatment (braces), teeth in the fracture

line, fractured teeth, impacted teeth and teeth in the line of irradiation to the head and neck (2)

Tooth extraction is a routine dental procedure in which, the majority should anticipate no complications during or after the tooth extraction if handled properly. However, difficulties with extractions are unpredictable, particularly increased in conditions such as: strong supporting tissues, abnormal root morphology, teeth with weakened crown surfaces due to large restorations, and in teeth with deep caries and brittle teeth after endodontic treatment (3). Adeyemo et al. (4) demonstrated that difficulties and accidents occurring during tooth extraction predispose into disturbance of post-extraction wound healing. In their study, the findings revealed that 24.7% of the 73 extractions with difficulties developed post extraction complications compared to 7.5% of the 228 extractions without difficulties. However, Simon and Matee (5) reported a low frequency of 1.1% post extraction complications and were mainly due to: infected

sockets (48.7%), bleeding sockets (41.0%) and retained roots (10.3%) in that descending order.

Studies suggest that, the most common teeth associated with post-extraction complications are mainly the molars (76%) and premolars (19%); and the most common molars to be affected are in the descending order from the first, the third and the second molars (6,7). In those studies, the prevalence of post-extraction complications which required intensive treatment was only 3.4% out of a total of 2968 patients who had extraction of one or more permanent teeth (6).

Alveolar osteitis accounted for 90% of the post-extraction complication cases and the mandibular as compared to the maxillary teeth were more likely to have complications. Post-extraction alveolus healing was also complicated by acutely infected alveoli and acutely inflamed alveoli (7). Therefore, these studies concluded that alveolar osteitis was the most common post-extraction complications often associated with difficult extraction in which, females were significantly more affected than males (8). However, studies have also shown that the likelihood of occurrence of post-extraction complication may equally involve mandibular and maxillary teeth (9).

Moreover, the pre-operative diagnosis of caries, periodontal disease or retained root is reported as having a higher tendency of predisposing into acutely inflamed socket (10). While an acutely infected socket had developed only in the cases of retained roots; the use of sterile surgical gloves had no better advantage over using clean gloves in minimizing socket inflammation, infection, as well as dry socket following dental extraction.

At Muhimbili Medical Centre, infected sockets was the most frequently appearing post extraction complication (48.7%) (5), while most other studies reported that alveolar osteitis was the most frequently occurring post extraction complication (7,6,8,9), posing controversy on the most frequently post-extraction complication. Nevertheless, these studies indicates an association of post extraction complications to posterior teeth and that pre-operative diagnosis of caries, periodontal disease or retained root had a higher tendency of producing post extraction complications.

The prevalence of post extraction complications, association to initial diagnoses and the linkage to the teeth extracted are not known in the Tabora Municipality. Therefore, the purpose of this study was to determine the magnitude of post extraction

complications and relate this to the extracted teeth and pre-extraction diagnoses among patients who attended dental clinics in Tabora Municipality from January 2004 to December 2008.

### **Methodology**

A retrospective descriptive study was conducted at two health facilities named Kitete Hospital and Town Clinic in the Tabora Municipality, involving the post-extraction complications that occurred in a five year span from January 2004 to December 2008; their related diagnoses and types of teeth extracted. All post operative re-attendances were eligible to participate into this study.

The study took four weeks of May 2009 and the information was obtained by going through 218 re-attendances in the dental register books and the available outpatient cards from which, 197 post extraction complications were identified and included into the study. Permission to conduct the study was sought from the Regional Medical Officer and the Tabora Municipal Medical officer.

Data collected from these cards included gender, age and residence, diagnosis and type of the tooth extracted in association with the collected post extraction complications. Register books and cards from which the information about both dependent and independent variables were not clear, were excluded from the study. However, most of those excluded were patients who had their deciduous teeth extracted due to dental abscess and they were re-attending for follow up, being under antibiotics coverage. Only permanent teeth in relation to post-extraction complications were considered as meeting the selection criteria of post-extraction complication for analysis. Data were analyzed using Statistical Package for Social Sciences (SPSS) files version 11.0, cross tabulations and Chi-square statistic was used to test significance with a critical value at  $P < 0.05$ .

### **Results**

Generally, the current study found that among the participated 197 re-attending patients, the most frequently diagnosis featuring in the records for patients who had their teeth extracted before re-attending for post-extraction complications was dental caries (92.9%,  $n=183$ ). Other recorded prior diagnoses were periodontal diseases (5.1%,  $n=10$ ) and Trauma (2.0%,  $n=4$ ).

According to Table1, Molars were the most frequently extracted teeth before post-extraction emergence, whereas anterior teeth are the least

common teeth involved in post-extraction re-attendance with complications.

The top ten most frequently extracted permanent teeth can be summarized in Table 2 according to number of teeth extracted most and percentage. None of the anterior teeth appears in the top ten extracted teeth.

