A comparative study to evaluate patient satisfaction with conventional dentures and implant retained overdentures

A Mini-Thesis Submitted In Partial Fulfillment Of The Requirements For
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By

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A comparative study to evaluate patient satisfaction with conventional dentures and implant retained overdentures

**Key words**

Complete denture
Edentulous
Endosseous dental implant
Overdenture
Patient Satisfaction
The edentulous jaw is a common feature in elderly patients that had lost their teeth during life due to local reasons such as poor oral hygiene and dental caries as well as periodontal disease. Hence these patients are the victims of biological phenomena that lead to difficulties in different aspects of patient comfort with dentures. Clinicians are always concerned to minimize these difficulties and increase patient comfort through manufacturing a proper prosthesis to substitute for the loss of the natural teeth as well as the surrounding structures for optimum satisfaction and improved quality of life of the patient.

**Aim:** The aim of this study was to evaluate patient satisfaction regarding function and aesthetics with conventional mandibular dentures and implant retained mandibular overdentures in denture wearers.

**Methodology:** Two groups of edentulous patients (25 patients in each group) were selected from the files of the “Mitchells Plain Oral Health Center” and the “Tygerberg Oral Health Center” data base. They all received a structured questionnaire that covered different aspects of patient demographic status and the extent of patient satisfaction with their existing dentures. All the participants selected fulfilled the inclusion criteria of the study.
**Data analysis:** The results were tabulated in an excel spreadsheet, an SAS V9 (SAS Institute Inc., Cary, NC, USA) statistical package was used to test for statistically significant differences between the two groups.

**Conclusion:** The results of this study showed that patients with implant retained mandibular overdentures experienced less difficulty in their daily life compared to patients with conventional mandibular dentures. The study supports the consideration of implant retained mandibular overdentures for the treatment of edentulous patients as a means to improving their quality of life.
DECLARATION

I hereby declare that “a comparative study to evaluate patient satisfaction with conventional dentures and implant retained overdentures” is my own work, that it has not been submitted before for any degree or examination in any University, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Amjad A.A. Al-Makki

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Signed:…………………………….
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DEDICATION

To my Parents and family for their constant support and love.

To the memory of my friends Khalid Al-Omarabi and Mohammed Abu Al-Einein.
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CHAPTER 1
INTRODUCTION

The complete denture wearer exists in all communities and it has been suggested that the number in this group will continue to increase in the immediate future (Douglass, Shih, Ostry 2002) with the expected increase in life expectancy.

The oral condition of edentulous patients has been observed and determined by clinicians who used measures such as, ridge height, profile, position and quality of mucosa as clinical criteria (Van Waas 1990 and Berg 1984).

Physical limitation in patients to having successful dentures has been reported especially in elderly patients who cannot operate with their dentures due to ridge resorption that affects the stability of especially the lower denture. In addition the reduction in the dynamic movements of the mandible could also affect the success of the dentures (Slagter et al 1992).

Missing teeth in the partially edentulous patients have traditionally been replaced with fixed or removable partial dentures and in the edentulous patient by complete removable dentures. Recently however implant supported prostheses have become a common treatment modality for edentulous patients that can financially afford them (National Institute of Dental Research 1987).

The success of complete dentures was always related to the quality of the impressions, bite force and the chewing capacity and efficiency of the patients (Slagter et al 1992, Wayler, Chauncey 1983, Lindquist et al 1986) as well as to the patient’s ratings of their dentures since they are mostly concerned about their
denture stability, comfort, speech, ease of removal and cleaning (Heydecke et al \(^{(a)}\) 2003).

Long term denture use, especially of poorly maintained and ill fitting dentures can cause soft tissue trauma and chronic soreness (Slagter et al 1992) and that is what the patients usually complain about. Therefore dentists should be aware of this and eliminate any such problems as soon as possible rather than allowing it to become long-term problems.

Patients show a high level of satisfaction with a good quality set of new complete dentures as soon as they receive them, despite this the level of satisfaction soon declines after a period of time due to the deterioration that affects denture retention, stability and quality. However there are some patients that show an improvement with time (Fenlon, Sherriff 2004) and this is largely due to their adaptive capacity.

Recently dental implants have demonstrated a high rate of success and acceptance by clinicians, based on biological and esthetic criteria (Zarb, Albrektsson 1998).

A study by Anna et al (2003) revealed that patients that have had experience with previous removable prostheses and later have had their dentures replaced with implant supported prostheses have reported a higher level of appreciation and acceptance of their new prostheses.

Endosseous implants have been used with dental prostheses to achieve and improve the stability and retention of these prostheses. In addition these implants have also been used to rehabilitate the oral cavity and associated functions, such as mastication, speech and swallowing. Satisfactory results and reports have been obtained to ensure and recommend the continued use of dental implants with prostheses (Tideman, Samman, Cheung 1998 and Leung, Cheung 2003).
Several studies (Awad et al 2003, Heydecke et al (b) 2003 and Meijer et al 1999) have shown that patients with two implants supporting their mandibular overdentures rated the satisfaction with their oral function higher when compared to patients with conventional dentures (Geertman et al 1996 and Tang et al 1999) which in turn contributes to their improved general satisfaction (Feine et al 1994).
CHAPTER 2
LITERATURE REVIEW

2.1 EDENTULOUSNESS

2.1.1 Definition
The edentulous jaw is a biological reaction of the human maxilla and mandible that occurs mostly in elderly people that had lost their natural dentition due to several reasons which affect and may cause changes to the basal bone and the alveolar bone (Van Waas (a) 1990 and Berg 1984) in the maxilla and the mandible.

2.1.2 Etiology of Edentulousness
It has been stated that dental caries and periodontal disease which may lead to the natural loss of teeth are the main factors responsible for the high rate of patient edentulism (Bouma et al 1987). Recently research has found that there are other non-pathological factors such as behavior, pattern of dental attendance, cultural factors, financial state and health care system that may also contribute to the edentulous state (Zarb et al 2004). In addition there is also a significant relation between the edentulous state and the high cost of the health care system (Anderson and Hussey 2000).

2.1.3 Prevalence of Edentulousness
The prevalence of edentulism is on the decline due to the awareness of the clinicians with the possible causes of edentulousness, and this according to some authors could result in a decrease in the number of edentulous individuals over time (Zarb et al 2004). Highly educated people are much more concerned with their oral state compared to the less educated. As such with the increasing levels of education, levels of edentulousness should decrease because those patients are much more exposed to dental care information and restorative
treatment compared to the less educated (Dharamsi and MacEntee 2002). In North America and some parts of Europe it has been reported that the need for complete denture treatment will continue to decline because of the economic wealth, the availability and the efforts of the health services to prevent and treat oral disease as well as the growing interest in patients to keep or to preserve their natural teeth (Zarb et al 2004) for as long as possible.

2.1.4 Classification of the Edentulous Jaw

The basal bone undergoes dimensional changes due to age that in turn reflects on the alveolar process of the mandible and the maxilla. A classification of these changes of the ridge has been produced by Attwood in 1971 and cited by Cawood and Howell (1988).

