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PATIENT SATISFACTION WITH COMPLETE DENTURES IN FUJAIRAH DENTAL CENTER

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ABSTRACT

Patient Satisfaction with complete dentures in Fujairah Dental Center

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Introduction:

Complete dentures are the most common treatment modality for edentate patients. Patient satisfaction with their dentures has not been previously investigated in the UAE.

Aim:

This study aimed to assess patient satisfaction with complete dentures provided at Fujairah Dental Centre.

Methods:

All patients seen and treated with complete dentures at Fujairah Dental Centre between 2014 and 2016 were invited to take part and thus formed a convenience sample. A 21-item questionnaire was developed. Demographic details included age and level of education. Satisfaction with several variables such as comfort, appearance, speech and masticatory efficiency were assessed on a 4-point scale. Other questions asked about soreness, taste and the reasons for not having dental implants.

Results:

A total of 60 patients from Fujairah Dental Centre took part in this questionnaire survey of complete denture satisfaction. The overall mean age of respondents was 63.08 years with no

statistical difference by gender. Responses to several aspects of denture satisfaction were analysed. Masticatory efficiency of the lower denture was rated as excellent by the lowest number of respondents (36%) whereas ease of insertion/removal of the upper denture was rated excellent by most respondents (74%). A significantly greater proportion of females felt older with wearing dentures compared to males ($p<0.001$). A strong positive correlation existed between denture comfort and masticatory efficiency, $\rho=+0.75$ for upper, $+0.72$ for lower ($p<0.001$). The mean length of time the participants were edentulous was 3.05 years for males and 2.45 years for females. There was no association between length of time participants were edentulous and denture satisfaction with either comfort or masticatory efficiency. Only half of the participants felt that the quality of speech was excellent, while 7 (11%) had occasional sore mouth and 11(18%) had experienced alteration in taste.

Conclusion:

The overall level of satisfaction with complete dentures was good to excellent. Respondents were less satisfied with the lower denture and in particular masticatory efficiency.

DEDICATION

This thesis is dedicated to my parents, my little daughter princess Haya, my husband, sister and my brothers for their endless love, support and encouragement.

DECLARATION

I declare that all the content of the thesis is my own work. There is no conflict of interest with any other entity or organization.

Name: Fatima Younes

Signature:

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There have been many people walking alongside me during the last three years, without whom this dissertation might not have been written and to whom I am greatly indebted.

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1.0 Introduction

The complete denture is a dental prosthesis that is a substitute for the lost natural dentition and associated structures of the maxilla, mandible or both. Edentulous patients are always conscious about their dental appearance. There are a large number of edentulous patients in all communities, and the trend suggests that the number in this group will continue to increase in the future. This can be explained by increased life expectancy. ⁽¹⁾

Oral health is associated with patients' general health. Therefore, the main goal of dentistry is not only to improve oral health but also to improve overall quality of life. ⁽²⁾

The most common treatment plan for the edentulous patient is the conventional complete denture.

⁽³⁾ It is extensively used because it is relatively inexpensive, aesthetically acceptable and easy to clean. ⁽⁴⁾ Complete dentures are often the best option for edentulous patients. They provide good appearance and normal speech while also supplying occlusal function for the mastication of food.

⁽⁵⁾ Dentures should be comfortable and preserve health for the supporting tissues. Satisfaction with complete dentures has been associated with several different denture-related, oral-related and patient-related factors. ⁽⁶⁾ Among these factors, aesthetics, general health, phonetics, experience with previous dentures and patient expectation regarding treatment were evaluated in previous studies. ^(7,10,12,26)

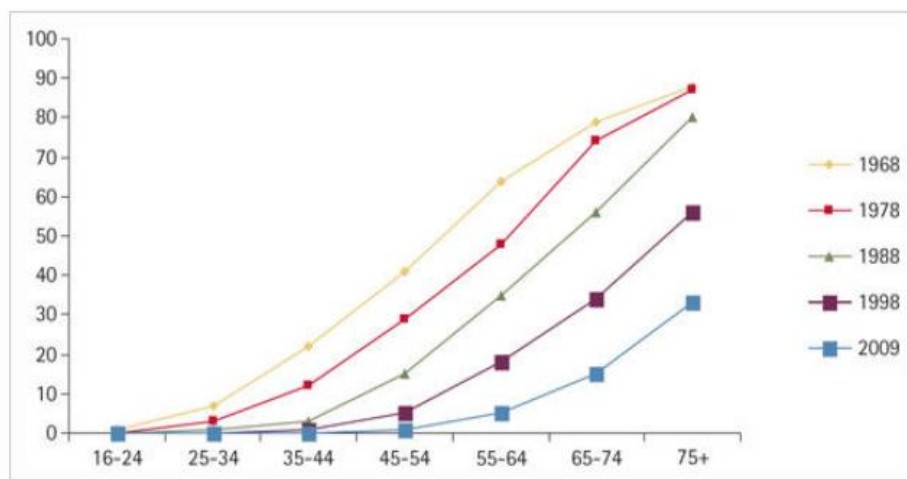
2.0 Literature Review

2.1 Prevalence of edentulousness.

The first U.K Adult Dental Health Survey (ADHS) was done in 1968 when it was common for relatively young people to have lost all of their natural teeth. The results for edentulousness were 7% for 25-34 year olds and 22% for age between 35-44 years. On the other hand in 2009, 94% of populations of England, Wales and Northern Ireland were dentate. The percentage of edentulousness was small. Less than 0.5% of those examined were edentate for the people between 25-34 years. While it was only 5% for the age range 55-64 years. For those over 85 years the percentage was 47%.

There was thus a significant reduction in the number of edentate people from 1968 to 2009, but a strong relationship remained between age and tooth loss. ⁽⁸⁾

Figure 1. Percentage of edentulousness by age from 1968 to 2009. For 1968-1988 the data are for England and Wales and for 1998–2009 for England only (source ref 8).



The line graph demonstrates the prevalence of total tooth loss in five different generations 1968,1978,1988,1998 and 2009 in a seven groups of age. We can notice that up until 1988 the prevalence of the total tooth loss in each ten year age group increased. ⁽⁸⁾

In 1968 and 1978 the proportion of tooth loss was the same for subjects over 75 years at around 90%.

