

PREVALENCE OF IMPACTED MANDIBULAR THIRD MOLAR TEETH AT

MEDUNSA ORAL HEALTH CENTRE

BY

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PREVALENCE OF IMPACTED MANDIBULAR THIRD MOLAR TEETH AT

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A Dissertation submitted in partial fulfilment of the requirement for the

degree of

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Key words

Impacted tooth

Mandibular third molars

Prevalence

Angulation

Orthopantomographs

Abstract

AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to investigate the prevalent types of impacted mandibular third molar teeth among patients who visited MEDUNSA Oral Health Centre during the period of January to December 2008.

OBJECTIVES

1. To determine the frequency of impacted mandibular third molars.
2. To describe the radiographic diagnosis of patients with impactions
3. To identify the impact of impacted mandibular third molar teeth with different ages and sexes.

STUDY DESIGN

The study was conducted on patients who visited MEDUNSA Oral Health Centre in the Maxillofacial and Oral Surgery Department in 2008. It was a retrospective study where patients' records with orthopantomographic radiographs were examined for mandibular third molar impactions.

THE RESULTS

The sample comprised of 206 patients with impacted mandibular third molar teeth. The mean age of patients with impactions was 27 years of age.

Female to male ratio was 1 (35.9%) to 1.6 (64.1%). Most patients had bilateral impactions with either the same or different angulations. The 51.9% were in mesioangular position, 18.4% in distoangular position, 15.5% in vertical position, 13.5% horizontally and 0.9% transverse position. Among the patients, 58.7% were 21-30 years, 10.1% were 17-20 years and only 9.2% were above 40 years of age.

CONCLUSION

This study demonstrated that males (64%) were more likely to present with impacted mandibular third molars than females (35.9%). The prevalence of third molar impactions was almost the same on both the left (49.6%) and right (50.4%) sides.

This study also noted that mesio-angular impactions (51.9%) were the most common type of impaction. The least common form of impactions was the transverse types (0.9%).

DECLARATION

I, Vusumuzi Ndumiso Tsabedze, hereby declare that the work on which this dissertation is based, is original (except where acknowledgements indicate otherwise) and neither the whole work nor any part of it has been, is being, or shall be submitted for another degree at this or any other university, institution for tertiary education or examining body.

Signed: _____

DEDICATION

This work is dedicated to my wife, Zethu, daughter, Simamukele my son, Basanda and my mother, Constance, for their continued support and encouragement they provided throughout the duration of this study. I give all the praises to God Almighty, my heavenly father, for all the strength he afforded me.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

MEDUNSA Oral Health Centre is a national referral hospital which mainly serves a community of low and middle class black population. The Maxillofacial and Oral Surgery department renders a number of surgical services such as tooth extractions, treatment of facial and oral trauma.

Impaction of third molars is caused by either insufficient maxillofacial skeletal development or a low correlation between maxillofacial skeletal development and third molar maturation leading to a lack of space between the second molar and the ramus (Obimakinde, 2009). Tooth impaction is presently being diagnosed more often than the past fifteen years. When compared with the primitive races, the modern man seems to have a higher incidence of third molar impaction. Theories on the aetiology of impacted third molars are many and varied but there seems to be a consensus on the association between a modern civilised diet and the occurrence of impactions (Olasoji and Odusanya, 2000).

Impactions assume different angulations and positions, and may occur in both jaws (maxilla and mandible). A patient may present with one or more impactions in either jaws. Identification of impactions can be done clinically and confirmed with radiographs such as orthopantomographs, lateral obliques and periapicals. The radiograph of choice to assess third molar impactions is the orthopantomograph radiographs (Sant'Ana, *et al.* 2005; Gupta, *et al.* 2010).

Obimakinde (2009) observed that mandibular third molars are the most commonly impacted teeth followed by maxillary third molars, maxillary canines and mandibular canines. According to the three years study conducted by Nzima (2005), a total of 171 patients had presented with impacted teeth in the Radiology department and this necessitated this study to determine if they do come to the Maxillofacial and Oral Surgery for treatment.

1.2 PROBLEM STATEMENT

Third molar teeth are the last to erupt and have a relatively high chance of becoming impacted (Hassan, 2010). Impacted third molar teeth are believed to be mainly due to space deficiency which is attributed to many factors such as soft diet, insufficient eruption forces and hereditary factors. The prevalence rates of mandibular third molar teeth varies from one population to another and several authors have reported prevalence rates ranging from 9.5% to 50%, higher in the western region (Obimakinde, 2009). Studies done in Nigerian population reported a prevalence rate of impacted mandibular third molar teeth as 1.9% to 15.1% for rural and urban populations respectively (Obiechina, *et al.* 2001). A study done in Kenya reported a prevalence rate of impacted mandibular third molar teeth as 15.8/1000 (1.6%) (Mwaniki a Gutha, 1992).

Little is known about the prevalence of impacted mandibular third molar teeth in South Africa as there are few studies available. It is therefore necessary to determine the prevalence of impacted mandibular third molar teeth on the basis of angulation in relation to gender and age of the patients who come to MEDUNSA Oral Health, at the Maxillofacial and Oral Surgery department.

This study is vital to provide definitive data on impacted wisdom teeth, and to assist in the evaluation and improvement of the current treatment modalities.

CHAPTER 2

LITERATURE REVIEW

2.1 DEFINITION

An impacted tooth refers to a tooth that has failed to emerge fully into its expected position due to a physical barrier within the path of eruption (Farman, 2004). Tooth impaction can also be defined as a tooth that fails to erupt into the dental arch within the expected time (Obimakinde, 2009). An impacted tooth is a tooth that is prevented from erupting into position because of malposition, lack of space, or other impediments, as quoted by Qirreish (2005).

The non erupted teeth may be subdivided into those that are obstructed by a physical barrier, non-erupted (impacted) and those that appear to exhibit a lack of erupted force (embedded) (Neville, *et al.* 2002).

Eruption times of third molars are variable, ranging from age 16 to 24 years (Fayad, *et al.* 2004). The mean age for third molar eruption is 17 years. The wide age range found with third molar eruption, as well as positional changes that occur after eruption may be due to differences in race, nature of the diet, the intensity of the use of the masticatory apparatus and possibly due to genetic background (Qirreish, 2005).