- **Class I - Dentate.**
- **Class II - Immediate post extraction.**
- **Class III – Well rounded ridge form, adequate in height and width.**
- **Class IV – Knife-edge ridge form, adequate in height, but inadequate in width.**
- **Class V – Flat ridge form, inadequate in height and width.**
- **Class VI – Depressed ridge form, with some basal bone loss evident.**

Such a classification serves to simplify the description of the residual ridge resorption pattern and it also aids the clinician to choose the appropriate surgical or prosthodontic technique (Cawood and Howell 1988) if and when these cases are to be rehabilitated with implant-supported prostheses.

It has been found that the basal bone can also change shape when it is subjected to harmful local effects such as overloading due to a poorly fitting denture. Alveolar bone changes can occur significantly in both the horizontal and vertical axes (Cawood and Howell 1988).
2.1.5 Bone Resorption

Many patients are not even aware of the biological and physical impact on their oral cavities resulting in bone resorption. However they are aware of the other physical changes that occur in their bodies throughout life (Pietrokovski et al 1995).

However the continuous resorption of the alveolar bone may result in an impaired denture bearing area (Tallgren 1972) with severe consequences as regards patient satisfaction with their prosthesis. Alveolar bone resorption tends to affect the mandible more than the maxilla and this is most probably due to the narrow denture bearing area in the mandible with its less than favorable distribution of the occlusal load (Tallgren 1972).

Long term resorption may cause complete loss of the alveolar ridge with a resultant increase in the inter-arch distance as well as an increase in the influence of the soft tissues, with decreased retention and stability of the prosthesis. Therefore the patient’s comfort will be compromised as well as the normal functioning as regards speech and chewing due to improper adaptation of the dentures (Boerrigter, Geertman, van Waas 1995) to the oral tissues.

2.1.6 Problems encountered by edentulous people

Introduction

Millions of people throughout the world are edentulous, because they have lost one of the most important parts of their body and they can be considered to be physically impaired according to the World Health Organization (WHO) criteria (Feine and Carlsson 2003). Loss of teeth was regarded as a natural consequence of dental caries and related oral disease (Bouma et al 1987) and females were considered to be at a higher risk of losing their teeth compared to males (Budtz-Jorgensen 1999). However these statistics are no longer necessarily true since the rate of edentulousness as regards gender is about the same throughout the population.
Edentulous patients especially the elderly mostly complain about their social appearance, which may have psychological implications for them (Zarb et al 2004). In addition in older patients the wounds heal more slowly and also possibly less effectively due to a poorer blood supply thus further compromising their ability to have successful dentures.

Loss of vertical dimension of the face due to resorption of the residual ridge, a reduced chewing efficiency and chewing forces could also result in a limited choice of diet. This may show pathological lesions inside or around the oral cavity such as angular cheilitis. Edentulous patients may also look older than their physiological age due to the loss of support from their lips and cheeks (Zarb et al 2004).

Excessive bone resorption tends to cause flabby ridges and exposure of the mental nerve leading to sensitivity in the area of the mental foramina, with even greater difficulty in being a successful denture wearer (Zarb et al 2004).

Loss of teeth and affected speech can also cause a loss of confidence that may lead to social withdrawal with psychological consequences (Zarb et al 2004).

2.1.7 Definition of support, retention and stability

According to Jacobson and Kroll (1983), (cited by Cawood and Howell 1988) these terms can be defined as:

- Support: as that aspect of the denture bearing tissues that resists displacement of the denture towards the tissues.
- Retention: as that aspect of the denture bearing tissues that resist displacement of the denture away from the tissues.
- Stability: as the property of the ridges, the dental musculature and the occlusal form of the dentures that resists displacement of the denture at right angles to the ridge (McCord, Smith, Grey 2000).
2.2 Treatment options for the edentulous patient

1. Conventional complete dentures (Figure 2.1 - 2.2 - 2.3).

2. Implant supported prosthesis, that can be further divided into:
   - Fixed ceramometal prosthesis (Figure 2.4).
   - Fixed detachable prosthesis (Figure 2.5).
   - Implant supported overdentures (figure 2.6 - 2.7 - 2.8 - 2.9).
   - Implant and tissue supported overdentures (Sadowsky 1997) (Figure 2.6 - 2.7).

The implant-tissue supported overdenture is supported by both, implants and the oral mucosa. It uses a reduced number of implants that may be beneficial since it reduces the risks associated with long surgical procedures as well as the cost factor, therefore it is much favored compared to other types of implant supported prostheses (DeBoer 1993).

Overdentures may be supported by a bar linking two or four implants in the anterior region of the mandible and retained with retentive clips in the protheses to provide rotation around the bar (Figure). However the most common approach is the use of ball attachments on two implants retained by “O” rings or sleeves in the canine region of the mandibular overdenture (Sadowsky 1997) (Figure 2.6 - 2.7).

2.3 Conventional Dentures

The classical treatment plan for the edentulous patient is the conventional complete denture for both jaws. It is widely used worldwide because it is relatively inexpensive, aesthetically acceptable, and easy to clean. In most cases patients can perform all normal functions with-in a short period of time with their conventional dentures (Doundoulakis et al 2003).

The success of complete dentures was traditionally related to the quality of the impressions, the bite force and the chewing capacity and efficiency (Slagter et al
1992, Wayler, Chauncey 1983, Lindquist et al 1986) as well as the patient’s ratings since patients are most concerned about their denture stability, comfort, speech, ease of removal and cleaning (Heydecke et al (a) 2003).
Figure 2.1 Edentulous mandible.

Figure 2.2 Conventional denture-fitting surface.
Figure 2.3 Conventional denture-polished surfaces.
2.3.1 Problems encountered with conventional dentures
Complete denture wearers can be regarded as oral invalids when compared to dentate subjects and it has been shown that the biting force value of complete denture wearers was only one fifth to one sixth of the values detected in dentate subjects (Haraldsson *et al* 1979). In another study it was found that the masticatory performance values of complete denture wearers was only about one sixth compared to the values reached by young adults with their natural dentitions (Kapur and Soman 1964).

In another study it was found by Slagter *et al* (1992) that edentulous patients experienced greater difficulties towards adaptation and the use of their complete dentures in chewing and biting hard food items compared to dentate people.

The appearance and the consistency of the supporting mucous membrane and the muscle tone may also contribute to denture stability. The resorption of the mandibular residual ridge makes the flanges of the denture less compatible with the functional lip sulcus, the tongue and the cheek movements. In addition the amount of saliva produced may also have an influence on the retention of the dentures (Slagter *et al* 1992).

Common problems amongst others encountered by denture wearers include:

- Lack of stability, retention and a decrease of chewing ability especially with the lower denture (Zarb *et al* 2004).
- Dentures with acrylic teeth are more prone to wear compared to dentures with porcelain teeth which on the other hand are brittle and can chip due to occlusal disharmony (Slagter *et al* 1992).
- A denture with a reduced surface area and short flanges could affect the support, retention and stability of the denture. On the other hand over extended denture flanges can traumatize the border tissues (Zarb *et al* 2004).
- Plaque accumulation on the tissue surface of a denture indicates an ill fitting denture (Carlsson 1997).
• Tissue trauma and patient inability to use their dentures can be related to occlusal discrepancies (Lindquist et al 1986).