In 1988 this proportion decreased to 75% for subjects over 75 years and dropped sharply to 30% for group aged from 55to 64 years and to around 13% for age between 45 to 54 years.

A further steep decline occurred between the years 1998 and 2009. For the youngest age groups up to the age of 44 years edentulousness was nil.

For the age group from 55 to 64 years the percent of edentulousness decreased sharply from 1998 by around 18% to about 4% in 2009. For people over 75 years of age the percentage was 50% in 1998 and this had fallen to 25% in 2009.

This finding shows that the number of edentulous subjects in the UK decreased in all generations and has become concentrated in the oldest population group.⁽⁸⁾

By the age of 75 years and above 13% were edentate as reported by Steele et al. ⁽⁸⁾

The estimated prevalence of complete edentulousness in age 65 years and above is 26% in the United States, 24% in Indonesia, 78% in Europe, 61% in Turkey and 11% in China. ⁽⁹⁾

Treating edentulous patients will remain part of future dental practice. In the U.S it is expected that around 2.6% of the overall population or 8.6 million people will be edentulous by 2050.⁽¹⁰⁾

Wu et al reported on edentulism in 50 year olds and above and found a variation in five different ethnic groups in the United States: Asian, Native Americans, Hispanic, African Americans and

non-Hispanic American Caucasian. In 2008 the highest proportion of edentulousness was in Native Americans at 19%, followed by 19% in African Americans, 17% for Caucasian and 14% for both Asian and Hispanic. ⁽¹¹⁾

Many factors are associated with edentulism including socioeconomic factors like increasing age, being female, lower education, ⁽¹²⁾ lower economic status and lower social class. Chronic Conditions such as diabetes, arthritis, asthma ⁽¹³⁾, stroke ⁽¹⁴⁾ and obesity are also associated with tooth loss ⁽¹⁵⁾ as are smoking, ⁽¹⁶⁾ and poor diet with inadequate consumption of fruit and vegetables. ⁽¹⁷⁾

Patients aged from 55 to 84 years were randomly sampled from the Swedish population in four different years (1980–81, 1988–89, 1996–97 and 2002). Information collected was on dental status, demographic, lifestyle, socioeconomic and health related factors. Edentulousness decreased from 43% to 14% in the age group 55–84 years from 1980 to 2002, and the proportion of subjects with removable dentures decreased from 68% to 33%. In the age group 55–74 years, the proportion of subjects with low education decreased from 60% to 28%, and the proportion of obese subjects increased from 9% to 15%. This study indicated an association between edentulousness and obesity, which was stronger in women aged between 55 and 77 years than in males. ⁽¹⁵⁾

The United States national epidemiologic survey showed that edentulousness decreased by 10% every 10 years over the past three decades, with around 90% of edentulous adults wearing complete dentures. The result suggested that the population needing one or more complete dentures will increase from 33.6 million in 1991 to 37.9 million in 2020. The 10% decline in edentulousness will be balanced by the 79% increase in the population older than 55 years by 2020. ⁽¹⁸⁾

2.2 Aim of treatment with complete dentures.

The components of oral function are masticatory, swallowing, aesthetic, sensory and phonetic. Oral function pathologies can be due to tooth loss, muscular parafunction, tumors, trauma and temporomandibular disorders. Patients with these disorders may experience a lot of social and psychological difficulties.⁽¹⁹⁾ Tooth loss can affect facial appearance, masticatory ability and speech, as well as quality of life. Prosthodontist should place special focus on patient-related outcome measures (PROM) such as quality of life and satisfaction with their dentures.⁽²⁰⁾

The World Health Organization (WHO) and the National Institute on Ageing (NIA) mentioned that tooth loss can be a risk for Alzheimer's disease.⁽²¹⁾ The component which controls mastication are: basal ganglia, thalamus, limbic system and cerebral cortex and are linked with the centers of mastication, respiration and deglutition.⁽²²⁾

Cognitive impairment may lead to inhibition of masticatory movement which is linked with the mastication center and deglutition center.⁽²³⁾ Masticatory performance by extraction or reduction of crown height was not reduced as subjects were still able to chew but this occlusal hypofunction lead to degenerative changes in periodontal mechanoreceptors due to suppression of sensory stimulation during chewing from the periodontal ligaments. Animal models used to test the relationship between masticatory hypofunction and cognitive deficiency found that animals' performance on tests of memory and learning was poor.⁽²⁴⁾

Masticatory efficacy in edentulous patients can be managed by several ways, from the conventional complete denture to the implant supported prosthesis.⁽²⁵⁾

It has been widely acknowledged that psychological factors may influence the result of denture treatments .Some authors have found that the level of satisfaction with and adaptation to their

dentures may depend on psychological status such as neuroses, but also can be affected by the oral health education programme and psychoeducation.⁽²⁶⁾

2.3 Psychological factors.

Gender, age and education level are sociodemographic variables that variably affect denture satisfaction but social support, which is a reflection of living status, may affect denture satisfaction. The most important factor that affects acceptance and adaptation to dentures is the psychological factor, although the personality type is still regarded as nebulous. In elderly patients, dentists should meet the patient's mind before the patient's mouth and be sure that patient understands the limitation when wearing complete dentures. Al Quran et al assessed the association between the psychological factors with acceptance of clinically satisfactory complete dentures. Patients were asked about their personality profile and denture satisfaction in a questionnaire. 16% complained about their dentures and the study concluded that factors of neuroticism had a significant relationship with denture dissatisfaction.⁽²⁶⁾

Patients after losing their teeth will be in a stressful situation particularly after extraction of last few teeth and having to transition to complete dentures. A good interpersonal relationship between the patient and the dentist will facilitate stress reduction and will promote satisfaction, Exchanging information and reducing patient expectations will improve understanding.⁽²⁷⁾

2.4 Influence of the fabrication procedures on patient satisfaction and denture quality.

Successful complete denture fabrication is dependent on technical, biological and psychological interplay between the dentist and the patient.⁽²⁸⁾

There is lack of evidence if a more complex technique such as face bow transfer and variation of material and technique like border molded custom tray is better than simpler technique. Kuwait

University compared the subjective and objective outcomes of complete dentures fabricated with four protocols. Selected steps during the laboratory phase were omitted. The first group followed the standard protocol, the second group were as group 1 but the cast was mounted without a face bow, in group 3 dentures were processed on a secondary cast and mounted without face bow and in group 4 the secondary cast was mounted with a face bow.