The most frequently recorded post-extraction complication was the infected socket (90.9%, n=179). Others were the alveolar osteitis and bleeding socket, each with 7.6% (n=9) respectively. Pre-extraction diagnosis was not significantly related to the type of post-extraction complication (Table 3), the infected socket appearing most frequently in all of the pre-extraction diagnoses.

**Table1. Frequency distribution by Palma/Zigmondy nomenclature system, of teeth extracted according to quantity and percentage of each tooth. N=197**

Percentage (%)	1.5	6.1	2.5	2.5	0.5	0	0	0.5	0	0	0.5	0.5	1.0	6.6	6.1	5.6
Number extracted	3	12	5	5	1	0	0	1	0	0	1	1	2	13	9	11
<b>Maxillary teeth</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>Mandibular teeth</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Number extracted	16	23	24	4	0	0	0	1	0	0	0	0	2	25	22	14
Percentage (%)	8.1	11.7	12.2	2.0	0	0	0	0.5	0	0	0	0	1.0	13.7	11.2	7.1

Table1 shows that whereas molars mostly lower, were the most frequently extracted teeth before the post-extraction complications, anterior teeth were least extracted.

Moreover, the permanent tooth extracted did not significantly relate to the type of post-extraction complication (Table 4). The infected socket most frequently occurred in all types of teeth extracted.

**Discussion**

This study focused on determining the magnitude and type of post-extraction. Complications in relation to initial diagnosis and type of tooth extracted in the Tabora Municipal Council from January 2004 to December 2008.

**Table2. Top ten frequently extracted permanent teeth in number and percentage**

Tooth (FDI 2-digit system)	Number of teeth extracted	Percentage %
36	25	12.7
46	24	12.2
47	23	11.7
37	22	11.2
48	16	8.1
38	14	7.1
26	13	6.6
17	12	6.1
28	11	5.6
27	9	4.6

Table 2 shows that teeth 36 and 46 were the most frequently extracted permanent teeth, with 12.7% and

12.2% respectively. They were followed by tooth number 47 and 37 with 11.7% and 11.2% respectively. Molar teeth were the only permanent dentition extracted in the top ten before the emergence of post-extraction complications.

The study was a retrospective one, it was conducted at two famous and well used health facilities (Kitete hospital and Town clinic) instead of three as it was planned. At the third also famous health facility; Moravian Dispensary, there was lack of the required basic patient information. Additionally, there was no patients re-attendance at the Dispensary as confirmed by the dental personnel in charge of the clinic, because no patient had ever returned with a complication after tooth extraction. Therefore, Moravian Clinic was excluded.

Moreover, outpatient cards were taken by patients after treatment not only from Moravian dispensary, but also from the Town clinic, with the dental registry books remaining as the only data source. Unlike the Town clinic and Moravian dispensary, data collection from Kitete hospital was difficult due to the renovation of the outpatient department (OPD) which caused the movement of all health services to another place (Kalunde). This led to the disorganization and loss of all outpatient cards beyond the year 2008.

**Table 3: Frequency distribution of diagnoses in relation to post extraction complication in terms of percentage (%) and number (n), N=197**

Post extraction complication	Diagnosis			Total
	Dental caries	Periodontal diseases	Trauma	
Infected socket	92.7% (166)	5.6% (10)	1.7% (3)	90.8% (179)
Alveolar osteitis	100% (9)	0	0	4.6% (9)
Bleeding socket	88.9% (8)	0	11.1% (1)	4.6% (9)
<b>Total</b>	<b>92.9% (183)</b>	<b>5.1 % (10)</b>	<b>2.0% (4)</b>	<b>100% (197)</b>

Dental caries (166, 92%) were the most frequent diagnosis and with infected socket ( $\chi^2 = 5.11$ ;  $P > 0.05$ ).

Nevertheless, recent cards were available, except that the information about initial treatments (normal or complicated extraction), duration from day of extraction to post extraction complication, factors related to it, and investigations were missing. However, all important data concerning specific objectives were accurately collected mainly from the dental register books and some outpatient cards. A similar method of data collection was used in the

study concerning pattern of Dental Caries in Mulago Dental School Clinic, conducted in Uganda (11); where a review of patients' treatment records for the period 1995 to 1999 was done. The consistence of record keeping in this study facilitated an easy retrieval of information unlike the presently collected data making the information obtained needing to be taken with some caution.

**Table 4: Frequency distribution of extracted permanent teeth in relation to post extraction complications in terms of percentage (%) and number (n), N=177**

Post extraction complication	Permanent tooth extracted			Total
	1 <sup>st</sup> Molars	2 <sup>nd</sup> Molars	3 <sup>rd</sup> Molars	
Infected socket	38.75% (62)	37.5% (60)	23.75% (38)	90.4% (160)
Alveolar osteitis	25% (2)	25% (2)	50% (4)	4.5% (8)
Bleeding socket	33.3% (3)	44.4% (4)	22.2% (2)	5.1% (9)
<b>Total</b>	<b>37.8% (67)</b>	<b>37.3%(66)</b>	<b>24.9%(44)</b>	<b>100% (177)</b>

The 1<sup>st</sup> molars (62, 38.75%) followed by 2<sup>nd</sup> molars (60, 37.5%) were the most frequent teeth extracted and with infected socket ( $\chi^2 = 4.01$ ;  $P > 0.05$ ).