2.2 PREVALENCE OF IMPACTED THIRD MOLARS

Impacted third molar teeth can occur in both the mandible and maxilla but most impactions occur in the mandible. The prevalence of impacted mandibular third molars in the population varies in different studies from 16.7% to 68.6% (Hassan, 2010).

The studies of Quek, *et al.* (2003), showed that mesio-angular impactions had the highest frequency, followed by horizontal and then the vertical impactions. According to the study done on Jordanian patients, the mesio-angular impaction was most common, followed by vertical, disto-angular and horizontal impactions (Ma'aita, 2000).

Chu, *et al.* (2003) in a study done in Hong Kong reported the classification according to angulation of the impacted wisdom teeth as: horizontal, mesio-angular, vertical, disto-angular and others in order of decreasing prevalence.

In another study done in Nigeria, the most prevalent third molar impactions were the mesio-angular, vertical, horizontal, disto-angular and others in the decreasing order of prevalence (Obiechina, *et al.* 2001).

In a study done at the University of Western Cape, the prevalence of impacted third molars was found to be in the following order: vertical position predominant (33.6 %), followed by the mesio-angular angulation (32.4%) and the horizontal impaction (28.1%). The disto-angular angular position was the least common type of impactions encountered (1.2%). Buccal and lingual angulation types of impactions were included in the category denoted under “other”, from which it was shown that the prevalence of these angulations makes up 4.6% of all cases of impactions (Qirreish, 2005).

2.3 PREDISPOSING FACTORS

The main cause of impaction of teeth is lack of space (Qirreish, 2005). A study of radiographs from 3,874 dental patients aged over 20 years determined the prevalence of impaction to be 17%; hence, this condition can be considered among the most significant affecting dental care. The most frequently affected regular teeth are the third molars (especially in the mandibular teeth) and the permanent maxillary canines. Impactions can occur simply due to dental crowding, space reduction following premature loss of primary teeth, or an errant path of eruption (Farman, 2004).

The third molar teeth are the last to erupt and may either be partially emerged through the gums or completely hidden. The etiology of the third molar impaction has been investigated in many international studies and several factors were reported as possible causes which include; lack of space distal to the permanent second molar and the ascending ramus, retarded third molar mineralization and the improper angulation of the tooth (Hassan, 2010).

Many authors have proposed several theories for the high frequency of mandibular third molars and they include low correlation between maxillofacial skeletal development and mandibular third molar maturation leading to reduced arch length between the second molar and the ascending ramus, late mineralisation and late physical maturation of mandibular third molar and shortening of the dental arch length due to consumption of refined carbohydrate (Obimakinde, 2009).

It has been theorised (Mendelian theory) that the coarse nature of Stone Age man's diet had the effect of producing extensive tooth wear. Tooth wear would reduce the collective length of the teeth, thus creating enough space to accommodate the wisdom teeth by the time they erupt. Our modern diet does not usually cause a significant amount of this type of tooth wear. It has also been argued that the coarse nature of Stone Age man's diet, as compared to modern man's diet which is relatively soft; probably require more activity of the chewing muscles. The activity could have stimulated greater jawbone growth, thus providing more space for wisdom teeth (Kaifu, *et al.* 2003).

Other theories include lack of sufficient eruption force, hereditary factors and not enough mesial movement of the dentition due to lack of interproximal attrition (Nzima, 2005). Richardson (1977) had found that patients with skeletal class II occlusion were more prone to present with impacted mandibular third molar teeth.

The etiology of impactions can be subdivided into local and systemic causes. Local causes include irregularities in the position of adjacent teeth, density of the surrounding bone, long periods of chronic inflammation of the overlying mucosa, prolonged deciduous tooth retention, premature loss of primary teeth, malposed tooth germs, arch-length deficiency, supernumerary teeth, odontogenic tumors, abnormal eruption path and acquired diseases. Systemic causes include prenatal causes such as hereditary and miscegenation factors. Postnatal causes are rickets, anaemia, congenital syphilis, tuberculosis and malnutrition. There are also rare conditions such as cleidocranial dysplasia, progeria, achondroplasia and cleft palate which are associated with impactions (Qirreish, 2005; Hassan, 2010).

The impacted tooth may be obstructed on its pathway of eruption by an adjacent tooth, bone or soft tissue (Chu, *et al.* 2003).

It can therefore be concluded that mandibular third molar impaction is a result of interplay of these factors.

2.4 CLASSIFICATION OF IMPACTED MANDIBULAR THIRD TEETH

Classification of impacted wisdom teeth may be as follows:

1. Winters (1926) classification is based on the relationship of the impacted tooth to the long axis of the second molar tooth (Obimakinde, 2009; Hupp, *et al.* 2008).

- Mesio-angular impaction means that the wisdom tooth is angled forward, toward the front of the mouth, more towards the adjacent second molar and generally in contact with the distal surface of the second permanent molar (Appendix B, impacted 48).
- Vertical impaction is where the long axis of the tooth runs parallel to the long axis to the second molar. The vertical type is directed towards the occlusal plane (Appendix C, impacted 38).
- The horizontal type has its long axis lying perpendicular to the second molar, within the mandible and has the crown facing the roots of the adjacent second molar (Appendix B, impacted 38).
- The distal or disto-angular impaction has its long axis angled away from the second molar, the crown facing towards the ramus of mandible (Appendix D, Impacted 38).
- Transverse/bucco-angular impactions have the crown directed mainly towards the buccal or lingual side of the face (Appendix E, Impacted 48).
- The inverted type of impaction takes a vertical position with the crown directed towards the inferior alveolar canal.

Quek, *et al.* (2003) proposed a classification system using orthodontic protractor. In their study angulation was determined by the angle formed between the intersected long axis of second and third molars. They classified mandibular third molar impaction as follows:

- a. Vertical (0° to 10°)
- b. Mesioangular (11° to 79°)
- c. Horizontal (80° to 100°)
- d. Distoangular (-11° to -79°)
- e. Others (-111° to -80°)

2. Impacted third molars can also be classified according to their depth in relation to the adjacent second molar according to Pell and Gregory (Farman, 2004; Obimakinde, 2009).