• The denture is surrounded by the lips, cheeks and rests on oral tissues covered with a thin lining mucosa that may be traumatized by the denture during functioning movements (Fenlon and Sherriff 2004).

• Denture instability may arise when the masticatory mucosa is not attached to the underlying periosteum. The attachment diminishes with ridge resorption especially in the mandibular arch (Zarb et al 2004).

• Contraction of the mylohyoid muscle raises the floor of the mouth and can cause dislodgment of the lower denture during function (Kapur and Soman 1964).

• The tongue in the edentulous patient becomes enlarged and strong and may exert dislodging forces on the lower denture (Kapur and Soman 1964).

It has been reported that even with a new, well fabricated denture between 10% and 45% of patients are dissatisfied with their dentures in general or towards specific aspects of their dentures such as when eating or the appearance of their dentures (Adell et al 1981).

2.3.2 Sequelae of wearing conventional dentures

Other direct effects of wearing complete dentures include mucosal reactions such as denture hyperplasia, traumatic ulcers, burning mouth syndrome and denture stomatitis which might be in association with oral carcinoma (Carlsson 1997). Altered taste perception, reduced bite force and masticatory ability may lead the patient to change his/her dietary selection with consequences for their health (Zarb, Bolender, Carlsson 1997).

Prosthodontically it may be more difficult to manage the edentulous patient who has medical problems which arise due to taking a large number of medication
without consultation or that being prescribed by different physicians without collaboration while having a new set of dentures made (Quirino, Birman, Paula 1995). This may result in tissue hyperplasia or ulcers that reduce or complicate the healing capacity of the oral tissues and makes the complete denture less satisfactory (Ivanhoe, Cibirka, Parr 2002).

Clinically those patients are frequently seen with severely resorbed residual ridges, prominent anatomic features or bony abnormalities. In cases where the maxillary denture is opposed by natural teeth in the anterior region of the mandible the patient often presents with tuberosities that can be enlarged in the maxillary arch and the soft tissues are often enlarged and unsupported (Kelly 1972) in the region of tuberosities and the anterior part of the maxilla giving rise to the combination syndrome.

Another clinical feature in older subjects with dentures is that they have a diminished neuromuscular co-ordination, less awareness of the position of the mandible related to the maxilla, that may result in an impaired ability to position the mandible or tongue in the natural position which tends to complicate the complete denture treatment process (Harrison et al 1992, Muller, Hasse-Sander 1993 and Write et al 1949).

2.3.3 Advantages of Conventional Dentures

- Replaces the missing teeth and their supporting structures (hard and soft).
- Provides soft tissue support.
- No invasive procedures.
- Aesthetically pleasing and can be customized.
- Affordable (Doundoulakis et al 2003).

2.3.4 Disadvantages of Conventional Dentures

- Patient acceptance may be poor or limited.
- Covers all soft tissue and gingiva which can accumulate plaque and if worn all the time can compromise the soft tissues.
Lack of retention and stability.

Resorption of the alveolar bone may continue, further compromising the stability and retention of the prostheses.

Compromised oral function (Doundoulakis et al 2003).

2.3.5 Preprosthetic surgery

In general most of the patients show an acceptance towards a new set of well fitting dentures, however in some cases it may be necessary to perform preprosthetic surgical intervention to improve the support for the lower conventional denture (Boerrigter, Geertman, van Waas 1995).

Preprosthetic surgery may be considered to be a questionable treatment option that can be provided and must be clearly explained by the clinicians to their patients, especially those patients who had long persistent difficulties with their existing conventional dentures (Slagter et al 1992). Those patients may have unrealistic expectations of the procedure with disappointing results.

A buccal vestibuloplasty and the deepening of the floor of the mouth are indicated to enlarge the denture bearing area. However with a total mandibular height of less than 15mm there may be technical problems with this procedure (Stoelinga 1984) with a result that there may still be inadequate supporting tissues as regards denture bearing area.

Surgical management of large tuberosities is recommended prior to denture construction. Failure to recognize and manage this problem may have clinical implications in determining the vertical dimension, and the occlusal plane orientation during denture construction (Slagter et al 1992).

Another preprosthetic procedure is to remove the soft tissue from the superior and lingual surfaces of the retromolar pad area. By using such a procedure the clinician creates a firm retromolar pad area with a shallow slope in the molar
region to allow the optimum seating of the lower denture without slipping off the retromolar pad (Slagter et al 1992).

Other methods such as removal of excessive soft tissues covering sharp or highly resorbed ridges, or augmentation of soft tissue to improve its quality with artificial material can also be recommended (Curtis, Beirne 1986).

2.4 Implant supported Overdentures

Introduction

Osseointegrated implant treatment was originally designed for edentulous patients (Sadowsky 1997).

Adell et al (1981) reported on the long term implant success for treating edentulous patients with implant supported protheses as opposed to conventional protheses in the presence of compromised bone.

When Osseointegration became established as a successful and predictable treatment concept (Adell et al 1981) clinicians started to treat patients with implant retained overdentures (IRO) in the lower jaw instead of the classical treatment with conventional dentures (CD). They noticed that their patients were more satisfied with the implant retained overdentures (Geertman et al 1996).

In the mandible if only two implants were used they were usually located in the interforaminal region of the mandible and retained with free standing ball attachments (Figure 2.6). This was and in some cases is still the most often used technique (Awad et al 2000 and 2003, Mericske-Stern 1998 and Meijer et al 2003). In some other cases four implants were used to stabilize the overdenture (Melas, Marceese, Wright 2001) these implants were then liked with a bar. The four implants were also placed in the interforaminal area of the mandible.
Figure 2.6 Ball attachments fitted two implants in the canine region.

Figure 2.7 Housing in the fitting surface of the lower denture to clip onto the ball attachment.
Figure 2.8 Bar attachment linking two implants.

Figure 2.9 Fitting surface of implant retained overdenture showing clips to attach to bar.

• Available bone
It is important to have sufficient bone for any adequate evaluation of the implant location by the surgeon and the prosthodontist for an optimum successful osseointegration treatment plan (Zarb and Lekholm 1985).

- **Bone Height**

Bone height is measured from the crest of the edentulous ridge to a landmark such as the mandibular canal in the mandible and to the floor of the maxillary sinus in the maxilla by using appropriate radiographic imaging techniques (Zarb and Lekholm 1985) and compensating for distortions such as magnification.

- **Bone width**

Bone width is measured between the lingual and buccal plates at the crest of the ridge. It is advised to allow for a minimum of 1.0 mm of bone to surround the implant for the maximum survival rate of the implant (Zarb and Lekholm 1985).

- **Bone quality**

Bone quality refers to the amount of compact bone that surrounds the trabecular bone and forms the entire jaw, and it is further classified as:

Type 1 entire jaw composed of a homogenous compact bone.