The result found no significant differences among the groups in all aspects of patient satisfaction and in prosthodontist rating of denture quality.⁽²⁹⁾

Another study assessed 20 edentulous patients who received two sets of complete dentures, the first one fabricate with a centric relation record, facebow transfer and balanced occlusion. The second set was fabricated without a facebow transfer and a simplified procedure with canine and premolar guidance. There was no significant difference in the ability to speak or chewing. Both comfort and ability to clean between the two types of denture were similar.⁽³⁰⁾

Two sets of dentures, one set made from alginate impressions and the second one with silicone material were worn by 85 patients for two periods of 8 weeks each. Comfort, chewing efficiency and stability was rated with OHIP-EDENT questionnaire. The results were as follows: 67.9% of patients preferred dentures made from silicone impressions whereas 17.9% preferred alginate impressions, 5% found both dentures equally satisfactory and 9% found them equally unsatisfactory. This study concluded that there is significant evidence that dentures made from silicone were preferred by patients and oral health related quality of life was better after using dentures made with silicone impression.⁽³¹⁾

2.5 Mastication and Occlusion.

Masticatory efficiency decreases as the number of lost teeth increases. A study has shown that the efficiency of mastication with complete dentures is around 10-20% of a dentate subject. ⁽³²⁾

Several patient factors affect chewing function like tooth loss, motor skills, salivary secretion, height and shape of the residual alveolar ridge. ⁽³³⁾ Mastication is necessary for full appreciation of the flavor of food, and to stimulate salivary and gastric secretions. In denture wearers the maximal bite force is five to six times less than in dentate subjects. ⁽³⁴⁾

Two sets of complete dentures, one with balanced occlusion and the second with lingualized occlusion, were worn up to 6 months in a cross-over study. Electromyography measured the activity of the masseter and anterior temporalis muscles, and the chewing ability and masticatory performance of the patients was rated by a questionnaire. Lingualized occlusion had increased masticatory performance, better satisfaction and resulted in decreased chewing time. ⁽⁹⁾

A systematic review from Sun-Yat-sen University, China, aimed to review the outcomes of different occlusal designs of complete dentures by using an electronic search for published English and Chinese literature. Anatomic occlusion, canine guided occlusion, balanced occlusion, monoplane occlusion and lingualized occlusion were all assessed and the highest satisfaction was with the lingualized occlusion. ⁽³⁵⁾

An EMG study of the activity of temporalis muscle and masseter muscle in 17 patients with a splint found significantly increased activity with balanced occlusion and concluded that the result of the study was the same in people with natural teeth. ⁽³⁶⁾

2.6 Design and retention.

Retention is defined as resistance of the denture to move away from the tissue vertically. To achieve the retention in the complete denture the prosthodontist should pay attention to two points. Firstly we should have accurate fit of the base to the mucosa and the space should be as minimum as possible. Secondly extending the flanges correctly to provide a border seal. Knowledge about the physical forces and factors that affect the retention of the complete denture and factors not important in the retention is crucial. Factors that are less important in the retention of the complete denture include atmospheric pressure, adhesion, wettability and surface roughness, while the important factors are surface tension, viscosity, border seal, base adaptation and soft tissue. ⁽³⁷⁾

Denture stability is defined as resist the displacement and functional or rotational stresses and more commonly related to occlusal imbalance or muscular imbalance. ⁽³⁸⁾

Anastassiadou and Heath examined 119 people who wore complete dentures to determine which clinical variables were associated with satisfaction. They found a significant association between freeway space, retention and stability with patient satisfaction. ⁽³⁾

The influence of different designs of metal base was assessed in 116 patients who received complete dentures and were divided in two groups, 31 with reinforced with metal base using Co-Cr-Mo alloy and 85 received conventional complete acrylic denture. Both metal frame and acrylic resin extended to the vibrating line. The result showed that the design of the upper denture where the metal frame work extended to the vibrating line and in the lower jaw the metal base with elongation over the convex edentulous ridge were the most successful for the experimental group of edentulous patients and there was no need for rebasing of complete dentures. ⁽³⁹⁾

2.7 Ridge resorption, anatomy and systemic factors that affect denture stability.

35 edentulous patients aged between 51 and 89 were assessed for the rate of mandibular residual ridge resorption and to analyze the factors which determine this process. The analyses involved were individual factors (gender, age and duration of edentulousness), local biochemical parameters (oral hygiene and history of periodontal diseases), and systemic biochemical parameters (calcium and phosphate metabolism, diet, smoking, alcohol intake and systemic diseases), as well as physical factors involved in the process (the use of prosthetic dentures). Analysis of the effect of patient age on residual ridge resorption failed to show any differences in the incidence of the particular classes of resorption. There were no statistically significant sex-related differences observed in the incidence of any particular degree of right-sided or left-sided mandibular residual ridge resorption.

Regarding the local biomechanical factors including hygienic status of the oral cavity and history of periodontal disease, no significant differences were found in the occurrence of particular classes of right- and left-sided resorption.

As regards systemic biochemical parameters, diet and systemic diseases was not shown to influence the incidence of the particular classes of right- and left-sided alveolar resorption.