Nevertheless, the response rate of in this study was 90.4% (n=197) in which, 87.8% (n=173) cases were re-attendances from Kitete Regional Hospital, with only 12.2% (n=24) cases being from the Town Clinic and none from the Morevian clinic. This would suggest that of the obtained re-attendees in this study and assuming that many patients tend to favor getting dental services from the Government Regional Hospital rather than the two private clinics, the obtained data should have sufficient information that may represent at least more than two thirds of the population in Tabora Municipality.

Furthermore, despite an increased number of post extraction complications from the Regional Dental clinic, most of the re-attendances lacked the first attendances when followed up. This implies, that initially many patients were treated somewhere else before contracting post extraction complications. More importantly, registry records and the available patient cards were silent on whether or not these

patients were referral cases from other health facilities. This might be contributed to poor data recording but also it may be assumed that cases like these could have been treated from private clinics such as the Moravian Clinic and other remote health facilities, using the weak referral systems to self-refer their post-extraction complications to the Regional dental clinic. Likewise, this should hint us that not all complications that were treated at the Regional dental clinic originated from the Regional dental clinic.

Dental caries accounted for 92.9% of all diagnoses in relation to post extraction complications, followed by periodontal diseases 5.15% and trauma 2.0%. This is consistent with the study by Chiu (12) in which, pre-operative diagnosis of dental caries, periodontal disease or retained root had a higher tendency of producing an acute inflamed socket. In the current study, the majority of post extraction complications were the infected sockets in 90.9%, followed by alveolar osteitis and bleeding socket 4.6% each.

Our findings differs from those reported by Simon and Matee (5) in which, the frequency of post extraction complications was mainly due to: infected sockets (48.7 %), bleeding sockets (41.0 %) and retained roots (10.3%). In the contrary, according to a study by Jaafar and Nor (6), alveolar osteitis accounted for nine out of ten cases and was concluded as the most common post-extraction complication. Moreover, Adeyemo et al. (8) reported that apart from alveolar osteitis, post-extraction alveolus healing was also complicated by acutely infected alveoli.

The fact that the number of infected sockets was extremely high in Tabora municipality, it might indicate possible problems of confusion between alveolar osteitis and infected socket probably due to differing diagnostic criterion and skills, leading into differences in the named complications.

Unfortunately, neither the register book nor outpatient cards showed the factors attributing to the complications. Consistently, a study by Jaafar and Nor (6) also reported that the etiology was unknown and no obvious association with medical history could be made.

On associating between the pre-extraction diagnoses with a type of post extraction complication at 95% confidence level, our findings did not find any statistical significant association. Similarly, association between the type of tooth extracted and post extraction complications indicated no statistical significance but the lower molar teeth were most hit with post-extraction complication, because the distribution of caries was higher in the lower than the upper jaw (11).

The reasons for the lower teeth and more importantly, the posterior teeth being more hit by caries could probably due to retention of food remnants not easily reached by tooth-brushing. Additionally, the posterior teeth could be more prone to caries due to anatomical reasons - broader occlusal surface areas, pits and fissures compared to the anterior teeth. Explanation to reasons for post-extraction complication to occur in post-extracted molar teeth more often than others could be poor post-extraction instructions given to patients; poor patient's home care to abide to the instructions given to them by their dentists; difficult or complicated extraction of posterior teeth as compared to the anterior - posterior more than the anterior. The cause for post-extraction complications however, was not part of our objective; this can follow strategically given opportunity to do so.

Little is known from other parts in the country, a need for an extensive study to other parts will give us a more meaningful inference, although anecdotal information suggest a similar trend of affair in many dental clinics. Therefore, from this study it may be suggested that the post extraction complications are not associated with dental diagnosis and also not generally with the type of tooth extracted, at least in our present study.

### **Conclusion**

From this study, it can be concluded that the most frequent post-extraction complication in Tabora Municipality was infected socket with a prevalence of 90.7%. Dental caries of posterior teeth was the most frequent initial pre-extraction diagnosis. However, there were no statistically significant association between the initial diagnosis and type of tooth extracted.

### **Recommendation**

The data shows that there is a problem of record keeping in our health facilities, at least in Tabora municipality. The health facility teams at various levels should emphasize on proper health record keeping by reinforcing on-job training or employing qualified record keepers for the posts. Proper and good records that show necessary details such as factors that contribute to possible complications can help in controlling the post-extraction complications. There is a need for more studies in order to resolve the discrepancies of findings among researchers.

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