Type 2 a thick layer of compact bone surrounding a core of dense trabecular bone.

Type 3 a thin layer of cortical bone surrounding a core of dense trabecular bone.

Type 4 a thin layer of cortical bone surrounding a core of low-density trabecular bone (Zarb and Lekholm 1985).

- **Bone quantity**

Bone quantity is the amount of bone available and can be classified as:

1. Most of the alveolar ridge is present.
2. Moderate residual ridge resorption has occurred.

3. Advanced residual ridge resorption has occurred with only basal bone remaining.

4. Extreme resorption of the basal bone has taken place (Zarb and Lekholm 1985).

### 2.4.1 Advantages of implant retained overdentures

- As few as two or four implants may be used.
- Provide good stability and retention.
- Improved function.
- Improved aesthetics.
- With a resultant reduced residual ridge resorption thereafter (Doundoulakis et al 2003).

### 2.4.2 Disadvantages of Implant retained overdentures

- Expensive.
- Technique sensitive to restore.
- Great time and more treatment sessions needed (Visser et al 2006).
- Maintenance problems.
- Require surgical intervention (Sadowsky 1997).

Patient satisfaction is an essential factor that demonstrates success of an overdenture and it can be evaluated if the patient satisfaction in an implant group is compared to a control group in a randomized clinical study (Ferringo et al 2002, Antczak-Bouckoms and Chalmers 1988).

It has been shown that the patient’s satisfaction with conventional dentures and implant retained overdentures depends on their ability to chew and speak and also with their concern towards the appearance of their prostheses (Bergman, Carlsson 1972).
Dissatisfaction with conventional dentures among edentulous patients was reported in several studies (Berg 1984, Pietrokovski et al 1995, Tallgren 1972).

The main reasons for this were due to discomfort, poor fitting and retention, soreness and pain particularly under the mandibular denture compared to the maxillary denture (Bergman, Carlesson 1972 and Pietrokovski et al 1995).

Nevertheless the patient’s self rating of retention and the sense of security with the prostheses also contributes to the overall satisfaction with the dentures (Heydecke et al (a) 2003).

Clinicians have found that conventional denture wearers have experienced different aspects of difficulties mainly due to a lack of stability and retention, continued loss of alveolar bone, ill fitting dentures and a lack of chewing ability, compounded by social discomfort (Doundoulakis et al 2003).

Many studies (Anna et al 2003, Boerrigter et al 1995, Heydecke et al (b) 2003, Slagter et al 1992 and Van-Waas(b) 1990) have been performed to assess patient satisfaction by using a validated questionnaire. These questions largely deal with functional problems of the maxillary and the mandibular dentures. A zero to four (0-4) point scale was used, to assess chewing ability of soft, tough and hard food. Finally a patient overall satisfaction with the prosthesis is expressed on a 10 point scale (Meijer, Martin, Van’t Hof 2003).

These types of sociodental indicators are designed to assess the functional and psychological outcomes of oral disorders in adults and older people and have been tested in various populations. In Uganda these indicators are currently in use in a study among the youth population of that country (Astrom, Okullo 2003).

In addition there are a variety of sociodental parameters used to assess the impact of oral disorder on the patient’s life (Allen 2003) such as:

- Social impact of dental disease
- Dental impact profile
- Oral health impact profile
• Oral impact on daily performance

The Oral Impact on Daily Performance (QIDP) scales assess the impact that is experienced by patients on their daily life, since it measures the behavior responses such as dental pain, difficulties in performing activities rather than the feeling of the patient. This is a very useful tool in population surveys (Astrom, Okullo 2003) for impact assessment. The (QIDP) scale had also been shown to have acceptable results when used in another study on a group of Tanzanian students (Masalu and Astrom 2003).
AIMS AND OBJECTIVES

The aim of this study was to evaluate patient satisfaction regarding function and aesthetics with mandibular conventional dentures and mandibular implant retained overdentures.

Objectives:

1. To compare patient levels of satisfaction with conventional dentures and implant retained overdentures.
2. To detect the difficulty, if any with their dentures between the two groups.
3. To determine which group has a confident social life and better functional activities.

CHAPTER 4
STUDY DESIGN:

The study design was Cross Sectional in the form of a Structured Questionnaire that was used by participants who had been treated in the “Mitchells Plain Oral Health Center and the Tygerberg Oral Health Center” with complete upper and lower dentures where the lower denture was either a conventional lower denture or an implant retained over denture.

Study Population:

Fifty edentulous patients who had received conventional mandibular dentures or implant retained mandibular overdentures at the Mitchells Plain Oral Health Center and the Tygerberg Oral Health Center constituted the study population. The patients were divided into two groups:

Group 1: consisted of 25 patients with conventional mandibular complete dentures (CD)

Group 2: consisted of 25 patients with implant retained mandibular overdentures (IRO)

The inclusion criteria used for the study were:

GROUP 1:

1. Edentulous upper and lower jaws.
2. The age and gender was comparable between the groups.
3. Patients had a denture history of at least one year.
4. Patients did not have any preprosthetic surgery performed prior to denture construction.
5. Patients agreed to participate in the study by signing a written consent.
GROUP 2:

1. Edentulous upper and lower jaws.

2. The age and gender was comparable between the two groups.

3. Patients had two implants retaining a mandibular overdenture for at least one year, with ball or bar attachments.

4. Patients agreed to participate in the study by signing a written consent.

Data analysis: The results were tabulated in an excel spreadsheet and a SAS V9 (SAS Institute Inc., Cary, NC, USA). Computer package was used to test for statistically significant differences between the two groups.

ETHICAL CONSIDERATION

- Ethical clearance was obtained from the Research committee at the University of the Western Cape.

- All patients that were asked to participate in the study had signed the consent forms.

- The confidentiality of the patient’s information was guaranteed.

CHAPTER 5

RESULTS
5.1 Introduction

A total of 50 edentulous patients participated in the study. They were equally divided into two groups. Each group contained 25 patients. Every patient was examined to meet the inclusion criteria of the study.

All the patients agreed to participate in the study after reading and signing the consent form. They were interviewed by the researcher using a structured questionnaire that included the Oral Impacts on Daily Performances (QIDP) sociodental indicator.

All the patients were coded and the answers obtained were recorded in the questionnaire sheet. The data was collected and later transferred to an Excel spreadsheet for analysis using the SAS V9 (SAS Institute Inc., Cary, NC, USA) computer package.

5.2 Frequencies found in the study

5.2.1 Demographics of the participants:

The results found that the mean age of the patients with conventional mandibular dentures was 55.5 years with a standard deviation (SD) of 6.8 years whereas the mean age of the patients with the implant retained mandibular overdentures was 57.1 years with a standard deviation (SD) of 7.7 years (Table 5.1).

The proportion of males was 40% in the conventional mandibular denture group and 24% in the implant retained mandibular overdenture group. The female participation was higher at 60% in the conventional mandibular denture group and 76% in the implant retained mandibular overdenture group (Table 5.1) (Figure 5.1).