The highest calcium levels were found in patients with mild (class I) alveolar resorption compared to moderate (class II) alveolar resorption and severe (class III) alveolar resorption, while for the phosphate concentration no any relationship was noted. No differences regarding the history of smoking and alcohol intake were found. ⁽⁴⁰⁾

After tooth extraction, the progenitor cells of the periodontal ligament differentiate into osteoblasts and form woven bone and later this bone is replaced by cancellous bone. Sharp edges

of the alveolar bone are remodeled and the exposed bone is resorbed by osteoclastic actions. Endosteal apposition accompanies this and new bone formation at the periosteal surface of the residual ridge, which remains porous, never develops a complete cortical layer.⁽⁴¹⁾

The residual alveolar ridge is an important factor for the stabilization and function of dentures and it has been agreed that reduction in the ridge height is associated with denture instability.⁽⁴²⁾

Compressive forces on the mucous membrane and periosteum from the denture instability may obstruct blood flow and initiate the resorption of residual ridge.⁽⁴³⁾ Mucosal inflammation can also generate arachidonic acid metabolites or interleukins2 and cause inflammatory resorption.⁽⁴¹⁾

Residual alveolar ridge height on panoramic radiographs and the differences between denture wearers and non-denture wearers was assessed in 50 dentures wearers, 50 edentulous patients without wearing the dentures and 47 dentate patients. The results found significant differences between the alveolar ridge heights of dentate and edentulous groups. Between the denture wearer and the non-denture wearer groups, there was significant difference in the lower jaw only, but not in the upper jaw. And the highest of alveolar ridge more in men.

There were also differences between men and women, and upper and lower jaws at every measurement sites and this study concluded that reduction in residual ridge is related with gender, denture usage and edentulousness.⁽⁴⁴⁾

Saglam found that the reduction in the residual alveolar ridge of the mandible was greater than in the maxilla and the percentage height reduction in the mandible in females was greater than in males.⁽⁴⁵⁾

2.8 Post insertion of the complete denture

Placement of a complete denture is not the final step in the treatment of edentulous patients as patients need to visit the dentist long after denture placement. Checks related to direct sequelae after placement of the complete denture like mucosal reaction, altered taste perception and gagging should be carried out.⁽³⁴⁾

Patients adapt to the new dentures with time. Hence the first few days following the placement of complete dentures are critical for the patients. The most frequent complaints of patients wearing complete dentures after the placement is traumatic mucosal ulceration,⁽⁴⁶⁾ denture base defects which relate to the mucosa, injuries due to many factors like improper adaptation of internal surface of the denture with underlying soft tissue, overextension of flanges, porosities or tissue undercut, denture irregularities and presence of immature occlusal contact.⁽³⁴⁾

Sadr aimed to evaluate the most common location of traumatic ulceration, frequency, duration and number of adjustments needed to achieve patient comfort. 60 patients were selected for complete denture treatment and after placement, all the patients were evaluated from the first day after placement until comfort was achieved. All the dentures were fabricated by the same methods under supervision of specialist prosthodontics. In the patients were visited from the first, second, third days and after two days until complete resolution of mucosal injuries was gained. All the lesions and all the adjusted parts of the dentures were marked and recorded. The result was that the mandibular dentures required more adjustment than maxillary dentures. The most traumatized maxillary areas were as follows: posterior palatal seal area in the soft palate 27%, buccal slope of the residual ridge 13.8%, distobuccal sulcus 13.1% and labial frenum 9.9%, In the mandible, the areas were retromylohyoid 48%, buccal sulcus adjacent to buccal shelf 9.8%, retromolar pad 9.5% and frenum 8.1%. The frequency of ulceration in the hard palate and mid-palatal suture was 0%,

incisive papilla and rugae 0.65%, tuberosity 2.6% and in the buccal or labial sulci it was 4.6%.The lowest frequency of lesions in the mandible was seen in the sublingual fold 0%, labial sulcus and mylohyoid region of the lingual sulcus 1.2% and buccal frenum and buccal shelf 2.1% .No significant differences were found between males and females in the areas of traumatic lesions.⁽⁴⁷⁾

Kivovics determined the location and frequency of traumatic lesions and their association with clinical anatomical features.61 patients wore complete dentures, 47 females and 14 males and all were seen for 1 weekly adjustments. 87 dentures required an adjustment at the first week, 50% at the second week and 7% at the third week. A higher ratio of denture induced irritation was detected in the mandible. Men had a higher lesion rate in the maxillary vestibular sulcus between buccal and labial frenum and in the mandible at mandibular vestibular sulcus of the buccal shelf region. The study concluded that the areas of irritation mostly occurred in the vestibular sulcus of the maxilla and mandible, which is necessary to evaluate the area of facial seal by application medium or heavy pressure indicator paste and make the adjustment at the delivery stage. ⁽⁴⁶⁾

Firoozmand studied Inflammatory Fibrous Hyperplasia (IFH), 50 patients diagnosed with denture induced fibrous hyperplasia from 1979 to 2000.Sex, race, age, duration and clinical features were analyzed statistically. IFH was present in 78% of females and 22% of males and the highest frequency was in patients aged 41 to 50 years. The study concluded that the inflammatory fibrous hyperplasia occurs more in females and mainly in patients over 40 years.⁽⁴³⁾

2.9 Assessment of complete denture satisfaction and function.

The Adult Dental Health Survey (ADHS, 2009) estimated that 6% of the population in England wore complete dentures and that a third have difficulty wearing mandibular dentures satisfactorily.

⁽⁴⁸⁾ This was believed to equate to approximately one million individuals. Managing cases with

grossly resorbed mandibular ridges is extremely challenging. Furthermore the psychological impact of complete denture wearing has received little attention. The perception of edentulousness differed significantly between two earlier ADHS in 1978 and 1988 depending on whether the dentate adults surveyed wore partial dentures or not. In 1978, 53% of participants found being edentate “very upsetting” but by 1988 this rose to “63%”. ⁽⁴⁹⁾ The authors did not analyse for any differences by gender. Chewing ability with lingualized and anatomic occlusal forms was significantly superior to zero-degree posterior occlusal surfaces, also called cuspless teeth, in a randomized cross-over clinical trial of 41 participants given 3 sets of complete dentures with 3 different occlusal schemes. Furthermore, the lingualized scheme was reported to be easier to clean and had better appearance. ⁽⁵⁰⁾ The functional assessment of dentures (FAD) was assessed in a pilot study using a protocol that involved scoring several complete denture parameters including occlusion, retention, tongue control and stability of the upper and lower dentures. The pilot study conducted on 40 patients attending a prosthodontic department indicated that lower complete denture stability was by far the most common problem identified by the 2 dentists using the FAD. This correlated with the prevalence of functional problems reported by the subjects. ⁽⁵¹⁾

3.0 Aims and Objectives

This study aimed to assess patient satisfaction with complete dentures provided at Fujairah Dental Centre.