- Position A: the highest point of the tooth is on the level at or above the occlusal plane of the second molar.
- Position B: the highest point of the tooth is below the occlusal plane, but above the cervical line of the second molar.
- Position C: the highest point of the tooth is below the cervical line of the second molar.

3. Pell and Gregory classification relates the position of the tooth to the ascending ramus and the second molar (Hupp, *et al.* 2008)

- Class I : there is sufficient amount of space between the ramus and the distal surface of the second molar for the accommodation of the mesiodistal size of the crown of the third molar
- Class II: the space between the ramus and the distal surface of the second molar is less than the mesiodistal size of the crown of the third molar.
- Class III : all or most of the third molar is located within the ramus

4. Thoma, as quoted by Obimakinde (2009), classified the curvature of the roots of the impacted mandibular molars into three categories:

- a. Straight roots (separated or fused)
- b. Curved roots in a distal position
- c. Roots curved mesially.

The number of roots may be two or multiple. The impacted tooth can also present with fused roots.

2.5 TYPE OF IMPACTION

In addition to the above mentioned classification of impactions, wisdom teeth can also be described as soft tissue or bony impactions. The term bony impaction indicates that the wisdom tooth is still fully encased in the jaw's bone. A soft tissue impaction is one where the upper portion of a wisdom tooth (the tooth's crown) has penetrated through bone, but has not yet fully erupted through the gums (Farman, 2004). Impacted third molars can also be classified as erupted when the crown can be seen totally in the mouth, partially erupted when the crown has penetrated the oral mucosa and is partially visible in the mouth or unerupted when the tooth has not penetrated the oral mucosa (Obimakinde, 2009; Kaushik and Gupta, 2010). The teeth can either be completely encased in bone or soft tissue or part of their crown exposed to the oral environment. Several authors have reported that the partial impaction were most common type (Chu, *et al.* 2003; Quek, *et al.* 2003).

2.6 GENDER DISTRIBUTION

Most studies on gender distribution have reported no sexual predilection in third molar impaction (Hassan, 2010). However, some studies have shown that impacted mandibular third molars are more prevalent in females than in males (Quek, *et al.* 2003; Hassan, 2010). In contrast, the study by Nzima (2005) showed that males had a higher risk than females to develop mandibular third molar impactions

2.7 IMAGING TECHNIQUES

Several radiographic techniques have been described for assessment of impacted mandibular third molars. A good radiograph should demonstrate the whole tooth, the investing bone, the adjacent tooth, inferior alveolar canal and anterior aspect of the ascending ramus (Bell, *et al.* 2003; Sarawati, *et al.* 2010).

Imaging techniques for impacted mandibular third molars include: intra oral periapical radiography, occlusal techniques, lateral oblique and orthopantomographs, skull radiography, stereoradiography, xeroradiography, computed tomography (CT) and magnetic resonance imaging (MRI). The orthopantomograph remains the radiograph of choice for impacted third molar teeth (Sarawati, *et al.* 2010).

2.8 COMPLICATIONS OF IMPACTED MANDIBULAR THIRD MOLARS

Impacted teeth are considered non - functional, abnormal and pathological. The mandibular third molar teeth are often associated with pain, pericoronal infection, cyst formation, benign tumors, root resorption, bone loss, periodontal disease, dental caries and subsequently secondary facial space infections (Kaushik and Gupta, 2010, McGrath, *et al.* 2003). They can also cause pathologic root resorption of adjacent teeth (Ma'aita, 2000). Bataineh, *et al.* (2002) noted that cysts were associated with 1.6% of cases of impacted mandibular third molars.

Studies have shown that patients with retained impacted third molars are significantly more susceptible to mandibular angle fractures (Fuselier, *et al.* 2002, Meisami, *et al.* 2002).

CHAPTER 3

AIMS AND OBJECTIVES

3.1 AIM

The aim of the study was to investigate the prevalent types of impacted mandibular third molar teeth for patients at MEDUNSA Oral Health Centre during the period of January to December 2008. The study was to determine:

1. The pattern of impacted mandibular third molars for patients who visited MEDUNSA Oral Health Centre at the Maxillofacial and Oral Surgery clinic.
2. The prevalence of impacted third molars.
3. The age and gender distribution of impacted third molars

3.2 OBJECTIVES

1. To determine the frequency of impacted mandibular third molars.
2. To describe the radiographic diagnosis of impacted mandibular third molars according to Winter's classification.
3. To measure the common types of impacted mandibular third molar teeth in different ages and sexes.

3.3 PURPOSE OF THE STUDY

1. This study is for a minor dissertation for partial fulfillment of Master's degree in Dental Science (MDS).
2. The results of this study will be published in a SAPSE accredited journal.

CHAPTER 4

MATERIALS AND METHODS

3.1 THE STUDY DESIGN

A retrospective study based on patient files with impacted teeth who presented at MEDUNSA Oral Health Centre in the Maxillofacial and Oral Surgery clinic were used. The study was conducted over a year period, between January and December 2008. Patients' files with orthopantomographs were considered for evaluation.

3.2 INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria for this study were the records of patients with orthopantomographs and above the age of 17years. The exclusion criteria were files for patients below 17years and those without orthopantomographs radiographs.

3.3 SAMPLING

The records from the Maxillofacial and Oral Health clinic were retrieved from the archives and were used as the source of data. From each patient file, the demographics such as gender and age, and orthopantomographs were assessed for the presence of impactions. The patient's records that met the definite inclusion criteria were recorded in a data collecting sheet (See appendix A).

The orthopantomographs were examined using a standard radiograph viewing box to evaluate the presence and type of impactions. Impactions were classified according to Winter's classification system as follows:

1. Mesioangular (Appendix B)
2. Horizontal angulation (Appendix B)
3. Distal angulation (Appendix C)
4. Vertical angulation (Appendix D)
5. Buccolingual/Transverse angulation (Appendix E)
6. Inverted angulation.

The radiographs were also assessed to determine the presence of impacted mandibular third molars on either one side or on both the right and left sides.