Table 5.1 Demographics of participants in the study
<table>
<thead>
<tr>
<th>Patient group</th>
<th>Male</th>
<th>Female</th>
<th>Mean-Age</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>40%</td>
<td>60%</td>
<td>55.5</td>
<td>6.8</td>
</tr>
<tr>
<td>IRO group</td>
<td>24%</td>
<td>76%</td>
<td>57.1</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Figure 5.1 Male : Female percentage

5.2.2 Years of wearing the denture:
Question: How long have you had the present denture in your mouth?

The mean years of wearing dentures in the conventional denture group was 7.5 years with a standard deviation (SD) of 3.1 years while in the Implant retained mandibular overdenture group the corresponding time was 4.9 years with a standard deviation (SD) of 2.6 years (Table 5.2) (Figure 5.2).

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Years-wearing dentures</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>7.5</td>
<td>3.1</td>
</tr>
<tr>
<td>IRO group</td>
<td>4.9</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Table 5.2 Years of wearing the denture

Figure 5.2 Years of wearing denture

Question: Do you wear your denture when you sleep?
The result found that 28% of the patients in the conventional mandibular denture group wore their dentures during sleep and 72% of the same group did not wear it during sleep.

Whereas in the implant retained mandibular overdenture group 52% of the patients wore their denture during sleep and 48% of the same group did not wear it during sleep (Table 5.3) (Figure 5.3).

### Table 5.3 Wear denture during sleep

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Wear denture during sleep</th>
<th>No denture during sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>28%</td>
<td>72%</td>
</tr>
<tr>
<td>IRO group</td>
<td>52%</td>
<td>48%</td>
</tr>
</tbody>
</table>

![Figure 5.3 Percentages wearing denture during sleep](image)

Question: Do you wear your denture for eating?
In the conventional mandibular denture group 64% of the patients wore their denture for eating and 36% removed their denture during eating.

Whereas in the implant mandibular over denture group 100% of the patients wore their denture for eating (Table 5.4) (Figure 5.4).

Table 5.4 Wear denture for eating

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Wear denture for eating</th>
<th>No denture during eating</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>IRO group</td>
<td>100%</td>
<td>____</td>
</tr>
</tbody>
</table>

Figure 5.4 Wear denture for eating

Question: Do you wear your denture all the time or some of the time?
As regards the denture wearing pattern of the participants 76% in the conventional mandibular denture group wore their dentures all the time while 24% only wore it some of the time.

In the implant retained mandibular overdenture group 100% of the participants wore their dentures all the time (Table 5.5) (Figure 5.5).

Table 5.5 Wearing of denture

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Wear denture all the time</th>
<th>Wear denture some of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>76%</td>
<td>24%</td>
</tr>
<tr>
<td>IRO group</td>
<td>100%</td>
<td>___</td>
</tr>
</tbody>
</table>

Figure 5.5 Wear denture all time and some of time

Question: Do you wear your denture for social occasion?
The study also showed that all the participants (100%) in both groups wore their dentures for the sake of their social life and public appearances (Table 5.6) (Figure 5.6).

Table 5.6 Wear denture for social occasion

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Wear denture for social occasion</th>
<th>Don't wear denture for social occasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>IRO group</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.6 Wear the denture for social occasion

Question: How well are you able to bite daily food?
Overall 60% of the patients with the conventional mandibular denture had experienced a little difficulty during biting food, while 40% of the conventional mandibular denture group experienced great difficulty in biting food.

Whereas in the implant retained overdenture group 88% of the patients had no difficulty in biting food and only 12% of the patients experienced a little difficulty in biting food (Table 5.7) (Figure 5.7).

Table 5.7 Difficulty in biting:

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>No difficulty</th>
<th>Little difficulty</th>
<th>Great difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td></td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>IRO group</td>
<td>88%</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.7 Difficulty to bite

Question: How well are you able to chew daily food?
In the conventional mandibular denture group 56% of the patients experienced a little difficulty during chewing, while 44% experienced great difficulty in chewing.

Whereas in the implant retained overdenture patients 96% had no difficulty in chewing and only 4% had little difficulty in chewing food (Table 5.8) (Figure 5.8).

Table 5.8 Difficulty during chewing:

<table>
<thead>
<tr>
<th>Patient group</th>
<th>No difficulty</th>
<th>Little difficulty</th>
<th>Great difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>______</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>IRO group</td>
<td>96%</td>
<td>4%</td>
<td>______</td>
</tr>
</tbody>
</table>

Figure 5.8 Difficulty in chewing

Question: How well are you able to swallow daily food?
In the conventional mandibular denture group 56% reported no difficulty during swallowing, while 40% reported a little difficulty during swallowing and 4% reported a great amount of difficulty during swallowing.

In the implant retained mandibular over denture group 96% of patients reported no difficulty during swallowing and only 4% experienced little difficulty during swallowing (Table 5.9) (Figure 5.9).

Table 5.9 Difficulty during swallowing

<table>
<thead>
<tr>
<th>Patient group</th>
<th>No difficulty</th>
<th>Little difficulty</th>
<th>Great difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>56%</td>
<td>40%</td>
<td>4%</td>
</tr>
<tr>
<td>IRO group</td>
<td>96%</td>
<td>4%</td>
<td>____</td>
</tr>
</tbody>
</table>

Figure 5.9 Difficulty to swallow
Question: In the past one year have you had problems with your mouth or has your denture caused you any difficulty during normal activity?

It was found that in the conventional mandibular denture group 80% had experienced some difficulty during normal activity or functioning and only 20% of the conventional mandibular denture group had no difficulty during normal activity.

Whereas in the implant retained mandibular overdenture group only 20% of the patients experienced any difficulty during activity or functioning while 80% had no difficulty at all during normal activity (Table 5.10) (Figure 5.10).

Table 5.10 Difficulty during normal activity

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>difficulty</th>
<th>No difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>IRO group</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Figure 5.10 Difficulty during normal activity
Question: How satisfied are you with your complete dentures?

92% of the patients with implant retained mandibular overdentures were very satisfied compared to no patients in the conventional mandibular denture group that were very satisfied with their prosthesis.

8% of the patients with implant retained mandibular overdentures were fairly satisfied while 44% of the patients in the conventional mandibular denture group were fairly satisfied. In the conventional mandibular dentures group 36% of the patients were fairly unsatisfied with their prosthesis compared to no patients in the implant retained mandibular over denture group. In addition 20% of the patients with conventional mandibular dentures were very unsatisfied compared to no patients in the implant retained mandibular overdenture group that were very unsatisfied with their prosthesis. (Table 5.11) (Figure 5.11).

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Very satisfied</th>
<th>Fairly satisfied</th>
<th>Fairly unsatisfied</th>
<th>Very unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td></td>
<td>44%</td>
<td>36%</td>
<td>20%</td>
</tr>
<tr>
<td>IRO group</td>
<td>92%</td>
<td>8%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.11 Satisfaction with denture
Question: How satisfied are you with the size and shape of your denture?

The results also revealed that 80% in the implant retained mandibular overdenture group were very satisfied with the shape and size of their dentures while only 20% in the same group were fairly satisfied with the size and shape of their dentures.