Objectives

- 1-The objective of this study was to evaluate patient satisfaction with their dentures by means of a questionnaire.
- 2-To determine which factors were the most satisfactory and which are the least satisfactory.

4.0 Material and Methods:

4.1 Study Design and location

The sample were patients who attended the Fujairah Dental Center (FDC), Alnujaimat Road located in the United Arab Emirates. All participants received conventional complete dentures in the last three years (2014 to 2016). Approximately forty patients were treated in each year at the clinic by one qualified prosthodontist.

The target sample was a consecutive series of every patient seen and treated at F.D.C

Over the 3 year period. This is therefore not a random sample but a cross-sectional convenience sample.

All patients in the clinic data base were contacted for the questionnaire survey. Those who could not attend the clinic were surveyed over the telephone.

Inclusion criteria: Edentulous patients, who have worn complete dentures for at least six months, but not more than 5 years.

Exclusion criteria: Patients with implant supported removable dentures, uncontrolled diabetes and compromised medical status.

Patients who had their dentures made on a private basis but who may have attended for adjustment.

4.2 Questionnaire Design

Study tool: A Questionnaire consisting of 20 questions relating to denture satisfaction and to the quality of life was distributed to the patients in the center. Alternatively, patients were interviewed over the telephone.

The demographic data collected from each participant included: Gender, Age and level of education.

A Pilot study was carried out in order to validate the questionnaire prior to full data collection.

Ten patients were included in the pilot of the questionnaire and recruited from the target sample at (FDC). Patients were asked to complete the questionnaire and answer the following questions.

1-Were the questions easy to understand? Yes No

2-Did you have any difficulty answering the questions? Yes No

3-If yes, what difficulty did you have? -----

4-Were any of the questions too long? Yes No

4.3 Result of the pilot study

All 10 subjects involved in the pilot study responded positively. All questions were easy to understand and none of the 10 respondents had any difficulty assessing the questions. None were deemed too long.

4.4 The Questionnaire

The first part of the questionnaire consisted of demographic information such as age, gender and educational attainment. The second part consisted of questions related to the satisfaction of the complete denture regarding the appearance, comfort, masticatory efficiency, quality of speech, ease of insertion of the complete denture, occurrence of sore mouth and if any taste disturbance was present.

The third part consisted of questions related to the patients' psychological view of complete denture wearing and particularly whether they felt older with dentures. The final part of the questionnaire asked about reasons for not having an implant such as psychological fear of surgery and blood or other medical reasons or financial status.

4.5 Sample size and study participants

The questionnaire was distributed to edentulous patients who were treated at Fujairah Dental Centre by a qualified prosthodontist, Dr. Mohammed Saleem, from 2014 to 2016.

The patients were given an information sheet and had the purpose of the study explained to them verbally.

Informed consent sheets were signed, and for those patients who were illiterate verbal approval and a thumb print was accepted.

No names or other identifying information were collected, as the questionnaire was completely anonymous.

Study Aim: To asses patient satisfaction after provision of conventional complete dentures.

Approval to conduct the study was obtained from the following:
HBMCDM Research Ethics Committee.

Ministry of health in the U.A.E



Study subjects

The participants are patients who received complete dentures at Fujairah Dental Centre provided by one qualified prosthodontist.

The Questionnaire was conducted by direct distribution and over the telephone.



Completed questionnaires were collected.

Figure 2. Flow chart of study method.

4.6 Statistical Analysis

All data was coded for analysis in SPSS v20. All variables were categorical apart from age, which was analyzed as a continuous variable. Categorical variables, such as gender, were analyzed by Chi Square, with statistical significance set at $p < 0.05$.

4.7 Ethical Consideration

This study was conducted in full conformance with the principles of Good Clinical Practice (GCP), and within the laws and regulation of the Ministry of health of United Arab Emirates.

The ethical approval was obtained from the Research Ethics Committee at Hamdan Bin Mohammed Collage of Dental Medicine, Mohammed Bin Rashid University.

5.0 Results

A total of 84 questionnaires were distributed and 60 subjects responded (75%). Within this group of respondents 31 were male and 29 were female, with a mean age for males of 64.39 years and 61.69 years for females, see Table 1. The overall mean age was 63 years. There was no significant difference in age between the genders ($p=0.39$). The demographic characteristics of participants in this study were: gender, age and educational level. The educational attainment according to gender is shown in Table 2.

Table 1: Mean age by gender.

Gender	N	Mean age in years	Std.Deviation
Male	31 (51.7%)	64.39	10.462
Female	29 (48.3%)	61.69	13.494
Total	60 (100%)	63.08	11.996

Table 2: Educational attainment by gender.

Education	Illiterate	Primary school	Secondary School	University	Total
Gender Male	9	12	7	3	31
Female	8	14	6	1	29
Total	17	26	13	4	60

Analysis of the level of education according to gender found no significant differences in the frequency distribution although there were very few were university educated participants.

($\chi^2 = 1.22$, $P = 0.747$).

Table 3: Mean duration of edentulousness in years by gender.

Gender	N	Mean (years)	Std.Deviation
Male	31	3.05	3.023
Female	29	2.45	2.237

Males were edentulous slightly longer than females but this was not statistically significant ($p > 0.05$). Most subjects had only worn one complete denture set (2 males had worn 2 previous sets).

The mean numbers of years respondents were edentulous was 2.76 years (SD 2.67) with a minimum of 4 months and a maximum of 10 years.

Table 4: The distribution of denture location by gender.

Area of wearing complete denture	Upper jaw	Lower jaw	Both	Total
Gender Male	7 (43.8%)	3 (42.9%)	21 (56.8%)	31 (51.7%)
Female	9 (56.3%)	4 (57.1%)	16 (43.2%)	29 (48.3%)
Total	16 (26.7%)	7 (11.7%)	37 (61.7%)	60 (100.0%)

The denture distribution in the jaws is shown in Table 4. There was no statistical difference in location of denture according to gender.