Since the orthopantomographs were used to identify the third mandibular molar impactions, these are fixed records and will remain valid and objective.

3.4 DATA CAPTURING

Data sheets were used to capture the information from patient files. The data was then recorded in a spreadsheet using Microsoft Office Excel. The parameters used in the spreadsheet included file number, gender, age and the type of impactions (Appendix F).

3.5 DATA ANALYSIS

A biostatistician was consulted from the beginning of the study for statistical analysis. Categorical variables (e.g. gender, type of impaction) were summarized by frequency counts and percentages. The Student t- test was used for comparisons of mean values. The comparison of the types of impaction between subgroups (e.g. males versus females of left versus right sides) was performed by the Fisher Exact test. Incidence rates were expressed as percentages with 95% confidence intervals. All statistical procedures were performed on SAS, Release 9.1.3, running under Microsoft Windows Vista Business for a personal computer. All statistical tests were two-sided and p values $\leq 0,05$ was considered significant.

CHAPTER 5

ETHICAL CONSIDERATION

All information gathered from this study was treated with strict confidentiality, patient file numbers were used and no personal information was recorded. Neither the names nor surnames were used during this study. A protocol was submitted to MREC to request for permission to conduct the study. The protocol was approved and allocated project number MREC/D/162/2009: PG. (Appendix G)

A letter was submitted to the Head of the Maxillofacial and Oral Department of the School of Dentistry of the University of Limpopo (MEDUNSA Oral Health Centre) in order to request permission for the researcher to access the patient's records (Appendix H). The department also wrote a letter granting permission to access patient files from the archives (Appendix I).

CHAPTER 6

RESULTS

A total of 1215 patients visited MEDUNSA Oral Health Centre in the Maxillofacial and Oral Surgery Department and 245 presented with impactions in the year 2008. A total of 206 patients met the inclusion criteria. The age ranged from 17 to 51 years, with a mean age of 27.6 years and the standard deviation was 6.3 years.

Table 1. Basic statistics for age, years

Age, years			
	Male	Female	Total
N	132	74	206
Mean	28.20	26.62	27.64
Std deviation	6.66	5.40	6.27
Min / Max	18 / 51	17 / 49	17 / 51

Among the 206 patients, there were 132 (64.1%) male patients and 74 (35.9%) female patients (See Table1). The male to female ratio of the study group was 1.6:1 (132:74).

Table 2. Distribution of impaction in different age groups and gender

The patients were divided into 5 year age groups ranging from 17 to 45years. Note that one group was created to accommodate those above 45years. The 21 to 25 year age group had the highest prevalence of tooth impaction (33.1%), but decreases with increasing age (Table 2).

The patients were divided into five groups, ranging from 17 to 51 years; each group spanning over a 5 year period.

Age group (years)	Patients with impacted teeth		Total	Percentage
	M	F		
17 – 20	13	8	21	10.2
21 – 25	42	26	68	33.1
26 – 30	28	25	53	25.7
31 -35	33	12	45	21.8
36 – 40	8	1	9	4.4
40 - 45	5	1	6	2.9
Above 45	3	1	4	1.9
Total	132	74	206	100

This distribution of impaction in different age groups and gender (Figure.1) showed that impactions tended to increase gradually between 17 and 25 years, and the incidence decreases in frequency with increasing age, except in the 26 to 30 year age group for females who showed an increase in impactions.

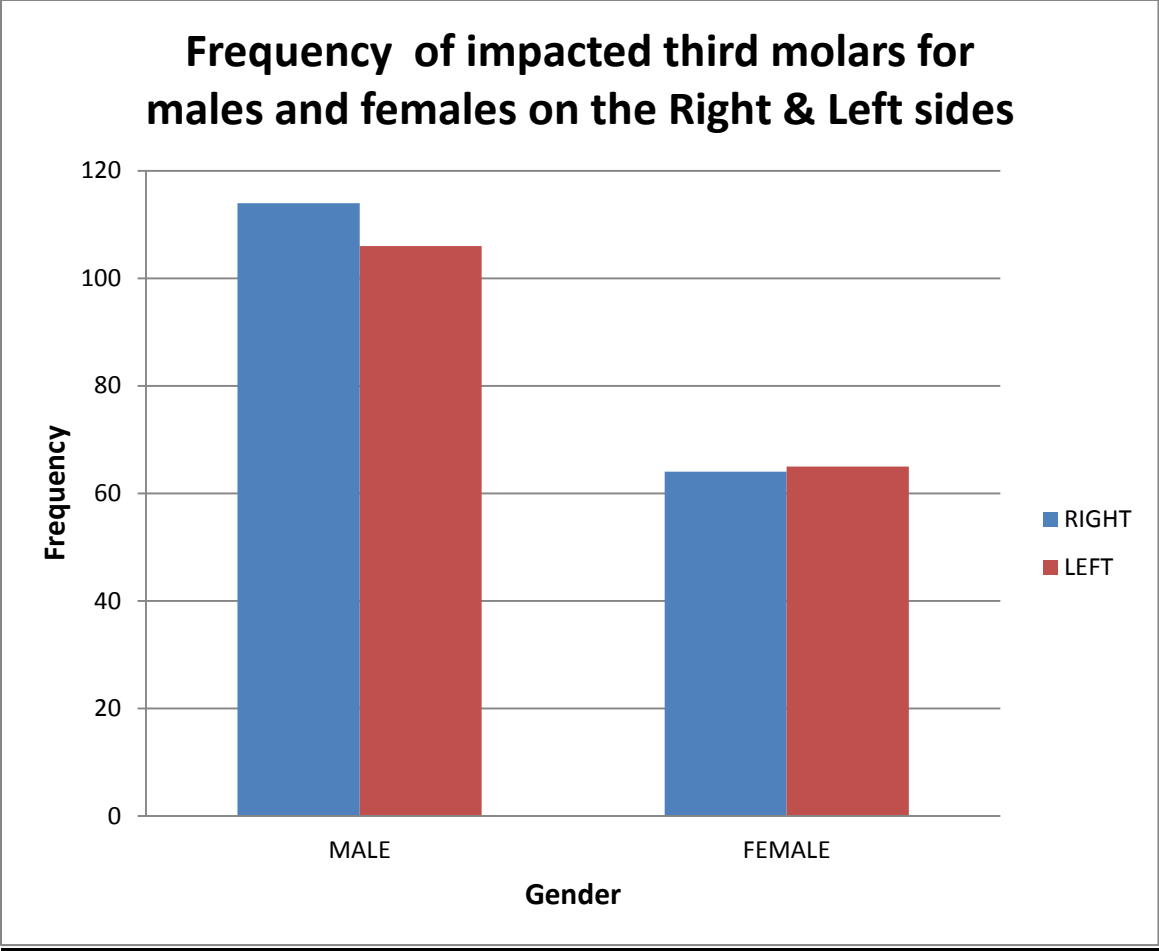


Figure 1: Distribution of impacted mandibular third molars on the Right and Left sides.

