The efficacy of a homoeopathic complex (*Arnica*, *Hypericum* and *Phosphorus*) in the treatment of post-operative implications associated with impacted third molar dental extraction.

By

MAUREEN DOS RAMOS

Dissertation submitted in partial compliance with the requirements for the Master's Degree in Technology in the Department of Homoeopathy at Technikon Natal.

I, Maureen dos Ramos, declare that this dissertation represents my own work, both in conception and execution.

23/10/2000

Signature of candidate Date

APPROVED FOR FINAL SUBMISSION

23/10/2000

~~Supervisor~~: Dr V. Naiker Date

Qualification: (BSc) BDS; F.C.I.P.; F.A.G.E.; D H M S

Place of Submission: Durban, KwaZulu – Natal

DEDICATION

TO MY MOM, OLGA, AND DAD, TONY,

WHOM HAVE GIVEN ME THEIR ENDLESS

LOVE, SUPPORT, WISDOM AND GUIDANCE

IN PURSUIT OF A LIFETIME OF HAPPINESS

AND LOVE.

GOD BLESS YOU BOTH.

TO MY SISTER, ANTOINETTE, AND MY BROTHER,

TONY, YOU HAVE BOTH BEEN A SOURCE OF

INSPIRATION, COURAGE AND MOTIVATION.

MAY YOU BOTH BE BLESSED WITH THE GIFT OF

HEALING AND WISDOM TO MAKE YOU STRONG

PRACTITIONERS.

ALEX, YOUR PERSISTENT LOVE AND FAITH

IN ME HAS RESULTED IN THIS ACCOMPLISHMENT. I

THANK YOU FROM THE BOTTOM OF MY HEART.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to the undermentioned for their assistance in the execution of the study and the preparation of the dissertation:

DR V. NAIKER (Supervisor), for giving me the chance to carry out this research under his supervision. You have been a great teacher and doctor to work with. You always performed your duties with such confidence, dedication and precision. Thank you for your time and seeing to the many patients in between your very busy schedule.

DR C.M. HALL (Co-supervisor), thank you for your time, advice and for proof reading.

MR G. SOMERS (Dental Technician), your help and advice has proven to be of the utmost value in the execution of this study. I thank you for the many times that you proof read the research and the advice you gave to improve the quality of this study.

MRS P. KRISHNER (dental assistant), no task was to big for you! Your constant willingness to help in the most unpredictable situations was greatly appreciated. Thank you for all you did for the patients and for me.

SISTER GOVENDER AND ALL THE STAFF AT KING GEORGE V DENTAL HOSPITAL, your interest in homoeopathy & your willingness to help where ever possible was much appreciated.

SISTER S. MTHEMBU, for translating the necessary documents into Zulu

MR N. WORKU (Statistician), for outlining the statistical methodology.

MR N. GOVENDER (Mathematician), for analysing the statistical results and helping me to interpret them.

MISS N. HLABE (Liberian), for locating the necessary books and documents.

ALL PATIENTS, thank you for being so brave!

FAMILY & FRIENDS, thank you for your continual support and encouragement.

ABSTRACT

The aim of this placebo-controlled study was to determine the effectiveness of a homoeopathic complex in impacted third molars in terms of the patients response to treatment. It was hypothesised that the homoeopathic treatment would result in substantial improvement in post operative implications of impacted third molars, and that it can be used as an alternative to analgesic and anti-inflammatory treatment in many cases.

Both the analgesics and anti-inflammatories utilised post-operatively in impacted third molar have a wide variety of side effects. Homoeopathic treatment on the other hand does not have side effects. It also has the added benefit of taking the medication pre-operatively as well as post-operatively. In so doing the body is prepared for the surgical intervention before it occurs and thus stimulates healing immediately, even as the surgical intervention is taking place. Where as the anti-inflammatories and analgesics are traditionally only prescribed post-operatively and therefore can only take effect once the patient consumes the medication.

The study was a clinical trial, in which a placebo control group was compared with an experimental group. Convenience sampling was used to draw patients into the trial. Volunteers responded to talks given by the researcher and after reading the patient information sheet.

A minimum of 30 participants was assessed and if they complied with the

diagnostic criteria they were accepted into the study. The participants were randomly divided into a double – blind study that lasted 7 days. During this period half the patients received placebo treatment while the other half received a homoeopathic complex. Neither the researcher nor the participants knew what type of treatment they received until the end of the research.

All the data obtained by the researcher through the questionnaires was interpreted by means of non-parametric statistical tests, since the sample size of the study was small. The two major non-parametric tests are 1. The Mann-Whitney test (for 2 independent or unpaired groups) and; 2. The Wilcoxon's signed rank test (used within a group). A Statgraphics plus (version 6) computer program was used to statistically analyse this data.

The data was the clinical findings which was obtained in the case history (includes age and sex) and physical examinations performed by the researcher. Data found before and after the treatment period was compared using Frequency distribution and Bar charts.

The Mann-Whitney U test demonstrated that at the end of the trial period there was a significant difference between the treatment and placebo group at the 5% level of significance.

With the Wilcoxon's signed rank test it was found that there was a significant improvement in the treatment group between the beginning and end of the

research at a 5% level of significance. The placebo group also demonstrated a significant difference at the 5% level of significance. However it is important to note that this difference was of a negative nature as there was deterioration over all in the placebo group.

From the results obtained during this clinical trial, it is evident that the Homoeopathic complex consisting of *Arnica Montana*, *Hypericum Perfoliatum* and *Phosphorus* is effective in minimising the complications associated with Impacted Third Molar Dental Extraction.

Thus in conclusion Homoeopathic treatment can be utilised when treating patients for Impacted Third Molar Dental Extraction in order to minimise the associated complications, especially in instances where patients are susceptible to the side effects of the standard anti-inflammatories or analgesics prescribed.

TABLE OF CONTENTS

Dedication		ii
Acknowledgements		iii
Abstracts		v
Table of Contents		viii
Appendices		xi
List of Tables		xii
List of Figures		xiii
Definition of Terms		xvii
CHAPTER ONE:	**INTRODUCTION**	1
CHAPTER TWO:	**REVIEW OF THE RELATED LITERATURE**	
2.1	Introduction	5
2.2	Epidemiology	7
2.3	Aetiology	9
2.4	Pathophysiology	11
2.5	Classification	14
2.6	Clinical Manifestation	16
2.7	Diagnosis and Physical Examination	23
2.8	Differential Diagnosis	26
2.9	Allopathic treatment	27

2.10 Homoeopathic treatment 32

CHAPTER THREE: MATERIALS AND METHODS

3.1 Introduction 38

3.2 Study Design 39

3.3 Subjects 39

3.4 Ethics 41

3.5 Intervention 42

3.6 Measurements and Observations 44

3.7 Statistical Procedure 45

CHAPTER FOUR: THE RESULTS

4.1 Introduction 47

4.2 Criteria for admissibility of the data 48

4.3 Tape measurements 49

4.4 Questionnaire 60

CHAPTER FIVE: THE DISCUSSION

5.1 Introduction 81

5.2 Tape measurements 81

5.3 Questionnaire 83

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions 86

6.2 Recommendations 86

LIST OF REFERENCES 88

APPENDICES

A Patient Case History

B Patient Information Sheet

C Iphepha Lokuchazela Isiguli – Zulu

D Informed Consent Form – English

E Ifomu Yemvume Yesiguli – Zulu

F Questionnaire on the patient's quality of life

G Imiduzo - Zulu

LIST OF TABLES

TABLE 4.3.1:	The Friedmans Test For The Treatment Group	49
TABLE 4.3.2:	The Friedmans Test For The Placebo Group	50
TABLE 4.3.3:	The Wilcoxon Signed-Rank Test For The Treatment Group	52
TABLE 4.3.4:	The Wilcoxon Signed-Rank Test For The Placebo Group	53
TABLE 4.3.5:	The Mann-Whitney Unpaired Test	55
TABLE 4.4.1	The Wilcoxon Signed-Rank Test For The Individual Questions Of The Questionnaire	62
TABLE 4.4.2:	The Mann-Whitney Unpaired Test For The Individual Questions Of The Questionnaire Filled In On Day 1	69
TABLE 4.4.3:	The Mann-Whitney Unpaired Test For The Individual Questions Of The Questionnaire Filled In On Day 7	72

LIST OF FIGURES

FIGURE 4.3.1: This figure shows the median values for the tape measurements of the treatment group on the four different observation days 54

FIGURE 4.3.2: This figure shows the median values for the tape measurements of the placebo group on the four different observation days 54

FIGURE 4.3.3: This figure illustrates the comparison between the treatment group and the placebo group for the tape measurements from the lateral corner of the eye to the angle of the mandible 57

FIGURE 4.3.4: This figure illustrates the comparison between the treatment group and the placebo group for the tape measurements from the tragus to the corner of the mouth 58

FIGURE 4.3.5: This figure illustrates the comparison between the treatment group and the placebo group for the tape measurements from the tragus to the pogonion 59

FIGURE 4.4.1: This figure shows the median values for the questionnaire within the treatment group on day 1 and day 7 of the observation 65

FIGURE 4.4.2: This figure shows the median values for the questionnaire within the placebo group on day 1 and day 7 of the observation 66

FIGURE 4.4.3: This figure illustrates the differences found in the five sections of the questionnaire on day 1 67

FIGURE 4.4.4: This figure illustrates the differences found in the five sections of the questionnaire on day 7 68

FIGURE 4.4.5: This figure illustrates the patients perception of their ability to swallow solids post-operatively on day 1 and day 7 respectively 75

FIGURE 4.4.6: This figure illustrates the patients perception of their ability to move their temporal mandibular joint post-operatively on day 1 and day 7 respectively 75

FIGURE 4.4.7: This figure illustrates the patients perception of the bruising they experienced on day 1 and day 7 respectively 76

FIGURE 4.4.8: This figure illustrates the patients perception of the swelling they experienced on day 1 and day 7 respectively 76

FIGURE 4.4.9: This figure illustrates the patients perception of the bleeding they experienced on day 1 and day 7 respectively 77

FIGURE 4.4.10: This figure illustrates whether the patient would go through the treatment again 77

FIGURE 4.5.1: This figure demonstrates the male to female ratio of the clinical trial. It also indicates the percentage of each gender receiving treatment and those receiving placebo 78

FIGURE 4.5.2: This figure illustrates the degree to which different race groups participated in the clinical trial 79

FIGURE 4.5.3: This figure illustrates the age range of the participants of the clinical trial. The youngest patient that participated in the study was 16 years old and the oldest was 33 years old 80

DEFINITION OF TERMS

Buccally: toward the cheek (Dorland 1988: 234).

Centesimal Hahnemanniene (cH): Hahnemann devised a two – step process whereby he diluted each remedy by succussion (shaking it vigorously and banging it down on a hard surface), at each stage of the dilution. Hahnemann called his new homoeopathic medicines "potentizations". In homoeopathy, "potency" describes the dilution (or strength) of a remedy. To produce different remedy potency the mother tincture is diluted in alcohol or water mixture. Between every stage of the dilution the diluted tincture is succussed. In the centesimal scale it is 1:100.

For example: To produce a 1cH potency of a remedy, 1 drop of mother tincture is added to 99 drops of an alcohol or water mixture and succussed 100 times (Lockie & Geddes 1995: 11 – 13).

Dental lamina: a horizontal band projecting perpendicular from the

vestibular lamina and extending into the substance of the embryonic gum, assuming a horseshoe-like shape to conform with the dental arches (Dorland 1988: 896).

Dentigerous cyst: Odontogenic cyst that forms from the reduced enamel epithelium (Bath-Balogh & Fehrenbach 1997: 343).

Gustatory deficits: taste deficits (Dorland 1988: 723).

Impacted tooth: a tooth that fails to erupt into the dental arch within the expected time (Hattab & Abu Alhaija 1999).

Nonsuccedaneous: permanent teeth without primary predecessors, namely the molars (Bath-Balogh & Fehrenbach 1997: 343).

Occlusal surface: pertaining to the masticating surfaces of the premolar and molar teeth (Dorland 1988: 1167).

Odontectomy: removal of partly erupted and unerupted teeth or retained roots that cannot be extracted by the forceps technique and therefore needs to be removed by surgical excision (Laskin 1996: 49).

Operculum: the hood of gingival tissue overlying the crown of an

erupting tooth; called also odontoclamis and tooth hood (Dorland 1988: 1183).

Pericoronitis: inflammation of the gingiva surrounding the crown of a tooth (Dorland 1988: 1259).

Placebo: a dummy treatment administered to the control group in a controlled clinical trial in order that the specific and non-specific effects of the experimental treatment can be distinguished (Dorland 1988: 1298).

Pogonion: spacially related, midsagital cephalametric landmark located at the most anterior point of the chin (Manhold & Balbo 1985: 180)

Supernumerary: in excess of the regular or normal number (Dorland 1988: 1609).

Third molar: The third molars, better known as the "wisdom teeth," are extremely variable in their eruption time as well as in their anatomical size and form. They were given this unusual nickname in ancient times when it was thought that only educated men had this important type of molar. Many kiddingly argued against the wisdom shown, because these teeth erupt between

18 and 25 years of age (Bath-Balogh & Fehrenbach 1997: 274).

Tragus: the cartilaginous projection anterior to the external opening of the ear (Dorland 1988: 1731).

Trismus: motor disturbance of the trigeminal nerve, especially spasm of the masticatory muscles, with difficulty in opening the mouth. Often found in patient post-operatively (Dorland 1988: 1748).

Unerupted teeth: unerupted refers both to teeth that are impacted and to teeth that are in the process of erupting (Punwutikorn et al. 1999).

CHAPTER 1

INTRODUCTION

Third molars that erupt normally can aid in the mastication of food when the jaws are adequately developed. Yet third molars are the teeth that most commonly follow an abortive path and become impacted because of an inadequate space in which to erupt. These impacted third molars can cause various problems such as: surrounding gingiva becomes inflamed; second molar becomes carious; surrounding bone becomes inflamed; cysts form and destroy the bone; abnormal eruption is caused in the second molar; other teeth are displaced resulting in malocclusion; and fracture occurs easily in the angle of the mandible (Asanami & Kasazaki 1990: 5).

The third molars, as a result of their topography, physiology and ontogeny, are directly or indirectly the underlying cause of numerous disorders in the mouth, jaw and facial regions. As a result their removal is often necessary and impacted third molar extraction is the most frequently undertaken oral surgical procedure (Tetsch & Wagner, 1990:1).

Surgical intervention becomes a necessity when the patient presents with either discomfort, malocclusion or any associated pathological conditions (Hooley 1986: 320). Surgical removal of impacted mandibular third molars represents a reproducible surgical trauma and causes moderate to severe pain, which usually

leaves the patient in need of an effective analgesic for at least a 24-hour period (Nørholt et al. 1998). Previous studies have shown that the proportion of patients using analgesics is higher in the first 24 hours post-surgery (acute period) than after 5 days, indicating that the severity of pain declines over this period (Garcia et al. 1997). The removal of impacted third molars is commonly associated with various sequelae, and it is advised that patients are informed of what to expect after the surgery; for example an alteration in diet (Ogden et al. 1998).

Previous research substantiates the use of placebo-controlled studies in order to evaluate the efficacy of the medicinal substances under study. In 1995 a placebo-controlled study was conducted to test the combination treatment of ibuprofen and methylprednisolone for swelling after the removal of impacted third molars. This study concluded that ibuprofen and methylprednisolone has a degree of anti-inflammatory action (Schultze-mosgau et al. 1995).

Savin and Ogden (1997) designed a questionnaire to assess the effect of third molar surgery on a number of measures of health care outcomes within the first post-operative week. Patients were asked to complete the questionnaire one-day following surgery and again seven days after surgery. Each patient recorded on a four-point scale how he/she felt. It was found that there was a small but significant improvement in the patient's perception of their quality of life over that time period. Accordingly, this report describes the development of an instrument designed to measure patients perceptions of their experiences after the surgical

removal of third molars. A patient's quality of life can be assessed with respect to their ability to eat, speech, physical effects and appearance. Under each of these, numerous aspects can be studied such as pain, bleeding, bruising, temporal mandibular joint (TMJ) movement, sleep, nausea, dizziness, dry mouth, numbness, bad breath, chewing, swallowing, diet, digestion, weight loss and self-confidence.

Allopathic treatment utilised after the removal of impacted third molars has proven beneficial. Yet, a closer study of the allopathic drugs reveals some side-effects. For instance, if one considered the side effects of glucocorticoids it is seen to produce adverse effects, especially with the high doses required for anti-inflammatory activity. Some of these side effects include: adrenal suppression; increased susceptibility to infection; peptic ulceration; sodium and water retention and hypertension (Neal 1992: 68-69). On the other hand, the side effects of the non-steroidal anti-inflammatory drugs (NSAIDs) includes damage to the gastrointestinal tract by inhibiting prostaglandin synthesis; bronchospasm especially in asthmatics; skin rashes and other allergies (Neal 1992: 67).

The reason why homoeopathy is growing is because it is effective and does not have the side effects that patients experience from standard medication. There is a great amount of information in our repertories and materia medicas relating to dental problems and dental procedures. Today this information is largely unused as homoeopathic teachers rarely mention dentistry. Communication needs to be

opened up between the homoeopath and the dentist for the benefit of the patient (Stephenson, 1998).

Hahnemann (as sited by Tyler 1995: 85) says *Arnica* is very beneficial in the most severe wounds, in pains and other ailments consequent on extracting the teeth and other surgical operations, whereby sensitive parts have been stretched for example as the TMJ is, following impacted third molar dental extraction. *Hypericum* is used to treat injured nerves and injuries to parts rich in nerves, whereas aspirin and morphine only blunt the sensation (Tyler 1995: 416). A complication and risk of third molar dental extraction is damage to the sensory nerve, which is estimated at 1 – 6% (Heydt 1999). *Hypericum perfoliatum* is strongly indicated in lacerations involving very sensitive areas and it prevents infections that can appear post-operatively (Borland 1988: 4). *Phosphorus* acts as a curative aid in post-operative bleeding, bruising, dizziness, nausea, dry mouths and bad breaths (Vermeulen 1997: 1286).