Table 5: The numbers of respondents and percentage of excellent scores rated by the participants on satisfaction items

Items of Denture Satisfaction	Total No	N	% of excellent	Mean (SD)
Comfort of upper denture	53	30	56.6	2.53(0.58)
Comfort of lower denture	47	22	46.8	2.36(0.51)
Rate appearance of upper denture	50	35	72	2.72(0.67)
Rate appearance of lower denture	50	36	70	2.68(0.45)
Speech quality	60	31	51.7	2.47(0.60)
Masticatory efficiency Upper Denture	53	27	50.9	2.43(0.64)
Masticatory efficiency of lower Denture	47	17	36.2	2.04(0.83)
Ease of insertion and removal upper denture	54	40	74.1	2.70(0.57)
Ease of insertion and removal lower denture	46	35	71.1	2.67(0.50)

N.B. Not all 60 participants wore both uppers and lowers dentures.

All the responses to questions 7 to 15 regarding satisfaction on the 0, 1, 2 and 3 scale were analyzed as if the responses were on a Likert scale, and hence converted to continuous/scale data.

The appearance and ease of insertion/removal were rated as excellent by at least 70% of respondents. Comfort of the lower denture and its masticatory efficiency had the lowest rating and lowest proportion of excellent scores.

Table 6: Overall responses to having a sore mouth.

	Frequency
Never	35 (58.3%)
Almost never	18 (30.0%)
Sometimes	7 (11.7%)
Total	60 (100%)

Table 7: Responses regarding sore mouth by gender.

Do you have a sore mouth?	Never	Almost never	Sometimes	Total
Male	19(54.3%)	8 (44.4%)	4 (57.1%)	31 (51.7%)
Female	16(45.7%)	10 (55.6%)	3 (42.9%)	29 (48.3%)
Total	35	18	7	60

There were no significant differences between the occurrence of sore mouth between males and females.

Table 8: The overall responses to change in taste.

	Frequency	Percent
Never	49	81.7%
Almost Never	11	18.3%
Total	60	100.0%

Table 8 shows the overall response to Question 17 which asked “Do you have any change in sense of taste with your denture?” Only 11 subjects (18.3%) responded “Almost never”.

Table 9: The gender specific responses to change in taste.

		Any taste change?		
		Never	Almost never	Total
Gender	Male	27	4	31
	Female	22	7	29
Total		49	11	60

There were no significant differences between males and females regarding a possible taste change as shown in table 9, $p>0.05$.

Figure 3: The percentage distribution of reasons for not having implants.

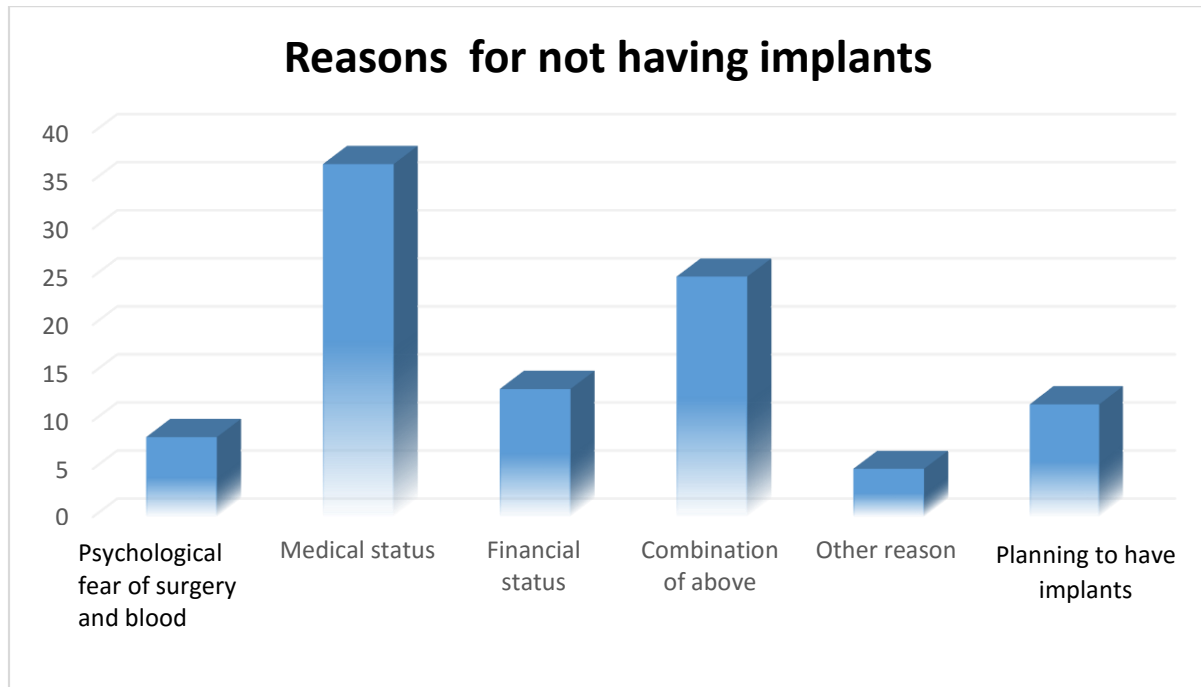


Table 10: Responses to whether participants felt older with dentures by gender.

Getting older with denture	No	Yes	Total
Male	28 (75.5%)	3 (13%)	31 (51.7%)
Female	9 (24.3%)	20 (87%)	29 (48.3%)
Total	37 (61.7%)	23(38.3%)	60 (100%)

Only 3 (13%) males responded that they felt older wearing complete dentures whereas 87% of females reported that they felt older after wearing complete dentures and this was statistically significant ($X^2 = 22.3, P < 0.001$).

Table 11: Responses to why the patient attended the clinic.