Table 3. Prevalence of impacted mandibular third molar teeth and their orientation

Angulations of impaction	Right side [48]	Left side [38]	Total	Total %, p	95% CI for p
Mesial	95 (54.0)	86 (49.7)	181	51.9	46.6 ; 57.1
Vertical	27 (15.3)	27 (15.6)	54	15.5	11.7 ; 19.3
Horizontal	25 (14.2)	22 (12.7)	47	13.5	9.9 ; 17.0
Distal	27 (15.3)	37 (21.4)	64	18.3	14.3 ; 22.4
Transverse	2 (1.1)	1 (0.6)	3	0.9	-0.1 ; 1.8
Inverted	-	-	-	-	-
Total	176 (100)	173 (100)	349	100	-

The most prevalent type of impaction recorded was the mesio-angular position (51.9%).

The distributions of the angulations of impaction on the right and left sides do not differ significantly (Fisher exact test, $p = 0,656$)

Table 4. Prevalence of impacted third mandibular molar teeth and their orientation by gender

Angulations of impaction	Male	Female	Total	Total (%)	95% CI for p
Mesial	122 (55.5)	59 (45.7)	181	51.9	46.6 ; 57.1
Vertical	26 (11.8)	28 (21.7)	54	15.5	11.7 ; 19.3
Horizontal	30 (13.6)	17 (13.2)	47	13.5	9.9 ; 17.0
Distal	40 (18.2)	24 (18.6)	64	18.3	14.3 ; 22.4
Transverse	2 (0.9)	1 (0.8)	3	0.9	-0.1 ; 1.8
Inverted	-	-	-	-	-
Total	220 (100)	129 (100)	349	100	-

The distributions of the angulations of impaction for males and females do not differ significantly (Fisher exact test, $p = 0,139$)

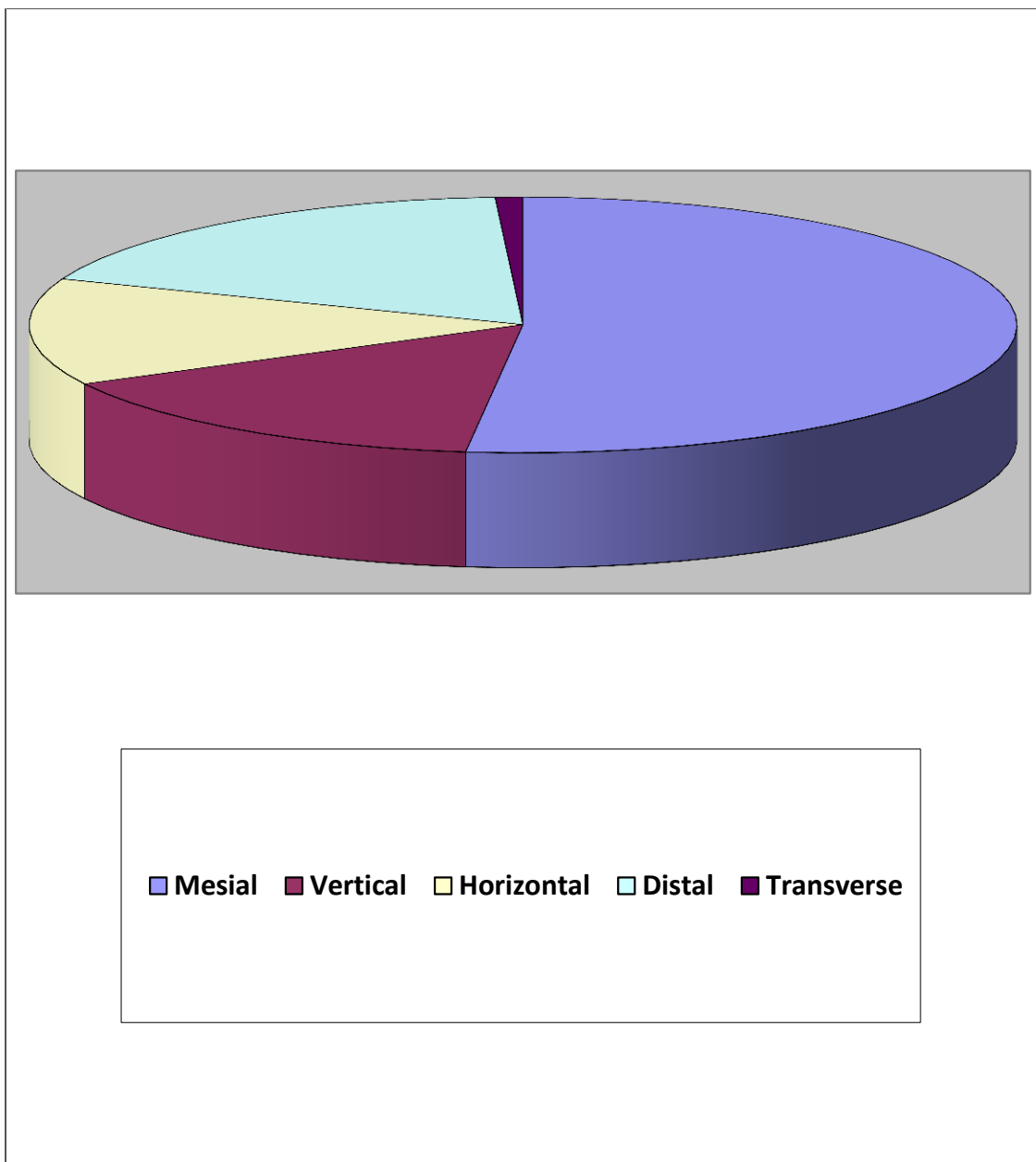


Figure 2: Presentation of angulations in impacted mandibular third molars

The mesial angulation is most prevalent – 51.9%

Vertical position – 15.5%

Horizontal position – 13.5%

Distal position – 18.3%

Transverse position was the least prevalent – 0.9%

CHAPTER 7

DISCUSSION

The sample utilised for this study was taken from the dental records of patients presenting at the Maxillofacial and Oral Surgery Department, School of Dentistry, University of Limpopo (MEDUNSA), South Africa, and a total number of 1215 patients had presented in this department in 2008.