In the conventional mandibular denture group only 72% were fairly satisfied. In addition 16% were fairly unsatisfied and 12% were very unsatisfied with the size and shape of their dentures (Table 5.12) (Figure 5.12).

Table 5.12 Satisfaction with the size and shape of the denture

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Very satisfied</th>
<th>Fairly satisfied</th>
<th>Fairly unsatisfied</th>
<th>Very unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td></td>
<td>72%</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>IRO group</td>
<td>80%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.12 Satisfaction with size and shape
Question: How satisfied are you with the color of the teeth of your denture?

The study revealed that in the conventional mandibular denture group 56% were very satisfied, 36% were fairly satisfied and 8% were fairly unsatisfied with the color of their denture teeth.

While in the implant retained overdenture group 88% were very satisfied and 12% were fairly satisfied with the color of their denture teeth (Table 5.13) (Figure 5.13).

Table 5.13 Satisfaction with color

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Very satisfied</th>
<th>Fairly satisfied</th>
<th>Fairly unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>56%</td>
<td>36%</td>
<td>8%</td>
</tr>
<tr>
<td>IRO group</td>
<td>88%</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.13 Satisfaction with the color of teeth
Question: Have you used any denture adhesives to help keep your complete denture in place?

As regards the use of denture adhesives 68% in the conventional mandibular denture group admitted using denture adhesives while only 32% managed without any denture adhesives. However in the implant retained mandibular denture no patients reported to using any denture adhesive material with their prosthesis (Table 5.14) (Figure 5.14).

Table 5.14 Use of denture adhesives:

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>IRO group</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure 5.14 Use of denture adhesives
Question: How much effect would you say that the denture has had on your daily life?

Most of the implant retained mandibular overdenture patient’s experienced no detrimental effect on their life regarding the lower denture (84%) while only 16% experienced a very minor effect. Whereas 80% of the conventional mandibular denture group had experienced minor and moderate effects on their lives and 16% had experienced severe effects on their lives (Table 5.15) (Figure 5.15).

Table 5.15 Effect of the prostheses on the patient’s daily life

<table>
<thead>
<tr>
<th>Patient group</th>
<th>No effect</th>
<th>Very minor effect</th>
<th>Minor effect</th>
<th>Moderate effect</th>
<th>Severe effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>_____</td>
<td>4%</td>
<td>40%</td>
<td>40%</td>
<td>16%</td>
</tr>
<tr>
<td>IRO group</td>
<td>84%</td>
<td>16%</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>

![Figure 5.15 Denture effect on daily life](image-url)
Question: Have you experienced any mild discomfort with your dentures?

The study showed that 100% of the conventional mandibular denture group had experienced at least mild discomfort regarding their dentures.

In the implant retained mandibular over denture group 24% had experienced mild discomfort while 76% had not experienced any discomfort regarding their dentures (Table 5.16) (Figure 5.16).

Table 5.16 Discomfort in use of denture

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Mild Discomfort</th>
<th>No Discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>IRO group</td>
<td>24%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Figure 5.16 Discomfort in use of denture
Question: Have you experienced any severe discomfort with your dentures?

The study showed that 60% of the conventional mandibular denture group had experienced severe discomfort while only 40% had not experienced any severe discomfort regarding their dentures.

In the implant retained mandibular over denture group only 4% had experienced severe discomfort while 96% had not experienced any severe discomfort regarding their dentures (Table 5.17) (Figure 5.17)

Table 5.17 Discomfort.

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Severe discomfort</th>
<th>No discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD group</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>IRO group</td>
<td>4%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Figure 5.17 Discomfort on use
5.3 STATISTICAL ANALYSES:

Analysis were done using the SAS V9 (SAS Institute Inc., Cary, NC, USA) computer package and two statistical tests to detect and compare the differences between the two groups. For variables with two responses (such as Yes-No questions) a Fisher's Exact test was used and the Wilcoxon Rank Sum test was used to compare the groups.

Due to the large number of comparisons done, a 0.01 level of significance was used to detect differences rather than the less conservative value of 0.05. The statistical analyses are attached as appendix 1.

Table 5.18 represents the summary of the findings/values that had been captured with the Fisher's Exact test and shows that there was a statistically significant difference between the two groups for all five questions listed: ie questions 5, 9, 10, 11 and 12.

<table>
<thead>
<tr>
<th>Question</th>
<th>Variable</th>
<th>P value</th>
<th>Significant</th>
<th>Not significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5</td>
<td>Wear for eating (Table 5.4)</td>
<td>0.0016</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>Use of adhesives (Table 5.14)</td>
<td>2.197 E-07</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q10</td>
<td>Mild discomfort (Table 5.16)</td>
<td>1.165 E-8</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q11</td>
<td>Severe discomfort (Table 5.17)</td>
<td>3.402 E-05</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q12</td>
<td>Difficulty during activity (Table 5.10)</td>
<td>4.728 E-05</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.19 represents the summary of the findings/values that had been captured with the Wilcoxon Rank Sum test and shows that there was a statistically significant difference for six of the seven variables studied between the two groups and covered in questions 6, 7, 8, 13, 14, 15 and 16.

Only as regards satisfaction with the color of the prosthesis was there no statistically significant difference between the two groups (Table 5.19).

<table>
<thead>
<tr>
<th>Question</th>
<th>Variables</th>
<th>P value</th>
<th>Significant</th>
<th>Not significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6</td>
<td>Satisfied with denture (Table 5.11)</td>
<td>1.234 E-12</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>Satisfied with shape and size (Table 5.12)</td>
<td>5.324 E-10</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>Satisfied with color (Table 5.13)</td>
<td>0.0168</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Q13</td>
<td>Effect on life (Table 5.15)</td>
<td>7.911 E-14</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q14</td>
<td>Ability to bite (Table 5.7)</td>
<td>1.291 E-11</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q15</td>
<td>Ability to chew (Table 5.8)</td>
<td>2.373 E-13</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Q16</td>
<td>Ability to swallow (Table 5.9)</td>
<td>0.0018</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 6
DISCUSSION

6.1 Introduction

Many studies have been performed to assess patient satisfaction after treatment with implant retained mandibular overdentures (Van Waas and Bosker 1989, Harle and Anderson 1993) and found that all the patients showed a high level of satisfaction with their implant retained mandibular overdentures (IRO) much more than patients who had received conventional mandibular dentures (CD) since they were able to perform normal activities (biting, chewing, speech) much easier. In addition patients with implant mandibular overdentures were more confident to show up in public with their prosthesis compared to the conventional mandibular denture patients who were always conscious and unconfident in public.

This study found significant differences between the IRO group and the CD group in almost all the variables. These findings are consistent with those of previous studies that looked at patient satisfaction with implant supported overdentures in the mandible (Awad et al 2003, Boerrigter et al 1995, Geertman et al 1996).

Further studies with larger sample sizes are necessary to support the findings and generalize the results of this study. In addition a study examining the same patient’s experiences with both types of dentures maybe valuable.