	Frequency
Fractured denture	3 (5.0%)
Regular follow -up	42 (70%)
Hygiene purpose	2 (3.3%)
Lower adjustment requested	9 (15%)
Upper and lower adjustment requested	4 (6.7%)
Total	60 (100%)

Most of the participants reported they did not need to change the dentures (70%). The main reason for changing the dentures was after repeated denture adjustments.

Further analyses were undertaken to determine if there was a correlation between several variables. It was expected that the length of time participants were edentulous would be associated with denture satisfaction in general and specifically with comfort and masticatory efficiency. In fact there were no statistically significant associations between these factors but there was between upper denture comfort and upper masticatory efficiency (Spearman's $\rho=+0.75$, $P<0.001$) and lower denture comfort with lower masticatory efficiency (Spearman's $\rho=+0.72$, $P<0.001$). These results may be predictable but confirm the positive relationship between mastication and comfort.

6.0 Discussion

Some studies have used questionnaires to evaluate the satisfaction of patients with complete dentures. ^(51, 53) Researchers have successfully used the versions of the Oral Health Impact Profile (OHIP) and General Oral Health Assessment Index (GOHAI). ⁽⁵⁴⁾ The Functional Assessment of Dentures (FAD) was introduced by Corrigan et al to evaluate denture quality and a FAD score was allocated to 5 parameters. ⁽⁵¹⁾

The lowest rate of satisfaction according to all of the variables was on the masticatory efficiency of lower dentures (36.2%), and the highest percentage satisfaction was on ease of insertion and removal of upper denture by 74.1%.

The satisfaction with the masticatory efficiency of the upper dentures was 50.9% which was higher than the lower dentures. Speech quality satisfaction for all the participants was 51.7%. This is in agreement with Corrigan et al in that the lower denture is less satisfactory than the upper. ⁽⁵¹⁾

A total number of 37 participants wore both upper and lower dentures (21 males, 16 females). An upper denture only was worn by 7 males and 9 females whereas 3 males and 4 females wore a lower denture only.

Regarding comfort, the satisfaction with comfort of the upper denture was 56.6% but for lower dentures it was 46.8%. For appearance it was 72% for the upper and 70% for the lower.

Thirty three patients who received a complete denture in the upper and lower jaws in King Saud University were asked to evaluate satisfaction by a questionnaire. The result showed that total satisfaction with the upper denture was greater than for the lower denture on factors such as comfort, appearance, retention and stability. ⁽⁵⁵⁾

Sheppard et al reported on 3,569 edentulous subjects that satisfaction with dentures was deceptive in view of the high incidence of lesions present. The majority of the subjects had not had professional dental attention for long periods. A method of reeducating was proposed. The main complaint was looseness followed by pain.⁽⁵⁶⁾ None of the participants from FDC complained of pain.

Alveolar resorption of the mandible is three to four times higher than the maxilla according to Atwood which results in a smaller denture bearing area and greater load on the lower alveolus which in turn results in greater discomfort.⁽⁵⁷⁾

According to Parkinson resorption of the mandible as opposed to the maxilla is more rapid in the initial edentulous period and then slows down with time.⁽⁴⁵⁾

An Iranian study of the frequency of traumatic lesions and ulcers between males and females in 60 patients found no significant differences between the genders.⁽⁴⁷⁾ In the current study there were also no differences between males and females in the occurrence of sore mouth.

Smith and Hughes evaluated 45 problematic patients wearing complete dentures, 35 patients presented with pain followed by looseness in 25 patients, only two complained of esthetic and speech difficulties.⁽⁵⁸⁾

The type of occlusion used in FDC was the balanced occlusion, using a semi-adjustable articulator (Hanau), and the final impression was taken with silicone material in a special tray. This material was preferred by patients wearing complete dentures in the satisfaction survey by Hyde et al.⁽³¹⁾ who found that patients reported that dentures made using a silicone second impression were more comfortable than those made using an alginate second impression.

There were a lot of reasons for not having implants for the participants in this study. The highest percentage was for medical status (36.7%) followed by combination of psychological fear of surgery and blood, (25%).

Many edentulous patients do not proceed to implant therapy because patients were satisfied with their dentures, or were unwilling to go for surgical procedures. Others were medically and psychiatrically unfit for this type of procedure and some were unable to pay for this treatment.⁽⁵⁴⁾

Dental anxiety was assessed in 40 implant candidates, the case group patients received awareness and reassurance and the control group received routine information. Anxiety scores were statistically analyzed. The result was that male patients had a significantly lower anxiety score than females, and female patients often experience higher level of anxiety than males.⁽⁵⁹⁾

The factors and symptoms of anxiety and depression in 158 complete dentures wearers, assessed perceptions about tooth loss, the benefit of wearing dental prostheses and social support as measured by the level of anxiety and depression. The results were the mean State Anxiety score was significantly higher among females as compared to males, also patients who have received longer dental treatment experienced more anxiety than do those who have received shorter dental treatment.⁽⁶⁰⁾

The gender differences in chewing discomfort among 56,616 elderly Koreans over 65 years with complete dentures was assessed. Chewing discomfort was set as the dependent variable, and independent variables were divided into socio-economic factors, general health factors and oral health factors. The result was females had more chewing discomfort than males.⁽⁶¹⁾

In this study most of the patients (70%) did not change their dentures as they felt comfortable.

Patient satisfaction with chewing was associated with the number of post-delivery adjustments, while patient satisfaction with esthetics was associated with gender and esthetic expectations and concluded patient satisfaction regarding complete dentures exceeded expectations.⁽⁶²⁾

Oral health-related quality of life (OHRQoL) and satisfaction among older adults after receiving new complete dentures assessed association of age, education, gender medical history, past prosthetic history in 114 patients over 65 years. Dentures were evaluated for their retention, stability and comfort and the patients answered a questionnaire on socio-demographic and level of satisfaction. There was a significant improvement in OHRQoL after the treatment. The largest changes were in relation to impacts on eating and smiling. Six months after placement of the dentures, patient satisfaction improved compared to before treatment. The results showed that satisfaction with complete dentures was correlated with age, gender and past prosthetic history.⁽⁶³⁾

7.0 STUDY LIMITATIONS

The limitations of this study are as follows:

- A convenience sample may not be representative of all denture wearers.
- Some patients at FDC declined to participate which may lead to re-call bias
- Communication with the patients was difficult especially for those who changed their phone number.
- Death of some patients reduced the response rate.

8.0 Conclusion

Participants had greater satisfaction with the upper denture regarding appearance, comfort, masticatory efficiency and ease of insertion and removal compared to the lower denture.

Participants rated the lower denture with the lowest satisfaction score.

Females felt they were becoming older by wearing dentures whereas male respondents generally did not feel older.

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10.0 Appendices

Appendix I: Questionnaire Form.

Appendix II: Ethical approval from the Mohammed Bin Rashid University.

Appendix III: Explanation letter for the participants.

Appendix IV: Consent form.

APPENDIX I

DENTURE SATISFACTION QUESTIONNAIRE

1-Age:

2-Gender:

Female

Male

3-What level of education you attained?

- Cannot read and write

-Primary

-Secondary

-University

4- Are you wearing a complete denture in:

-Upper jaw

-Lower jaw

- Upper and lower jaw

5- For how long have you been edentulous? -----years

6- How many sets of complete dentures have you had? -----

PLEASE CIRCLE the most appropriate answer

Score (0 =Unsatisfactory, 1= Satisfactory, 2=Good, 3=Excellent)

7-How comfortable is your upper denture?

0 1 2 3

8-How comfortable is your lower denture

0 1 2 3

9- How do you rate the appearance of your lower denture?

0 1 2 3

10- How do you rate the appearance of your upper denture?

$$0 \quad 1 \quad 2 \quad 3$$

11-How do you rate the quality of your speech with the denture(s)?

0 1 2 3

12-How do you rate the masticatory efficiency of your upper denture?

0 1 2 3

13-How do you rate the masticatory efficiency your lower denture?

0 1 2 3

14- How easy is it to remove and insert your upper denture?

0 1 2 3

15-How easy is it to remove and insert your lower denture?

0 1 2 3

16- Do you have a sore mouth with your denture?

Never

Almost never

Sometimes

Always

17-Do you have any change in sense of taste with your denture?

Never

Almost never

Sometimes

Always

18- What is the main reason for not having an implant to restore your teeth?

A- Psychological fear of the surgery and blood.

B- Medical status

C- Financial status

D- Other reason, please state: -----

19-Wearing dentures reminds me that I am growing older

20- How old is your current denture? -----

21- Why are you changing the denture? -----

APPENDIX II



Date: 8/03/2017

Dear Dr Fatima Younis AlBuloushi

Prosthodontics Resident

Re: Your research protocol

Titled: Patient satisfaction with complete dentures

Thank you for submitting your research protocol to the Research and Ethics committee of the Hamdan Bin Mohammed College of Dental Medicine, MBRU.

It was considered at the meeting held on: 5/03/2017

It was agreed to approve the protocol pending minor modifications which you have done. The protocol is now approved.

Please make sure you see your research supervisor regularly during the project in order to maintain close collaboration and support. The committee would like to remind you that it is a requirement of the programme that you complete a research dissertation, which comprises 15% of credits within the 3-year MSc programme.

The committee wish you every success with your study.

Yours sincerely,

Prof A Milosevic

Chair, Research and Ethics Committee, HBMCDM

APPENDIX III

Explanation letter regarding this research project on denture satisfaction.

Dear patient,

It is my pleasure to invite you to be part of this project , I am Dr. Fatima Younis from Mohammed bin Rashid University, A Third year resident in prosthodontics under the supervision of Professor Alex Milosevic. My research is about Satisfaction with complete dentures. This is a simple questionnaire containing of 20 questions which should take no more than 5 minutes.

All the information is confidential and there are no names as the questionnaire is anonymous.

We are very grateful for your help in completing the questionnaire but you do not have to take part.

Should you wish to discuss any part of this project please contact me

Dr.Fatima Younis

Mobile Number: 0502326668

E-mail: fatmah.boloushi@mbru.ac.ae

رسالة شرح عن مشروع مدى رضا المريض عن طقم الاسنان

عزيزي المريض

انه من دواعي سروري ان تكون جزءا من هذا المشروع .انا الدكتورة فاطمة يونس من جامعة محمد بن راشد للطب تحت اشراف البروفيسور اليكس ميلوسوفتش في السنة الثالثة من تخصص التركيبات السنية . بحثي هو عن مدى رضا المرضى مع طقم الاسنان.الاستبيان يتكون من عشرين سؤال لا تتجاوز اجاباته مدة خمس دقائق. كل المعلومات سرية ولا توجد اسماء في هذا البحث.

نحن ممتنون جدا لمساعدتكم لنا في هذا البحث حتى وان لم يكن لديك الرغبة للمشاركة.

اذا رغبت في مناقشة اي تفاصيل من اسئلة البحث يرجى التواصل :

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APPENDIX IV

نموذج الموافقة على استبيان مدى رضا المريض بطقم الاسنان

التاريخ: -----

في حالة المرضى الذين لا يجيدون الكتابة والقراءة
ينبغي أن يشمل المشاركون الأميون طبعة الابهام

طبعة الابهام للمريض المشارك في الاستبيان

اسم المشارك في الاستبيان : _____



بيان الباحث / الشخص الذي يأخذ
الموافق

لقد قرأت بدقة ورقة المعلومات للمشارك المحتمل، وبأفضل قدرتي على التأكد من أن المشارك يفهم أنهم يشاركون في استبيان حول مدى رضاه مع طقم الاسنان.

وأؤكد أن المشارك أتاحت له الفرصة لطرح أسئلة عن الدراسة، وقد تم الرد على جميع الأسئلة التي طرحها المشارك بشكل صحيح وبأفضل ما لدي من قدرة. وأؤكد أن الفرد لم يكره على إعطاء الموافقة، وقد أعطيت الموافقة بحرية وطوعية.

اسم الباحث / الشخص الذي يحصل على الموافقة: -----

توقيع الباحث / الشخص الذي يحصل على الموافقة: -----

التاريخ: -----