The researcher had found by scrutinizing the literature, that these three remedies were all recommended in the treatment of post-operative implications following impacted third molars dental extraction. These claims, however, had not been substantiated by a clinical trial. The research endeavoured to determine whether the homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum* and *Phosphorus* could show an improvement in terms of the patient's quality of life and the swelling after the operation, compared to that of placebo.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

2.1 INTRODUCTION

Our ancestors' need for third molars was critical since the eruption of the third molars helped to push together the remaining teeth, especially necessary if a portion of tooth was lost through attrition or accident. As civilisation advanced, survival became less dependent on keeping one's teeth due to the refining of our diet and foodstuffs. More and more persons survived without third molars. Today congenital absence of third molars presents no problem whatsoever. A modern genetic trend in humans, which is becoming more dominant, is congenitally missing third molars. More and more persons will never have one or more third molars formed, and they will suffer no consequences because of it except during restorative periods later in life (Brand & Isselhard 1994: 422).

One of the main functions of the molar teeth is to grind the food, hence the name molar, which means "grinder" in Latin. The permanent molars are the most posteriorly placed teeth of the permanent dentition and they are also the largest teeth. Each dental arch usually has 6 molars, 3 in each quadrant, if all have erupted. There are three types of molars: the first molars, the second molars, and the third molars. Due to the age of eruption, the first molars and the second molars are called the 6-year molars and 12-year molars, respectively (Bath-Balogh & Fehrenbach 1997: 273).

Eruption of the third molars usually marks the end of the growth of the jawbones. The first molar is usually the largest, and the second and third are each progressively smaller. The first molars are closer to the midline, at the sixth position from it, and are also distal to the permanent second premolars. The second molars are in the seventh position from the midline. And, the third molars are distal to the second molars and are in the eighth position from the midline (Bath-Balogh & Fehrenbach 1997: 274).

All three types of molars erupt in order distal to the primary second molars, long after all the primary teeth have erupted and are functioning. Thus all the permanent molars are nonsuccedaneous, and they do not replace any primary teeth. Because of the continued elongation of the facial bones during development, these teeth usually have enough space as they progressively erupt, except for the third molars in some cases. (Bath-Balogh & Fehrenbach 1997: 274).

Tooth eruption commences at the time the tooth crown is completed and the root starts to form and continues throughout the life of the tooth. Tooth eruption is the combination of bodily movements of the tooth, which occurs before and after the emergence of its crown into the oral cavity, and brings it and maintains it in occlusion with the teeth of the opposing arch (Bath-Balogh & Fehrenbach 1997: 274).

The term impaction means that a tooth is prevented from eruption or movement in the coronal direction by an obstruction. Impaction can occur to any tooth, but it is most frequently seen with mandibular third molars (Poyton 1982: 166).

An impacted tooth is an unerupted or partially erupted tooth that is positioned either against bone, another tooth, or soft tissue; or if it is prevented from eruption because of the angle at which it is situated within the bone; or it occurs due to an underdeveloped jaw and the space or arch length is insufficient to accommodate these teeth because they are the last to erupt. Third molars, maxillary or mandibular, have a greater tendency to be impacted than any other teeth. Hence surgical removal becomes necessary (Brand & Isselhard 1994: 422).

Impacted third molars have a common trait of having soft enamel, not serving any function, always decaying, and causing dental problems. Its posterior arch location makes any oral hygiene procedures or instrumentation difficult (Woelfel 1990: 156).

2.2 EPIDEMIOLOGY

Naidoo (1997) stated that the most common oral procedure performed by general dental practitioner in South Africa is the removal of impacted third molars.

There seems to be an increasing incidence of the population reaching adulthood with impacted third molars. The increase is to such an extent that it is believed to be reaching an epidemic extent. It has been calculated that third molars account for 98% of all impacted teeth (Hattab & Alhaija 1999).

Factors affecting third molar eruption include racial variance, nature of diet causing attrition, reduction in mesiodistal crown diameter, degree of use of the masticatory apparatus and genetic inheritance (Hattab & Alhaija 1999).

The possibility of an unerupted tooth to become partially erupted at age fifteen is virtually zero. Whereas the possibility peaks at nineteen and then tapers off to a low residual level at twenty-five years of age. On the other hand, the probability of a partially erupted tooth to fully erupt is low initially – about 1.5% per year – and gradually rises in likelihood throughout life – to about 2.5% per year by age 40 (Brickley & Shepherd 1998).

There appears to be a frequent occurrence and high incidence of complications associated with impacted third molars, therefore noneruption of the mandibular third molar plays an important role from the standpoint of clinical significance. Most nonerupted mandibular third molars are situated in a mesioangular or a vertical position; however, they may assume many varied positions in the arch (Stafne & Gibilisco 1975: 46).

Brown et al. (1982) did a survey on black and white South Africans using 1 895 subjects and found an incidence of 15-30 per cent of impacted third molars. In 1992/93 67 430 people had third molars removed by general practitioners in the General Dental Service of England and Wales (Edwards et al. 1998).

2.3 AETIOLOGY

The enamel organs of the tooth germs of the permanent molars develop from an extension of the dental lamina distal to the position of the primary molars. The first permanent molars develop approximately in the position they will hold upon emergence into the oral cavity. But the crowns of both the second and third molars form in a different position, and must undergo complicated motions of rotation and forward movement in order to emerge into correct relation to other teeth. At the time that the second and third molars begin to develop and erupt, neither the maxilla nor the mandible is large enough to accommodate them.

The mandibular second and third molars develop in the ramus of the mandible with their occlusal surfaces directed mesially. The second molar usually emerges into the oral cavity in its correct position distal to the first molar. Occasionally, due to inadequate jaw development and a failure of sufficient rotating movement in the early stages of eruption, the crown of the mandibular third molar press against the roots of the adjacent second molar. The result of such a positional relationship is an impacted mandibular third molar.

If the mandibular third molar does not become impacted and assumes a vertical or nearly vertical position, it may reach the level of occlusion but still have a portion of its crown embedded in bone of the anterior border of the ascending ramus. Mandibular third molars are often also prevented from erupting by dentigerous cysts (so-called eruptive cysts), which arise on them while they are still in the stage of development and prior to the normal time for their eruption (Stafne & Gibilisco 1975: 45).

In the maxilla, the second and third molars develop in the maxillary tuberosity with their occlusal surfaces directed distally and buccally. Inadequate jaw development and a failure of sufficient rotating movement in the early stages of eruption may result in the emergence of the maxillary third molar with its occlusal surface directed distally and buccally. The change in position of developing teeth in the jaws is a result of the growth of the teeth, the growth of the alveolar process, and the growth of the jaws.

If the space is not too greatly reduced, the maxillary third molars will move downward in a vertical direction, but before eruption is completed they may become impacted against the second molar. Also in its movement downward it may be diverted posteriorly, but rarely will it erupt through the bone of the posterior surface of the tuberosity. There is also the possibility of early formation of dentigerous cysts and obstruction by supernumerary teeth, which is not an uncommon occurrence in this region (Stafne & Gibilisco 1975: 46).

As age progresses, there seems to be evidence that indicates that the gonial angle decreases. Previous research indicates that a smaller, more acute gonial angle was more common among members with impacted third molars (Hattab & Abu Alhaija 1999).

Despite the complexity of aetiologies involved in third molar impactions, there are often a variety of associated pathological conditions, which exhibit an impact on arch crowding and the stability of orthodontic treatment (Hattab & Abu Alhaija 1999).

2.4 PATHOPHYSIOLOGY

The age at which a third molar erupts varies greatly, but a general guideline is between 18 & 25 years of age. A typical third molar is hard to describe, as it has no standard form with respect in size, shape, and relative position to the other teeth. Rarely is it as well developed as a second molar. The crown of the third molar is shorter than that of a second molar. The roots tend to fuse, resulting in one fused root. The occlusal outline of a maxillary third molar is heart shaped. The distolingual cusp is poorly developed or even absent. It often appears as a developmental anomaly or does not form at all. There is a difference between a mandibular third molar and a maxillary third molar (Brand & Isselhard 1994: 422).

MAXILLARY THIRD MOLARS

If the permanent maxillary third molars erupt, they erupt distal to the permanent maxillary second molars and thus are nonsuccedaneous. The tooth's mesial

contact is in the middle third, but it dose not have a distal tooth contact. This tooth is the smallest molar and most variable in shape in the permanent dentition. Thus it is smaller in all dimensions than a second maxillary molar. The crown of the maxillary third molar is poorly developed compared with other maxillary molars. The tooth is composed of four developmental lobes. There are two types of occlusal outlines for a maxillary third molar. For both types of occlusal forms, the distobuccal cusp is much shorter than the mesiobuccal cusp, which helps to distinguish the right maxillary third molar from the left. Like other maxillary molars, the maxillary third molars are trifurcated (Bath-Balogh & Fehrenbach 1997: 284).

However the roots are sometimes so close together that they are fused, either partially or fully, and thus may give the appearance of a single root. All roots of a third molar are also poorly developed, like the crown, and shorter than that of a second molar. The distobuccal root usually is the smallest and is frequently found "tucked" under the crown. The roots are curved distally. Which helps to distinguish the right maxillary third molar from the left (Bath-Balogh & Fehrenbach 1997: 285).

The pulp cavity of a maxillary third molar may have a pulp chamber and three pulp canals. The tooth may sometimes have one large pulp canal, if the root is fused, too as many as four pulp canals, if there are four roots. The number of pulp horns varies and is dependent on the number of cusps; if there are three

cusps, there are three pulp horns (Bath-Balogh & Fehrenbach 1997: 285).

The maxillary third molar does not have as much space in the jaws in which to develop; therefore there is a greater tendency for the tooth germ to be displaced and assume an abnormal position. As a result there is a higher incidence of inversion of the maxillary third molar. Those that are inverted tend to move upward to reach a position that is at some distance from the alveolar crest and in a location where they may not be revealed by the routine dental roentgenographic examination (Stafne & Gibilisco 1975: 46).

MANDIBULAR THIRD MOLARS

If the permanent mandibular third molars erupt, they erupt distal to the permanent mandibular second molars. This molar is usually also smaller in all dimensions than the second molar, although at times this molar is the same size as the first molar. Like the mandibular second molars, the mandibular third molars are usually composed of four developmental lobes, unlike the mandibular first molars, with five lobes. The lobes are named for the associated cusps and the developmental grooves on the occlusal surface show lobe division. The crown of a mandibular third molar tapers distally when viewed from the side. There are two types of occlusal outlines for a maxillary third molar. The occlusal outline of the crown is more oval than rectangular. The two mesial cusps are larger than the two distal cusps. The occlusal surface appears very "wrinkled," with an irregular groove pattern, numerous supplemental grooves, and occlusal

pits (Bath-Balogh & Fehrenbach 1997: 295).

A mandibular third molar usually has two roots that are fused, irregularly curved, and shorter than those of a mandibular second molar. Additionally the roots are usually smaller in proportion to the crown and have sharp apices. The pulp cavity of the tooth is usually similar to that of the second molars, with four pulp horns and two or three pulp canals (Bath-Balogh & Fehrenbach: 295 & 297).

2.5 CLASSIFICATION

Classification of impacted third molars are usually according to the position of their long axis in relation to the long axis of the second molar. In 1926 Winter was the first to devise such a classification, which is of practical value because it forms the basis for selection of the proper operative procedure. The various positions are as follows:

1 Vertical

2 Mesioangular

3 Horizontal

4 Distoangular

5 Buccoangular

6 Linguoangular

7 Inverted

8 Unusual

Not only is the malalignment of the tooth to be considered, but also the level of the tooth in relation to the occlusal plane of the second molar. The status of the tooth is dependent on the level the tooth reaches. Those teeth which have reached a high level generally are partially erupted and have minimal bony covering; those which are at a low level are unerupted and are sometimes completely encased in bone (Laskin 1996: 49).

Another important consideration is the relation of the impacted tooth to the ramus and the second molar. The most favourable situation is when there is sufficient space between the ramus and the distal aspect of the second molar to accommodate the mesiodistal diameter of the third molar, and the least favourable is when almost the entire crown is within the ramus (Laskin 1996: 49).

The number of roots can also influence the complexity of the surgical procedure. Therefore teeth can be classified according to the status of their roots, such as if they have fused roots, two roots or multiple roots. Thus curvature of the roots is another important consideration, and the following sub-classification should be recognised: (1) straight roots, separated or fused: (2) roots curved in a distal direction; and (3) roots curved mesially (Laskin 1996: 49).

Sometimes the roots of the mandibular third molars are partially or completely surrounded by the inferior alveolar nerve. There may be a wide bifurcation of the roots through which the mandibular canal runs, or the neurovascular bundle may

be completely surrounded by the roots, the apices of which are fused. Sanders (1937), Sheridan (1941), and Hauser (1962) have written on this subject (Laskin 1996: 49).

2.6 CLINICAL MANIFESTATIONS

Impacted third molars can cause a multitude of problems that could progressively lead to severe situations and even compromise the patient's normal everyday activities. Embedded teeth are often a cause of conditions that are clinically noticeable (Stafne & Gibilisco 1975: 55).

Young adults are usually affected. Soreness and tenderness round the partially erupted tooth quickly go on to pain, swelling and difficulty in opening the mouth. The regional lymph nodes are enlarged, there may be slight fever and, in severe cases, suppuration and abscess formation. The swelling and difficulty in opening the mouth may be severe enough to prevent examination of the area (Cawson 1980: 166).

When third molars are partially erupted the surrounding gingiva and possibly the operculum, may become susceptible to periodontal infection (pericoronitis) due to poor oral hygiene of the area (Bath-Balogh & Fehrenbach 1997: 297).

When unable to erupt normally, impacted third molars may cause the following complications for which they should be extracted:

CROWDING OF DENTITION

It is usually highly recommended that impacted third molars are removed either prior to or after orthodontic treatment because it has been claimed that these teeth sometimes can produce an anterior movement that will cause separation of the contact points and subsequent crowding of the mandibular or maxillary incisors (Laskin 1996: 54).

ERUPTION UNDER A DENTURE

A mandibular or maxillary third molar may erupt very late in life after all the other teeth have been extracted. This may cause pain and infection under a denture (Cawson 1980: 167).

DAMAGE TO THE ADJACENT SECOND MOLAR

Pressure by a third molar may cause the second molar to tilt or be reabsorbed. A stagnation area forms between the two teeth sometimes causing a deep pocket on the distal surface of the second molar (Cawson 1980: 166).

PERICORONITIS

Pericoronits is the most commonly encountered condition involving the impacted mandibular third molar. There is an estimated prevelance of 10% (Heydt 1999). The infection develops in the remnants of the follicle between the crown of the impacted tooth and the surrounding bone and gingival tissue. When the infection is limited to the overlying gingival flap, it has been termed an operculitis (Laskin 1996: 50).

Among the usual causative organisms are streptococci, staphylococci, and Vincent's spirochetes, of which all three normally inhabit the oral cavity. Of practical importance is the fact that streptococcal infections have been implicated in the aetiology of both rheumatic fever and glomerulonephritis. The possible dangers of recurrent episodes of pericoronitis are therefore evident (Laskin 1996: 50).

Bacteria gain access into the follicular space either through an opening in the overlying gingiva or through the gingival crevice distal to the second molar. Such infections may remain localised in the pericoronal region, spread through the lymphatic channels into the submandibular lymph nodes, or extend directly to the surrounding tissues. The most frequent site of direct extension is the buccal vestibule above the attachment of the buccinator muscle. Occasionally, however, the infection may spread beneath the buccinator and give rise to a buccal space abscess (Laskin 1996: 50).

Once pericoronitis develops, there is a tendency for the process to recur intermittently when completion of eruption is not possible. In addition to the extreme discomfort associated with such repetitive episodes, they can cause sufficient bone destruction between the second and third molars to produce a deep periodontal pocket (Laskin 1996: 50).

When pericoronitis develops and it is apparent that the tooth cannot erupt fully,

the infection should be treated and, when it has been overcome, the tooth should be extracted (Cawson 1980: 167).

PERIODONTITIS

Constant food impaction between a partially erupted third molar and the adjacent second molar can result in inflammation and considerable bone loss. Such periodotal pocket formation weakens the support of the second molar, which may become quite loose. In instances of deep pocket formation, devitalization of the second molar by apical extension of the infection may also occur. When severe periodontitis has developed, even removal of the impacted tooth will not eliminate the pocket. Extraction of impacted teeth is therefore indicated at the first sign of periodontal disease. In fact, the prevention of these problems should be considered an indication for the prophylactic removal of impacted third molars, since this procedure has been shown to actually reduce the cervicular depth on the distal aspect of the second molar (Laskin 1996: 51).

CARIES

When an impacted third molar becomes partially exposed to the oral environment, its susceptibility to caries is increased because of the collection of food debris and the difficulty in keeping the area clean. In most instances the restoration of such carious lesions is not only impractical but also often technically impossible, unless the tooth is going to come into a position and function (Laskin 1996: 51). A carious third molar should be extracted before the

crown is seriously damaged or periapical infection develops (Cawson 1980: 166).

Recurrence of caries is a frequent finding. For these reasons the removal of carious tooth generally is indicated, even if the lesion has not extended into the pulp (Laskin 1996: 51).

The same factors that affect the impacted third molar also may make the adjacent second molar more susceptible to caries. Restoration to the second molar should never be attempted unless the impacted tooth has been removed. Otherwise there is always the possibility of damaging the restoration during the surgical procedure (Laskin 1996: 51).

PAIN

Pain is usually the result of infection and probably does not occur while the tooth remains completely buried (Cawson 1980: 166).

A patient presenting with pain in the event of an unerupted third molar should be examined for caries and pulpitis in other teeth. Pain from an unerupted third molar is thought to be due to pressure as the tooth tries to erupt, particularly when it is obstructed by the second molar (Cawson 1980: 166).

A patient complaining of unbearable pain, even though clinically and radiographically there is no apparent abnormality, other than a deeply embedded

impacted tooth with no obvious oral communication, should be examined for the possibility of referred pain. Since it has been claimed that referred pain can be caused by pressure of the tooth on the inferior alveolar nerve (Laskin 1996: 53).

PATHOLOGICAL RESORPTION

Pressure of the crown of an erupting third molar against the root surface of the second molar sometimes can result in pathological resorption (Laskin 1996: 52). If the resorptive process has not involved the pulp of the second molar, removal of the impacted tooth is indicated. However if the second molar has been devitalised and must be extracted, it may be advisable in young patients to leave the third molar when it is not too severely inclined. In such instances it can still have enough eruptive force to assume a functional position in the oral cavity (Laskin 1996: 52).

Idiopathic resorption of an impacted tooth is also seen occasionally in the elderly, as there has been no direct communication with the oral cavity. Pain is often a concomitant factor (Laskin 1996: 52).

CYST FORMATION

The development of dentigerous cysts from embedded teeth is not an infrequent occurrence, and such teeth also may be a source of odontogenic tumors, namely fibromas, myxomas, ameloblastomas, and mixed odontogenic tumors (Stafne & Gibilisco 1975: 55).

Such lesions often remain asymptomatic for long periods during which they undergo considerable enlargement. At times they may produce intraoral or facial swelling or cause pain by compression of the inferior alveolar nerve as a result of secondary infection. Therefore enucleation should be employed, since both ameloblastomas and carcinomas arising in the walls of dentigerous cysts have been reported (Laskin 1996: 53).

NEOPLASMS

Benign and malignant neoplasms of soft tissue and bone may occur in the third molar region. The range of incidence is quoted at 0 - 11%, however it is difficult to judge reliability of these estimates due to lack of details in reviews identified (Heydt 1999). The third molar should never be allowed to remain if it compromises the successful removal of a neoplastic lesion. Moreover an impacted tooth should never be left in an area that will be subjected to radiotherapy (Laskin 1996: 53).

SYSTEMIC DISEASES

It has been found that there is no inflammation in the tissue surrounding a tooth that is completely embedded in bone. Therefore no benefit should be anticipated from the removal of such teeth in patients suffering from systemic disease. If there is no roentgenographic evidence of associated infection or other complications, one should consider carefully the age and the condition of the patient and the severity of the surgical procedure in determining the indications

for the removal of teeth that are completely embedded in bone (Stafne & Gibilisco 1975: 56).

2.7 DIAGNOSIS AND PHYSICAL EXAMINATION

A patient presenting with pain, inflammation or local discomfort is assessed by a a dentist or a maxillofacial surgeon. Once the problematic area has been localised a panorex x-ray is taken of the area. On radiological examination an impacted third molar can be diagnosed.

If an infection or inflammation is present that causes trismus, the patient is prescribed a course of antibiotics. Once the infection and or inflammation has diminished, and the patient is able to open their mouth, the patient will under go a surgical procedure for the removal of their impacted third molars. This may either be done under general or local anaesthetic, depending on the severity of the impaction.

Having made the decision to remove a misplaced wisdom tooth the difficulty and the planning of the operation depend on factors which include the following: (Cawson 1980: 168).

THE STATE OF ERUPTION

The tooth may be partially covered by soft tissues or may be entirely embedded in bone. A lateral X-ray must determine the thickness of this overlying bone.

POSITION

It is necessary to determine whether the tooth is mesioangular, buccally or lingually impacted. It is also important to determine whether the crown of the third molar is locked under the curve of the distal surface of the second molar's crown.

ACCESSIBILITY

The distance between the second molar and the ramus of the mandible is, in effect, the space in which the operation must be carried out.

ROOTS

The number, curvature and direction of the roots affects the difficulty of the operation; fortunately the roots are often simply conical. Careful preoperative evaluation of the root configuration and intimacy to the mandibular canal is paramount when nerve entrapment is suspected (Motamedi 1999).

CONDITION OF THE CROWN

Caries or resorption of the crown may cause it to break off during operation leaving inaccessible roots.

CONDITION OF THE OVERLYING SOFT TISSUES

Pericoronitis prohibits operation, which must be delayed until the infection has been overcome.

CONDITION OF THE OVERLYING BONE

An intra-oral x-ray should be taken to show the density of the bone and the presence of infection or of cyst formation.

THE CONDITION OF THE SECOND MOLAR

Caries, extensive fillings and resorption of, or pocketing behind, the distal surface should be looked for clinically and in an intra-oral x-ray. If the second molar is seriously damaged in any of these ways its removal should be considered, particularly if this will provide space for the third molar to erupt.

THE STRENTH OF THE MANDIBLE

A thin mandible, ededtulous apart from an impacted third molar, may fracture during the surgical procedure, therefore splints should be prepared beforehand in these cases.

DISORDERS OF THE BONE

Osteomyelitis, neoplasms or osteodystrophies, which are sometimes quite unsuspected until shown by x-rays, will seriously complicate the operation but are rare (Cawson 1980: 168).

The standard procedure after the surgical removal of impacted third molars is to prescribe an anti-inflammatory and analgesic and to send the patient home. Under standard operative conditions with no complications, the patient is not

asked to come in for a follow-up unless some form of complication arises.

2.8 DIFFERENTIAL DIAGNOSIS

In the event of the clinical absence of a number of teeth, three diseases should be considered in the differential diagnosis:

- cleidocranial dysostosis,
- cretinism,
- and partial anodontia.

A patient presenting with cleidocranial dysostosis will demonstrate radiographic pictures similar to those of multiple supernumerary and impacted teeth. However, the accompanying features of cranial and clavicular abnormalities will enable the clinician to recognise and distinguish this entity. It is helpful to remember that multiple embedded or impacted teeth more commonly occur as isolated events than as part of a syndrome (Wood & Goaz 1985: 617).

In some instances cretinism (hypothyroidism in young children) causes crowding, delayed eruption, and impaction of permanent teeth. The short stature of the patient, however, combined with a history of hypothyroidism and low serum thyroxin levels, should guide the clinician to the correct diagnosis (Wood & Goaz 1985: 617).

Partial anodontia may be considered during the initial oral screening examination

when certain permanent teeth are observed not to be present and the history indicates they have not been extracted. When radiographs are available, however, and reveal that the missing teeth are in reality present as embedded or impacted teeth, then partial anodontia can be rejected (Wood & Goaz 1985: 616).

2.9 ALLOPATHIC TREATMENT

The removal of impacted teeth causes significant morbidity, therefore a full assessment of the patient and the oral cavity is essential for appropriate surgical planning. It is important that the patient be fully informed before surgery of the possible complications of the planned procedure (McIntyre 1998).

Often the presentation of mild to severe symptoms may occur intermittently and may resolve spontaneously without treatment (Punwutikorn et al. 1999). It has been noted that impacted third molars become more troublesome during menstruation or during pregnancy.

Early removal of asymptomatic, disease-free impacted third molars is a controversial issue and it is recommended that more research is needed (Reynaldo 1999).

INDICATIONS FOR THERAPEUTIC REMOVAL OF IMPACTED MANDIBULAR THIRD MOLARS

Although impacted third molars occasionally may remain asymptomatic throughout a person's life, more frequently such teeth become involved in one of a number of pathological processes. These problems may vary from something as simple as dental caries to more serious conditions such as cyst formation or the development of a neoplastic lesion in the surrounding follicular tissue. When a serious problem occurs, there is usually agreement about the indications and contraindications for removal of the impacted tooth. Before deciding whether prophylactic removal of all third molars is indicated or whether attempts should be made in some instances to treat certain pathological conditions to retain an impacted molar, one must understand not only the problems that can affect these teeth but also the sequelae that may accompany such problems (Laskin 1996: 50).

Impacted third molars may be removed either under local anaesthetic or general anaesthetic, depending on the severity of impaction. A general recommendation is that if the surgery takes less than thirty minutes then it is to be done under local anaesthetic. A procedure taking longer than this calls for the removal under general anaesthetic. It is important to note that the force applied under general anaesthetic is greater hence the sequelae of surgery tends to be intensified. It has also been documented that there is a high incidence of damage to the nerves surrounding the third molars during a surgical procedure performed

under general anaesthesia (McGurk & Haskell 1999). At times the damage to the nerves is slow to heal and at other times the damage is irreversible. This could be due to the fact that the procedure increases in complication when surgery is performed when the patient is positioned in the supine position or the extent of muco-periosteal stripping and bone removal (Brann et al. 1999).

DRUG PROBLEMS IN DENTAL PRACTICE

There is an estimated 10% of dental patients that are receiving drug treatment for a variety of diseases or are taking other medication. It is known that many of these drugs can have interactions either in theory or in practice with drugs used for dental purposes (Scully & Cawson 1987: 522).

ORAL SIDE-EFFECTS OF DRUGS

Oral side effects caused by drugs are relatively uncommon. The most common drug-induced oral problems are candidosis (caused by tetracyclines, ampicillin or corticosteroids), pheytoin-induced gingival hyperplasia and dry mouth caused by many drugs with an atropinic action (Scully & Cawson 1987: 522).

DRUG REACTIONS OR INTERACTIONS IN DENTAL PRACTICE

Few of the drugs commonly used in dental practice cause significant adverse reactions. The extreme rarity of reactions to local anaesthetics – even in patients with cardiac disease – the lack of evidence of interactions with tricyclic or other antidepressants, and the rarity of hypersensitivity reactions have recently been

stressed. Furthermore, the introduction of parabens-free local anaesthetics is likely further to reduce side effects. The use of general anaesthetics or sedative techniques, however, is more likely to produce adverse reactions.

Drug interactions are rare in general dental practice because few drugs are routinely used in dental treatment. If however general anaesthesia is used, drug interactions are more likely. Drug interactions are also common in the elderly or medically handicapped patient (Scully & Cawson 1987: 522-523).

ADVERSE EFFECTS OF DRUGS USED IN DENTISTRY IN THE MEDICALLY COMPROMISED PATIENT

Any suggestion of previous drug reaction or allergy, and particularly any adverse reaction during anaesthesia, should be taken seriously. Patients with allergy to one drug, those who suffer from atopic disease (eczema, asthma or hay fever) and patients with Sjögren's syndrome may be particularly liable to drug allergies. Other patients who are particularly at risk from drug reactions are those with cardiovascular, hepatic or renal disease (Scully & Cawson 1987: 523).

DRUG DEPENDENCE AND ABUSE

Many drugs can cause central nervous system stimulation, depression or hallucinations, or distort perception, thinking or judgement. Abuse of such drugs is increasingly common and presents management difficulties in dentistry, particularly because of behavioural disorders, drug resistance or interactions,

hepatitis, AIDS or social problems. Of extreme concern is the high level of psychoactive drug use in the medical and allied professions (Scully & Cawson 1987: 523-524).

DRUGS USED FOR RECREATION AND THOSE USED BY ADDICTS

Treatment of patients that use and abuse recreational drugs can be potentially dangerous as there is always the possibility of psychotic effects due to the drug interaction between the recreational drug and the treatment drug (Scully & Cawson 1987: 524).

MANAGEMENT

Impacted teeth should be removed because of the danger of pathological fracture, odontogenic infection, or development of a follicular cyst, another indication for removal would be to prepare for a prosthetic appliance. A careful clinical examination of these patients would be performed to eliminate the possibility of them having cleidocranial dysostosis (Wood & Goaz 1985: 617).

PREVIOUS RESEARCH

A study performed by Shafer et al. (1999) demonstrated the gustatory deficits after the extraction of all four third molars. These deficits may be the result of nerve compression (possibly secondary to oedema), stretch, or laceration. However these do not result in patient complaints, but tests indicated that taste deficits persist for at least six months. It is documented that the taste loss can

last for longer than six months.

A placebo-controlled research performed in 1996 on patients aged between 18-40, demonstrated that both soluble and tablet formulations of ibuprofen provide effective pain control in the post-operative period after the removal of impacted third molars. It also went on to demonstrate that there is little analgesic advantage in increasing the dose to 600mg and only minimal benefit from using a soluble formulation of the drug (Seymour et al. 1996).

A recent study concluded that the use of a chlortetracycline-impregnated drain may be an effective method for reducing post-operative inflammation of the alveolus, but has no beneficial effect on pain, swelling, and mouth-opening reduction after impacted mandibular third-molar surgery (Akota et al. 1998).

2.10 HOMOEOPATHIC TREATMENT

A physician's highest and most important aim is to restore a *dis-eased* patient to their former healthy state, in the most palliative manner with minimal discomfort or limitations imposed on the patient and the patient's life-style (Hahnemann 1996: 92).

Homoeopathy is by no means a recent concept. As long ago as the fifth century BC, Hypocrites stated that there were two methods of treating disease. Firstly, there was treatment by opposites – when a medicine was used to oppose or

counteract the symptoms and signs of disease-; and Secondly, there was treatment by similars – stimulate healing in the body by giving a substance which would mimic the symptoms and signs of disease (Gibson 1991:84).

Doctor Samuel Hahnemann (1755-1843), a German medical doctor, was the founder of Homoeopathy and developed the first laws of healing which he called "*similia similibus curentur*" which means "*let like be cured by like*" (Castro 1995:5).

Homoeopathic remedies are non-toxic due to their successive dilutions. These remedies do not act chemically but rather according to a particular physical state (Jouanny 1991: 91).

The potencies and strength of a remedy relate directly to the degree of serial dilution, that is, the higher the dilution of the mother tincture the greater the power of the remedy to act (Smith 1982: 15). According to Boyd (1989) higher potencies such as the 30^{th} centesimal potency and the 200^{th} centesimal potency are most frequently utilised in acute conditions. In acute conditions the remedy stimulus must be repeated frequently. It is the repetition that increases the effect of the medication in acute illness and not the size of the dose. The same dose and potency can be utilised in an infant, a grown man or an elderly lady. Commonly indicated remedies to use in the dental surgery are *Arnica montana*, *Hypericum perfoliatum* and *Phosphorus*.

ARNICA MONTANA

Hahnemann (as sited by Tyler 1995: 85) emphasises the use of *Arnica montana* in pains and other ailments consequent on extracting the teeth whereby sensitive parts have been stretched, for example as the TMJ is following impacted third molar dental extraction. For internal use he recommended the 30th potency.

According to Tyler (1995) a few doses of *Arnica* internally, after tooth extraction, is common practice. *Arnica montana* is most useful internally (Borland 1988: 4). Arnica will help the patient to recover more quickly and smoothly after surgery (Boyd, 1989). Elmiger (1998) advises with events that can be planned, such as an operation, a dose of Arnica should be administered just prior to the intervention as well as when the patient recovers. Arnica cannot replace surgery but it can transform the prognosis and greatly shorten the recovery period.

Arnica montana is the remedy indicated in aliments from injury with a concomitant soreness. In the acute phase it is utilised to treat extravastion of blood in injuries or surgery with a concomitant bruised sensation. The injury has a degree of sensitivity and pain when being touched.

Arnica is found in the following rubrics in the:

(Schroyens 1997)

Third degree

Mouth – Bleeding - Gum – extraction of teeth; profuse after

Generals – injuries (= blows, bruises, falls)

Mouth – odour – offensive

First degree

Teeth – pain - cutting

HYPERICUM PERFOLIATUM

Hypericum is used to treat injured nerves and injuries to parts rich in nerves, whereas aspirin and morphine only blunt the sensation (Tyler 1995: 416). *Hypericum perfoliatum* is strongly indicated in lacerations involving very sensitive areas and it prevents infections that can appear post-operatively (Borland 1988: 4).

Hypericum is utilised when there are injuries to nerves attended by great pain such as those seen in punctured, incised, contused or lacerated wounds, when pain is extremely severe, and particularly if they are of long duration, like those of a severe toothache. Boyd (1989) sited that Keysell demonstrated the fact that Hypericum had an analgesic effect, by either producing its effect on the opiate receptors or promoting the release of endorphins and/or enkephalins. *Arnica* is the remedy of injured "soft parts" where as *Hypericum* is the remedy for injured nerves.

Hypericum perfoliatum is found in the following rubrics in the:

(Schroyens 1997)

Third degree

Generals – injuries (= blows, bruises, falls)

Second degree

Generals – anaesthesia (= insensibility)

First degree

Teeth, nerves, injuries to dental nerves

Teeth – pain jerking

PHOSPHORUS

Phosphorus is a remedy that is used to treat wounds that bleed very easily due to the fact that the blood from the haemorrhage tends to be very fluid and difficult to coagulate (Tyler 1995: 643). Morrison (1993: 294) recommends its use in excessive bleeding after dental extraction. Vermeulen (1997: 1286) recommends its use for persistent bleeding after tooth extraction.

Phosphorus acts as a curative aid in post-operative bruising, dizziness, nausea, dry mouths and bad breaths. Research conducted by Senghore and Harris (1999) indicated that one intravenous pre-operative dose of tranexamic acid is effective in preventing excessive post-operative bleeding in patients undergoing third molar extraction under general anaesthetic and therefore facilitates early, safe discharge from hospital.

Phosphorus is found in the following rubrics in the:

(Schroyens 1997)

Third degree

Mouth – Bleeding - Gum – extraction of teeth; profuse after

Face – inflammation of – periosteum

Second degree

Generals – injuries (= blows, bruises, falls)

Teeth, pain, boring

First degree

Teeth, numbness

Mouth, odour offensive

Teeth, pain, boring

Teeth, pain, boring – morning while lying

Teeth, pain, boring – while lying

Teeth, pain, boring – night

Teeth, pain, burning

Teeth, pain, drawing

Teeth, pain, drawing - morning

Teeth, pain – molars - lower

Teeth, pain, gnawing

Teeth, pain, gnawing - morning

Teeth, pain, gnawing – evening

Teeth, pain, gnawing - molars

Teeth, pain, jerking

CHAPTER 3

MATERIALS AND METHODS

3.1 INTRODUCTION

AIMS

The purpose of this placebo-controlled double blind study, was to determine the efficacy of a homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum* and *Phosphorus* following impacted third molar dental extraction, in terms of the patient's perception of their quality of life post-operatively and their rate of recovery in terms of the post-operative swelling, the week following the surgery (7 days).

OBJECTIVES

There were two main objectives to this study:

(1) The first being to determine the efficacy of a homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum* and *Phosphorus* following impacted third molar dental extraction, in terms of the patient's perception of their quality of life post-operatively by utilising a recognised dental extraction questionnaire which was to be completed on day 1 and day 7 post-operatively.

(2) The second being to determine the efficacy of a homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum* and *Phosphorus* following impacted third molar dental extraction, in terms of the post-operative swelling by

utilising the recognised tape measure method on the day prior to extraction and days 1,3 and 7 post-operatively.

3.2 STUDY DESIGN

A minimum of 30 patients were accepted for this research. All procedures were carried out under standardised operative conditions to ensure consistency and validity of results. The criteria governing the admissibility of the patient were assessed and only those patients that complied with the criteria were included into the study.

3.3 SELECTION OF SUBJECTS

Patients were randomly divided into two groups (experimental and placebo), in such a way that each patient had an equal chance of being selected for either group. An independent person administered the medication in such a way that neither the researcher nor involved parties new what treatment the patient received.

Evaluation of patients

First consultation: Patients presenting at King George V Hospital were examined by the dentist or maxillofacial surgeon on duty. If an impacted third molar was suspected the patients had a panorex X-ray taken. The radiographer reviewed the X-ray and then referred the patient to the dentist on call. Once a confirmed diagnosis of impacted third molars had been made, and if the patient complied

with the necessary criteria for the research they were then referred to the researcher. The patient was interviewed by the researcher, at which time the researcher explained the criteria of the research. During this initial consultation a case history was taken which included the patients past surgical and medical history as well as the family history (appendix A).

The patient was given an information sheet (appendix B & C) to inform them of the study and to clarify any uncertainties. If the patient agreed to part take in the research, they were asked to sign a consent form (appendix D & E). The consent document stated they were participating in the study at their own free will and could withdraw at any time, without obligation. Participants were informed that it was a voluntary study and that it wouldn't cost them anything.

The patients were given the nine powders and included were instructions on how the medication was to be taken as well as contact numbers should they have had any queries. At the same time the patient was given an appointment for their surgery.

3.3.1 INCLUSION CRITERIA

Patient's ages generally ranged from 16 to 26 years, but patients presenting with other reasons such as a premature eruption and abnormalities other than acute pain were accepted for the research provided that they fell within the following Parant scale.

The difficulty of the removal procedure was evaluated on a modified Parant scale, as follows: Grade I: Extraction with forceps only; Grade II: Extraction by ostectomy; Grade III: Extraction by ostectomy and coronal section; Grade IV: Complex extractions. In all cases, the duration of the operation (from incision to last suture) was recorded (Garcia et al. 1997).

3.3.2 EXCLUSION CRITERIA

Patients that had been on anti-inflammatories were required to under go a 5-day washout period prior to surgery. Patients that received any form of treatment, the day before the operation or 7 days post-operatively that interfered with the study, were excluded from this study. Pregnant or lactating females were also excluded from this investigation.

3.4 ETHICS

The researchers proposed research had to go to the medical ethical board for approval. The ethics committee considered the application and it was approved. The nature of the study was explained to the patients who qualified for the study. If they agreed to participate, a consent form was signed (Appendix D & E).

3.5 INTERVENTION

A double-blind study was conducted. An independent dispenser administered the homoeopathic complex or placebo treatment to each patient. Each patient

received granules in the form of nine powders.

The homoeopathic complex consisted of *Arnica montana* in the 30th centesimal potency, *Hypericum perfoliatum* in the 200th centesimal potency and *Phosphorus* in the 30th centesimal potency. One dose was equivalent to one powder.

The placebo medication consisted of *Saccharum lactis*. These granules looked identical to those of the complex group. One dose was also equivalent to one powder.

The patient was instructed to take the medication in the following manner:
powder number 1 the evening prior to the extraction;
powder number 2 the morning of extraction;
powder number 3 as soon as the surgical procedure was completed;
powder number 4 before going to bed on the day of the surgery;
Thereafter, the patient took one powder daily in the morning on rising for the following 5 days.

On the day of the surgery the patient presented at King George V Hospital. Patients were seen by the researcher first, at which time the first tape measurement was taken. Thereafter, the patient was prepared for their surgical procedure. Before the surgical procedure commenced the patient was given a local anaesthetic of 1.8ml xylotox E80-A – each ml contains lignocaine

hydrochloride 20mg and adrenaline 12,5 μg (1:80 000). Once the local anaesthetic had taken effect the surgical procedure took place. In order to keep the study as standard as possible, only one dentist carried the procedure out. Present at the surgery was the dentist, his assistant, the researcher and the patient. The researcher timed the surgical procedures from the time that the incision was made to the time of suturing. After the surgery the researcher stayed with the patient in order to take the second tape measurement and to ensure the administration of the third homoeopathic medication. At the same time, the patient was given their questionnaire (appendix F & G) to fill in that evening, and a follow-up appointment for the third day of the study was given.

At the first follow-up on the third day the third tape measurement was taken and the questionnaire from day 1 was collected. At the same time the patient was given an appointment for the seventh day for the fourth follow-up and suture removal. Once the researcher had completed with the patient, the patient was assessed by the dentist to ensure no complications were developing.

On the seventh day the fourth and final tape measurement was taken and the patients were again asked to fill in the same questionnaire that they had filled in on the first day (appendix F & G). They were instructed to answer the questions in accordance with the way they felt that day. Thereafter the patient was seen by the dentist for suture removal and examination for the possibility of complications. Patients that presented with persisting inflammation and or

truisms and or infection were prescribed a course of anti-biotics and anti-inflammatories and analgesics and asked to return for a follow-up with the dentist.

3.6 MEASUREMENTS AND OBSERVATIONS

Measurements

The researcher took measurements with a tape measure in order to assess the inflammation (swelling). The marking points for the tape measurements were drawn using a waterproof felt tip pen. Measurements were made of the distances from the lateral corner of the eye to the angle of the mandible, from the tragus to the outer corner of the mouth, and from the tragus to the progonion. All patients were positioned in full intercuspation (closed occlusion) during measurements. Patients were seen pre-operatively and on the first, third and seventh post-operative days (Schultze-Mosgau et al. 1995).

Questionnaires

The patients completed a questionnaire on day 1 and 7 after the operation evaluating the patient's quality of life and rate of recovery (Savin & Ogden 1997).

3.7 STATISTICAL PROCEDURE

Methods of data analysis:

(1) **With respect to the sum of the measurements of the swelling**

SAMPLE SIZE AND VARIABLES OF STUDY

There are two groups: placebo and treatment.

In each group there are 15 patients. This is a small sample size, and hence, no parametric test will be done. In each group there are three readings which are taken at four different time periods.

STATISTICAL PROCEDURE

i) Two sample-unpaired t-tests will be used to compare groups 1 and 2 with respect to each variable of the study.

ii) Within group 1, comparison between the four consultations using Friedman's non-paramatic ANOVA test will be utilised.

iii) Procedure (ii) will be repeated within group 2.

iv) Bar graphs will be constructed using average readings for the "swelling".

Decision Rule:

Reject H_0 at the α level of significance if the P-value $< \alpha/2$

Accept H_0 at the α level of significance if the P-value $\geq \alpha/2$

All tests will be carried out at the $\alpha = 0.05$ level of significance

(2) **Analysis with respect to the questionnaire.**

SAMPLE SIZE AND VARIABLES OF STUDY

There are two groups: placebo and treatment.

In each group there are 15 patients. This is a small sample size, and hence, no parametric test will be done.

STATISTICAL PROCEDURE

i) The Mann-Witney's Unpaired Test will be used to test whether the two groups are alike or different by comparing groups 1 and 2 with respect to the 66 times (2 x 33).

ii) Within group 1, Wilcoxon's Signed Rank Test will be used to compare 2 related samples (33 times).

iii) Repeat procedure ii within group 2.

iv) Construct bar charts for 4 of the 5 categorical variables (use actual frequencies or percentages and not averages).

STATISTICAL PACKAGE

SPSS will be used for data entry and analysis.

CHAPTER 4

THE RESULTS

4.1 INTRODUCTION

This chapter contains the results that were obtained after statistically analysing the data pertaining to this research project.

The one set of data represented in this chapter was collected from the tape measurements representing the inflammation of the facial area post-operatively. Each patient had three readings taken at four different time periods. Patients were seen pre-operatively and post-operatively on the day of the surgery. And again on the third and seventh days post-operatively. Within the treatment group, comparison between the four consultations using Friedman's non-parametric ANOVA test was utilised to assess if there was a significant difference at each individual site. The test was then repeated within the placebo group. The Wilcoxon signed rank test was then utilised to test whether or not there was a difference between the various consultations with respect to the same site within the treatment group. Once again the test was repeated in the placebo group. The Mann-Whitney unpaired t-tests was used to compare the placebo group and the treatment group with respect to each variable of the study.

The second set of the data was collected from the questionnaire (appendix F & G) related to the patient's quality of life. This questionnaire contained 33 questions and was completed by the patient on day one and day seven post-

operatively. The questions were rated on a four point scale where 1 represented no change in the patients quality of life; 2 represented a little change; 3 represented quite a lot of change; and 4 reflected a great change in the patient's life post-operatively. Within the treatment group, the Wilcoxon's Signed Rank Test was used to compare the questions answered on day 1 and day 7 post-operatively. This was then repeated within the placebo group. The Mann-Whitney unpaired t-test was used to test whether the two groups are alike or different; firstly by comparing the placebo group and treatment group with respect to the 5 sections of the questionnaire (2x5) and secondly by comparing the placebo group and treatment group with respect to the 33 questions (2 x 33).

4.2 CRITERIA FOR ADMISSIBILITY OF THE DATA

- Only data collected from the trial at King George V Hospital was accepted for analysis.
- Only patient's with confirmed panorex x-ray diagnosis of impacted third molars were incorporated into the study.
- The researcher performed all case histories.
- All questionnaires were explained in detail to the patient by the researcher. Questionnaires were given in the patient's home language.
- All tape measurements were conducted by the researcher using the same tape measure for all the patients.

4.3 Tape measurements

FRIEDMAN TEST

The Friedman's non-parametric ANOVA test was utilised in order to compare the four different tape measurements taken from a particular site within the treatment group. This was done in order to assess whether the patient was under going any form of inflammation.

Since there were 3 sites that were measured at 4 different time intervals, it is necessary to study each site individually. Then only can it be determined whether the patients were deteriorating or improving during the clinical trial.

TABLE 4.3.1: THE FRIEDMANS TEST FOR THE TREATMENT GROUP

MEASUREMENT	FRIEDMAN STATISTICS	P-VALUE	RESULTS
From lateral corner of the eye to the angle of the mandible	26.131	0.000	Significant difference
From the tragus to the outer corner of The mouth	18.022	0.000	Significant difference
From the tragus to the pogonion	23.500	0.000	Significant difference

It was found that there was a significant difference at each consultation. Therefore the null hypothesis could be rejected as the P values all = 0.000. This difference is of a positive nature and indicated that inflammation was not notable.

The test was then repeated within the placebo group in order to assess whether the patients in that group had under gone any form of inflammation. The results were as follows:

TABLE 4.3.2: THE FRIEDMANS TEST FOR THE PLACEBO GROUP

MEASUREMENT	FRIEDMAN STATISTICS	P-VALUE	RESULTS
From lateral corner of the eye to the angle of the mandible	27.268	0.000	Significant difference
From the tragus to the outer corner of the mouth	32.909	0.000	Significant difference
From the tragus to the pogonion	34.123	0.000	Significant difference

The placebo group was also found to have a significant difference as the p-value were < 0.05. Yet after examining the values it is noted that the difference is of a negative nature and therefore indicates an increase in inflammation during the trial period.

THE WILCOXON'S SIGNED RANK TEST

The Wilcoxon's Signed Rank Test is a non-parametric procedure used with two related variables to test the hypothesis that the two variables have the same distribution. It makes no assumptions about the shapes of the distributions of the two variables. This test takes into account information about the magnitude of differences within pairs and gives more weight to pairs that show large differences than to pairs that show small differences. The test statistic is based on the ranks of the absolute values of the differences between the two variables.

The Wilcoxon's Signed Rank Test was used to test whether there was a significant difference between the related tape measure readings taken at 4 different time intervals.

Since measurements were taken at 3 different sites at 4 different time intervals there are several comparisons (6) to be made, in order to establish the relevant differences and also to determine the efficacy of the treatment. In so doing the treatment group can be compared to the placebo group. Within the treatment group it was calculated that significant differences occurred between the readings (table 4.3.3).

TABLE 4.3.3: THE WILCOXON SIGNED-RANK TEST FOR THE TREATMENT GROUP

COMPARISON BETWEEN THE READING FROM:	A P-VALUE FOR MEASUREMENT FROM THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE	B P-VALUE FOR MEASUREMENT FROM THE TRAGUS TO THE CORNER OF THE MOUTH	C P-VALUE FOR MEASUREMENT FROM THE TRAGUS TO THE POGONION	RESULTS
PRE-OPERAT & POST - OP	0.007	0.008	0.322	**A & B:** Significant Difference **C:** No Difference
PRE-OPERAT & DAY 3 POST-OP	0.729	0.262	0.030	**A & B:** No Difference **C:** Significant Difference
DAY 1 POST-OP & DAY 3 POST-OP	0.023	0.016	0.10	**A, B & C:** Significant Difference
DAY 3 POST-OP & DAY 7 POST-OP	0.008	0.014	0.004	**A, B & C:** Significant Difference
DAY 1 POST-OP & DAY 7 POST-OP	0.010	0.002	0.001	**A, B & C:** Significant Difference
PRE-OP & DAY 7 POST-OP	0.010	0.010	0.027	**A, B & C:** Significant Difference

TABLE 4.3.4: THE WILCOXON SIGNED-RANK TEST FOR THE PLACEBO GROUP

COMPARISON BETWEEN THE READING FROM:	A P-VALUE FOR MEASUREMENT FROM THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE	B P-VALUE FOR MEASUREMENT FROM THE TRAGUS TO THE CORNER OF THE MOUTH	C P-VALUE FOR MEASUREMENT FROM THE TRAGUS TO THE POGONION	RESULTS
PRE-OPERAT & POST - OP	0.001	0.610	0.030	**A & C:** Significant Difference **B:** No Difference
PRE-OPERAT & DAY 3 POST-OP	0.000	0.000	0.000	**A, B & C:** Significant Difference
DAY 1 POST-OP & DAY 3 POST-OP	0.001	0.000	0.000	**A, B & C:** Significant Difference
DAY 3 POST-OP & DAY 7 POST-OP	0.002	0.003	0.001	**A, B & C:** Significant Difference
DAY 1 POST-OP & DAY 7 POST-OP	0.012	0.007	0.001	**A, B & C:** Significant Difference
PRE-OP & DAY 7 POST-OP	0.850	0.265	0.472	**A, B & C:** No Difference

FIGURE 4.3.1: THIS FIGURE SHOWS THE MEDIAN VALUES FOR THE TAPE MEASUREMENTS OF THE TREATMENT GROUP ON THE FOUR DIFFERENT OBSERVATION DAYS

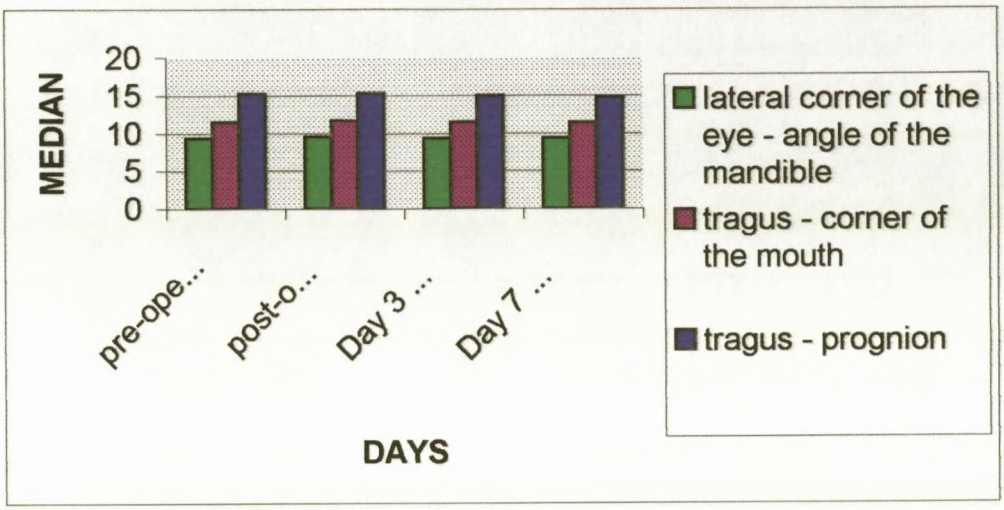
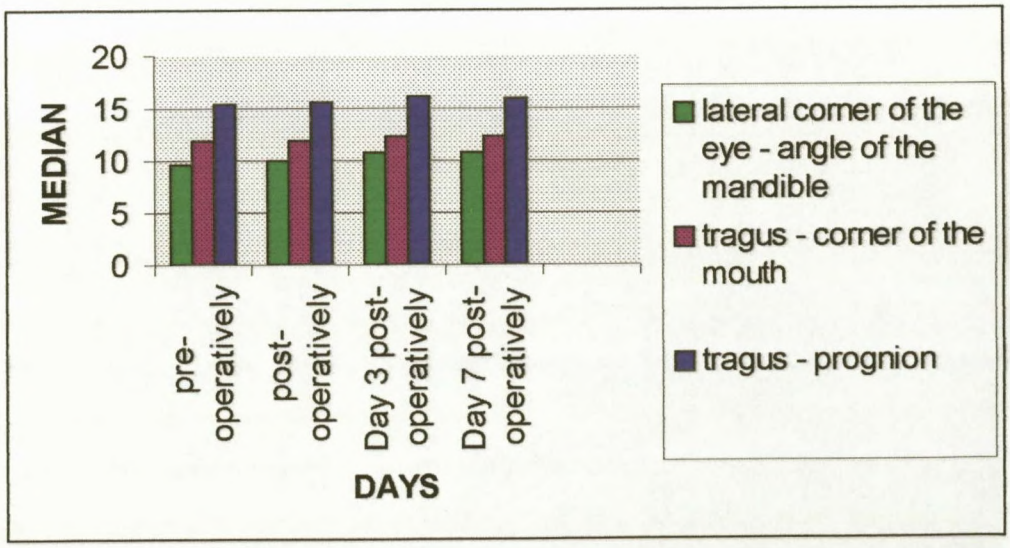


FIGURE 4.3.2: THIS FIGURE SHOWS THE MEDIAN VALUES FOR THE TAPE MEASUREMENTS OF THE PLACEBO GROUP ON THE FOUR DIFFERENT OBSERVATION DAYS



THE MANN-WHITNEY UNPAIRED TEST

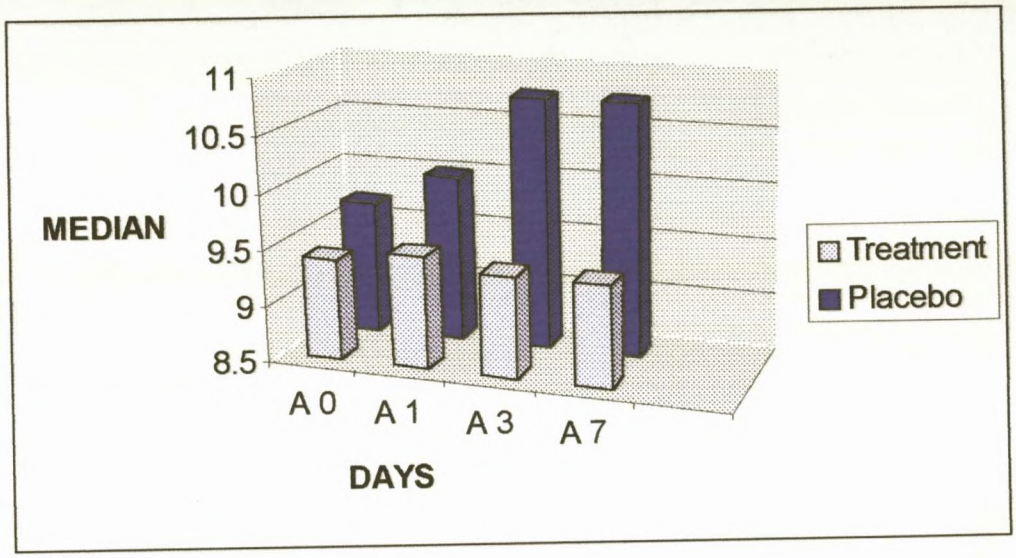
The Mann-Whitney Unpaired Test was used to test whether the two groups are alike or different by comparing the treatment group and placebo group. Comparisons were made between the three different sites at four different time intervals (3x4). The results are tabulated in table 4.3.5.

TABLE 4.3.5: **THE MANN-WHITNEY UNPAIRED TEST**

COMPARISON BETWEEN THE READING OF THE TREATMENT & PLACEBO FROM:	P - VALUE	RESULTS
THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE PRE-OPERATIVELY	0.258	NO SIGNIFICANT DIFFERENCE
THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE ON DAY 1 POST-OPERATIVELY	0.134	NO SIGNIFICANT DIFFERENCE
THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE ON DAY 3 POST-OPERATIVELY	0,001	SIGNIFICANT DIFFERENCE
THE LAT. CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE ON DAY 7 POST-OPERATIVELY	0.001	SIGNIFICANT DIFFERENCE

COMPARISON BETWEEN THE READING OF THE TREATMENT & PLACEBO FROM:	P - VALUE	RESULTS
THE TRAGUS TO THE CORNER OF THE MOUTH ON DAY 1 POST-OPERATIVELY	.546	NO SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE CORNER OF THE MOUTH ON DAY 3 POST-OPERATIVELY	0.005	SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE CORNER OF THE MOUTH ON DAY 7 POST-OPERATIVELY	0.010	SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE POGONION PRE-OPERATIVELY	0.405	NO SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE POGONION ON DAY 1 POST-OPERATIVELY	0.351	NO SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE POGONION ON DAY 3 POST-OPERATIVELY	0.002	SIGNIFICANT DIFFERENCE
THE TRAGUS TO THE POGONION DAY 7 POST-OPERATIVELY	0.001	SIGNIFICANT DIFFERENCE

FIGURE 4.3.3: **THIS FIGURE ILLUSTRATES THE COMPARISON BETWEEN THE TREATMENT GROUP AND THE PLACEBO GROUP FOR THE TAPE MEASUREMENTS FROM THE LATERAL CORNER OF THE EYE TO THE ANGLE OF THE MANDIBLE**



A 0 represents the reading taken pre-operatively

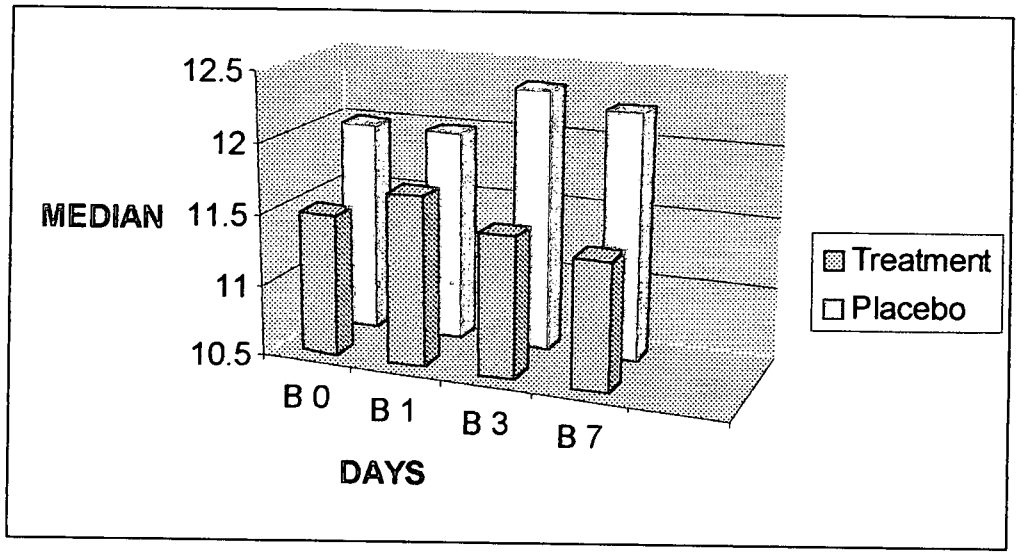
A 1 represents the reading taken on day 1 post-operatively

A 3 represents the reading taken on day 3 post-operatively

A 7 represents the reading taken on day 7 post-operatively

In the treatment group, there is an initial rise in the median value on day 1 post-operatively. But this rise is so slight that inflammation is not prominent. Whereas in the placebo group it is noted that overtime there is an increase in inflammation, which is not alleviated during the 7 day clinical trial.

FIGURE 4.3.4: **THIS FIGURE ILLUSTRATES THE COMPARISON BETWEEN THE TREATMENT GROUP AND THE PLACEBO GROUP FOR THE TAPE MEASUREMENTS FROM THE TRAGUS TO THE CORNER OF THE MOUTH**



B 0 represents the reading taken pre-operatively

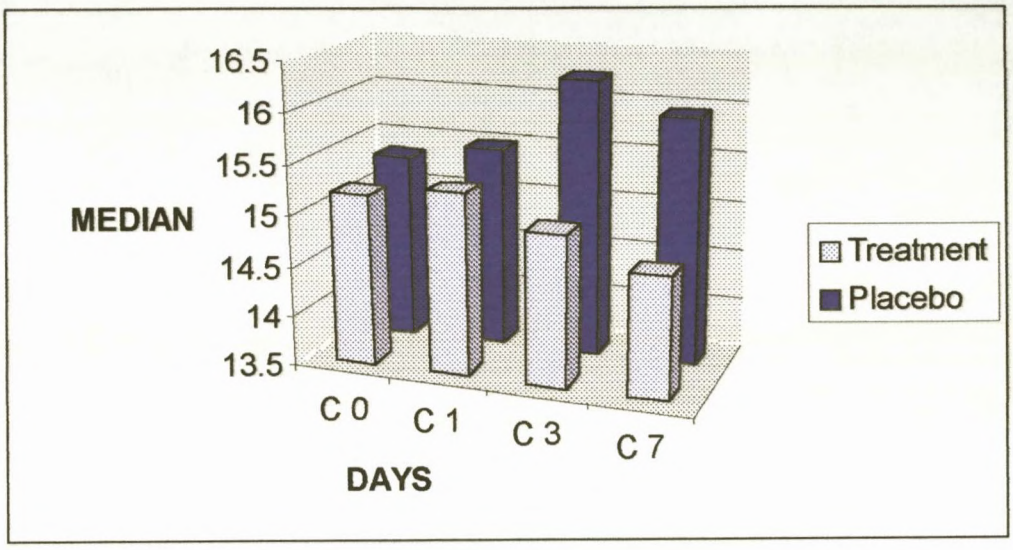
B 1 represents the reading taken on day 1 post-operatively

B 3 represents the reading taken on day 3 post-operatively

B 7 represents the reading taken on day 7 post-operatively

In this group of measurements it is noted that the treatment group has an initial peak but continues to decrease with time. Whereas the placebo group, once again, shows an increase over a period of time, reflecting that there is inflammation. The swelling was at its worst on day 3 post-operatively

FIGURE 4.3.5: **THIS FIGURE ILLUSTRATES THE COMPARISON BETWEEN THE TREATMENT GROUP AND THE PLACEBO GROUP FOR THE TAPE MEASUREMENTS FROM THE TRAGUS TO THE PROGNION**



C 0 represents the reading taken pre-operatively

C 1 represents the reading taken on day 1 post-operatively

C 3 represents the reading taken on day 3 post-operatively

C 7 represents the reading taken on day 7 post-operatively

Once again there is an initial rise after the operation in the treatment group, yet this rise is minimal. In the placebo group over time the is an increase in inflammation which is most noted on day 3 post-operatively

4.4 Questionnaire regarding the patient's quality of life.

This questionnaire was developed for some of the main descriptor symptoms associated with the post operative implications of third molar dental extraction. The questionnaire comprised of five sections, which contained various related questions under each section . The questionnaire was graded using a "Semantic Scale", i.e. a scale consisting of four gradings, the highest (4) being the most severe / negative and the lowest (1) being no symptoms / positive.

The questionnaire was first analysed with respect to the 5 sections. In so doing it shows which sections of the questionnaire reported significant differences. After this had been done, each question within the questionnaire was analysed separately .

THE WILCOXON'S SIGNED RANK TEST

The Wilcoxon's Signed Rank Test was used to test whether there was a significant difference two related samples, i.e. between the treatment group on day 1 and the treatment group on day 7. This test was then repeated in order to evaluate if there was a significant difference within the placebo group.

Decision Rule:

Reject H_0 at the α level of significance if the P-value $< \alpha/2$

Accept H_0 at the α level of significance if the P-value $\geq \alpha/2$

All tests will be carried out at the $\alpha = 0.05$ level of significance

On performing the Wilcoxon's Signed Rank Test it was found that there was a significant improvement between the beginning and end in the research trial for the treatment group in section 1, section 2, section 3 and section 4 at the 5% level of signifcance. The p values varied between 0.000 to 0.039. Only section 5 (P = 0.705) did not show a significant improvement at the end of the research trial at a 5% level of significance.

In the placebo group the null hypothesis was accepted for section 1, section 2 and section 5 as these results showed that there was no significant improvement between beginning and end in the research trial at the 5% level of significance. The P values varied between 0.093 and 1.000. Whereas for section 3 (P = 0.003) and section 4 (P = 0.035) the null hypothesis got rejected as it was determined that there had been improvement between the beginning and the end of the research trial at the 5% level of significance.

TABLE 4.4.1 THE WILCOXON SIGNED-RANK TEST FOR THE INDIVIDUAL QUESTIONS OF THE QUESTIONNAIRE

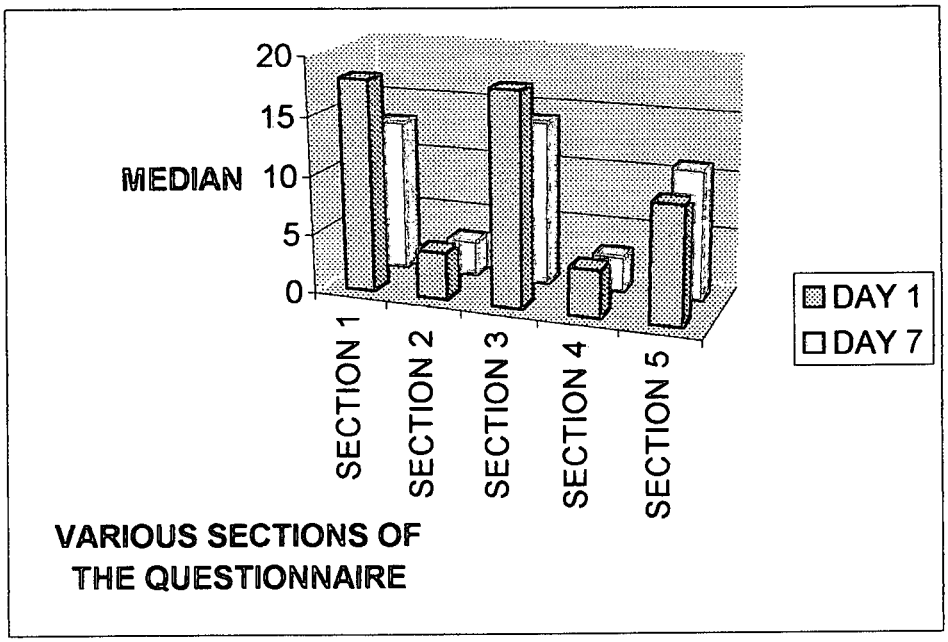
NUMBERING CORRESPONDS TO THE NUMBERING ON THE QUESTIONNAIRE UTILISED IN THIS CLINICAL OBSERVATION (APPENDIX F & G).	P-VALUES FOR THE TREATMENT GROUP	P-VALUES FOR THE PLACEBO GROUP
1.a	0.006	0.190
1.b	0.002	0.112
1.c	0.003	0.135
1.d	0.006	0.851
1.e	0.131	0.660
1.f	1.000	0.815
1.g	0.002	0.227
1.h	0.792	0.357
1.i	0.572	0.024
1.j	0.248	1.000
2.a	0.132	0.055
2.b	0.102	0.747

NUMBERING CORRESPONDS TO THE NUMBERING ON THE QUESTIONNAIRE UTILISED IN THIS CLINICAL OBSERVATION (APPENDIX F & G).	P-VALUES FOR THE TREATMENT GROUP	P-VALUES FOR THE PLACEBO GROUP
2.c	0.032	0.748
3.a	0.002	0.216
3.b	0.197	0.236
3.c	0.038	0.047
3.d	0.180	0.726
3.e	0.002	0.011
3.f	0.007	0.011
3.g	0.317	0.317
3.h	0.020	0.020
3.i	0.025	0.121
3.j	0.096	0.013
3.k	0.017	0.144
3.l	0.083	0.007

NUMBERING CORRESPONDS TO THE NUMBERING ON THE QUESTIONNAIRE UTILISED IN THIS CLINICAL OBSERVATION (APPENDIX F & G).	P-VALUES FOR THE TREATMENT GROUP	P-VALUES FOR THE PLACEBO GROUP
4.a	0.480	0.020
4.b	0.046	0.250
4.c	0.564	0.279
5.a	0.084	0.161
5.b	0.593	0.773
5.c	0.430	0.449
5.d	0.796	0.502
5.e	0.615	0.407

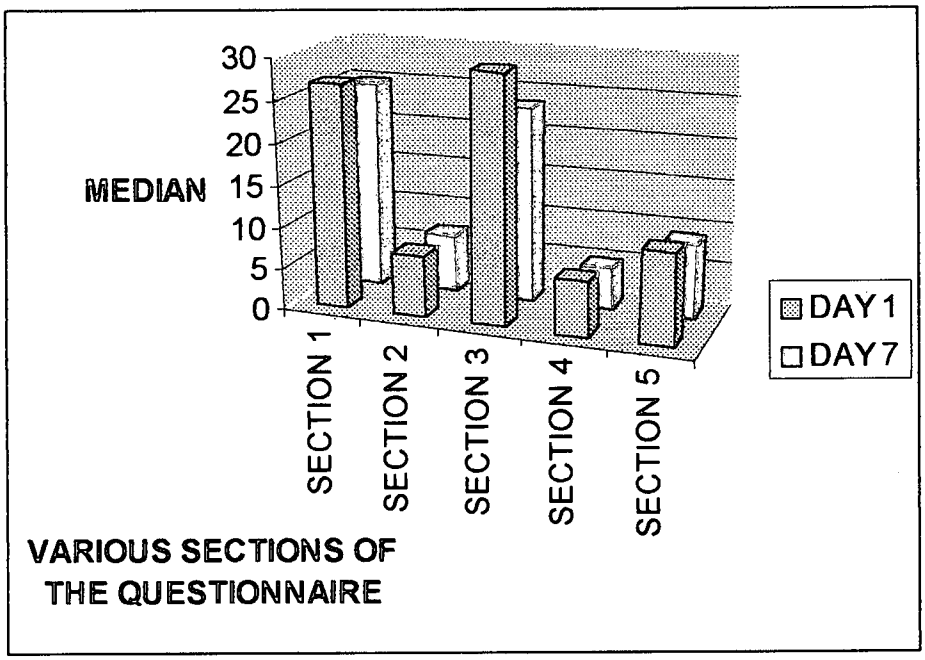
ALL VALUES REPRESENTED IN RED INDICATE A SIGNIFICANT DIFFERENCE AT THE 5% LEVEL OF SIGNIFICANCE.

FIGURE 4.4.1: **THIS FIGURE SHOWS THE MEDIAN VALUES FOR THE QUESTIONNAIRE WITHIN THE TREATMENT GROUP ON THE DAY 1 AND DAY 7 OF THE OBSERVATION PERIOD**



From the figure it is noted that overtime the median values for sections 1 to 4 of the questionnaire decrease, indicating that there is improvement over time. Although section 5 shows an increase it is still of a positive nature. Due to the fact that the higher the response the more willing the patients are to under go the treatment once again

FIGURE 4.4.2: THIS FIGURE SHOWS THE MEDIAN VALUES FOR THE QUESTIONNAIRE WITHIN THE PLACEBO GROUP ON THE DAY 1 AND DAY 7 OF THE OBSERVATION PERIOD

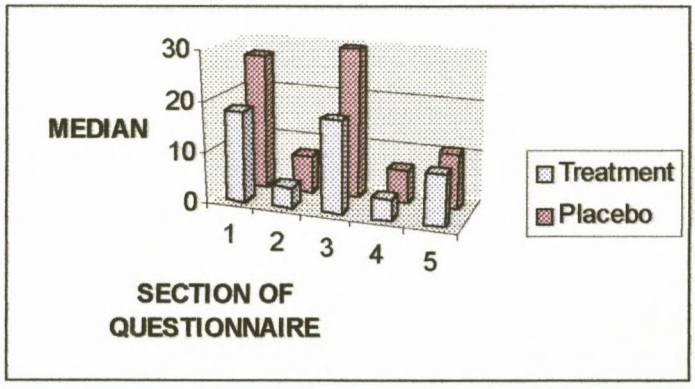


From the figure, it is noted that overtime there is only a slight difference on how the patient felt after the 7th day. This indicates a slow recovery period. Yet in section 2, patients conditions are deteriorating.

THE MANN-WHITNEY UNPAIRED TEST

The Mann-Whitney Unpaired Test was used to test whether the two groups are alike or different by comparing the treatment group and placebo group with respect to the five sections on day 1 and day 7 (2 x 5). On day 1 it was found that in section 1, section 2, section 3 and section 4 that there was a significant difference between the treatment group and the placebo group and therefore the null hypothesis was rejected. The P values varied between 0.001 and 0.049. Within section 5 the null hypothesis was accepted as the P value was 0.660.

FIGURE 4.4.3: THIS FIGURE ILLUSTRATES THE DIFFERENCES FOUND IN THE FIVE SECTIONS OF THE QUESTIONNAIRE ON DAY 1

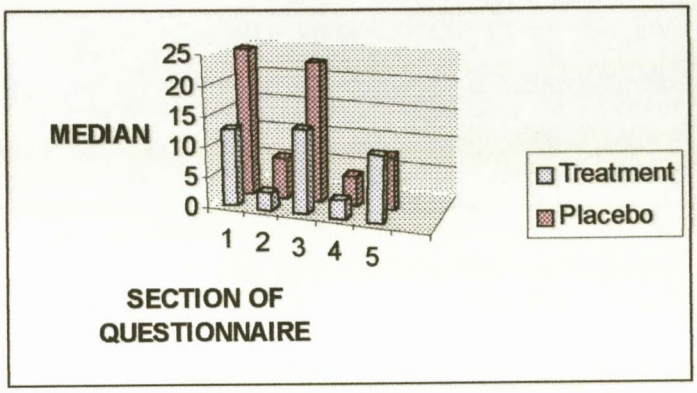


The figure illustrates that patients receiving placebo had higher scores on the questionnaire which means they were affected greatly by the operation.

On day 7 it was found that in section 1, section 2, section 3 and section 4 that there was a significant difference; therefore the null hypothesis was rejected. The P values varied between 0.000 and 0.003. Within section 5 the null hypothesis

was accepted, as the P value was 0.503.

FIGURE 4.4.4: **THIS FIGURE ILLUSTRATES THE DIFFERNCES FOUND IN THE FIVE SECTIONS OF THE QUESTIONNAIRE ON DAY 7**



Overtime the treatment group improved substantially whereas the placebo group experience relief, but not to the same extent as that of the treatment group.

TABLE 4.4.2: **THE MANN-WHITNEY UNPAIRED TEST**

FOR THE INDIVIDUAL QUESTION OF THE QUESTIONNAIRE FILLED IN ON DAY 1

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
1.a	0.009	Significant Difference
1.b	0.020	Significant Difference
1.c	0.008	Significant Difference
1.d	0.424	No Significant Difference
1.e	0.045	Significant Difference
1.f	0.009	Significant Difference
1.g	0.020	Significant Difference
1.h	0.072	No Significant Difference
1.i	0.035	Significant Difference
1.j	0.807	No Significant Difference
2.a	0.110	No Significant Difference
2.b	0.103	No Significant Difference

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
2.c	0.057	No Significant Difference
3.a	0.045	Significant Difference
3.b	0.053	No Significant Difference
3.c	0.001	Significant Difference
3.d	0.096	No Significant Difference
3.e	0.001	Significant Difference
3.f	0.002	Significant Difference
3.g	0.782	No Significant Difference
3.h	0.258	No Significant Difference
3.i	0.424	No Significant Difference
3.j	0.143	No Significant Difference
3.k	0.173	No Significant Difference
3.l	0.032	Significant Difference

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
4.a	0.001	Significant Difference
4.b	0.232	No Significant Difference
4.c	0.096	No Significant Difference
5.a	0.287	No Significant Difference
5.b	0.049	Significant Difference
5.c	0.103	No Significant Difference
5.d	0.002	Significant Difference
5.e	0.029	Significant Difference

TABLE 4.4.3: **THE MANN-WHITNEY UNPAIRED TEST**

FOR THE INDIVIDUAL QUESTION OF THE QUESTIONNAIRE FILLED IN ON DAY 7

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
1.a	0.001	Significant Difference
1.b	0.001	Significant Difference
1.c	0.000	Significant Difference
1.d	0.005	Significant Difference
1.e	0.008	Significant Difference
1.f	0.019	Significant Difference
1.g	0.001	Significant Difference
1.h	0.546	No Significant Difference
1.i	0.613	No Significant Difference
1.j	0.163	No Significant Difference
2.a	0.961	No Significant Difference
2.b	0.014	Significant Difference

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
2.c	0.000	Significant Difference
3.a	0.001	Significant Difference
3.b	0.057	No Significant Difference
3.c	0.001	Significant Difference
3.d	0.045	Significant Difference
3.e	0.005	Significant Difference
3.f	0.062	No Significant Difference
3.g	0.782	No Significant Difference
3.h	0.443	No Significant Difference
3.i	0.163	No Significant Difference
3.j	0.987	No Significant Difference
3.k	0.007	Significant Difference
3.l	0.832	No Significant Difference

COMPARISON BETWEEN OF THE QUESTIONNAIRE BETWEEN THE PLACEBO GROUP AND THE TREAMENT GROUP	P-VALUES	RESULTS
4.a	0.014	Significant Difference
4.b	0.273	No Significant Difference
4.c	0.483	No Significant Difference
5.a	0.568	No Significant Difference
5.b	0.126	No Significant Difference
5.c	0.163	No Significant Difference
5.d	0.020	Significant Difference
5.e	0.038	Significant Difference

FIGURE 4.4.5: THIS FIGURE ILLUSTRATES THE PATIENT'S PERCEPTION OF THEIR ABILITY TO SWALLOW SOLIDS POST-OPERATIVELY ON DAY 1 AND DAY 7 RESPECTIVELY

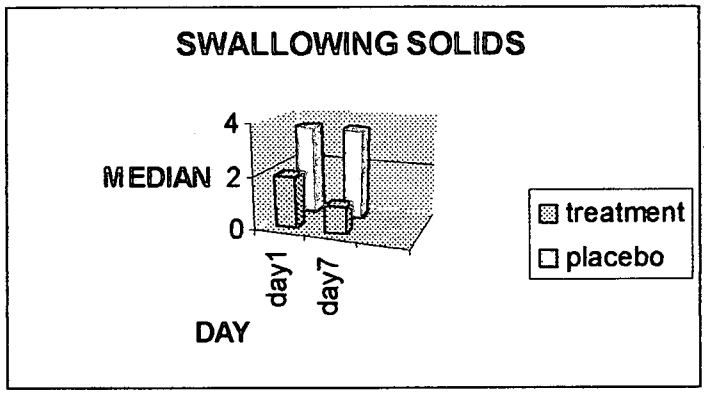


FIGURE 4.4.6: THIS FIGURE ILLUSTRATES THE PATIENT'S PERCEPTION OF THEIR ABILITY TO MOVE THEIR TEMPORAL MANDIBULAR JOINT POST-OPERATIVELY ON DAY 1 AND DAY 7 RESPECTIVELY

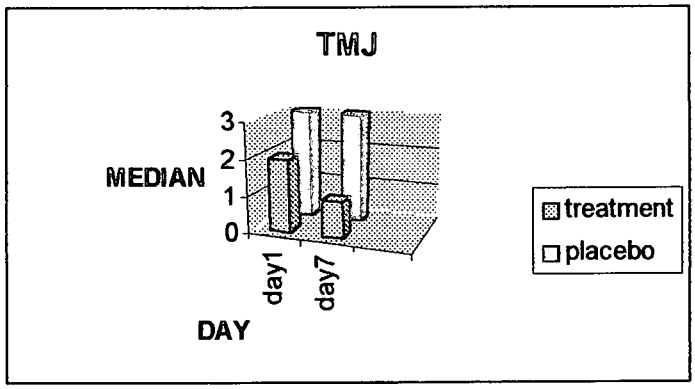


FIGURE 4.4.7: THIS FIGURE ILLUSTRATES THE PATIENT'S PERCEPTION OF THE BRUISING THEY EXPERIENCED ON DAY 1 AND DAY 7 RESPECTIVELY

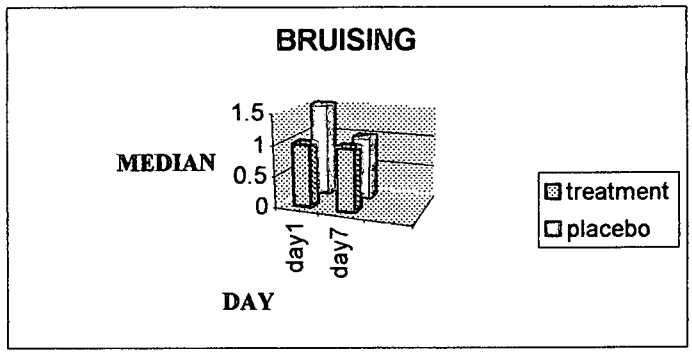


FIGURE 4.4.8: THIS FIGURE ILLUSTRATES THE PATIENT'S PERCEPTION OF THE SWELLING THEY EXPERIENCED ON DAY 1 AND DAY 7 RESPECTIVELY

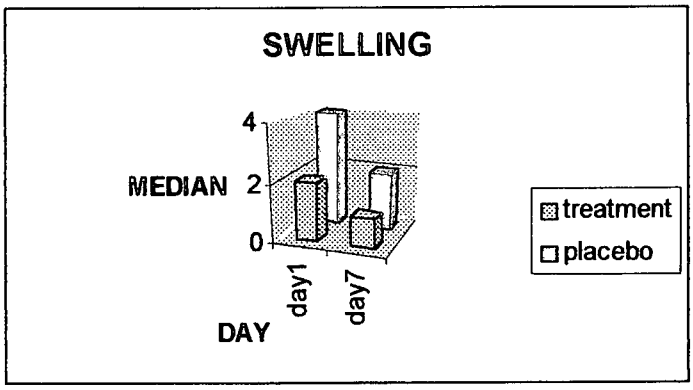


FIGURE 4.4.9: THIS FIGURE ILLUSTRATES THE PATIENT'S PERCEPTION OF THE BLEEDING THEY EXPERIENCED ON DAY 1 AND DAY 7 RESPECTIVELY

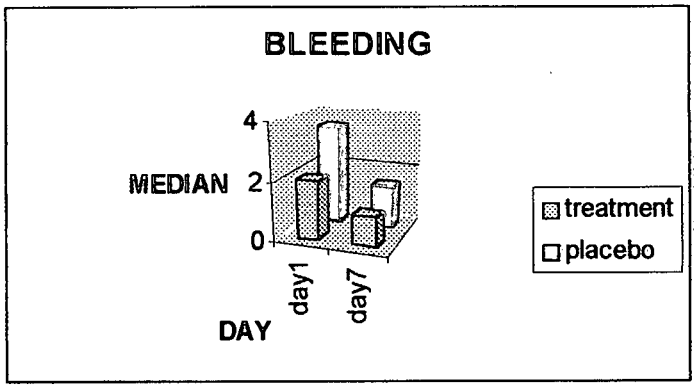
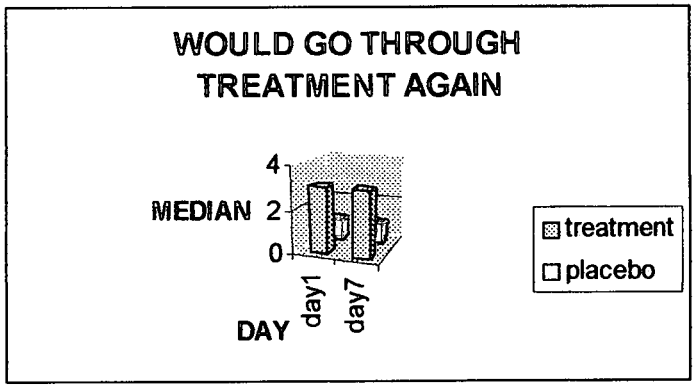


FIGURE 4.4.10: THIS FIGURE ILLUSTRATES WHETHER THE PATIENT WOULD GO THROUGH THE TREATMENT AGAIN



4.5 Other data collected during the study

FIGURE 4.5.1: THIS FIGURE DEMONSTRATES THE MALE TO FEMALE RATIO OF THE CLINICAL TRIAL. IT ALSO INDICATES THE PERCENTAGE OF EACH GENDER RECEIVING TREATMENT AND THOSE RECEIVING PLACEBO.

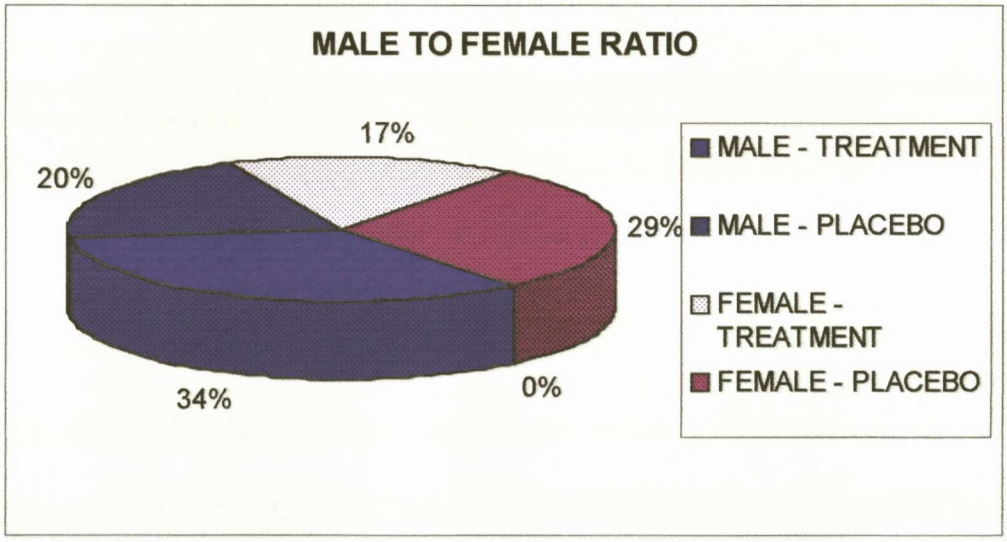


FIGURE 4.5.2: THIS FIGURE ILLUSTRATES THE DEGREE TO WHICH DIFFERENT RACE GROUPS PARTICIPATED IN THE CLINICAL TRIAL.

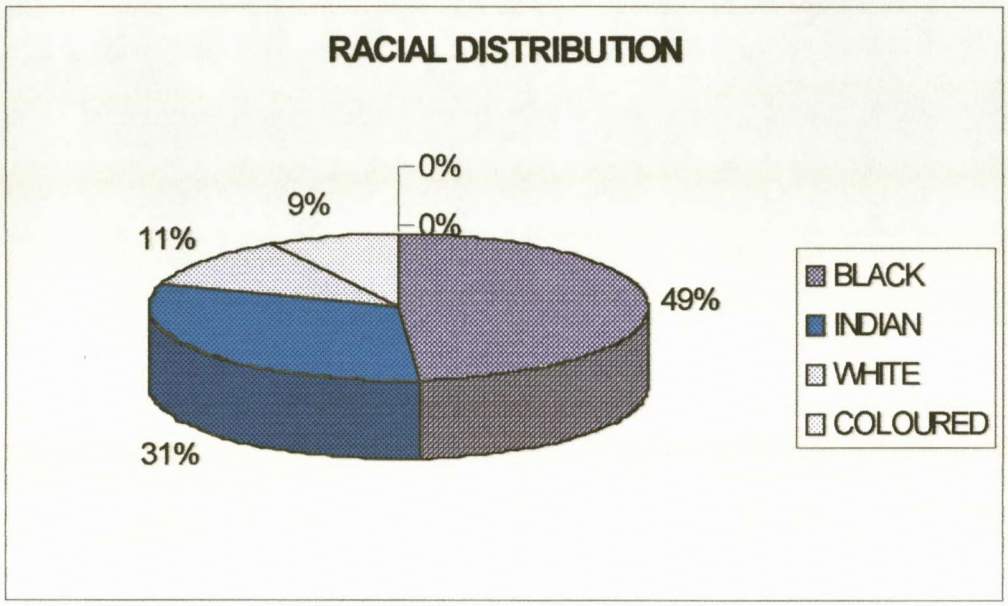
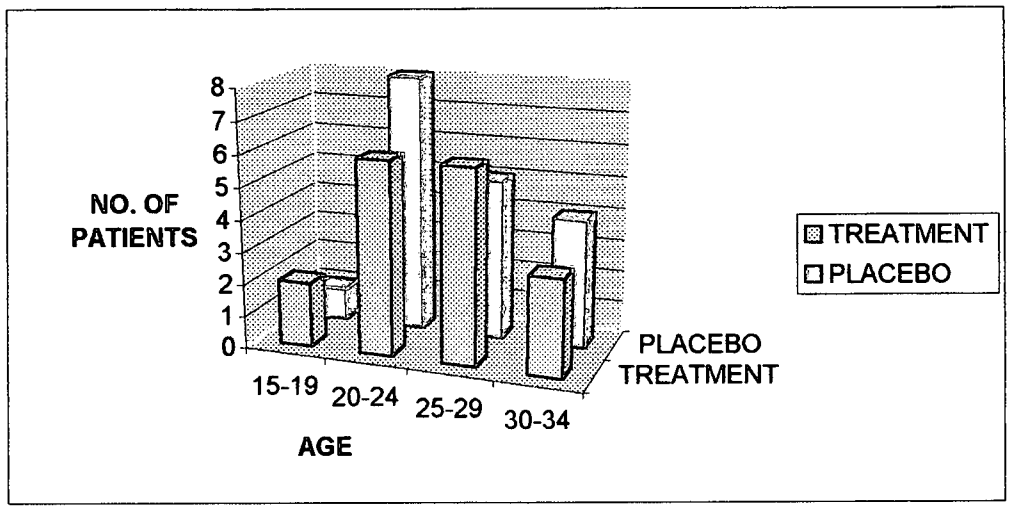


FIGURE 4.5.3: THIS FIGURE ILLUSTRATES THE AGE RANGE OF THE PARTICIPANTS OF THE CLINICAL TRIAL. THE YOUNGEST PATIENT THAT PARTICIPATED IN THE STUDY WAS 16 YEARS OLD AND THE OLDEST WAS 33 YEARS OLD.



CHAPTER 5

DISCUSSION

5.1. Introduction

This study was designed to evaluate the efficacy of a homoeopathic complex in the treatment of post-operative implications associated with impacted third molar surgical dental extraction.

The researcher had to decide whether to utilise patients that were removing their third molars under general anaesthesia or local anaesthesia. After scrutinising the relevant literature, it was decided that patients that had their impacted third molars removed under local anaesthesia were to be utilised. McGurk & Haskell (1999) reported that the force applied under general anaesthesia is greater, hence the sequelae of surgery under general anaesthesia is greater. Since this study was placebo controlled, it was decided to utilise patients that would not have severe sequelae. Edwards (1998) recommended that inpatient operations should be limited to those patients who require complex work and whose medical problems require them to be admitted. Where as day surgery is suitable for those that are fit and healthy.

5.2. Tape measurements

At the end of the clinical trial it was noted that patients that received the homoeopathic complex showed minimal inflammation. In fact this group showed

a decrease in inflammation from the start of the trial to the end of the trial. Whereas the placebo group showed an over all increase in inflammation.

Table 4.3.1. for the treatment group indicated a significant difference at the 5% level of significance whereas the placebo group (table 4.3.2.) also showed a significant difference but this difference indicated an increase in inflammation whereas the treatment group had experienced a decrease in inflammation.

The Wilcoxon's Signed Rank Test was used to test whether there was a significant difference between the related tape measure readings taken at 4 different time intervals within the treatment group (table 4.3.3.) and then again within the placebo group (table 4.3.4.). Both placebo and treatment group showed a difference at the 5% level of significance; the treatment group showed a decrease in inflammation and the placebo group demonstrated a deterioration in the placebo group with an increase in inflammation.

The graphical representations (Figure 4.3.3. – Figure 4.3.5) clearly demonstrate that there was little change in the treatment group with respect to inflammation. In fact there seemed to be an initial rise after the surgical procedure followed by a decrease. Whereas the placebo group clearly under went deterioration which peaked on day 3 post-operatively and by day 7 had shown little improvement. A number of the patients in the placebo group that were experiencing discomfort and or inflammation were prescribed a coarse of anti-biotics and or analgesics,

after the clinical trial had been completed.

From these tape measure analysis it is evident that the homoeopathic medication aided the patient by preventing them from experiencing notable inflammation. It is also noted that it is necessary that the patient be given some form of anti-inflammatory whether it is allopathic or homoeopathic in order to ensure minimal discomfort after the surgical intervention.

5.3 Questionnaire

The questions in the questionnaire covered the majority of the symptom complexes in order to indicate the extent to which the patient's quality of life was disrupted as a result of the surgical intervention. The study period was short due to the fact that this is an acute condition, and previous research by Nørholt (1998) showed that the patient needed an effective analgesic in the first 24-hour period post-operatively. Garcia (1997) demonstrated that the proportion of patients using analgesics is higher in the first 24 hours post-surgery (acute period) than after 5 days, indicating that the severity of pain declines over this period .

Questions from the questionnaire concentrated on the type of complaints that are commonly associated with surgical removal of impacted third molars as well as complaints that accompany surgical procedures such as post-operative nausea, dizziness and dry mouths.

Overall the patients seemed to have had few complaints related to nausea and dizziness in both the treatment group and the placebo group.

After statistically analysing the treatment group it is noted that there is a significant difference at the 5% level of significance with respect to eating, speech, physical effects and appearance over the trial period indicating that there is an improvement in the patients in these areas. Patients response to whether or not they would under go the procedure again was of a positive nature (Figure 4.4.1.).

Figure 4.4.2. indicates that overtime there is a slight difference on how the patients felt after the 7^{th} day post-operatively. This indicated that the patients are experiencing a slow recovery period. Except for the speech, where patients felt that their speech had been affected greatly and was difficult to talk with respect to movement of the temporal mandibular joint.

On comparing figure 4.4.1 and 4.4.2 it is noted that the median value of the treatment group were not as high as those of the placebo group. Indicating that the patient's quality of life for the treatment group was better that that of the placebo group.

When comparing the placebo group and the treatment group with respect to the questions filled in on day 1 it is noted that the major differences are:

their ability to eat, chew foods, swallow solids, food enjoyment, food taste, bad taste in the mouth, pain with respect to tooth extraction, pain with respect to TMJ, bleeding, numbness, swelling of facial region, and time off work or college.

When comparing the placebo group and the treatment group with respect to the questions filled in on day 1 it is noted that the major differences are:
diet, their ability to eat, chew foods, swallow solids, swallow liquids, food enjoyment, food taste, ability to open mouth, vocal speech in terms of the throat being affected, vocal speech with respect to the TMJ being affected, pain with respect to tooth extraction, pain with respect to referred pain, pain with respect to TMJ, bruising, sleep pattern, and swelling of facial region.

Patients in the treatment expressed their willingness to under go the treatment again whereas the placebo group did not want to under go through the treatment again.

This clinical trial has shown that the homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum*, and *Phosphorus* can be utilised to treat the post-operative implications associated with impacted third molar surgical dental extraction.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The study demonstrated that the homoeopathic complex consisting of *Arnica montana*, *Hypericum perfoliatum*, and *Phosphorus* is effective in the treatment of the post-operative implications associated with impacted third molar dental extraction.

6.2 RECOMMENDATIONS

Since it has been established that homoeopathic treatment is beneficial in treating the post-operative implications associated with impacted third molar dental extraction, the use of homoeopathic treatment should be compared to that of glucocorticoids and NSAIDs, such as ibuprofen and methylprednisolone, in order to establish which form of treatment would be more beneficial to the patient.

From a homoeopathic standpoint, much more research could be done on impacted third molars, as well as other dental related conditions. The use of simplex remedies should be compared to the use of the complex remedies. And the frequency of administration of the homoeopathic drugs needs to under go

clinical trials. This study used higher potencies than the French Homoeopathic system, it would therefore be interesting to compare a similar complex in lower potencies with more frequent repetition.

If this study was to be reproduced, a larger group of participants must be considered and more attention should be placed on racial distribution as well as gender distribution.

The economic viability of homoeopathy compared with allopathic treatment is recommended for further study.

Acupuncture as a form of analgesic to relieve the pain and as an anti-inflammatory to relieve the swelling could be considered as an alternative to homoeopathic and allopathic treatment.

REFRENCES

Akota, I., Alvsaker, B. & Bjørnland, T. 1998. The effect of locally applied gauze drain impregnated with chlortetracycline ointment in mandibular third-molar surgery. Acta Odontologica Scandinavica, 56 (1): 25-29.

Asanami, S & Kasazaki, Y. 1990. Expert Third Molar Extraction. Tokyo: Quintessence Publishing Company. 297p. ISBN 4-87417-308-X.

Bath-Balogh, M. & Fehrenbach, M.J. 1997. Illustrated Dental Embryology, Histology and Anatomy. Philadelphia: W.B. Saunders Company. 392p. ISBN 0-7216-6687-6.

Borland, D. 1988. Homoeopathy in Practice. Second Edition. Beaconsfield, England: Beaconsfield Publishers. 208p. ISBN 0-906584-06-X.

Boyd, H.W. 1989. Introduction to Homoeopathic Medicine. Second Edition. Beaconsfield, England: Beaconsfield Publishers. 285p. ISBN 0-906584-21-3.

Brand, R.W. & Isselhard, D.E. 1994. Anatomy of Orofacial Structures. Fifth

Edition. Missouri: Mosby pupbishers. 527p. ISBN 0-8016-7967-2.

Brann, C.R., Brickley, M.R. & Shepherd, J.P. 1999. Factors influencing nerve damage during lower third molar surgery. British Dental Journal, 186(10): 514-516.

Brickley, M.R. & Shepherd, J.P. 1998. A study of the validity of a simulation of third molar eruption based on Markov modelling. British Dental Journal, 185(5): 233-237.

Brown, L. H., Berkman, S., Cohen, D., Kaplan, A.L. & Rosenberg, M. 1982. A radiological study of the frequency of impacted teeth. Journal of the Dental Association of South African, 37: 627-630.

Castro, M. 1995. The Complete Homoeopathic Handbook: A Guide to Everyday Health Care. London: Macmillian London Limited. 275p. ISBN 0-333-5581-3.

Cawson, R.A. 1980. Essentials of Dental Surgery and Pathology. Third Edition. Edinburgh: Churchill Livingstone. 444p. ISBN 0 443 01401 9.

Dorland, W.A. & Newman W.A. 1988. Dorland's Illustrated Medical Dictionary. International Edition. Philadelphia: W. B. Saunders Company. 1940p. ISBN 0-7216-5323-5.

Edwards D.J., Brickely M.R., Horton J., Edwards M.J. & Shepherd, J.P. 1998. Choice of anaaaesthetic and healthcare facility for third molar surgery. British Journal Of Oral & Maxillofacial Surgery, 36: 333-340.

Elmiger, J. 1998. Rediscovering Real Medicine. The New Horizons of Homoeopathy. Btistol, Great Britain: Element Books Limited. 281p. ISBN 1-86204-199-7.

Garcia, A.G., Sampedro,F.G., Rey, J.G. & Torreira, M.G. 1997. Tismus and Pain After Removal of Impacted Lower Third Molars. Journal of Oral & Maxillofacial Surgery, 55(11): 1223-1226.

Gibson, S & Gibson, R. 1991. Homoeopathy For Everyone. Middlesex, England: Penguin books limited. 223p. ISBN 0-1401-9290-5.

Hahnemann, S. 1996. Organon of Medicine. Reprint Edition. Delhi, India: B. Jain Publishers. 314p. ISBN 81-7021-085-2.

Hattab, F.N. & Abu Alhaija, E.S.J. 1999. Radiographic evaluation of mandibular third molar eruption space. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, & Endodontics, 88(3): 285-291.

Heydt, H. 1999. The Third Molar. South African Dental Journal, 54: 133.

Hooley, J.R. 1986. Surgical Removal of Impacted Teeth. In Levine, N. Current Treatment in Dental Practice. pp 319-331. Philadelphia, U.S.A: W.B. Saunders Company. 553p. ISBN 0-7216-1198-2.

Jouanny, J. 1991. The Essentials Of Homoeopathic Therapeutics. Boiron Edition. Boiron, France: Boiron Publishers. 417p. ISBN 2-85742-014-5.

Laskin, D.M. 1996. Oral and Maxillofacial Surgery. Vol. 2. Delhi: Krishan Nagar. 1124p. ISBN 81-85386-0-3

Lockie, A & Geddes, N. 1995. The complete guide to Homoeopathy. The

principles and practice of treatment. Great Britian: Dorling Kindersley. 240p. ISBN 1868 12 645 5

Manhold, J.H. & Balbo, M.P. 1985. Illustrated Dental Terminology. Philadelphia: Lippincoft Company. 370p. ISBN 0-397-52115-4.

Mc Gurk, M. & Haskell, R. 1999. Wisdom tooth removal and lingual nerve damage. British Journal of Oral & Maxillofacial Surgery, 25(4): 253-254.

McIntyre, G. 1998. Kissing molars: An unexpected finding. Dental Update, 25(6)10 - 11.

Morrison, R. 1993. Desktop Guide to Keynotes and Confirmatory Symptoms. Albany, U.S.A: Hahnemann Clinic Publishing. 440p. ISBN 0-9635368-0-X.

Motamedi, M.H.K. 1999. Impacted lower third molar and the inferior alveolar nerve. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, & Endodontics, 87(1): 3-4.

Naidoo, L.C.D. 1997. Third molar surgery in general dental practice. Journal of the Dental Association of South Africa, 52: 73-75.

Neal, M.J. 1992. Medical Pharmacology at a Glance. Second Edition. Oxford, England: Backwell Scientific Publications. 92p. ISBN 0 632 03424 6.

Nørholt, S.E., Aagaard, E., Svensson, P. & Sindet-Pedersen, S. 1998. Evaluation of Trismus, Bite Force, and Pressure Alometry After Third Molar Surgery: A Placebo- Controlled Study of Ibuprofen. Journal of Oral & Maxillofacial Surgery, 56(4): 420-429.

Ogden, G.R., Bissias, E., Ruta, D.A. & Ogston, S. 1998. Quality of life following third molar removal: a patient versus professional perspective. British Dental Journal, 185(5): 233-237.

Poyton H.G. 1982. Oral Radiology. London: Williams & Wilkins. 403p. ISBN 0-683-06964-0.

Punwutikorn, J., Waikakul, A. & Ochareon, P. 1999. Symptoms of unerupted mandibular third molars. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, & Endodontics, 87(3): 305-310.

Reynaldo, A.L. 1999. Prophylactic third molar extraction: The public health policy

implications. Dental Abstracts, 44(4): 156.

Savin, J. & Ogden, G.R. 1997. Third molar surgery – a preliminary report on aspects affecting quality of life in the early post-operative period. British Journal of Oral & Maxillofacial Surgery, 35: 246-253.

Schroyens, F.1997. Synthesis: Repertorium Homeopathicum Syntheticum. Seventh Editionn. London: Homeopathic Book Publishers. 1718p. ISBN 0 9522744 3 4.

Scully, C & Cawson, R.A. 1987. Medical problems in Dentistry. Second edition. Bristol: Wright. 588p. ISBN 0 7236 0631 5.

Scultze-Mosgau, S., Schmelzeisen, R., Frölich, J.C. & Schmele, H. 1995. Use of Ibuprofen and Methylprednisolone for the Prevention of Pain and Swelling After Removal of Impacted Third Molars. Journal of Oral & Maxillofacial Surgery, 53: 2-7.

Senghore, N. & Harris, M. 1999. The effect of tranexamic acid (cyclokapron) on blood loss after third molar extraction under a day case general anaesthetic. British Dental Journal, 186(12): 634-636.

Seymour, R.A., Ward-Booth, P. & Kelly, P.J. 1996. Evaluation of different doses of soluble ibuprofen and ibuprofen tablets in post-operative dental pain. British Journal of Oral & Maxillofacial Surgery, 34: 110-114.

Shafer, D.M., Frank, M.E., Gent, J.F. & Fischer, M.E. 1999. Gustatory function after third molar extraction. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, & Endodontics, 87(4): 419-428.

Smith,T.1982. Homoeopathic Medicine. Hammersmith, London: Thorsons. 256p. ISBN 0-7225-0775-5.

Stafne, E.C. & Gibilisco, J.A. 1975. Oral Roentgenographic Diagnosis. Fourth edition. Philadelphia: W.B.Saunders. 478p. ISBN 0-7216-8547-1.

Stephenson, D.L. 1998. Root Canal and Homoeopathy. The New England Journal of Homoeopathy, 7(1): 99-103.

Tetsch, P. & Wagner, W. 1990. Operative Extraction of Wisdom Teeth. Cased Edition. Worcester: Ebenezer Baylis. 137p. ISBN 072340836X.

Tyler, M.L. 1995. Homoeopathic Drug Pictures. Tenth Impression. Essex, England: Daniel. 868p. ISBN 0-85032-021-6.

Vermeulen, F. 1997.Concordant Materia Medica. Second Edition. Haarlem, The Netherlands: Emryss bv Publishers. 1686p. ISBN 90-76189-02-1.

Woelfel J.B. 1990. Dental Anatomy: Its Revelance to Dentistry. Fourth edition. Pennsylvania: Lea & Febiger. 438p. ISBN 0-8121-1259-8.

Wood, N.K. & Goaz, P.W. 1985. Differential Diagnosis of Oral Lesions. Third edition. Missouri: Mosby. 791p. ISBN 0-8016-5671-0.

APPENDIX A:

PATIENT CASE HISTORY

NAME: DATE:

D.O.B: AGE:

SEX: RACE:

MARITAL STATUS: OCCUPATION:

ADDRESS:

PHONE NUMBER: (H) (W)

PAST MEDICAL HISTORY:

1. Have you ever had any serious medical problem?
2. Have you ever been in hospital and for what?

CURRENT HEALTH STATUS:

1. Do you suffer from any allergies?
2. Are you taking any medication or supplementation at present?
3. Do you smoke?
4. Do drink any form of alcohol?

FAMILY HISTORY

1. Are your parents alive?
2. Do any of them have any medical problems?
3. Are there any medical problems in the rest of the family?

SURGICAL REMOVAL OF:

BOX NO.:

DURATION OF SURGERY:

PARANT SCALE GRADING:

DATE OF SURGERY:

DATES OF FOLLOW-UP APPOINTMENTS:

MEASUREMENTS:

	Pre-operative	Post-operative	Day 3	Day 7
A				
B				
C				

APPENDIX B:

PATIENT INFORMATION SHEET

This research project is investigating the effectiveness of Homoeopathic treatment in post-operative implications associated with impacted third molar extraction, in order to determine whether homoeopathy actually has a place in the medical sphere for this condition. Your honest participation will thus greatly contribute to this research and more importantly it will educate the public that there are safer and effective forms of treatment for the post-operative implications of impacted third molars.

In order to part take in this study it is crucial that no other forms of medication are to be taken during the period of clinical observation (day prior to extraction and 7 days post-operatively). It is important that you maintain as normal as possible life-style within the bounds of this study.

At your first consultation a comprehensive examination of your x-rays will be conducted by the maxillofacial surgeon. Once a confirmed diagnosis of impacted third molars has been made, you will be interviewed by the researcher.

A double-blind study will be conducted. Participants will be randomly divided into two groups (experimental and placebo), in such a way that each patient will have an equal chance of being selected for either group.

1. UKUDLA - kusukela uhlinziwe luye lwaba khona yini ushintsho:

a) ekudleni kwakho ?	1	2	3	4
b) ekuhlafuneni kwakho ukudla ?	1	2	3	4
c) ekugwinyeni ukudla okuqinile ?	1	2	3	4
d) ekugwinyeni okusamanzi ?	1	2	3	4
e) ekuthokozeleni kwakho ukudla ?	1	2	3	4
f) ekunambitheni kwakho ukudla?	1	2	3	4
g) ekuvuleni kwakho umlomo ?	1	2	3	4
h) umoya onukayo ?	1	2	3	4
i) ukunambitheka kabi komlomo ?	1	2	3	4
j) ukugcwala kokudla esisinini ?	1	2	3	4

Chaza kancane ukuthi lokhu okungenhla kuyithinte kanjani indlela yakho yokuphila ?

An independent dispenser will administer the homoeopathic complex or placebo treatment to each patient. Each patient will receive granules in the form of nine powders.

The homoeopathic complex will consist of *Arnica montana* in the 30th centisimal potency, *Hypericum perfoliatum* in the 200th centisimal potency and *Phosphorus* in the 30th centisimal potency. One dose will be equivalent to one powder. The placebo medication will consist of granules that look identical to those of the complex group.

You are to take the medication in the following manner: powder number 1 the evening prior to the extraction; powder number 2 the morning of extraction. Powder number 3 is to be taken as soon as the surgical procedure is completed. Powder number 4 is to be taken before going to bed on the day of the surgery. There after, you are to take one powder daily, in the morning on rising for the following 5 days.

The researcher will take measurements with a tape measure in order to assess the inflammation (swelling). You will be seen pre-operatively and on the first, third and seventh post-operative days by the researcher. You will also be required to complete a questionnaire on days 1 and 7 after the operation in order to evaluate your perception on the quality of your life post-operatively.

APPENDIX C:

Iphepha Lokuchazela Isiguli

Lolucwaningo lwenzelwe ukuthi kubonakale ukusebenza kwemithi ye Homoeopathy emva kokuhlinzwa kwamabamba, lokhu kwenzelwe ukuthi kubonakale ukuthi lemethi ye homoeopathy eqinisweni inayo yini indawo kwezokwelapha maqondana nalokhu. Ukuhlanganyela kwakho ngokwe thembeka kuzoba nosizo olukhulu kulolucwaningo, futhi okubalulekile kuzofundisa umphakathi ukuthi kukhona ezinye izindlela ezingenabungozi futhi eziyimpumelelo zokwelapha lokho okungavela emva kokuhlinzwa kwamabamba.

Ukuze uthathe iqhaza kuloluncwaningo kubalulekile ukuthi kungabi bikho olunye uhlobo lomuthi ozoluphuza ngesikhathi sokuhlolwa (usuku ngaphambi kokukhipha kanye nangezinsuku ezingu – 7 emva kokuhlinzwa). Kubalulekile ukuthi uzame ukugcina indlela ophila ngayo ngokwemigomo yalolunwaningo.

Ekubonweni kwakho kokugala, ukuhlolwa okubanzi kwezithombe ze x-ray kuyokwenziwa ngudokotela wemihlathi (maxillo-facial). Emva kokuthi esenesiqiniseko sokuthi amabamba akho anenkinga wena uyobe sewuxoxisana nalowo owenza uncwaningo.

Loluwaningo luyobe lufihlekile. Labo abazobamba iqhaza bayokhethwa

ngokucaphunwa bahlukaniswe kabili (abazohlolwa ngomuthi nalabo bomuthi ongemuthi), ngendlela yokuthi yilowo nalowo uyoba nethuba elifanayo lokukhethwa ukuthi abe kunanoma yiliphi iqembu.

Lowo ozimele okhipha imithi uyonikeza umuthi we homoeopathy noma umuthi ongemuthi kuleso naleso siguli. Isiguli ngasinye siyothala ophawuda abayizinhlobo ezingu – 9.

Imithi ye homoeopathy iyoba nalokhu – Arnica montana 30^{th} ch, Hypericum perfoliatum 200^{th} ch kanye ne Phosphorus 30^{th} ch. Ukuphuza kanye (dose) kuyalingana no phawuda owodwa. Impuphu yomuthi ongemuthi iyobe ifana naleyo yelinye igembu.

Umuthi uyowuthatha ngalendlela elandelayo :

uphawuda 1 ebusuku ngaphambi kokukhipha

uphawuda 2 ekuseni ngelanga lokukhipha

uphawuda 3 masinyane emva kokukhipha

uphawuda 4 phambi kokuthi uyolala ngelanga lokuhlinzwa

Emva kwalokhu thatha uphawuda owodwa nsuku zonke, ekuseni ngesikhathi uvuka izinsuku ezingu – 5.

Umncwaningi uyokala ngetheyiphu ukubona ukuvuvuka, wena uyobe usubonwa ngaphambi kokuhlinzwa kanye nangosuku lokuqala (1), lwesibili (2), kanye

nangosuku lwesikhombisa (7) emva kokuhlinzwa ngumcwaningi. Wena kuyodingeka ukuthi wena ugcwalise imibuzo nsuku zonke, kusukela ngosuku lokuqala -1 / kuya ku – 7 emva kokuhlinzwa ukuze wena ubone indlela yempilo yakho emva kokuhlinzwa.

Emva kokuthi wena usuqonda kahle ngokungena kwakho kuloluncwaningo, futhi uvuma ukuthi uthathe iqhaza kuloluwanigo, kuyisidingo ukuthi wena usayine ifomu yemvume.

APPENDIX D:

PATIENT CONSENT FORM

INFORMED CONSENT FORM

To be completed in duplicate by patient / parent.

TITLE OF RESEARCH PROJECT

The efficacy of a homoeopathic complex (*Arnica*, *Hypericum* and *Phosphorus*) in the treatment of post-operative implications associated with impacted third molar dental extraction.

NAME OF SUPERVISOR

Dr. Naiker

NAME OF RESEARCH STUDENT

Maureen dos Ramos

PLEASE CIRCLE THE APPROPRIATE ANSWER

1. Have you read the research information sheet? YES / NO

2. Have you had an opportunity to ask questions? regarding this study? YES / NO

3. Have you received satisfactory answers to your questions? YES / NO

4. Have you had an opportunity to discuss this study? YES / NO

5. Have you received enough information about this study? YES / NO

6. Who have you spoken to? _____

7. Do you understand the implications of your involvement in this study? YES / NO

8. Do you understand that you are free to withdraw from this study:

   a) at any time

   b) without having to give a reason for withdrawing, and

   c) without affecting your future health care YES / NO

9. Do you agree to voluntarily participate in this study? YES / NO

10. If no has been answered to any of the above questions, who is accountable for clarification _____

PATIENTS NAME _____ **Signature**_____

PARENT / GUARDIAN NAME _____ **Signature**_____

WITNESS NAME _____ **Signature**_____

RESEARCH STUDENT NAME _____ **Signature**_____

APPENDIX E:

IFOMU YEMVUME YESIGULI

IMVUME OKUXOXISENWE NGAYO

Kufanele igcwaliswe ibe yiduplikhethi yisiguli / wumphathi.

IGAMA LONWANINGO

Ukusebenza kwemithi ye homoeopathy (i-Arnica, Hypericum kanye ne Phosphorus) ekwelapheni okungavela emva kokuhlinzwa okuphathelene namabamba.

IGAMA LOPHETHE

Dr. Naiker

IGAMA LESITSHUDENI ESINGUMCWANINGI

Maureen dos Ramos

SICELA UKEKELEZELE IMPENDULO OKUYIYONA

1. Usulifundile uphepha lencazelo ngocwaningo na? YEBO / CHA

2. Ulitholile ithuba lokubuza imibuza

mayelana nalolucwaningo na? YEBO / CHA

3. Uzitholile izimpendulo ezigculisayo ngemibuzo yakho na? YEBO / CHA

4. Ube nalo ithuba lokuxoxisana ngalolucwaningo na? YEBO / CHA

5. Uyitholile incazelo eyanele ngalolucwaningo na? YEBO / CHA

6. Ukhulume nobani? _____

7. Uyaqonda ngokuzifaka kwakho kulolucwaningo na? YEBO / CHA

8. Uyaqonda ukuthi ungaphuma kulolucwaningo ngokukhululeka:

   a) noma ngasiphi isikhathi

   b) ngaphandle kokunika isizathu sokuphuma, futhi

   c) ngaphandle kokuthinteka kwempilo yakho ngesikhathi esizayo YEBO / CHA

9. Uyavuma yini ukuthi uthathe iqhaza kulolucwanningo ngokuzikhethela na? YEBO / CHA

10. Uma ngabe kukhona umbuzo owuphendule ngo cha kulena engaphezulu, ngubani okufanele akuchazele kahle na? _____

_____ _____

IGAMA LESIGULI **SAYINA**

_____ _____

IGAMA LOMZALI / UMPHATHI **SAYINA**

_____ _____

IGAMA LIKA FAKAZI **SAYINA**

_____ _____

IGAMA LESITSHUDENI ESINGUMCWANINGI **SAYINA**

APPENDIX F:

QUESTIONNAIRE

THE EFFICACY OF A HOMOEOPATHIC COMPLEX (*ARNICA, HYPERICUM AND PHOSPHORUS*) IN THE TREATMENT OF POST-OPERATIVE IMPLICATIONS ASSOCIATED WITH IMPACTED THIRD MOLAR DENTAL EXTRACTION.

Observer:

Patient name:

Guardian name:

Instructions:

In order to improve the quality of care we provide to our patients, it is important for us to examine the effects our procedures have upon our patients. We would ask you to complete this survey form. All completed forms are treated in the strictest confidence.

This questionnaire is to be completed by patient or by patients guardian. This is a preliminary report on the aspects affecting the quality of life in the early post-operative period.

Please complete the questionnaire on day 1 and 7 after your operation and return it.

Please answer the questions as objectively and honestly as possible. Make sure you answer all the questions and do not skip any accidentally. All questions are to be read carefully before answering. If you have any quires, please ask the researcher for assistance. In the following questions, please circle the number which corresponds most closely to your view using this system:

For example:

Not at all = 1 A little = 2 Quite a lot = 3 Very much = 4

1. EATING - since your operation has there been any changes in:

a)	your diet ?	1	2	3	4
b)	your ability to chew foods ?	1	2	3	4
c)	your ability to swallow solids ?	1	2	3	4
d)	your ability to swallow liquids ?	1	2	3	4
e)	your enjoyment of food ?	1	2	3	4
f)	your tasting of food ?	1	2	3	4
g)	your ability to open your mouth ?	1	2	3	4
h)	bad breath ?	1	2	3	4
i)	bad taste in your mouth ?	1	2	3	4
j)	food collection in extracted site ?	1	2	3	4

Briefly indicate how the above impacted your life-style ?

2. SPEECH - since your operation has there been any changes in:

a)	post-operative dry mouth ?	1	2	3	4

b) has your vocal speech or the way you say things in terms of your voice/throat been affected ? 1 2 3 4

c) your ability to talk with respect to the movement of the temporal mandibular joint? 1 2 3 4

Briefly indicate how the above impacted your life-style ?

3. **PHYSICAL EFFECTS - since your operation:**

a) have you had any pain with respect to tooth extraction ? 1 2 3 4

b) have you had any pain with respect to referred pain (e.g. Ear) ? 1 2 3 4

c) have you had any pain with respect to the temporal mandibular joint ? 1 2 3 4

d) have you experienced any bruising ? 1 2 3 4

e) have you experienced any swelling ? 1 2 3 4

f) have you experienced any bleeding ? 1 2 3 4

g)	have you experienced any diarrhea ?	1	2	3	4
h)	have you experienced any dizziness ?	1	2	3	4
i)	have you experienced any nausea ?	1	2	3	4
j)	have you experienced a dry mouth ?	1	2	3	4
k)	has your sleep pattern altered ?	1	2	3	4
l)	have you experienced a loss of feeling / numbness	1	2	3	4

4. APPEARANCE - since your operation:

a)	has your appearance changed with respect to swelling of the facial region ?	1	2	3	4
b)	has your appearance changed with respect to bruising of the facial region ?	1	2	3	4
c)	have you lost weight ?	1	2	3	4

Briefly indicate how the above impacted your life-style ?

5. OTHER ASPECTS OF TREATMENT - since your operation:

a)	has your self-confidence changed	1	2	3	4
b)	if you work or attend school/college have you had time off	1	2	3	4
c)	has your ablility to go out socially changed	1	2	3	4
d)	would you go through with the treatment again	1	2	3	4
e)	would you recommend the treatment to others	1	2	3	4

Briefly indicate how the above impacted your life-style ?

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE, YOUR HELP IS VERY MUCH APPRECIATED

APPENDIX G:

IMIBUZO

UKUSEBENZA KWEMITHI YE HOMOEOPATHY (I-ARNICA HYPERICUM KAYNE NE PHOSPHORUS) EKWELAPHENI OKUNGAVELA EMVA KOKUHLINZWA OKUPHATHELENE NAMABAMBA.

Obhekile: Igama lesiguli:

Igama lomzali / umphathi:

Imithetho:

Ukuze senze ncono isimo sokwelapha ezigulini zethu, kubalulekile ukuthi sihlole ukuthi lokho esikwenza ezigulini kunamphumela muni kuzo. Sizocela ukuthi ugcwalise le fomu yocwaningo. Wonke amafomu abuyayo ayosetshenzwa ngokuyimfihlo.

Lemibuzo kufanele ingcwaliswe yisiguli noma ngumphathi waso. Lona ngumbiko wokuqala kulezo zinto ezithinta impilo ekahle emva

kokuhlinzwa.

Sicela ukuthi ugcwalise lemibuzo ngosuku lokuqala, nangemva kwezinsuku ezingu 7 emva kokuhlinzwa bese uyayibuyisa. Kulemibuzo elandelayo, sicela ukekelezele inombolo esondelene nokubona kwakho ekusebenziseni lendlela.

Akukho lutho = 1

Kancane = 2

Kakhulu = 3

Kakhulu – kakhulu = 4

1. UKUDLA - kusukela uhlinzwe luye lwaba khona yini ushintsho:

a) ekudleni kwakho ?	1	2	3	4
b) ekuhlafuneni kwakho ukudla ?	1	2	3	4
c) ekugwinyeni ukudla okuqinile ?	1	2	3	4
d) ekugwinyeni okusamanzi ?	1	2	3	4
e) ekuthokozeleni kwakho ukudla ?	1	2	3	4
f) ekunambitheni kwakho ukudla?	1	2	3	4
g) ekuvuleni kwakho umlomo ?	1	2	3	4
h) umoya onukayo ?	1	2	3	4
i) ukunambitheka kabi komlomo ?	1	2	3	4
j) ukugcwala kokudla esisinini ?	1	2	3	4

Chaza kancane ukuthi lokhu okungenhla kuyithinte kanjani indlela yakho yokuphila ?

2. **UKUKHULUMA - kusukela uhlinziwe luye lwaba khona yini ushintsho:**

a) ukoma komlomo emva kokuhlinzwa ? 1 2 3 4

b) ukukhuluma kwakho – izwi noma umphimbo wakho ube nakho yini ukuthinteka na ? 1 2 3 4

c) ukukhuluma kwakho – ukunyakaza kwamathambo omhlathi ? 1 2 3 4

Chaza kancane ukuthi lokhu okungenhla kuyithinte kanjani indlela yakho yokuphila ?

3. **UKUTHINTEKA KOMZIMBA - kusukela uhlinziwe:**

a) ube nabo yini ubuhlungu emva kokukhipha na ? 1 2 3 4

b) ube nabo ubuhlungu obungumthelela (njenga sendlebeni) na ? 1 2 3 4

c) ube nabo ubuhlungu bemihlathi ? 1 2 3 4

d) kube khona yini ukulimala emlonyeni na? 1 2 3 4

e)	ube nakho yini ukuvuvuka ?	1	2	3	4
f)	ube nakho yini ukopha ?	1	2	3	4
g)	ube nakho yini ukuhhuda ?	1	2	3	4
h)	ube nakho yini ukuzulelwa yikhanda ?	1	2	3	4
i)	ube nakho yini ukucanuzelelwa yinhliziyo na?	1	2	3	4
j)	ube nakho yini ukoma komlomo ?	1	2	3	4
k)	ukulala kwakho kuye kwaphazamiseka na ?	1	2	3	4
l)	uye waba nakho yini ukulahlekelwa yimizwa / ukuba ndikindiki na?	1	2	3	4

4. UKUBUKEKA KWAKHO - kusukela uhlinziwe:

a)	luye lwaba khona yini ushintsho – ukuvuvuka ebusweni ?	1	2	3	4
b)	luye lwaba khona yini ushintsho ngenxa yokulimala na ?	1	2	3	4
c)	uye wancipha yini ngokomzimba na?	1	2	3	4

Chaza kancane ukuthi lokhu okungenhla kuyithinte kanjani indlela yakho yokuphila ?

5. OKUNYE OKUPHATHELENE NOKWELASHWA - kusukela uhlinziwe:

a) ngabe ukuba nguwe kuye kwaba nalo yini ushintsho na? 1 2 3 4

b) uma usebenza noma ufunda / usekolishi wasithola yini isikhathi sokuba sekhaya ? 1 2 3 4

c) ngabe indlela yakho yokuhlangana nabangani iye yashitsha yini ? 1 2 3 4

d) ungaphinda yini ungene kuloluhlelo lokwelapha na ? 1 2 3 4

e) ungabancomela yini abanye ngaloluhlelo lokwelapha na? 1 2 3 4

Chaza kancane ukuthi lokhu okungenhla kuyithinte kanjani indlela yakho yokuphila ?