6.2 Demographics:

The study revealed that the percentage of females in the conventional mandibular denture group was 60% compared to the percentage of males (40%). Whereas the percentage of females was higher at 76% compared to the male percentage (24%) in the implant retained mandibular overdenture group. However this may be
probably only be related to the fact that more females visited the Oral Health Centers for treatment and may not be clinically significant.

The mean age was 55.5 for the conventional mandibular denture group with a minimum age of 42 years and maximum age of 68 years, whereas the mean age for the implant retained mandibular overdenture group was 57.1 years with minimum age of 45 years and maximum age of 71 years (Table 5.1) (Figure 5.1). This implies that there was no significant difference in the range of the ages for the two groups. It also implies that patients receiving this type of treatment are in the older category of patients.

6.3 Years of wearing dentures:

The study showed that the patients in the conventional mandibular denture group wore their denture for a period of 7.5 years compared to the patients in the implant retained overdenture group who only wore their denture for a period of 4.9 years. This difference may be related to the need for maintenance and replacement of components in the IRO as compared to the CD group.

6.4 Wear denture during sleep:

28% of the patients in the conventional mandibular denture group sleep with their denture and 72% sleep without their denture in their mouth and that maybe because the denture is not stable and may press and irritate the soft tissues and cause discomfort during sleep. Whereas in the implant retained mandibular overdenture group 52% of the patients sleep with their denture and this maybe because the denture is supported with two implants that keep it in place and prevent it from displacing. As a result they do not feel any discomfort. 48% from the implant retained mandibular overdenture group sleep without their denture and this maybe due to habit.

6.5 Wear denture for eating:

In the conventional mandibular denture group 64% wore their denture for eating and 36% removed their denture for eating mainly because they experienced difficulties while eating with their denture, while all the patients in the implant retained
mandibular over denture group (100%) wore their denture for eating. This difference in wearing habits while eating maybe due to the fact that the IRO did not experience any difficulties with their denture due to the improved retention and stability.

6.6 Wear of denture:

The results also showed that 76% of the conventional denture group wore their denture all the time and only 24% wore it some of the time the main reasons maybe due to the fact that the denture may cause difficulty during speech with some discomfort and a difficulty with adaptation. However all the patients 100% in the implant retained mandibular overdenture group wore their denture all the time. This maybe related to the greater level of confidence with their denture in the IRO group. Also the improved retention maybe contributed to this level of confidence.

6.7 Wear denture for social occasion:

All the patients 100% in both groups wore their denture for social occasion and for the sake of public appearance. This illustrates the importance of replacing teeth for patients, and if the replacement is satisfactory the levels of acceptance will also be high.

6.8 Difficulty in biting:

In the conventional mandibular denture group 60% of the patients had experienced little difficulty in biting and 40% of the patients experienced great difficulty in biting compared to only 12% in the implant mandibular overdenture group that had experienced little difficulty in biting while 88% had no difficulty in biting. None of the conventional mandibular denture group had no difficulty in biting and none of the implant retained mandibular over denture group had great difficulty in biting.

This implies that retention and support are vital in performing normal oral functions such as biting. The better supported and retained a denture is the better will be the biting ability of that denture.
6.9 Difficulty in chewing:
56% of the conventional denture group experienced little difficulty during chewing and 44% had great difficulty, while in the implant retained mandibular overdenture group only 4% had little difficulty and none of the patients had great difficulty during chewing. In addition none of the patients in the conventional mandibular denture group had no difficulty compared to 96% of the implant retained mandibular overdenture group that had no difficulty during chewing. Again this finding maybe related to the support and retention of the prosthesis and the IRO group that had better support and retention had less difficulty in chewing.

6.10 Difficulty in swallowing:
40% of the conventional denture group experienced at least a little difficulty during swallowing and 4% had great difficulty, while in the implant retained mandibular overdenture group only 4% had experienced a little difficulty during swallowing and none of the patients had experienced great difficulty in swallowing. In addition 56% of the patients in the conventional mandibular denture group had no difficulty compared to 96% of the implant retained mandibular overdenture group that had no difficulty in swallowing. This finding maybe related to the fact that the CD group first had to stabilize the denture and then swallow whereas in the IRO group the denture was stable and the patient just had to swallow.

6.11 Difficulty during activity:
The study found that 80% of the CD group had experienced difficulty during activity or functioning and only 20% had no difficulty, whereas in the IRO group only 20% experienced any difficulty at all during function and activity while 80% had no difficulty during function and activity. Again this result can be directly related to the stability of the denture.

6.12 Satisfaction with denture:
Furthermore in the IRO group 92% patients were very satisfied with their dentures and only 8% where fairly satisfied while none of the CD group was very satisfied and only 44% of the patients were fairly satisfied. In the CD group 36% were fairly
unsatisfied and 20% were very unsatisfied probably due to the reduced stability and insufficient retention of their lower dentures especially during function. This is further supported by the fact that a substantial number in the CD group only wore their dentures for social occasions and appearance.

6.13 Satisfaction with size and shape of denture:

Better scores were also evident regarding denture size and shape, in the IRO group 80% of the patients were very satisfied and only 20% were fairly satisfied whereas in the CD group none of the patients were very satisfied while 72% were fairly satisfied. In addition 16% were fairly unsatisfied and 12% were very unsatisfied whereas none of the patients in the IRO were fairly or very unsatisfied. This may be related to the fact that implant supported overdentures can be made smaller in size as they are not dependent on surface coverage for retention and stability.

6.14 Satisfaction with color:

36% of the CD group were fairly satisfied with the color of the teeth of their dentures and only 8% were fairly unsatisfied, while in the IRO group only 12% were fairly satisfied and none of the patients were fairly unsatisfied. In addition 56% of the patients in CD were very satisfied compared to 88% of the IRO. There is no reason clinically why this difference should be present. If the practitioners allowed the patients of both groups to be involved in the selection of the color of their teeth then no significant difference should be present. However this difference was not statistically significant.

6.15 Use of denture adhesives:

In the CD group 68% of the patients had used denture adhesives to prevent their denture from displacement whereas none of the IRO patients had used denture adhesives with their prosthesis. Only 32% of the CD patients did not use denture adhesives due to good ridge support or well retained prosthesis. Due to the improved retention with implants the need for denture adhesives no longer existed.
6.16 Effect of prosthesis on patients daily life:

Most of the patients 84% in the IRO group said that the prosthesis had no effect on their daily life while only 16% of the patients found that it had a very minor effect. In the CD group none of the patients were in the category where the prosthesis had no effect on their lives and only 4% that it had a very minor effect. Whereas 80% of the patients in the CD felt that the prosthesis had a minor or moderate effect on their lives and 16% felt that it had severe effect on their lives. None of the IRO group experienced any minor, moderate or severe effect from the prosthesis on their lives. Therefore patients in the IRO group scored high levels of satisfaction with their prosthesis compared to CD group.

This implies that if patients are happy and satisfied with their prosthesis the level of effect on their lives is very low to show.