The number of patients who presented with impactions was 245 and 206 met the criteria for inclusion in the study. Those patient files (39 files) who did not meet the criteria, the files were either missing from the archives or there was some data missing (no orthopantomographs or data), and these were excluded from the study.

The prevalence of impacted mandibular third molars for this study was 17%. This is comparable to that reported by Quek, *et al.* (2003), who had noted that the occurrence of third molar impaction was between 18% and 32%.

The female to male ratio of the study group was 1:1.6 (74:132). This distribution is similar to that reported by Nzima, where the female to male ratio was 1:1.5 (2005). Contrary to our findings, Venta, *et al.* (2001) and Qirreish (2005) have reported that there were more females than males who presented with impacted mandibular third molars. Some studies have reported no sex predilection about third molar impaction (Hassan, 2010). The mean ages of males and females do not differ significantly (t- test, $p = 0,082$).

The study included males and females between the ages 17 and 51 years. The minimum inclusion age for males was 18 years for males and 17 years for females, and the maximum age for males was 51 years and 49 years for females.

The mean age of the cases that were studied was 27.6 years. This finding is similar to those reported by Jaffa and Tina-Oo (2009), Venta, *et al.* (2001) and Qirreish (2005) whose mean age was 24.9, 24.4 and 24.5 years respectively.

The impacted mandibular third molars are common amongst young adults. It was found that patients in the age group 21 and 25 years were most likely to present with impactions, with 68 (33.1%) patients, followed by patients between 26 and 30 years with 53 (26.2%). From this study, it is evident that impacted third molars decrease with corresponding increase in the age of patients. Furthermore, the study also showed that males between 21 and 25 years presented more frequently with impacted mandibular third molars than females. Obiechina, *et al.* (2001) observed that patients in the 20 – 25 year age group presented with the highest number of impactions.

The mesio angular impaction was the most common type seen with a 51.9% incidence, followed by distal inclination (18.4%) then vertical inclination with 15.5%, and horizontal impactions with 13.5%. The transverse inclination was the least with 0.9%. This study is in agreement with the findings of Nzima (2005), who found that mesioangular impactions were the most predominant type of impaction which was followed by vertical and horizontal impactions.

Studies in Nigeria showed that mesioangular type of impaction was the most frequently seen (Gbotolorun, *et al.* 2007; Obiechina, *et al.* 2001). Likewise, it was also the most common type among Chinese (80%) and Korean populations (46.5%) (Quek, *et al.* 2003). A study in Thailand revealed that out of 680 impacted molar extractions, 402 teeth were mesioangularly impacted (Unwerawattana, 2006). One Spanish study done by (Chaparro-Avendaño, *et al.* 2005) showed similar results where mesioangular was most common (71.5%) while another study in Barcelona documented that vertical angulation type of impaction was predominant (47.9%) and mesioangular was about 20.5% (Almendros-Marqués, *et al.* 2006). Jaffar and Tin-Oo (2009) also concluded that mesioangular impaction was the most frequently seen (52.3%) followed by horizontal (26.4%), vertical (12.2%) and distoangular impaction (9.1%). Hassan (2010) also concluded that the most common angulation of impaction in the mandible was the mesio – angular type (33.4%), followed by the horizontal (27.5%). However, a study among Jordanians found that vertical impaction was the most common type (61.4%) and mesioangular type was only 18.1% (Bataineh *et al.* 2002). Sasano, *et al.* (2003) in their studies had observed that mandibular third molars with vertical (46%), horizontal (34%), mesial (19.5%) and distal (0.5%) which was not in agreement with this study.

The distributions of the angulations of impaction on the right and left sides do not differ significantly (Fisher exact test, $p = 0,656$). Also the distributions of the angulations of impaction for males and females do not differ significantly (Fisher exact test, $p = 0,139$)

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

This study demonstrated that the female to male ratio is 1:1.6, more males were likely to present with impacted mandibular third molars than females. The prevalence of third molar impactions was almost the same on both the left and right sides. Mesio-angular impactions were the most prevalent type of impaction, followed by vertical, horizontal, distal and transverse angulations.

The study was conducted over a period of one year probably a longer period would give a better picture of the problem of impacted molar teeth.

The presence of impacted third molars means there is a need to have more specialised personnel and improvement in the necessary equipment.

The results of this study can be used as baseline data for future studies involving impacted third molars. Such studies should include Pell and Gregory classification and complications associated with impactions. The study can also include the impactions of maxillary third molars and canines in future.

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Appendix A

DATA COLLECTION SHEET

Section A: Record examination

File No.....

Age.....years

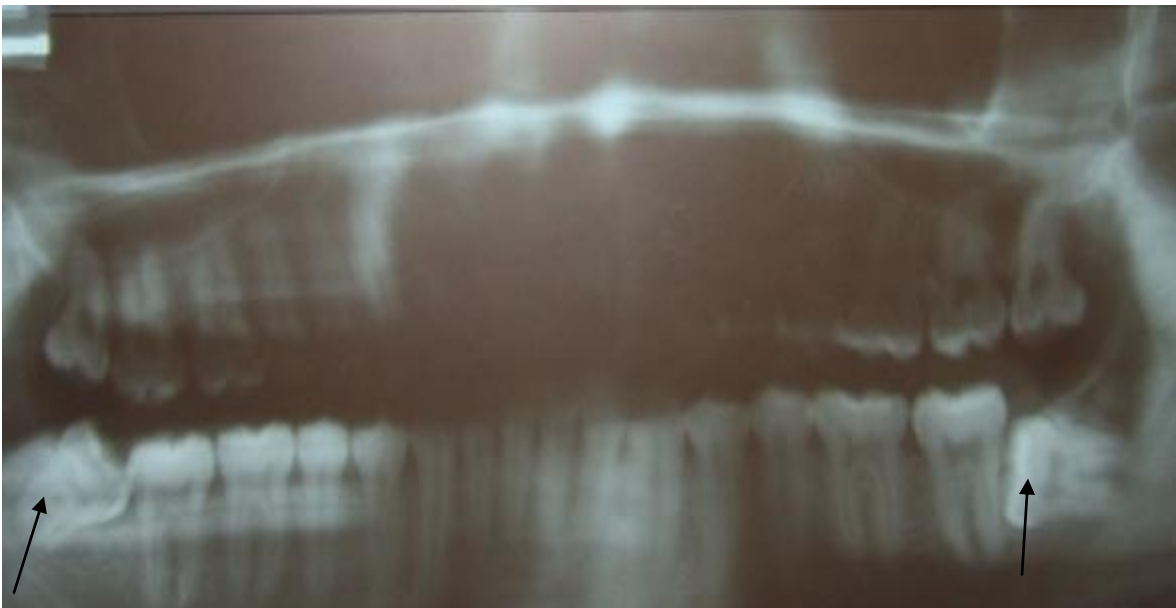
Gender: F M

Section B: Radiographic examination

Angulation of impaction	Right side [48]	Left side [38]
Mesial		
Vertical		
Horizontal		
Distal		
Transverse		
Inverted		

Appendix B

Orthopantomograph showing mesio-angular 48 and horizontal angulation of 38



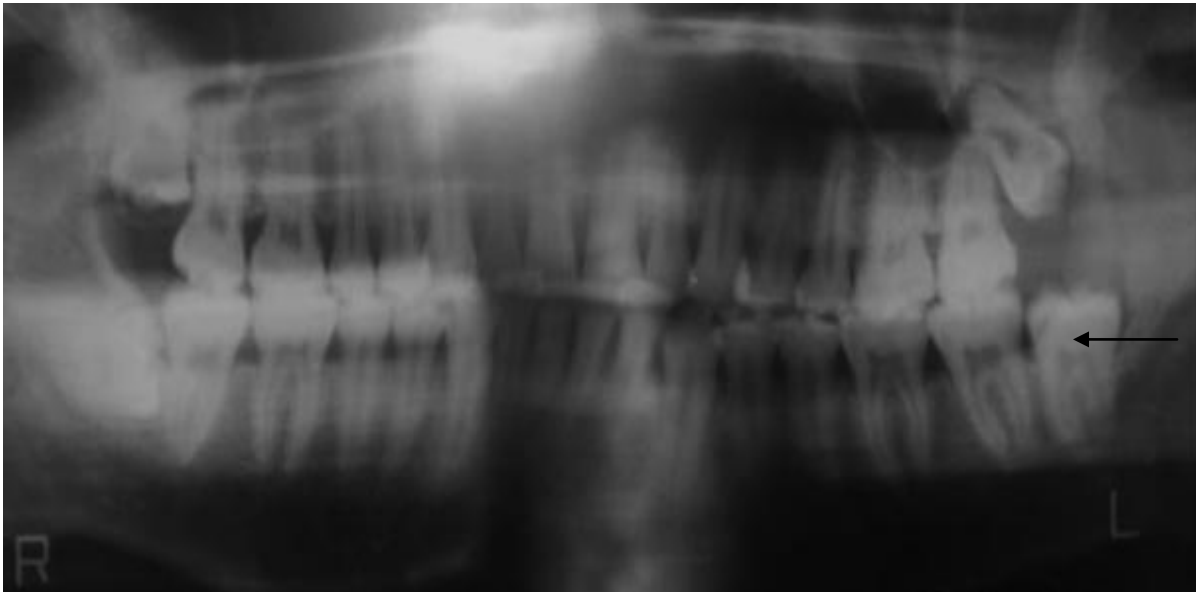
Appendix C

Distal angulation of 38



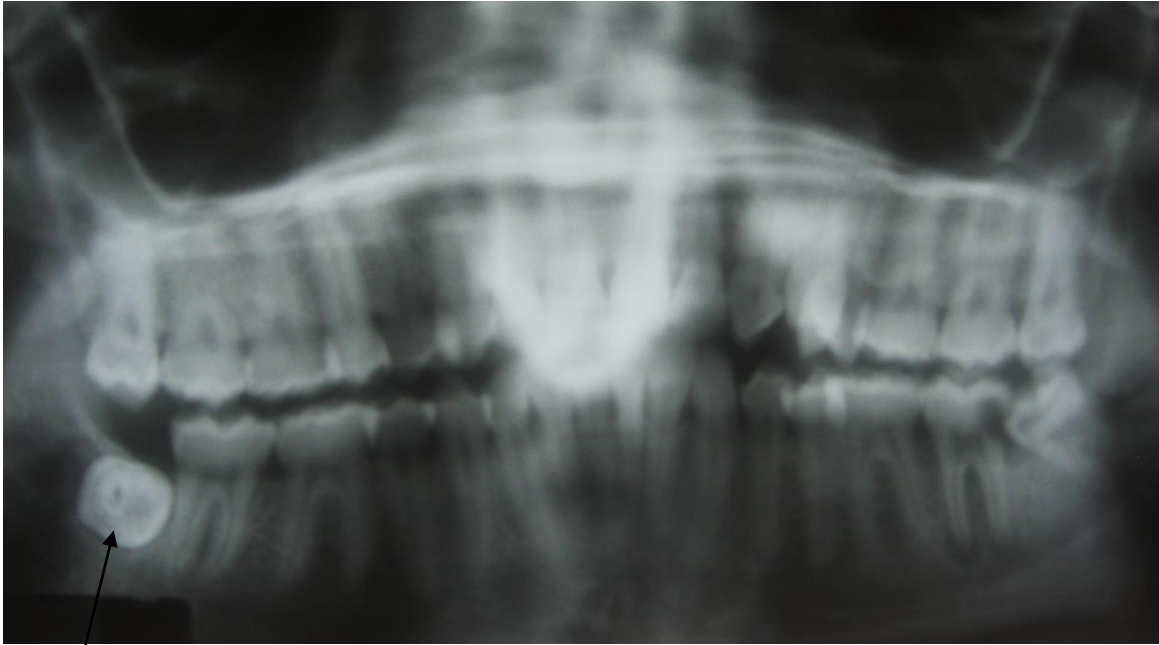
Appendix D

Vertical angulation of 38



Appendix E

Buccolingual angulation of 48



Appendix F

Spreadsheet presentation of Data

No	File No	AGE	GENDER	RM	RV	RH	RD	RT	L M	LV	LH	LD	LT
1	801705	27	F	1					1				
2	801503	27	F			1					1		
3	801626	32	F	1					1				
4	801714	28	M	1					1				
5	708152	34	M						1				
6	801459	23	M							1			
7	801441	28	F		1					1			
8	801443	25	F		1					1			
9	801392	32	M	1					1				
10	801107	30	M	1					1				
11	801695	25	F	1					1				
12	801502	23	F	1					1				
13	801311	28	M	1					1				
14	801245	45	M			1			1				
15	801249	17	F		1					1			
16	801313	29	M			1				1			
17	801355	29	M			1					1		
18	801673	24	M	1					1				
19	801717	19	M	1					1				
20	702919	28	F		1					1			
21	802108	31	M	1					1				
22	802025	27	F		1					1			
23	802377	28	M				1					1	
24	708361	23	M						1				
25	609116	33	M	1					1				
26	708546	20	F				1					1	
27	802731	24	M				1					1	
28	802408	26	M						1				
29	802458	25	F	1					1				
30	712189	34	M	1					1				
31	802853	24	F		1					1			
32	802824	22	M				1					1	
33	802381	29	F	1					1				
34	802192	19	M	1									
35	802344	20	M	1									
36	802346	47	M									1	
37	802533	28	F	1					1				
38	802625	37	F			1							

39	802794	17	F		1					1			
40	802876	20	M	1									
41	802848	28	F	1					1				
42	803205	25	M						1				
43	709488	25	F		1					1			
44	709445	32	F		1					1			
45	707806	26	M				1					1	
46	803117	29	F	1									
47	803077	30	M	1									
48	803271	36	M	1									
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107	807805	18	F				1						
108	807844	31	F	1							1		
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205	711242	22	F		1					1			
206	711293	27	M		1						1		

Key: 1- represents the presence of impaction

M- Male

F – Female

RM – Right Mesial

RV – Right Vertical

RH- Right Horizontal

RD – Right Distal

RT – Right Transverse (Buccolingual)

LM – Left Mesial

LV – Left Vertical

LH – Left Horizontal

LD – Left Distal

LT - Left Transverse (Buccolingual)

Appendix G

UNIVERSITY OF LIMPOPO
Medunsa Campus



MEDUNSA RESEARCH & ETHICS COMMITTEE
CLEARANCE CERTIFICATE

P O Medunsa
Medunsa
0204
SOUTH AFRICA

MEETING: 09/2009

PROJECT NUMBER: MREC/D/162/2009: PG

Tel: 012 - 521 4000
Fax: 012 - 560 0086

PROJECT :

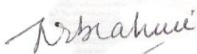
Title: Prevalence of impacted mandibular third molar teeth at Medunsa Oral Health Centre

Researcher: Dr V Tsabedze
Supervisor: Dr JM Mchenga
Hospital Superintendent: Prof TS Gugushe (Director: School of Dentistry)
Department: Maxillofacial and Oral Surgery
School: Dentistry
Degree: Masters in Dental Sciences (MDS)

DECISION OF THE COMMITTEE:

MREC approved the project.

DATE: 26 November 2009


PROF N EBRAHIM
DEPUTY CHAIRPERSON MREC



- Note:**
- i) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.
 - ii) The budget for the research will be considered separately from the protocol. PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

African Excellence - Global Leadership

Appendix H

LETTER OF REQUEST FOR ACCESS TO THE PATIENTS FILES

Dr VN Tsabedze (19839747)

Hlathikulu Government Hospital

P.O.Box 20

Hlathikulu

Swaziland

14 March 2009

Prof MMR Bouckert

The head of Maxillofacial and Oral Surgery department

School of dentistry

University of Limpopo-MEDUNSA Campus

Dear Professor

Re: APPLICATION FOR ACCESS TO PATIENT RECORDS

I am currently doing an MDS at University of Limpopo-MEDUNSA Campus. The title of the mini-thesis that I plan to do is **Prevalence of impacted mandibular third molar teeth at Medunsa Oral Health Centre**

The planned research is a retrospective, record-based study. I have applied for

the approval and registration of the protocol by the research committee of the University of Limpopo, MEDUNSA campus, I therefore kindly request your permission to access patient records at the Oral Health Centre. The patient's names will not be noted in the study. All clinical data will be used with discretion and confidentiality. No clinical files will leave the hospital

Thanks for your attention to this matter.

Yours sincerely

Dr Vusumuzi N Tsabedze: (BDS (Medunsa), BSc (Uniswa))

Appendix I

UNIVERSITY OF LIMPOPO

FACULTY OF DENTISTRY
DEPARTMENT OF MAXILLOFACIAL & ORAL SURGERY
PO BOX D22
MEDUNSA
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Tel: (012) 521 4858
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E-mail: amohamed.ac.za or heila@ul.ac.za



MEDUNSA CAMPUS

TO WHOM IT MAY CONCERN

Dear Dr Tsabedze

RE: ACCESS TO PATIENT RECORDS

Permission is hereby granted for you to access patient records for the purpose of collecting data to complete your research project entitled: *Prevalence of impacted mandibular third molar teeth at Medunsa Oral Health Centre (MREC/D/162/2009:PG)*.

Yours sincerely

Dr A Mohamed
12/02/2010.