6.17 Mild discomfort:

All the patients in the CD group had experienced minor discomfort with their prosthesis and none of them had ever experienced any discomfort, while only 24% of the IRO patients had experienced mild discomfort and 76% had no discomfort at all with their prosthesis. This clearly shows that implant retained overdenture prosthesis can overcome most of the complains that are usually evident with the conventional mandibular denture.

6.18 Severe discomfort:

The findings of this study also showed that 60% of the CD group had severe discomfort while using their prosthesis compared to only 4% in the IRO. In addition only 40% of the CD group and 96% in the IRO had not experienced any severe discomfort.

This finding illustrates the point that if a denture is stable and well retained especially during function it is highly unlikely that the prosthesis will cause discomfort.
SUMMARY

All the participants in this study had been interviewed with the structured questionnaire. The results showed that the percentage of females was higher compared to the percentage of males. But this may not be significant as it was a retrospective, hospital based sample and more females may have sought treatment compared to males during that period.

The findings of this study reveal a wide range of frequencies for the variables which were used to detect statistically significant differences between the implant retained mandibular overdenture group and the conventional mandibular denture group.

A \( P \) value of less than 0.01 for almost all the variables except satisfaction with color of the prosthesis emphasized a statistically significant difference in regard to the overall satisfaction, comfort, aesthetics, biting and chewing ability between the conventional mandibular denture group and the implant retained mandibular overdenture group.
CHAPTER 7
CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION
This study revealed that patients who had received implant retained mandibular overdentures were more satisfied with the comfort of their lower dentures, shape and size and performed functional activities (bite, chew, swallow) more easily compared to patients with conventional mandibular dentures. Both groups were satisfied with the color of their dentures.

The results of this study showed that patients with implant retained mandibular overdentures experienced less difficulty in their daily life compared to patients with conventional mandibular dentures. The study supports the consideration of implant retained mandibular overdentures for the treatment of edentulous patients as a means to improving their quality of life.

7.2 RECOMMENDATION
According to the results obtained in this study and supported by the literature, the best recommendation will be for final year dental students at the -University of the Western Cape- to consider implant retained mandibular overdentures as a suitable and promising treatment modality for the edentulous mandibular patients treated at the Oral Health Centers in Mitchells Plain and Tygerberg in preference to conventional mandibular dentures.
REFERENCES


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45. Tallgren A. The continuing reduction of residual alveolar ridge in complete denture wearers, a mixed longitudinal study covering 25 years. J Prosthet Dent 1972;27: 120-132


Appendix 1

The MEANS Procedure

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The FREQ Procedure

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<td>0.001769</td>
</tr>
</tbody>
</table>
Appendix 2

UNIVERSITY OF THE WESTERN CAPE

A comparative study to evaluate patient satisfaction with conventional dentures and implant retained overdentures.

**Questionnaire**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Patient Code:</th>
<th>Gender:</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 2</td>
<td></td>
</tr>
</tbody>
</table>

**Complete Denture**

Q1 How long have you had the present denture in your jaw?

Upper: ____ years  
Lower: ____ years

Q2 Do you wear your denture when you sleep at night?

Upper: Yes / No  
Lower: Yes / No  
(Yes=1/ No=2)
Q3 Do you wear your denture

Upper: All of the time? =1  Some of the time? =2
Lower: All of the time? =1  Some of the time? =2

Q4 If denture worn some of the time, do you wear it for social occasions?

Upper: Yes / No  Lower: Yes / No  \((Yes=1/\ No=2)\)

Q5 In general do you wear your denture for eating?

Upper: Yes / No  Lower: Yes / No  \((Yes=1/\ No=2)\)

Q6 How satisfied are you with the overall comfort of your complete denture?

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>1</td>
</tr>
<tr>
<td>Fairly satisfied</td>
<td>2</td>
</tr>
<tr>
<td>Fairly Unsatisfied</td>
<td>3</td>
</tr>
<tr>
<td>Very unsatisfied</td>
<td>4</td>
</tr>
<tr>
<td>Can’t say</td>
<td>0</td>
</tr>
</tbody>
</table>

Q7 How satisfied are you with the shape and size of your complete dentures?

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>1</td>
</tr>
<tr>
<td>Fairly satisfied</td>
<td>2</td>
</tr>
<tr>
<td>Fairly Unsatisfied</td>
<td>3</td>
</tr>
<tr>
<td>Very unsatisfied</td>
<td>4</td>
</tr>
<tr>
<td>Can’t say</td>
<td>0</td>
</tr>
</tbody>
</table>

Q8 How satisfied are you with the color of the teeth of your complete denture?

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>1</td>
</tr>
<tr>
<td>Fairly satisfied</td>
<td>2</td>
</tr>
<tr>
<td>Fairly Unsatisfied</td>
<td>3</td>
</tr>
<tr>
<td>Very unsatisfied</td>
<td>4</td>
</tr>
<tr>
<td>Can’t say</td>
<td>0</td>
</tr>
</tbody>
</table>

Q9 Have you used any adhesive to help keep your complete dentures?

Yes / No  \((Yes=1/\ No=2)\)
Q10 Have you experienced any mild discomfort with your dentures?
   Yes / No

Q11 Have you experienced any severe discomfort with your dentures?
   Yes / No

Q12 In the past one year have problems with your mouth or dentures caused you any difficulty during activity?
   Yes / No

Q13 How much effect would you say that this difficulty has had on your daily life?
   No effect
   A very minor effect
   A minor effect
   A moderate effect
   A severe effect
   A very severe effect
   Can’t say

Q14 In general how well are you able to bite daily food?
   No difficulty
   A little difficulty
   A Great amount of difficulty

Q15 In general how well are you able to chew daily food?
   No difficulty
   A little difficulty
   A Great amount of difficulty

Q16 In general how well are you able to swallow daily food?
   No difficulty
   A little difficulty
   A Great amount of difficulty
*Could you eat the following (Item) easily, with some difficulty, or not at all?

<table>
<thead>
<tr>
<th>Item</th>
<th>Eat easily -1</th>
<th>Eat with some difficulty -2</th>
<th>Could not eat at all - 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sliced bread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw carrots</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roast potatoes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooked vegetables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sliced cooked meats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-done steaks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apples</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oranges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato chips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolates</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Can you tell me if you have had any problems with your dentures during the last one year (eg, fracture of the denture)?
Implants Only

*Can you tell me if you have had any problems with your implants during the last one year (eg, pain, fracture of the implant or the abutment screw, paresthesia, infection)?

( I will write down patients comments )

Screening Questions

A. Natural teeth: (Yes=1 / No=2)

B. Complete denture: Complete dentures on both jaw 1
Complete denture on upper jaw 2
Complete denture on lower jaw 3
No complete dentures 4

C. Implants: Any implants 1
No implants 2

- Number of implants:

- Location of implants: Interforaminal region only 1
Other 2

Q17 Types of superstructure:
- Ball 1 / Bar 2

Q18 Clinical examination:

- Implant mobility: (Yes=1 / No=2)
- Hyperplasia formation: ~~

Q 19 Presence of calculus: ~~

- Number of implants with calculus: