AN ASSESSMENT OF COMMON PROBLEMS ASSOCIATED WITH COMPLETE DENTURE BASED ON A SURVEY OF COMPLAINTS MADE BY THE PATIENTS REPORTING TO DENTAL COLLEGE IN LUCKNOW (BBDCODS)

DISSERTATION

Submitted to

BABU BANARASI DAS UNIVERSITY, LUCKNOW, UTTAR PRADESH

In the partial fulfilment of the requirement for the degree

of

MASTER OF DENTAL SURGERY

In the subject of

PROSTHODONTICS, CROWN AND BRIDGE

Submitted by

DR. NAMRA KAUSAR ZAIDI

Under the guidance of

DR. (Prof.) MANOJ UPADHYAY

DEPARTMENT OF PROSTHODONTICS, CROWN AND BRIDGE

BABU BANARASI DAS COLLEGE OF DENTAL SCIENCES, LUCKNOW

Batch: 2021-24 **Enrolment No.: 12103292959**

DEPARTMENT OF PROSTHODONTICS CROWN AND BRIDGE
BABU BANARASI DAS COLLEGE OF DENTAL SCIENCES, LUCKNOW.

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "An assessment of common problems associated with complete denture based on a survey of complaints made by the patients reporting to dental college in Lucknow (BBDCODS)" is a bonafide and genuine research work carried out by me under the guidance of **Dr. Manoj Upadhyay,** Professor, Department of Prosthodontics Crown and Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh.

Date:

Signature of the Candidate

Place: BBDCODS

Dr. Namra Kausar Zaidi

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled **"An assessment of common problems associated with complete denture based on a survey of complaints made by the patients reporting to dental college in Lucknow (BBDCODS)"** is a bonafide work done by **Dr Namra Kausar Zaidi**, under my direct supervision & guidance in partial fulfilment of the requirement for the degree of **Master of Dental Surgery (M.D.S.)** in the specialty of Prosthodontics Crown and Bridge.

GUIDE
Dr. Manoj Upadhyay
MDS
Professor
Department of Prosthodontics
Crown and Bridge, Babu Banarasi
Das College of Dental Sciences,
Lucknow.

DEPARTMENT OF PROSTHODONTICS CROWN AND BRIDGE

BABU BANARASI DAS COLLEGE OF DENTAL SCIENCES, LUCKNOW.

ENDORSEMENT BY THE HOD

This is to certify that this dissertation entitled **"An assessment of common problems associated with complete denture based on a survey of complaints made by the patients reporting to dental college in Lucknow (BBDCODS)"** is a bonafide work done by **Dr. NAMRA KAUSAR ZAIDI**, under the direct supervision of **Dr. MANOJ UPADHYAY**, Professor, Department of Prosthodontics Crown and Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh.

Dr. Swati Gupta
Professor & Head
Department of
Prosthodontics Crown and
Bridge, Babu Banarasi Das
College of Dental Sciences,
Lucknow.

DEPARTMENT OF PROSTHODONTICS CROWN AND BRIDGE

BABU BANARASI DAS COLLEGE OF DENTAL SCIENCES, LUCKNOW.

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

This is to certify that this dissertation entitled **"An assessment of common problems associated with complete denture based on a survey of complaints made by the patients reporting to dental college in Lucknow (BBDCODS)"** is a bonafide work done by **Dr. Namra Kausar Zaidi**, under the direct supervision & guidance of **Dr. Manoj Upadhyay**, Professor & Head, Department of Conservative Dentistry & Endodontics, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh.

Dr. Puneet Ahuja
Principal
Babu Banarasi Das College
Of Dental Sciences,
Babu Banarasi Das University, Lucknow.

DEPARTMENT OF PROSTHODONTICS

CROWN AND BRIDGE

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Date:

Place: BBDCODS

Signature of the Candidate

Dr. Namra Kausar Zaidi

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.***DR.NAMRA KAUSAR ZAIDI***

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ABSTRACT

Introduction

One important prosthodontics treatment option is complete denture prosthodontics. Making a complete denture without any challenges has proven difficult, especially for certain people, despite the enormous amount of research and development that has been done in this area. This is primarily caused by the variety of techniques and materials employed in the fabrication process, as well as, to some extent, by the various patient circumstances. Several authors have examined complete denture complaints in great detail, but the most common method used to evaluate typical post-insertion issues is survey-based analysis. This study aims to close that gap by offering a structurofunctional evaluation of complete dentures and linking post-insertion issues to certain demographic parameters.

Material and methods

A straightforward, convenient sampling technique was employed in this cross-sectional analytical survey. Results were recorded using a customised questionnaire. Three main causes were identified after a structural-functional examination of the complaint was completed. Version 20.0 of the Statistical Package for Social Sciences (SPSS) program was used to statistically analyse the collected data.

Results

Most participants voiced at least one grievance. The most common complaints were related to retention and discomfort, with the mandibular posterior region accounting for the majority of these problems. There were complaints categorized by gender, with more complaints coming from women than from men. When it came to the three SFA variables as a reason for complaints, there were clinically significant

differences. The primary reason behind all complaint categories was an error in the denture base.

Conclusion

We can draw the conclusion that complete denture complaints are a common occurrence. Patients have voiced a variety of concerns, but the two main ones are discomfort and retention loss. There is a pronounced difference between sexes in the quantity and nature of complaints, with females reporting more concerns pertaining to discomfort and appearance. Additionally, denture base error is the most common cause of complaints involving complete dentures, with occlusion error and physiopsychological error being less common.

INTRODUCTION

Prosthodontics, the specialty of complete dentures, is arguably the oldest branch of dentistry. In the past, losing teeth was associated with poverty and the curse of God in addition to being a symptom of poor health. Huge amounts of creativity and mental energy were used to either hide or at least lessen the flaw. Animal teeth or bone that had been cut into the shape of teeth and then implanted directly into the socket were the first materials used to replace natural teeth. Significant advancements in the sciences occurred over time. The "Three M" of complete denture impressions—material, mould, and technique—were impacted by the developments[1.] Accurate impression-making techniques improved, materials were created with exceptional dimensional accuracy, and a variety of approaches were devised to suit various clinical scenarios. But despite all of these changes, one thing remained constant. Complaint from patient following denture delivery.

Post insertion complaints are as old as dentures. Stories of suffering and agony abound regarding the ivory dentures crafted by hand throughout ancient times, with the exception of a few exceptional examples of artistry[2]. Despite extensive research and development in this sector, and with a greater understanding of human anatomy and evolution in the material sciences, fabricating a problem-free pair of complete dentures has proven challenging, especially for some patients. This is mostly because there are so many different techniques and materials utilized in the creation process. This has prompted studies to investigate the many elements that may contribute to or exacerbate denture-related problems. Certain problems may have obvious reasons (such as a painful denture border or sharp nodule[3,4]), while other complaints can call for the dentist to employ all of their diagnostic tools.

The nature of the complaint, its length, and its type are all subject to numerous changes. Smith[5] et al. discovered that discomfort and looseness were the most common complaints made by patients. Four main categories of difficulties were identified by Morstad[6] et al: phonetics, comfort, aesthetics, and function. On the other hand, Brunello[7] listed pain, discomfort, trouble eating, and looseness as complaint kinds. As a result, the complaints can range from soreness, looseness, and discomfort[8] to phonetics, esthetic dissatisfaction, and phonetics [9,10,11]. Additionally, the type of complaints may differ based on factors including age, sex, health, length of use, prosthesis accuracy, patient psychology, rapport and relationship between the dentist and patient, etc.[12–17] The patient's happiness with his complete dentures doesn't seem to be determined by a single cause, but rather by a coordinated action of technical, anatomical, biological, and psychological aspects.[18–21] The lack of consistency or pattern in the complaints has made it difficult to determine the precise reason for the complaints. Better dentures may generate more complaints than ones that are poorly made [22–24]. "Oral acrobats" instantly spring to mind when this is mentioned[2]. Additionally, a patient may arrive with multiple problems at one time or with distinct concerns at separate times.

The patient might file several different kinds of complaints with the dentist. But some complaints are more frequently reported than others The process of adjusting to complete dentures is complicated, and research on the causes, frequency, and length of denture-wearing issues has produced contradictory findings.[26] There are complaints about one or more parts of the functioning of a complete denture, even with the dental surgeon and technician paying the highest attention to detail.[4, 6, 7, 17, 27, 31] As a result, evaluating these concerns necessitates a deep understanding of the numerous interrelated variables involved. They can be roughly categorized as prosthetic factors

and patient factors.[21] A patient's medical history, prior experience with removable prostheses and dentures, anatomical and physiological variances, patient psychology, and even their social situation are all considered patient variables.[32] The prosthetic elements include the state of the dentures, the expansions of the denture base, the kind of occlusal scheme, and the kind and condition of the denture teeth.[34, 35] To grasp these challenges, numerous experiments and investigations have been conducted in the past. These contain surface tension and retention studies by various authors.[36-38] Murray [39, 40] highlighted the significance of the denture base in retention, and denture fabrication errors were explained by Laurina et al.[27] Role of tongue in mandibular denture stability was elaborated upon by Bohnenkamp[9]

While a survey-based method is required to identify and correlate patient-based subjective aspects, the experimental technique may aid in understanding material-related difficulties. Numerous surveys have been conducted on occasion to determine the prevalence of edentulism in India and other countries, to correlate it with demographic characteristics, and to evaluate its effects on oral and overall health.[41–47] Comparably, a large number of survey-based research have been carried out to evaluate post-insertion complaints in various demographic groups.[5, 26, 30, 48]

Nassif [49]has noted that questions answered on a questionnaire can be used to conduct targeted, structured interviews, and that reviewing a completed questionnaire can immediately identify issues that warrant additional investigation. A number of variables, including inter-rater bias, questionnaire style, question type, patient selection strategy, and others, may have an impact on the survey's outcome. The literature describes a variety of questionnaire forms and their variants, which can be altered to meet specific needs [50–56.] It can be stated that post-insertion problems with complete dentures are a part of complete denture therapy, even though they may be

minimized by careful manufacture and patient variables consideration. There are, however, few research that examine this problem in an Indian community. In order to confirm this further, an electronic search was conducted using PubMed (MEDLINE) using the terms "complete denture," "post insertion," "discomfort," and "India". Only peer-reviewed English articles published up until January 2023 were included in the search. The manual search of pertinent journals and the reference lists of certain articles were added to the literature search.

Furthermore, a thorough investigation of the causality of post-insertion symptoms has not been conducted. The research is made more complex by the claim that social and psychological variables have an equal role in explaining post-insertion complaints as do physical elements [32]. By offering a structurofunctional assessment of full dentures complaints as stated by patients and a correlation between the most often reported complaints and numerous social and demographic characteristics in the Lucknow region of Uttar Pradesh state in India, the current study aims to close this gap.

The study's null hypothesis states that there is no relationship between post-insertion complaints involving complete dentures and variables including sex, the length of time dentures have been worn, where they were made, and how many pairs of dentures have been worn previously.

AIMS AND OBJECTIVES

The aims and objectives of this study are as follows:

1. To conduct a survey of patient's complaints of their complete denture
2. To perform a structurofuntional analysis of the presented complains
3. To find any correlation between complains with complete denture and various social demographic factors.

REVIEW OF LITERATURE

1.Skinner[37] et al (1951) Conducted an experimental study to elaborate on the findings made earlier by Ostlund. It was done to include the effect of post dam, peripheral seal, and relief areas on the retention of the denture. The following facts and conclusions have been demonstrated by the data obtained from the experiment: 1. The use of relief areas resulted in a decrease in the retention of the denture regardless of all other factors which may have tended to increase the retention. 2. The use of the post dam and peripheral seal, either singly or together, resulted in an increase in the retention of the denture. 3. The retention of the denture was less along the posterior border than along either the right or left ridge. 4. The peripheral seal was equal in effectiveness to the post dam in increasing the retention as measured across the posterior of the denture baseplate. 5. The peripheral seal was more effective in increasing the lateral retention, than was the post dam. 6. The buccal frenum tended to reduce the retention of the denture. 7. The ridge area at the contour of maximum curvature apparently contributed nothing to the retention of the denture.

2.Kimball[56] (1954) in an article presented a classification of factors for control and elimination of chronic tissue soreness beneath dentures. He divides them into mechanical considerations and systemic considerations. Mechanical considerations were divided into relief of pressure areas inside of denture, use of soft lining material, size of denture base and relief of occlusal trauma and interference. The last consideration was further sub divided into many classes like spot grinding of teeth, checking of centric relation, checking of occlusal balance, milling in of occlusion etc. The systemic considerations were divided into drug antibiotic and allergic reaction,

debilitating disease, endocrine gland disturbance and nutritional disturbance. While describing the systemic factors it was stressed that this approach was difficult to develop due to multiplicity of factors present. Great importance was given to vitamin deficiency as it was included in more than one section.

3. Colett[57] (1958) in a review article described various oral conditions associated with complete dentures. He classified lesions into two categories (i) those caused by denture and (ii) those caused by some other cause but aggravated by dentures. The first category is further divided into irritative lesions caused by denture flanges and irritative lesions caused by basal seat of denture.

Mucostatic technique of impression making was found to result in decubital ulcers due to local interference in circulation. Also, new dentures on insertion cause slight ulceration in the denture border regions. As dentures have a tendency to settle, pressure ulcers may appear after the patient has been wearing the dentures for some time. Error in occlusal harmony causes denture

base to skid or rotate on tissue every time the jaws are closed in centric relation leading to alveolar ridge resorption and continuation of the same problem finally causing stomatitis. Relief areas do not add to the retention of dentures, but also interfere with it by allowing the formation of a thicker fluid film in the space created by the relief. Uncontrolled diabetes might cause more rapid resorption following the removal of teeth, and the tissues are more likely to react unfavourably to denture irritation and pressure. Nutritional deficiencies can cause stomatitis and can contribute to its cause. Psychologic over adaptation to dentures is seen in some patients as they don't seek adequate service for their dentures, and damage to the denture supporting structures is to be anticipated.

4.Lopate[58] (1958) in an article mentioned anatomical abnormalities complicating the adjustment period for complete dentures. Denture patients and especially new denture patients face certain problems of adjustment which can be complicated by anatomic abnormalities occurring in the oral cavity. Patients usually fail to understand the nature of their difficulties, and this can result in an unsatisfied individual who may automatically blame the dentist for their troubles. The altered muscular habits in chewing and talking must be unlearned to successfully master artificial denture. After teeth have been extracted, the alveolar ridge tends to resorb very rapidly for the first few months and then more slowly over a fairly long period of time thus compromising tissue adaptation. The long-standing absence of teeth may also cause a lack of maxilla-mandibular space. As a result, it may be difficult to carry the denture back as far as necessary for maximum stability and retention. It is usually more difficult to retain a lower denture than an upper denture because of the movement of the lower jaw and the tongue. This situation is made more unstable when a knife-edge ridge is presents. In cases where the gums are too thin to absorb the pressure well, discomfort may be increased and a tenderness which interferes with the wearing of the denture results. When the soft palate descends abruptly from its junction with the hard palate the denture must be constructed somewhat shorter, and some degree of instability may result. The labial and buccal frenula are quite often a problem in developing and maintaining adequate retention in complete denture prosthesis. This is due primarily to the nature of the dense fibrous strand of tissues present in the frenula and may cause loss of retention related complaints.

5.Landa[59] (1960) in an article mentioned troubleshooting in complete dentures post insertion.

Traumatic occlusion was classified as horizontal and vertical with former due to interference in

lateral jaw movement and latter due to interference in even centric occlusion. Lack of uniformity in settling of dentures may be due to faulty occlusal stresses, unequal distribution of the mucosa over the alveolar process, or the presence of spinous processes on the surface of the alveolar bone. In describing the traumatic lesions first masticatory mucosa was described. They are usually round or irregular in form, are often small in size (1 to 2 mm.) and their detection is difficult. They represent minute invaginations or small ulcerations of the masticatory mucosa.

Lesions on specialized mucosa of tongue include tongue biting and friction of the dorsal surface against the occlusal surface of maxillary teeth. This occurs due to arranging teeth too far off the ridge in palatal direction. An insufficient vertical dimension of occlusion may also lead to frequent and excessive friction of the dorsal surface of the tongue. When dentures are worn for many years with an insufficient degree of jaw separation, the papillae in the anterior third and part of the middle third of the tongue may be obliterated. The tongue in this area may appear smooth and shiny. In conclusion classification of oral mucosa according to degree of keratinization follows a definite pattern and same should be replicated in the finished denture.

6. Östlund[36] (1960) in an article discussed the relation between saliva and denture retention. The aim of the study was the measurement of retention of complete denture in the mouth after administration of two drugs and demonstration of any correlation between the secretion from the palatine glands and the retention of the dentures. It was mentioned that denture retention was associated with many factors like reduced atmospheric pressure, adhesion, cohesion, shape and weight of the denture, material

used etc. Ten edentulous patients (7 men and 3 women) were selected for the study. The residual ridges of these patients were without undercuts. An acrylic resin base was obtained which was provided with a lever extending about 35 mm. from the ridge.

The denture base was placed into the mouth, and the pull necessary to tip the base from the posterior part of the palate was measured by using a spring balance applied in a cranial direction.

The results showed that the retention recorded after injection of methyl scopolamine nitrate differed considerably from that noted after administration of neostigmine bromide. The increase in retention varied from 57 to 150 per cent. It was so marked that statistical analysis must be regarded as superfluous. Both mechanical and enzymatic destruction rapidly reduce the viscosity of the saliva almost to that of water. Also, the surface tension of saliva is lower than that of Water, which means that the viscosity must be of greater significance than suggested by the previous experiments. Another reason why the importance of the viscosity of the saliva has not been fully realized is that in laboratory studies mixed saliva was always used and effect of purely mucous saliva was not studied.

7. **Sharp[60] (1960)** conducted a study of 350 patients, all with subjective complaints referable to the oral mucous membranes to describe low tolerance to dentures. The chief complaint in approximately 10% of these patients were denture irritation. The majority of the denture patients with low tolerance demonstrated atrophy of the mucous membranes and marked susceptibility to irritation. The mucous membranes appeared erythematous due to hyperemia and increased transparency secondary to atrophy. In view of the extent of the mucosal changes in these patients, dentures could not be accepted as the cause of the local irritation, only as the triggering mechanism.

Patients with atrophic mucous membranes may be unable to assimilate or retain a sufficient amount of nutritive substances even from carefully directed diets. Possibly they are unable to utilize these substances properly because of a basic metabolic defect. Vitamin therapy (even with all of the vitamins known at present) has not reversed the degenerative mucous membrane changes for all patients. Crude compounds, including yeast and liver extract, combined with vitamin therapy have been much more effective than has specific therapy in correcting abnormal mucous membranes. This would seem to indicate that there must be unidentified fractions in crude liver and yeast which are responsible for improvement in the condition of the mucous membranes; this improvement, in turn, increases the ability of the patients to tolerate their dentures.

8.Landa [61](1960) in an article explained proper adjustment procedure for complete dentures to relieve pain and discomfort. General factors which contribute to soreness are: knife edged mylohyoid ridge, sharp lingual edges of bony platforms running from genial tubercle to cuspids, sharp bony projections on the labial surface of lower and upper ridges. A diffuse inflammatory condition over an extended area of lower ridge is caused frequently by premature contact of posterior teeth on affected side. The lesion of the masticatory mucosa on the lower ridge may be small and circumscribed, with a minute ulceration in the center. This lesion may be caused by displacement of the tissue by the impression, by injury to the cast, or by premature contact of one high cusp. If the denture base is at fault, the tissue surface of the denture that corresponds to the ulceration is located with indelible pencil and reduced. If a high cusp is responsible for the ulceration, the dentures are remounted on an articulator and the high cusp reduced. In case of maxillary denture the most frequent cause of soreness is torus palatinus. Premature contact should be relieved but physiological contact should

be maintained between the torus and the denture. A functional method of relieving hard area is advocated which involves relieving dentures as their settling progresses in function. Another method is preventive method where relief is given by scraping the impression or by placing tinfoil on the cast on which denture is to be constructed. Occlusion contributes to most injuries and should be corrected until there is harmony between centric relation and centric occlusion.

9.Langer[34] et al (1961) conducted a study dealing with various clinical factors influencing satisfaction with complete dentures in geriatric patients. The subject group consisted of 127 individuals from four old age homes in Israel between the age group of 61-86 years. Trained

prosthodontist made the clinical and oral evaluation of all dentures without the knowledge of the dentist who had fabricated them. Another dentist trained in psychology with the help of a trained psychologist determined the satisfaction of patients in relation to dentures using a questionnaire. The data obtained was subjected to statistical analysis and coefficient of association was found. The satisfaction with dentures was high with no significant difference between males and females. Presence of acrylic or porcelain teeth made no difference to the satisfaction level.

Almost perfect relationship was found between patient satisfaction with dentures and masticatory function. There was a weak relation (C = 0.155) between clinical fit as evaluated by dentist) and patient satisfaction indicating that there was no correlation between patient appraisal and dentist's appraisal of dentures. Analysis of social adjustment showed 73 patients as well adjusted, 15 as disturbed and 39 as variable. However, there was a weak correlation (C = 0.293)

between social adjustment and denture satisfaction. A denture may be regarded as a failure when both patient and dentist are dissatisfied. However, no single factor pays a dominant role, rather there is interplay of different anatomic, physiological, biological, constructional and psychological factors determine satisfaction.

10. **Zegarelli[62] et al (1961)** under took a study to evaluate the efficacy of a number of different therapeutic regimens in the treatment of denture stomatitis. Some of the etiologic factors associated with denture stomatitis are traumatic influence of dentures, allergy or toxicity from denture materials and harboring of infectious agents by the denture. In this study four men and 24 women ranging in age from 13 to 72 years were included. Each subject had classic signs of denture stomatitis. Various therapeutic agents were applied over varying duration of time. It was indicated that the application of Amphotericin B had a suppressive and not a curative action.

This in indicated that the administration of drug therapy is not intended to replace or super cede complete and thorough prosthetic dental care for patients with denture stomatitis.

11. **Yoshizumiss[35] (1964)** conducted a study to evaluate the factors pertinent to the success of complete dentures service. Factors considered in this study were: quality of dentures, comfort of patients, ability of patients to masticate, period of time in which dentures were in use and effect of these factors on one another. In this study 239 male patients at the Veterans Administration Domiciliary at Wodsworth, Kansas were clinically examined. Age of patients varied from 36 to 82 years with the mean being 62.36 years. All the examinations and questioning were conducted by the author himself and only those patients were included in the study who had maxillary and

mandibular complete dentures. Quality of dentures was measured on basis of 4 features:

Occlusion, vertical dimension, border extension and adaptation of denture base. Occlusion was evaluated at centric, protrusive and lateral positions. Adaptation of denture base involved checking for absence of "rocking" effect of denture base-when finger pressure was applied at various locations. Border extension was evaluated by clinical evaluation of borders of denture in relation to limiting anatomic structures of the jaws as mentioned by Boucher. Comfort of patient and ability to masticate were confirmed by asking standard questions verbally. Data thus obtained was subjected to phi statistical analysis. It was found that while the relation of time with quality, comfort and mastication was statistically significant. Also there was a positive correlation between quality of dentures and comfort and masticatory ability of patients. Patients who were comfortable with their dentures generally had good quality dentures. However, 12.5% patients were uncomfortable with good quality dentures. Many reasons were attributed for this ranging from tissue reaction to antibiotics to endocrine imbalance to psychosomatic conditions. Conversely, some patients may be comfortable with ill-fitting dentures due to "over adaptation". An upper ceiling of 5-6 years was suggested by the author after which time the denture should be relined or remade.

12. Carlsson[21] et al (1967) conducted a study to evaluate patient factors in appreciation of complete dentures. The aim of the study was to determine a research method and furnish a survey of the

relationships between appreciation of complete dentures, and the social, personal, and prosthetic factors of the patients. A re-examination was made of 182 edentulous men

and women less than 60 years of age who had received complete dentures 1 to 4 years previously at the Student Clinic of the Dental School of the University of Umea, Sweden. The re-examination consisted of a medical-social investigation concerning various personal and social conditions, subjective evaluations of the prosthetic treatment and its results, and an assessment of the dentures and oral conditions. Social adaptation was considered poor if the patient felt unhappy in their present situation. Adaptation to the dentures was considered good if the patient had the impression that other people thought the esthetic result was good, if he himself liked the dentures, if he seldom had pains, if he felt that the dentures functioned well, or if he thought the retention of both upper and lower denture was good. If the patient had negative remarks about 2 or more of these factors, his adaptation to the dentures was considered poor. Cooperation was considered poor if the patient could not get along well with the student-dentist or the clinic instructor. Principles of the clinical analysis included examination of esthetics, stability, retention, and occlusion, vertical relation at occlusion, anatomical considerations and total assessment of dentures. The results showed that 91% patients had adapted well to the dentures and 60% tolerated the upper denture better than the lower denture thus confirming a clinically known fact. Data obtained was subjected to various statistical operations including Yule's coefficient of association, significance association by x test with Yate's correction and binomial test in cases where X' test was not suitable. It was found that of the subjective factors investigated, the patients' co-operation and their conceptions of the esthetic result of the prosthetic treatment, and the retention of the upper dentures were most related to the total assessment of the dentures. Patients find it easier to accept a lower denture with poor retention than an upper one with the same difficulty.

Social adaptation, the age of the dentures, and pain in the mouth when using the dentures were weakly associated with the patients' appreciation of their dentures; whereas other factors, including earlier denture experience and assorted social variables, revealed very slight or no association at all.

13. **Morstad[6] et al (1968)** in a review article have described post-insertion denture problems and categorized them into four major headings: comfort, function, esthetics and phonetics. Problems causing discomfort were divided into sore spots, burning sensation, tongue and cheek biting, redness of bearing tissues and pain in the temporomandibular joints. A list of probable causative factor was given for each problem along with measures which can be taken to rectify them. Similarly while describing the problems in function interference while swallowing and gagging; instability-when not occluded, when in centric occlusion and when incising food-were mentioned. It has been mentioned that complaints regarding esthetics should be resolved at the try-in stage or a second try-in planned. However, phonetics related problems cannot be detected at the try-in stage because of different reaction of lips and tongue to wax and acrylic.

14. **Langer[63] et al (1968)** conducted a study concerned with the occlusal perception after placement of complete dentures. It checked for the ability of patients to distinguish different grades of hardness of test materials immediately after placement of complete dentures and after the first week of adjustment to the dentures. Twelve subjects, 5 men and 7 women, ranging between 44 and 72 years of age, were randomly selected and divided into two groups: experienced and inexperienced. After relief of mucosal irritations, the experiment was conducted which was divided into three parts. The first part was familiarization of test material, second part was discrimination between materials of different hardness and the third part was a continuation of second

part with different grade of test material hardness. The subjects had to distinguish between the different grades of hardness by biting on the test sticks. The biting tests were performed first on the left posterior teeth, next on the right posterior teeth, and finally on the anterior teeth. After one week, the occlusal perceptivity tests with rubber sticks of different hardness were repeated. A definite difference was noted between experienced and inexperienced denture wearers. Topical anesthesia, as used in 4 subjects, had no effect on results. No difference was apparent between experienced or inexperienced subjects.

15. **Bell[13] (1968)** in an article mentioned some conditions that contribute the problems most frequently encountered in complete denture treatment. Numerous problems arise solely from patient's lack of knowledge and misinformation as propagated by other patients. The soiution is patient education by the dental profession-patient education that is accurate, complete and altered to meet the specific needs of each individual patient. The average length of usefulness of complete dentures is six years. Within this time period, sufficient changes occur either in the prosthesis or in the supporting structures to render the prosthesis inadequate and most patients will require some form of maintenance therapy, and some dentures must be remade at frequent intervals. Patients who have a low pain threshold respond to the slightest pressure or tissue injury causing marked discomfort. Other patients, who have a high pain threshold, will endure marked tissue abuse without experiencing significant pain. This phenomenon provides poor protection and the increased functional demands far exceed the physiologic tolerance of the supporting structures, causing tissue injury, pathosis, and/or destruction. Patients can themselves enhance the retention and stability by centralizing and minimizing functional forces. Clinical experience has proved the value of intermittent or interrupted use of complete dentures for many patients.

Continuous use and poor denture hygiene are almost hazardous combination.

16. Bolender[50] et al (1969) conducted a study on 516 complete denture patients at the University of Washington to evaluate the effectiveness of Cornell Medical Index CMI) as a prognostic instrument. CMI was chosen from other tools available like interviewing the patient, Minnesota Multiphasic Personality Inventory MMPI) and taking detailed dental histories. As MMPI requires 45 to 90 minutes for a patient to complete it's considered too time-consuming for most dentists to use routinely as a screening. The CMI, a well-established aid in taking a medical history is composed of 195 yes-no questions developed at the Cornell University Medical College in New York. It requires 15 to 20 minutes for the patient to complete and can also be administered by auxiliary personnel. The CMI is designed so that only the "yes" response is significant, in that it suggests the presence of a problem. It can be scored and interpreted immediately by the dentist thus enabling them to review the results prior to meeting the patient.

The total number of "yes" responses in the entire questionnaire is significant as more than 25 "yes" responses indicate a potential problem. If they are mainly located in one or two sections, the patient's medical problem is probably localized, and is of an organic nature. In contrast a "yes" response scattered throughout the four pages of the CMI indicate the medical problem is likely to be diffuse, usually involving an emotional disturbance. Although a correlation was not found between patient satisfaction score and CMI, the study establishes a correlation between emotional problems and denture problems. It further indicates that the CMI is a reliable instrument for identification of patients who may encounter difficulty with new dentures.

17. Lutes[64] et al (1972) conducted clinical investigation to study denture modification during adjustment phase of complete denture service. In this study 64 patients were given maxillary and mandibular complete dentures. Patients accepted into the study were in reasonably good health, were not over 65 years of age, and had been edentulous for at least one year. Corrective measures to restore abused oral tissues to optimal health were accomplished prior to making final impression. The 64 patients were assigned to either Group I or Group II. In Group I: (a) The maxillary cast was oriented arbitrarily to the upper member of an articulator, (b) no effort was made to achieve a bilateral balanced occlusion in eccentric positions and the opposing anterior teeth did not contact in centric occlusion and (c) correction of occlusal discrepancies was also done intra-orally using ribbons and small stones. While in Group II: (a) Hinge axis location was determined, and hinge-bow records were taken, (b) the articulator was adjusted by using the average value of three plaster inter-occlusal maxilla-mandibular records for both right and left protrusive lateral positions of the jaw, (c) artificial teeth were arranged to achieve maximum simultaneous contacts in all positions within the working ranges of the teeth and the opposing anterior teeth did not contact in centric occlusion and (d) occlusal discrepancies were corrected by mounting the finished dentures on an articulator with new plaster inter-occlusal maxilla-mandibular records. The patients in both groups were given appointments for examination 24 and 48 hours after they received their dentures. After these preliminary appointments, the patients were requested to call for an appointment when they felt they needed attention. The results showed that there were no significant differences between the groups and the dentists did not differ in the number of adjustment visits as a function of the procedure employed. As a whole, there was no significant increase in the number of adjustment visits as a result of corrective surgical procedures

however, those who had surgery made more visits than the members of any other three subgroup. It was concluded that it seemed logical for dentists to plan for three post placement visits by each patient for the adjustment phase of treatment with complete denture.

18. **Michman[65] et al (1975)** conducted a study to evaluate post insertion changes in complete dentures. The aim was to find relation between some post insertion denture changes and the patient's satisfaction and pattern of mastication as documented by clinical and electromyographic (EMG) data. The post insertion period, that is, the time the dentures were in use, ranged from 13 months to 15 years (average 4 years and 9 months). The examination consisted of: (1) the serviceability of the dentures as evaluated by the prosthodontist; (2) the subjects' assessment of their dentures; (3) the masticatory performance based on degree of test food comminution, number of masticatory strokes, and time needed to reach swallowing threshold; and (4) masticatory frequency and muscle coordination, expressed by regularity of masticatory strokes and ability to shift chewing activity from side to side. The serviceability of dentures was judged by the prosthodontist with regard to their occlusion, retention, and stability.

Subject satisfaction with dentures was reiated to chewing ability and evaluated according to answers to specific questions. Masticatory performance was measured using fresh raw carrots. A two-channel Stanley-Cox electromyograph was used. The results showed a significant correlation between the time the dentures were in use and the subsequent occlusal changes,showing a gradual deterioration and becoming most evident after 5 years. No statistical correlation could be found between the subject's assessment of his chewing ability and degree of comminution of test food in contrast, the regularity of masticatory strokes as observed electromyographically was

significantly correlated with the subject's assessment of his chewing ability. In conclusion no correlation was found between denture serviceability on the one hand and masticatory performance and muscular coordination during chewing of test food on the other. Despite the obvious differences among the respective subjects, the number of masticatory strokes in the same individual was rather constant.

19. **Levin[53] et al (1976)** in an article suggested a questionnaire for predicting denture success or failure by giving the dentist/ student clues to the psychological nature and/or attitude of patient.

Various studies were quoted to emphasize that behavioral science study has not been well recognized in the past but the situation was changing. Questions like why a patient seeks treatment and the doctor selected for providing treatment should be considered. It has been seen that patients who are more involved in their treatment fare better than others. The Cornell Medical Index was quoted as being used for making diagnostic and prognostic decisions.

However, the scale was not used by the authors due to its complexity and unsuitability due to educational back ground of their patients. It was concluded that psychological and emotional factors involved are just as important as if not more important than the oral and systemic

findings in treating edentulous patients.

20. **Jones[66] (1976)** in an article presented the various manifestations of soft tissues associated with complete dentures. The various categories of conditions mentioned were: inflammatory processes under denture base, hyperplasias, mechanical irritation, chemical burns, white lesions, ulcerative lesions, occluded salivary glands and finally malignant lesions. No relation between malignant lesions and dentures was mentioned

however tobacco use was associated with history of verrucose carcinomas. Similarly no relation was derived between presence of dentures and chemical burns and occluded salivary glands. Under mechanical irritation decubital ulcers and cheek/tongue biting was mentioned. In this regard careful post insertion care was emphasized. With regard to white lesions leukoplakia was cited to be most associated with buccal mucosa while lichen planus was not considered to be of great significance to denture patient. Most conditions were grouped under the first and second category. These included chronic denture stomatitis, stomatitis venenata and moniliasis under inflammatory process under denture base and fibrous hyperplasia on the ridge, epulis fissurata, papillary hyperplasia and fibroid papilloma under category of hyperplasias. Stomatitis venenata is an uncommon condition associated with sensitization to methyl methacrylate base. Chronic denture stomatitis presents an array of symptoms including pain, burning of tissue, metallic taste in mouth etc with the most dramatic symptoms seen under maxillary denture and most severe symptoms associated with mandibular denture. Many causes have been attributed to this condition while the treatment includes precise jaw records, accurate impressions, good oral hygiene, relieving tissue abuse and most importantly resting the tissue for 8 hours a day. In conclusion it was mentioned that denture fabrication involves much more than mere mechanical procedures and that complete dentures are not the innocuous devices that they are often thought to be.

21. Nassif[49] (1978) mentioned the merits of a self-administered questionnaire as an aid in managing complete denture patients. As patients employ various subjective and objective standards to evaluate their complete denture service, these standards may not match that of the dentist. The key to success is for the dentist to obtain information at the outset about all factors over which the patient has direct influence. An excellent

method for this is a questionnaire completed by the edentulous patient. The presented questionnaire has 22 questions covering chief complaint, ability to adapt, desires and opinions, personality traits and oral habits. Ability to adapt tells about physiologic tolerance, neuromuscular coordination etc. Desires and opinions are closely related adaptive capabilities with psychological overtones. Personality traits identification has a direct bearing on the ease or difficulty of treating an edentulous patient. Finally oral habits help to identify trigger factors which might cause problems like residual ridge resorption. In conclusion, such a questionnaire has several advantages like - quick identification of the problem, saving time for the dentist, reducing the cost of treatment, helping in evaluation of neuromuscular coordination through handwriting review, reference for post insertion problems and has a legal merit when properly dated and signed indicating that maximum diagnostic and therapeutic efforts were intended.

22. **Powter[67] et al (1980)** in a study described quantitative assessment of some factors governing complete denture success. A questionnaire designed to assess satisfaction with their complete dentures was mailed to 258 edentulous patients. A total of 162 completed forms were returned.

Patients were subdivided into satisfied and dissatisfied patients according to their questionnaire answers. The dissatisfied patients were older, had worn their dentures for a shorter period and required more post-insertion visits than patients in the satisfied group. These differences were statistically significant. The dissatisfied group of patients contained more females over the age of 51 years (designated as postmenopausal) than under this age when subjective criteria for success were used. It was also seen that longer the dentures were worn, the lesser the problems the patient had. The use of objective criteria did not reveal any statistically significant differences

between the two age groups. There was little correlation between the dentist's and patient's evaluation of success.

23. **Jacobson[68]et al (1983)** in an article reviewed the factors involved in complete dentures stability. The factors that contribute to stability include ridge height and conformation, base adaptation, residual ridge relationships, occlusal harmony, and neuromuscular control. These factors can be condensed into the following categories: 1. The relationship of the denture base to the underlying tissues. This depends on the impression procedures of the clinician as optimal denture stability requires that the tissues that provide resistance to horizontal forces be properly recorded and related to denture base. 2. The relationship of the external surface and border to the surrounding or facial musculature 3. The relationship of the opposing occlusal surfaces. As the mandibular lingual incline has soft overlying tissue they are less effective to resist forces of denture base, therefore the most desirable feature of the lingual slope of the mandible is that it approaches 90° to the occlusal plane. Anatomical factors which affect stability are arch form and shape. Factors involving polished surface and musculature are: first, the action of certain muscle groups must be permitted to occur without interference by the denture base and second, normal functioning of some muscle groups can be used to enhance stability. In enhancing stability the concept of neutral zone is advocated to establish harmony between polished surface and associated musculature. Occlusal relationships should be non-interfering during both functional and parafunctional movements. Finally position of teeth and level of occlusal plane are also important factor to affect stability.

24. **Jacobson[69] et al (1983)** in an article reviewed factors involved in complete denture retention. Retention in complete dentures is the resistance to displacement of the denture base away from the ridge. This property may be least important however it

provides psychological comfort to patient. The most common factors of retention are adhesion, cohesion, interfacial surface tension, gravity, intimate tissue contact, peripheral (border) seal, atmospheric pressure, and neuromuscular control. There is contention between various authors on the relative importance of these factors. Many clinical and laboratory studies were discussed which clearly explain the physical retention of complete dentures. To be effective air must be excluded from the intaglio, and the fluid film must be as thin as possible. Intimate tissue contact is the biologic factor that promotes these conditions by eliminating air entrapment. The border seal maintains this relationship by preventing the ingress of air once the denture is seated. The physical factor of gravity contributes to mandibular complete denture retention. The biologic factor of neuromuscular control gradually becomes a major determinant in complete denture retention as experienced patients learn to alter their muscular function to harmonize with their prosthesis.

Older patients have more difficulty adjusting to new complete dentures. This may result from the progressive cerebral atrophy that affects related neurologic systems. The anatomic factors which affect retention are posterior palatal seal area and the buccal space or retrozygomatic space in maxillary denture. In mandibular denture there are greater problems in retention because a movable floor of the mouth, which causes difficulty in establishing a lingual border seal, and lack of ideal ridge height and conformation, which minimizes denture stability. The lingual side of the mandibular denture is challenging for denture retention and the most difficult region is the anterior lingual border.

25. **Kuebker[8] (1984)** in an article described diagnostic procedures and clinical treatment in case of patient discomfort problems. Sore mouth after initial placement of dentures has been attributed to too long wide or sharp borders, lack of relief in non-

yielding areas, pressure area from impression or warpage of denture, error in occlusion causing denture movement, overextension in masseter area of mandibular denture and insufficient relief over undercuts. While generalized soreness after repeated adjustment may be due to error in occlusion, inadequate freeway space, clenching/bruxing, low tissue tolerance due to nutritional deficiency or uncontrolled diabetes or pemphigus vulgaris. Hypersalivation has been attributed to strangeness of new denture and sore throat due to overextension of hamular notch distobuccal of maxillary denture, distolingual of mandibular denture or onto pterygomandibular raphe above retromolar pad. Impingement of nerves over mental foramen or on incisive papilla causes discomfort. Cheek biting is due to sharp buccal cusp, insufficient horizontal overlap of posterior teeth and insufficient clearance between denture bases distal to last tooth. Finally non-specific pain may be caused due to pressure over zygomatic process or wide distobuccal border of maxillary denture base.

26. Kuebker[11] (1984) in an article described diagnostic procedures and clinical treatment in case of gagging and speech problems. Gagging at the time of insertion may be caused due to nervousness at receiving first denture, long or thick posterior border of maxillary denture, too long or thick distolingual flange of the mandibular denture, too low maxillary occlusal plane triggering tongue gagging. Delayed gagging may be due to mandibular teeth set too far lingual, vertical dimension of occlusion greater than physiological limits, heavy mucinous saliva palatal salivary glands. Initial speech problem may be due to unfamiliarity with new denture and too much vertical overlap and too little horizontal overlap of teeth. Prolonged difficulty in speech may indicate a history of corrected speech problem as a child. Whistling on "s" sounds may be due to deep median groove and posterior teeth set too far lingually. While

stigmatalis lateralis (i.e. "" sounding likes "sh") may be due to too shallow median tongue groove or escape of air from the lateral borders of tongue.

27. **Chamberlain[70] et al (1984)** conducted a study on the differences in perception between patient and prosthodontist regarding existing maxillary and mandibular denture. They used a standardized criteria developed and tested for reliability at the University of Michigan, School of Dentistry. Patient perception was assessed by rephrasing the criteria statements in terms of commonly occurring chief complaints. Random selection of 80 patients was done for the study.

Assumptions made for the selection of patients in the group included; firstly, patient perceived a definite need for treatment and expected the deficiency to be corrected in new prosthesis.

Secondly, age range of existing dentures was from 5 to 24 years which was considered enough to eliminate personality conflict and money as cause of disagreement between patient and dentist.

The results indicated that there was 100% agreement between prosthodontist and patient evaluations on denture esthetic criteria of tooth shade, lip support and amount of upper and lower teeth displayed by patient. However, 14% patients expressed dissatisfaction with general appearance of the denture while the prosthodontist considered the total esthetic result to be acceptable. With regard to comfort more than 90% agreement was shown between patient and dentist for the outline form of the mandibular denture and nearly 100% agreement for that of the maxillary denture. Similarly, high agreement was seen between the two regarding vertical dimension (60%) and stability (80%). High disagreement was present regarding maxillary and mandibular retention (80%). In terms of difference in satisfaction level 32% patients

were satisfied with the inter-occlusal distance (when the dentist considered it over-closed), 44% were satisfied with occlusion which the prosthodontist found unstable. Conversely, 6% were dissatisfied with the occlusion when the prosthodontist found it satisfactory. It was concluded that except retention, the difference between patient's and prosthodontist's perception of treatment show great variability with regard to function than to either esthetics or comfort. Also, occlusion retention and vertical dimension may be more important for communication than esthetics of the complete dentures.

28. Kuebker[71] (1984) in an article described diagnostic procedures and clinical treatment in case of retention problems in complete dentures. It is emphasized that factors which may limit the prognosis of treatment must be explained to the patient. The same information presented to a patient after a problem has surfaced may be interpreted as an excuse rather than an explanation and is likely to lead to patient dissatisfaction. Lack of retention at the time of insertion in maxillary denture has been attributed to tissue contour or fluid balance change since time of impression, inadequate clearance for labial or buccal frena, incorrect posterior palatal seal (seal too far or too short posteriorly, inadequate depth of seal, posterior border and seal not extending into hamular notch), thin tissue covering over prominant mid-palatine suture or torus, dry mouth due to radiation and short labial flange. Also loose maxillary denture while speaking is caused due mostly to these factors. Looseness in maxillary denture on opening too wide is attributed to:

long posterior borders, interference with coronoid process of mandible by disto-buccal flange. In mandibular dentures lack of retention at the time of insertion may be due to change in tissue contour from the time of impression, impingement due to labial or buccal frena, improper extension of buccal and labial flanges and distolingual borders,

unrelieved lingual frenum, retracted tongue position, inadequate lingual seal, too posteriorly placed teeth and lack of neuromuscular control. Variation in looseness of maxillary denture at different times of day may be due to heavy secretion of saliva from palatal salivary glands and periods of excessive dry mouth. Finally cause of one or both denture falling while eating has been attributed to occlusal plane higher than retromolar pad, interceptive contact in occlusion, inadequate neuromuscular control and teeth set too far buccal to the crest of ridge.

29. **Bergman[26] et al (1985)** conducted a clinical long term study of complete denture wearers. The study comprised 32 patients who had their teeth extracted and complete denture treatment done in the maxilla or the mandible 21 years ago. The examination consisted of a questionnaire and clinical and radiographic examinations. The questionnaire included questions on denture treatment and function, wearing habits, satisfaction with the dentures, general and oral health including the masticatory system, and chewing ability. In the clinical examination, the following items were noted: the state of the oral mucosa and the denture-wearing tissues, signs of mandibuiar ysfunction, anatomic conditions for denture wearing, and the condition of the dentures including tooth wear. The cephalometric radiographic examination was done. The results of the questionnaire indicated that half the subjects thought something needed to be done with the dentures they were wearing. Two third had not got any relining or rebasing done in their dentures. Most of the patients were wearing dentures day and night and they had adapted well to their dentures. On clinical evaluation many deviations were found from optimal conditions.

Vertical dimension was considered too low and most of the subjects needed occlusal adjustment or repair. The cephalometric findings showed great individual variation in bone resorption.

Notwithstanding the loss of three participants during the study, no reason seemed to be present to doubt a bias in the study. Adaptation to denture wearing varied greatly between patient response (70%) and examiner's evaluation (37%). There was a low frequency of mandibular dysfunction which was probably related to good adaptation to wearing dentures. Although the denture quality was not good, patients were satisfied with function of their dentures. It was concluded that the discrepancy found in the study between the patients' satisfaction with the dentures and the dentist's assessment of their quality was in agreement with the results of previous studies. This fact underlined the need for regular check-ups even for complete denture patients to avoid maladaptation and/or biologic injuries. Lastly, alternatives such as removable partial dentures and over dentures should be considered seriously prior to teeth extraction and fabrication of complete dentures.

30. Dorey[72] et al (1985) conducted a study from 1976 to 1983 by reviewing the records of 200 edentulous patients. It was mentioned that the changes that occur within the oral cavity of edentulous persons differ from the changes in dentulous patients because of the special nature of the denture bearing oral mucosa. All patients had some form of removable prosthesis and 120 of them had one or more lesions related to the use of dentures. These patients ranged from 24 to 90 years of age; 24% were men and 76% were women. The greatest number of denture-related oral lesions was found in the 60 to 69 year old age group. Most patients (67.5%) were wearing complete dentures; 91% had one complete denture that opposed another complete denture, natural dentition, or a removable partial denture. A relationship was found between oral mucosal abnormalities and wearing dentures in 60% of patients. Tissue response to chronic trauma was the most common problem (17%). There were a high proportion of women to men in this study probably caused due to female predilection for denture-related

problems. The most common traumatic lesion found intra-orally was non dysplastic hyperkeratosis. Other patients had burning sensations caused by friction from poorly fitting dentures, poor occlusion that caused pressure points, infringement of the interocclusal space, and habits that placed excess tension on the tissues. Alteration of the occlusion, reduction of high spots, soft relines, and sometimes new dentures solved the problem. Some patients with burning pain that involved the denture bearing mucosa had referred pain from the temporomandibular joints and associated musculature. The discomfort was probably accentuated by parafunctional habits that increased stress on the denture-bearing mucosa. The high incidence of angular cheilitis among our patients was, as might be expected, frequently related to either a decreased vertical relation of occlusion with subsequent collection of moisture at the corners of the mouth or to intraoral candidiasis that had spread from the denture-bearing mucosa. Patients with symptoms but no intraoral changes frequently had a psychologic component to their complaint and did not improve after alteration of their dentures.

31. **Kotkin[73] (1985)** conducted a study to test and analyze information derived from self-report inventory of denture complaints. The test group consisted of eight men and thirty-two women with a mean age of 53 years. In addition to personal particulars like age and sex, self-report inventory was divided into categories of general denture complaint, main complaint, history of denture made within previous years, patient's assessment of denture currently in use and additional information. Of the general complaints, it was found out that three year replacement rate was much lower for maxillary denture however; twenty-one patients reported its appearance to be unsatisfactory. Most frequent general complaint with mandibular denture was looseness. Seventy-five percent of main complaints were related to mandibular dentures with pain being most frequent. Factors affecting assessment were maxillary

denture retention, masticatory ability with pain, ascribed to both the dentures, being a highly significant factor. It was surmised that patient's problem, to a large extent, can be gleaned from an evaluation of complaints in a completed inventory. Denture expectations may not be satisfied because of dentist's limitation or patient's unrealistic demand.

32. **Smith[5] et al (1988)** conducted a survey of referred patients expressing problems with complete dentures. The survey utilized the prosthodontics consultation service present in the UK which gives advice to patients or treats them. A total of 461 new patients were seen out of which only those 45 were selected for analysis who matched the criteria developed for the study. Of these patients 28 were women and 17 were men. The method involved asking some patients to fill questionnaires at different stages of treatment and technical assessment of denture with special attention to retention, stability, occlusion and articulation, vertical dimension and border extension of denture bases. The first questionnaire recorded Patient's Assessment of Denture (PAD/A) at first visit. The second was a Ten Question Index (TQIA) derived from Cornell Medical Index. The TQI was asked to be filled a second time after impressions were made and finally the PAD was asked to be filled 4-6 weeks post insertion (PAD/B) with the addition of a single question (Are the dentures an improvement on your previous dentures?). The referral pattern was quantified based on the experience of the dentist who made the prosthesis. The most frequent complaint was pain and looseness and technical faults seen in dentures (incorrect extension of denture bases; poor retention, stability and occlusion of mandibular dentures). Three particular questions in PAD/B were considered true indicators for success and based on responses to these questions 24 patients were classified as successful, five as failed. Of the remaining 11, six were categorized as "improved" and five as failed. It was

concluded that fundamental faults were responsible for referral in all patients. All dentures were under-extended and half had faulty occlusion and there were few attempts to rectify the problem. The origin of technical work did not appear to be related to faults. No conclusion was reached on emotional state of patients in the study consequently the effect of emotional stability on failure to wear dentures was not confirmed in the study. The authors cautioned against substandard prosthodontics work inundating the referral facility with clinical failures of referring practitioners.

33. **Van Waas[20] (1990)** conducted a study to gain more information about the factors relevant to the success of complete dentures. The most obvious factors that may possibly influence satisfaction or dissatisfaction with dentures, such as the technical quality of the dentures and the physical condition of the mouth, were investigated. A group of 130 patients who received new complete dentures was evaluated. The quality of the dentures was assessed with a clinical evaluation. The physical condition of the mouth was studied with the use of a clinical evaluation, radiographs, and stone casts. Three months after insertion of the dentures, the patient's opinions about the new dentures were evaluated by means of a questionnaire. The evaluation of the technical quality of the dentures was divided into four parts: 1. Occlusion-assessment of the occlusal vertical dimension, centric occlusion, and articulation. 2. Arrangement of the teeth-assessment of the position of the teeth and their acrylic resin bases and the position of the teeth in the occlusal plane. 3. Adaptation to the basal seat-assessment of the border extension of both dentures and the adaptation of the denture bases against the bearing areas. 4. Total assessment. The clinical evaluation of the condition of the mouth was divided into five parts: 1. Basal seat-assessment of the ridge form of both jaws and the quality of the mucosa. 2. Inter-ridge form-assessment of the inter arch space and the interridge relation. 3. Borders of the basal seat-assessment of the

vestibular borders of the dentures, the soft palate, the floor of the mouth, and the tongue. 4. Abnormalities-disturbing characteristics recorded. 5. Total assessment. It was concluded that problems with dentures are not always solved by making new dentures. The condition of the mouth appeared to have no influence on satisfaction. This was in agreement with earlier studies indicating that the general increase in satisfaction with dentures the longer they are worn even especially when destructive changes are known to take place in the supporting structures. It implies the tolerance for dentures appears to increase despite continuing retrogressive oral changes.

34. **Jegannathan[18] et al (1993**) in a review article mentioned various faults in complete dentures. Majority of patients with complete dentures are apparently well satisfied, however, little correlation was found between patient's appraisal and dentist's appraisal of the denture. Some patients seek adjustment in their denture and this can develop into a cycle with some individuals. Patient's psychological well-being has also been attributed as the cause of denture problem in addition to technical problems. Common denture faults have been classified into various interrelated fields including faults in retention, stability and inadequate of complete denture patients. While some studies quote pain as the most common complaint, other quote looseness as the main complaint and still other fault the mandibular complete denture. While describing faults in retention, incorrect extension was found out to be a universal problem with all dentures being under extended. Certain sites showed more instances of under extension than others. Also disagreement was noted between prosthodontist and patient in respect to adequacy of retention and function. Faults in stability were related to occlusal imbalance or muscular imbalance. In respect of occlusal imbalance the pressure of disparate terms to describe maxilla-mandibular relations and various occlusal concepts is a problem. Incorrect VDO and inadequate inter-occlusal clearance

was the most common error found when the complete denture patients were examined for peer reviews. Among other denture faults 31% of patients in a study were found to have incorrect horizontal component, while unbalanced occlusion was seen in 62% of examined patients. 44% patients were satisfied with their occlusion when the prosthodontist found an unstable occlusion. In respect to placement, teeth were found to be too far palatally placed while incorrect placement of anteriors varied from 8%-19%. Lingual placement of mandibular molars was the commonest fault in mandibular denture teeth placement. Other than these factors inadequate aftercare also complicated the problem, with patients not being informed properly about regular post insertion visits

35. **Rendell[74] et al (1995)** conducted a study on retention and stability of the maxillary denture during function. The objective was to (1) develop methods for measuring movements of the maxillary denture in vivo; (2) apply those methods to the study of denture movements during functional movements; and (3) determine differences in the extent of denture movement as a function of the fit of the denture. A total of 24 patients (15 men, 9 women) with complete maxillary dentures served as subjects. Their ages ranged from 45 to 81 years, with a mean age of 71 years. Denture fit was determined by use of the Kapur scale of retention/stability criteria as applied to the maxillary denture. Denture movements were measured with a commercially available tracking device. Each of the three movement signals from the kinesiograph appeared as time-varying direct current voltages that were recorded. The results of the multivariate analysis of variance for fit revealed that differences in overall movement were not statistically significant between the two groups (of poorly fitting and well-fitting dentures) neither were differences in vertical and anterior/posterior movement. However, differences in lateral movement were statistically significant ($p < 0.02$). The

absence of statistically significant differences is the result of the large variability in denture movement among individuals. The results of this study demonstrated that (1) the maxillary denture was subject to movement in both the vertical and medio-lateral planes in all subjects for all activities; (2) the greatest degree of movement for all activities occurred in the vertical plane; (3) denture movement for both chewing activities was significantly greater than for swallowing activity or speech production; (4) extensive variability appeared in the degree of denture movement from individual to individual; and (5) statistically significant between-group differences appeared only for lateral movements during chewing.

Measurable denture movement was observed for all subjects during all functional activities suggesting that the maxillary denture is subjected to some movement during function, regardless of whether it is a clinically well-fitting prosthesis.

36. Lechner[25] et al (1995) conducted a survey to investigate complaints described by patients dissatisfied by new dentures, the faults considered to cause these problems, the measures taken to deal with them and the success rate achieved. The survey was conducted on patients referred from within the public health system for treatment at the United Dental Hospital, Sydney. The patients included in the survey had at least one edentulous jaw and those who were considered to be difficult or to have difficult prosthodontic problems. 114 patients were included in the survey, many of whom had complete dentures and partial dentures. Patient's complaints were recorded under five different headings viz. (1) pain maxilla, (2) pain mandible, (3) retention maxillary denture, (4) retention mandibular denture and (5) esthetics. Denture type were classified as maxillary opposed by partial denture or dentition (F/-); mandibular opposed by a partial denture or dentition (-/F); maxillary opposed by a complete denture (F/f); mandibular opposed by a complete denture (fF). To be classed as

successful, patients had to profess themselves as trouble free, or be able to cope within limitations of their particular circumstances at a follow up appointment. It was found out that the commonest problem were those of pain and lack of retention due mainiy to occlusal discrepancies and excessive vertical dimension at occlusion (VDO). Surprisingly, esthetics was not a major factor in patient's complaint which may be due to socio-economic background of the patients.

37. Carlsson[75] (1997) in an article reviewed selected literature on the sequelae of treatment with complete dentures specifically residual ridge resorption, mucosal reactions, burning mouth syndrome, temporomandibular disorders, and patient satisfaction. The effects of, wearing a denture were divided into direct and indirect sequalae. First group includes residual ridge resorption and mucosal reactions, such as denture stomatitis. Indirect sequelae are related to the great changes in masticatory function in complete denture wearers compared with dentate subjects. However, there is considerable inter-individual variation in the rate of bone loss after tooth extraction and the wearing of complete dentures and may proceed throughout the lifetime of the denture wearer. Factors most often used in correlation analyses are gender, age, facial structure, duration of edentulousness etc. but related multivariate analyses are still rare. The prevalence reported for denture stomatitis vary greatly, with up to two thirds of the maxillary and one fifth of the mandibular mucosa diagnosed as inflamed in complete denture wearers. The predisposing factor being presence of a denture, and denture-wearing habits. Dentures of patients with BMS revealed reduced tongue space, incorrect placement of the occlusal table, and increased VDO in comparison with control subjects. In case of temporomandibular disorders (IMD) severe signs and symptoms are rare, even in subjects with old dentures of poor quality thus explaining relatively few complete denture wearers in samples of patients with MD. Older

patients have been found to be more satisfied with poorly fitting dentures and less prepared to seek denture improvement. However, it's widely acknowledged that patient satisfaction is not based solely on the technical quality of the dentures. Psychological and emotional factors may be of great importance in maladaptive patients, even though they seek technical advice.

38. **Brunello[7] et al (1998)** conducted a study to examine complete denture patients experiencing difficulty with their prosthesis and to determine relationship between most frequent complaint of patient and the following factors: age and gender of patients, chronic and debilitating medical condition and most frequently identified denture fault. Charts of patients were evaluated for such information as age, gender, medical history etc. During examination five divisions were made and complaints segregated into them. They were pain, looseness, eating, food and speech. Patient dentures were evaluated and most frequently observed inadequacies were grouped. The information collected was subjected statistical evaluation which gave the following results: All patients had complaints and many had multiple complaints. The most common complaints were pain and generalized discomfort, difficulty in eating, looseness in denture, however no complaints were reported regarding appearance of dentures. Also, patients experiencing difficulty with their dentures complained most frequently of pain and discomfort; difficulty with eating and looseness of denture. There was no significant relationship between patient's age, gender or general medical condition. However, a significant relationship was observed between patient's unhealthy denture bearing mucosa and complaints relating to pain. Finally, it was reported that difficulties in complete denture experienced by patients are due to an identifiable cause and the clinician should evaluate the denture for faults in denture

base extension, horizontal and vertical jaw relations before concluding that patient's complaint is related to age, gender or general medical condition.

39. **McCord[4] et al (2000)** discussed various types of post insertion problems and their common causes. The problems may be transient or serious enough inhibit use of denture. Factors causing problems were grouped into four categories viz. adverse intraoral anatomic factors, clinical factors, technical factors and patient adaptation factors with the last one being most critical.

Problem solving should be done in a logical way after taking history and careful oral examination. Problems reported by patients shortly after denture insertion includes discomfort, looseness or general problems in relation to adaptation. Some of these problems/difficulties may have a very large number of possible causes and, indeed, can be multifactorial in origin.

Discomfort associated with dentures can be prolonged where potential problems were not identified at examination or at the time of insertion. In addition, discomfort may arise sometime after apparently successful prosthodontic provision as a result of intra-oral or systemic changes or of denture wear or damage. Discomfort is most frequently but not exclusively— associated with the lower denture supporting area. Looseness of dentures is more commonly associated with the lower denture, and may be referred to by patients as their denture rocking', 'falling' (maxillary) or 'rising' (mandibular), 'shifting' or sometimes that they 'feel too big'. Retention and stability of complete dentures may be likened to a simple balance of retaining forces on one side and displacing forces on other. If the latter exceed the former, instability/looseness will arise. In assessing problems relating to adaptation the variety of symptoms may be functionally-related, psychologically-related or may relate to patience. There is a clear

need to diagnose the former at the planning stage of treatment and to avoid the latter by virtue of trial denture visits which focus on the functional and aesthetic components of the compete dentures.

40. **Corrigan[76] et al (2002)** have devised a method for functional assessment of complete dentures. The criteria for the assessment were finalized during a pilot study. Functional items assessed were freeway space, occlusal balance, retention and stability. Further, retention and stability were divided into retention of upper denture, stability of upper denture and stability of lower denture. Assessment of denture articulation was discarded and the numbers of choices in the assessment outcomes were restricted to improve agreement between operators. Binary coding (0,1) was used for eight factors and for the ninth (freeway space) the three criteria were simplified to two. It was done to enable computer assisted statistical analysis. After application of statistical tools it was found out that the inter-operator agreement was "Good" to Very good" and the poorest item showed only 7.5% disagreement. No inference was made about the quality of dentures in use by the wider population. It was concluded that functional assessment of denture was practical and simple to use and the criteria have potential to be used as a routine diagnostic Tool and to investigate relationship between functional outcome and denture qualities.

41. **Wright[77]** (2004) in a review article mentioned factors necessary to develop stability in mandibular dentures. The qualities necessary to create and maintain stability are dependent upon the following factors. (1) retention, (2) diagnosis, (3) the functions of the mouth, (4) the denture base outline, (5) the occlusal plane, (6) the arch arrangement, and (7) instruction and education of the patient. Retention in itself depends upon interfacial surface tension and the intermittent use of a partial vacuum. Retention of mandibular dentures depends upon a seal in the same manner as a

maxillary denture, but the seal area is not as readily located, and it has considerable movement during ordinary functions of the mouth. Tongue position is also important as those who have a retracted tongue position lack the ability to develop or to maintain retention without some degree of training. A properly formed denture base outline develops a seal that can be maintained during most of the normal oral functions. The buccal flange from the buccal frenum to the retromolar pad is extended to cover the external oblique line. The landmark is well defined, and trimming with a knife is probably the most practical method. Overextension in this region invariably results in soreness. The posterior border is extended for complete coverage of the retromolar pad. The only part of the border outline that is entirely arbitrary is the distolingual extension of the lingual flange which is limited by the lateral throat form. A high occlusal plane forces the tongue into a new position that is higher than its normal position which causes the tongue to lose much of its accuracy. Furthermore, the higher position of the tongue causes the floor of the mouth to raise and create undue pressure on the border of the lingual flange leading to disruption of the normal position of the floor of the mouth and partial loss of the border seal.

Patients who have a retracted tongue position present the dentist with the added responsibility of guiding the patient through a retraining period. This can be accomplished by showing the patient the normal tongue position and demonstrating its significance. Those failing to respond to this simple treatment can be given a series of tongue exercises.

42. **Petersen[41] et al (2005)** in an article described the importance of improving the oral health of older people. The proportion of older people continues to grow worldwide, especially in developing countries and in coming decade's health and social policy-

makers will face tremendous challenges posed by the rapidly changing burden of chronic diseases in old age.

Chronic disease and most oral diseases share common risk factors. Globally, poor oral health amongst older people has been particularly evident in high levels of tooth loss, dental caries experience, and the prevalence rates of periodontal disease, xerostomia and oral precancer/cancer. The needs for care are highest among disadvantaged, vulnerable groups in both developed and developing countries. In developing countries the challenges to provision of primary oral health care are particularly high because of a shortage of dental manpower. Education and continuous training must ensure that oral health care providers have skills in and a profound understanding of the biomedical and psychosocial aspects of care for older people. Research for better oral health should not just focus on the biomedical and clinical aspects of oral health care; public health research needs to be strengthened particularly in developing countries. Operational research and efforts to translate science into practice are to be encouraged.

43. **Laurina[27]et al (2006)** conducted a retrospective study with information derived from literature found with Medline from 1984 till 2004 about the patients who experienced ongoing difficultieswith new complete dentures, to determine the possible underlying cause. Two thirds of the 118 respondents surveyed in the study reported that they were "very satisfied" with their maxillary denture as compared with 51% for mandibular dentures. Of the individuals who wore their dentures "all day", 5% were "very dissatisfied" with at least one of their dentures. Several authors cite the most frequent complaints with complete dentures are those pertaining to esthetics, retention and stability, comfort while eating, and the accumulation of food under the appliance. The factor that most often appears to have an impaction either success or failure of

complete dentures is esthetics. Attention has also been focused on patient's expectations of their dentures and patients often believing that the dentures will be comparable to their natural teeth. It has been stated that these high expectations of dentures are more prevalent in older age group.

Practitioners have statistically significantly fewer adjustment appointments and a greater number of pleased patients when all esthetic decisions are made by the patient implying that when the esthetic result is successful, the dentures are more successful over all. The tongue of the patient who is wearing complete dentures has a dual function-to take part in speech articulation and to control the dentures. If the dentures are loose, the demands of this latter function may be so great that there is a general deterioration in the quality of speech. When the patient complains of looseness it must be checked for peripheral extensions, posterior palatal seal, adaptation of the bases, occlusion, shape of the polished surface and tooth position. In the absence of pain and associated overextension of the periphery, looseness of dentures is probably a result of failure to obtain peripheral seal. A further etiological factor may be poor adaptation of the denture to the underlying tissues. The other feature to check is the width of the polished surface around the maxillary tuberosities. When the mouth is opened wide, the coronoid process of the mandible can encroach upon the neutral zone in this region thus displacing the denture. A further difficulty may be that there are insufficient occlusal contacts to maintain a stable maxillary denture. It was concluded that there are still no reliable methods to predict the outcome of complete denture treatment and there are many problems related to treatment with complete dentures and the most frequent complaint was of looseness of their dentures, esthetics, difficulty while eating, and accumulation of food under the appliance.

44. **Bohnenkamp[9] et al (2007)** in a case report discussed the clinical use of phonetics and tongue position during fabrication and at insetion to improve the retention and stability of a newly fabricated mandibular complete denture. Several authors have suggested that where marked mandibular residual ridge resorption occurs it may be desirable to use the tongue and the buccinator muscle to fix the mandibular denture in place by appropriate design of the width and form of the denture flanges. Also, in a study conducted by van Waas, no correlation was found between patient satisfaction with complete dentures and any of the variables concerning the physical condition of the patient's mouth, including the quality of the mandibular residual ridge. If a patient can be taught to position the tongue in a purposeful manner to improve retention and stability of a mandibular denture it can greatly aid in retention of the mandibular denture. In this regard the dentist must help guide the mental attitude of the skeptical patient to foster acceptance and success of complete dentures. A "feeling of looseness" may be a condition experienced while patients learn to wear a new mandibular complete denture. Some patients may not understand the reasons given by dentists for the lack of retention of a new mandibular denture.

This type of patient requires more explanation, more advice, and more instruction. A phonetic training technique to properly position the tongue and buccinator muscles may be needed for some denture patients to learn their role in denture retention.

45. **Aghdaee[28] et al (2007)** conducted a study of complete denture patients experiencing difficulties with their prostheses and determine: (a) the most frequent complaints; (b) the age and gender distribution of these patients; (c) the number of patients afflicted with chronic and debilitating medical conditions; and (d) the most frequent denture faults and how these may relate to patient's complaints. The study included only those who have been wearing dentures for at least one year. A total of

80 compete denture wearers, 48 femaie and 32 male, with the age range of 43-74 years were examined. Medical history was recorded since many elderly patients are undergoing medication and the drugs used may greatly affect the oral environment. Medication required for systemic or local disease can adversely affect oral tissues and the quantity and quality of the produced saliva. Patient complaints were divided into five groups viz. pain, eating, looseness, food and speech. The condition of the patient's denture bearing tissues was assessed at the initial appointment. The examination screened for ulceration, presence of infection, or any other abnormalities such as hyperplasia. Various cumulative headings were given sum up all the causes arrived at viz retention, jaw relation and tooth position. The statistical tests used were the Chi-square and Fisher's exact test. It was found that the most common complaints of wearers of complete dentures were pain and generalized discomfort (59%), difficulty in eating (77.5%), and looseness (78.5%). There was no significant statistical relationship found between complaints and patient's age and sex nor with patients previous medical condition but significant relationships were observed between the presence of denture construction errors relating to retention and patient complaints of loose dentures, as well as construction errors relating to jaw relationships and complaints of difficulty in eating. According to this study, complete denture wearer who experienced difficulties with their dentures most frequently complained of pain and discomfort, difficulty with eating, and looseness of their dentures. There were no significant relationships between patients' age, gender, or general medical condition and the type or number of complaints.

46. Loney[82] et al (2009) described a method to diagnose denture problems using pressure indicating media. The aim of the article was to provide guidelines for optimal use of the media, and to identify alternative applications for consideration in daily

practice. Prior to applying pressure indicating media remove any obvious sharp projection, dry the denture before application of media. However the oral mucosa should be left moist. Use the correct amount of material. Use a stiff brush to place pronounced streaks in the material. For polymerizing materials, use as thin a layer as possible to completely obscure the underlying denture. Do not place streaks in elastomeric materials. Place both types of media on the intaglio side of the prosthesis and over the flanges to evaluate for proper extension or renal impingements. Insert the denture using mouth mirrors to retract the commissures, so that the material is not wiped away from the denture during insertion. Apply firm pressure in the area of the first molars or instruct the patient to close with firm pressure on cotton rolls over the posterior teeth. Do not allow occlusal contacts, which can cause tipping of the denture and a change in the distribution of pressure. Exert pressure perpendicular to the occlusal plane unless evaluating the pressure pattern when the dentures moving. To interpret, examine the denture for three distinct patterns in the media: areas where streaks remain, representing areas where there has been no contact with tissues; areas with paste but no streaks, where there has been acceptable contact; and areas without paste, which normally suggest excessive pressure or impingement. After identifying areas requiring modification, adjust the denture with an acrylic bur of appropriate size and shape. Adjustment is complete when the area being evaluated has a relatively even pattern of contact compare with. It is often not possible to achieve perect adaptation of the base. If interpretation of the indicating media is difficult, avoid adjustment until signs or symptoms appear, so as not to over adjust the denture.

47. **Ahmad[30] (2010)** conducted a study to diagnose and compare the problems of complete dentures after insertion into the patient's mouth. The sample consisted of 40 subjects (20 males and 20 females). Subjects were selected randomly between the age

ranges 55-65 years. The post insertion problems were classified into discomfort, looseness and adaptation problems. The patients were then asked to fill a form which had questions divided according to the classification. 11 questions related to discomfort, four related to looseness and seven related to adaptation were asked. Only two responses were provided (yes/no). The results showed that more patients suffered from adaptation problems than looseness with discomfort being the least concern. This was attributed to the personality, attitude and emotional factors. Further the emotional reaction of an aged person is by subjective factors, while the ability to make objective decisions decreases with senescence. In this regard the author advocates that in addition to clinical skills good understanding and rapport between patient and dentist is also important.

48. Petersen[42] et al (2010) in an article presented a report on global oral health of older people. The aim of this report was to provide a global overview of oral health conditions in older people, use of oral health services, and self-care practices; to explore what types of oral health services are available to older people and to identify some major barriers to and opportunities for the establishment of oral health services and health promotion programs. A postal questionnaire designed by the World Health Organization (WHO) was distributed worldwide to the Chief Dental Officers or country oral health focal points at ministries of health. In total, the data base covers 136 out 193 countries, i.e. 71% of all WHO Member States. Results showed that dental caries and periodontal disease comprise a considerable public health problem in the majority of countries. Significant disparities within and between regions are observed in epidemiologic indicators of oral disease. The prevalence rates of tooth loss and experience of oral problems vary substantially by WHO region and national income. Experience of oral problems among older people is high in low income countries;

meanwhile, access to health care is poor, in particular in rural areas. According to the country reports, health promotion programs targeting older people are rare and this reflects the lack of oral health policies. Although some countries have introduced oral health promotion initiatives It was concluded that countries establish oral health programs to meet the needs of the elderly. The integration of oral health into national general health programs may be effective to improve the oral health status and quality of life of this population group.

49. **Parameshwaran[29] et al (2011)** in an articl mentioned various causes of problems related to complete dentures and their management. The most frequently observed fault in denture fabrication relate to retention and jaw relations which may in tum be correlated to patient complaint of looseness and difficulty in eating respectively. Common complaints dealt with are esthetics, phonetics, pain, sore spot, looseness, food accumulation etc. It was surmised that in case of esthetics patient expectation should be managed and attention paid to teeth selection and contouring of denture base. In phonetics role of tongue was emphasized. If denture is loose the tongue has to play a great role to retain it thus compromising phonetics. Various causes were attributed to pain including pearls or sharp ridges, unrelieved denture in undercut area, unrelieved frenum and incorrect vertical dimension. Looseness was attributed to imbalance between displacing and retaining forces. Also gradual loss of retention meant cause related to saliva while sudden loss of retention is mainly related to mechanical causes. Problem of bulk, excessive salivation and mucosal reaction have been attributed to placement of new denture in mouth and are temporary in nature. In conclusion inevitable ridge resorption over time may further decrease oral function if dentures do not remain retentive and stable. The most frequently observe defaults in denture construction are related to retention and vertical and horizontal jaw

relationships. There is a significant relationship between inadequate retention and improper intermaxillary relationships and patient complaints of looseness and difficult eating. The clinician should carefully evaluate for identifiable causes before concluding that the complaint is related to age, gender, or general medical condition.

50. Chen [79]et al (2012) conducted a study to assess the relationship between the essential functional qualities of complete dentures and participants' oral health-related well-being among an elderly edentulous population. A total of 411 participants from Taiwan, aged more than 65 years, with diverse levels of formal education, received intraoral examinations in accordance with the 10 criteria embedded in the Functional Assessment of Dentures (FAD) and personal interviews in accordance with the Oral Health Impact Profile (OHIP)-14. The study was conducted from May 2007 to August 2008.Each participant received an intraoral examination in accordance with the 10 criteria embedded in the FAD and a personal face-to-face interview to obtain basic demographic information and collect responses to the OHIP-14 questions. Results of this study show that significant relationships existed between the mean OHIP-14 score and all individual mean OHIP-14 domain scores, except psychological limitations, with many of the FAD criteria. However, there were many deviations from the study conducted by Anastassiadou for FAD validation. It was found that articulation was the biggest problem. Secondly, retention of maxillary denture affected retention of mandibular denture. This is because when the maxillary denture retention is adequate there is minimal need for additional tongue support for it, thus the priority for tongue function is shifted to augmenting mandibular denture stability. In conclusion, a stable and retentive maxillary denture with adequate articulation provides an optimal environment for oral function with the highest level of patient oral health-related well-being in this elderly population.

51. **Ogunrinde [17]et al (2012)** conducted a study on the influence of demographic factors and medical conditions on patient's complaints with complete dentures. The case records of complete denture patients who attended the prosthetic dental clinic of the University College Hospital, Ibadan between January 2004 and December 2010 were reviewed. Information was collected on the demographic data, medical and dental history, previous denture experience, period of edentulousness, oral findings at commencement of the denture fabrication, the edentulous nage form, the type of complaints and adjustment made to the denture at review appointments and the orai findings at review appointments. The results showed that majority (68.29%) of the patients were above 65 years and 16 out of 23 (69.57%) patients that complained of pain were above 65 years. Twenty nine of the forty-six (63%) male complete denture wearer patients had complaints, while twenty-two of the thirty-six (61%) female patients had complaints. Male patients presented more with multiple complains than females, while females presented more with pain related complaint than males. Majority (78.1%) had no systemic disease condition. The main cause of complaints was over extension of the flange, this was followed by lack of peripheral seal/under-extension while ridge irregularity was the least cause of complaints. There was no significant relationship between gender and the number of complaints. The most common complaints of the complete denture patients was pain (28%) followed by loose denture (14.6%). It was concluded that the most common cause of complaints was over extension of denture flanges. There was no correlation between age, gender and systemic conditions with complete denture complaints. However there were statistically significant relationships between types of dentures, construction faults and denture complaints.

52. **Yamaga[80] et al (2013)** conducted a study to investigate the relationship between mandibular ridge form, stability and retention of mandibular complete denture, accuracy of jaw relation recording, patients' perception of chewing ability, satisfaction with dentures and oral health-related quality of life (OHRQoL) in complete denture wearers. The study population consisted of systemically healthy patients who attended the Dental Hospital of Tokyo Medical and Dental University, from December 2008 to July 2011, requesting new complete dentures. After excluding subjects with missing scores data of 166 patients (77 men and 89women) with a mean age of 75.1 (range, 44-91; SD: 9.2) years were analysed in this study. Oral health-related quality of life was measured using the Japanese version of the Oral Health Impact Profile for edentulous subjects (OHIP-EDENT-I). The hypothesized model was a structural equation model which aimed to test the relationship between mandibular ridge form, stability and retention score of the mandibular complete denture, jaw relation index, mastication score, patient's satisfaction with complete dentures and OHIP-EDENT-I summary score. It was found out that mandibular denture stability, jaw relation index and mandibular ridge form score had a significant effect on mastication score, OHIP-EDENT-I summary score, and exhibited a high OHRQoL; while retention did not have any statistically significant effect on mastication score, satisfaction and OHIP. Thus, stability rather than retention is more important for successful complete denture therapy.

53. **Amjad[48] et al (2013)** in a study discussed frequency of complaints in complete denture patients. The aim of the study was to examine 100 complete denture patients experiencing difficulties with their prosthesis and determine the most frequent complaints so that it will be rectified at fabrication stage of complete denture. A

retrospective study was conducted including 66 men and 34 women in the sample with ages ranging from 50 to 60 years and a mean of 55.7 years.

Five divisions were used to group the various complaints the patients presented with. Namely pain, eating, looseness, food and speech. Patients with multiple complaints were listed under more than one grouping. Recording summarized the information collected from patient files with a "tick the box" method onto a standardized data sheet. Data was analyzed using SPSS Version 16. Descriptive statistics were used to describe the data and Chi-square test used to investigate differences between groups. The level of statistical significance chosen was $p = 0.05$. It was observed that 71% of patients complained of problems relating to pain and discomfort; 42% stated that they had difficulty eating their food; 59% stated that their dentures were loose; and only 19% complained of food accumulating around or under their appliances. A total of 17% of the patients in the sample said they had difficulties with their speech while wearing their dentures. Interestingly, there were no complaints from the patients in this sample regarding the appearance of the dentures, which is in strong contrast to most other reports.

54. **Memon[81] et al (2013)** conducted a study to evaluate the clinical quality of old removable complete dentures and to find out patient satisfation. It was carried out from July 2011 to June 2012. It was case series descriptive study using convenience sampling method. Data relating to patients wearing complete dentures were collected using structured eight categories, four point scale pro forma. Detailed patient history, clinical and prosthesis examination were undertaken. Data related to age, gender, fitting place and complete denture post-fitting duration were also recorded. Male to female patient's ratio was 2.2:1. Forty one (57%) complete dentures wearers had got their dentures made from public hospitals. Majority (42%) of evaluated complete

dentures were not older than five years. Patients reported good retention in 27 (37.5%) of maxillary and fair retention in 34 (47.2%) of mandibular complete dentures. Good mastication was reported by 40 patients (55.5%) and good esthetics by 34 (47.2%). Sixty three (87.5%) patients complained about pain in their maxillary dentures and 54(75%) in mandibular dentures. Good stability was reported by 31 (43%) of mandibular dentures and 37 (51.3%) of maxillary dentures. Good occlusion was seen in 37 (51.3%), oral hygiene in 45 (62.5%) and prostheses hygiene in 39 (54.1%). It was concluded that retention and stability was good in maxillary dentures while fair in mandibular dentures. Majority of the patients showed poor oral and prosthesis hygiene. Pain was the most common complaint of these complete denture wear.

55. **Salih[82] et al (2016)** conducted a study to examine and assess complete dentures in patients experiencing difficulties with their new prostheses, and to determine the most frequent complaints and their possible relation to age and gender. A total number of 200 complete denture wearer patients, 126 females and 74 males, participated in this study. A questionnaire was used to record the information which was taken directly from the patient when they attend the dental hospital for dental visit, the patient consent were taken verbally. The information include; the gender, the age and the type of the complaint. All the patient's complaint and dentures were examined and assessed clinically by one prosthodontics specialist to approve these complaints. The age was divided into two groups, up to 60 years, and above 60 years. The patient complaints were divided into; pain, speech, eating, loose, and food accumulation. The data were correlated and statistical analysis was done. The study result revealed that female number 126 (63%) was more than male 74 (37%). Significant difference were found between gender and age groups ($p < 0.05$). Pain 54 (27%) was the most common complaint of most of the patients in both genders, 23 (6.5%) for male and 31 (15.5%)

for females. Loose denture complaint had the lowest number among male 10 (5%), while complaint relating to mastication and eating had the lowest number among females 18 (9%). No significant difference were found between gender and type of complaints ($p > 0.05$). It was concluded that pain during insertion, removing, and wearing a complete denture had the highest prevalence, alongside speech problem in one age group only. Significant difference was found between gender and age group. No statistically significant differences were found between gender and type of complaints or between age groups and type of complaints.

MATERIALS AND METHODS

The following study was conducted in the department of Prosthodontics and Crown & Bridge at Babu Banarasi Das Dental College, Lucknow, Uttar Pradesh, India. The study was approved by the ethical committee of BBDCODS, BBD university. **The number allotted to the study is 40**

SURVEY OVERVIEW & ELIGIBILITY

The investigation was conducted from January 2022 to December 2023. This cross-sectional analytical investigation employed a straightforward, convenient, random sampling technique. In other words, the study covered all patients who came to the department within the specified time frame and met the inclusion and exclusion criteria.

Inclusion criteria:

1. Individuals with edentulous maxilla and mandible

2. Individuals who consistently wear their complete dentures.

3. Individuals who had a complete denture manufactured in the previous five years.

Exclusion criteria:

1. patients with impaired health.

2. Individuals with neurological and psychological conditions such as dementia, Parkinson's disease, motor neuron illnesses, etc.

3. Patients who had underwent jaw restructuring surgeries

MATERIALS

The survey was conducted using a questionnaire that was specially created for this investigation (figures 1). Four sections made up the questionnaire: general information, medical history, questions about complete dentures, and classification and assessment of issues faced.

Along with questions regarding name, age, sex, occupation, and primary complaint, general information also included details about food habits, religion, and occupation. Questions about previous and present medication usage, as well as a history of cardiovascular, neurological, and respiratory diseases, were included in the medical history. All of the questions about dentures were about how many had been worn in the past, how long they had been worn, where the dentures were made, and why the dentures were being worn—with options for chewing, esthetics, and phonetics.The three options were ranked in order of preference with I being the most important reason and 3 being the least important. Depending on what was appropriate, the observations were recorded. The most important portion of the questionnaire was the part that dealt with rating and categorizing problems. All complaints were categorized into four groups: miscellaneous, retention, discomfort, and aesthetics. These were then further separated into groups according to the anatomical location,type of complaint, clinical findings, etc., as appropriate. Following is the graph for it:

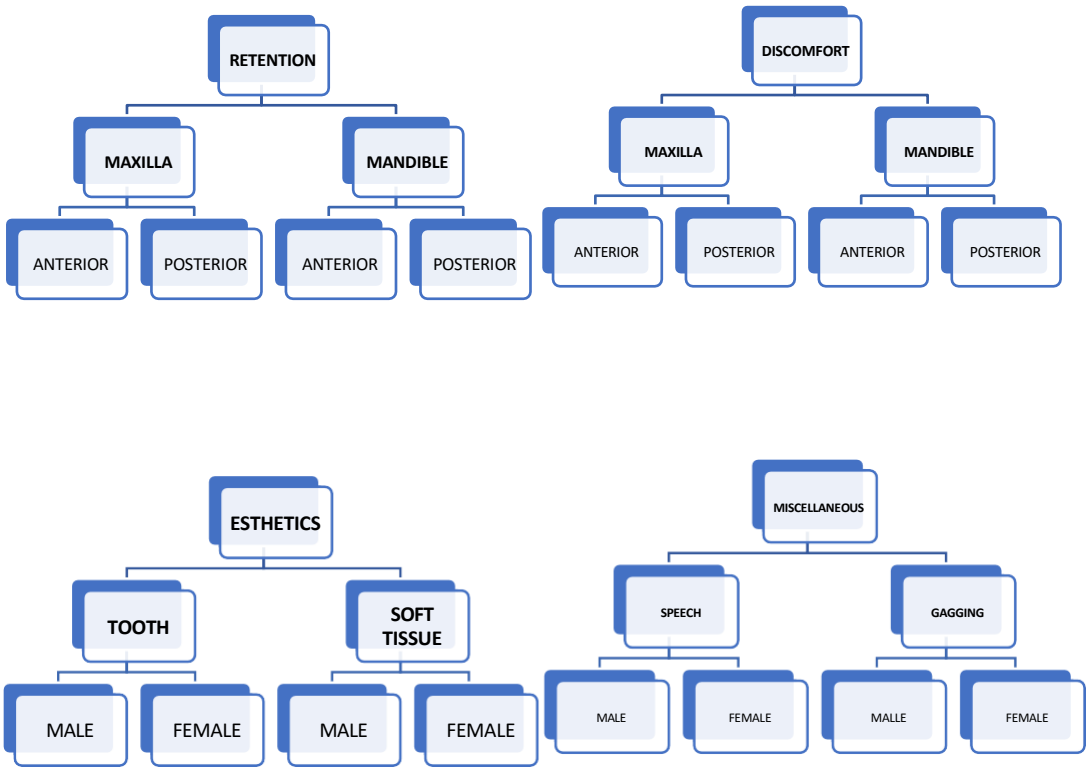
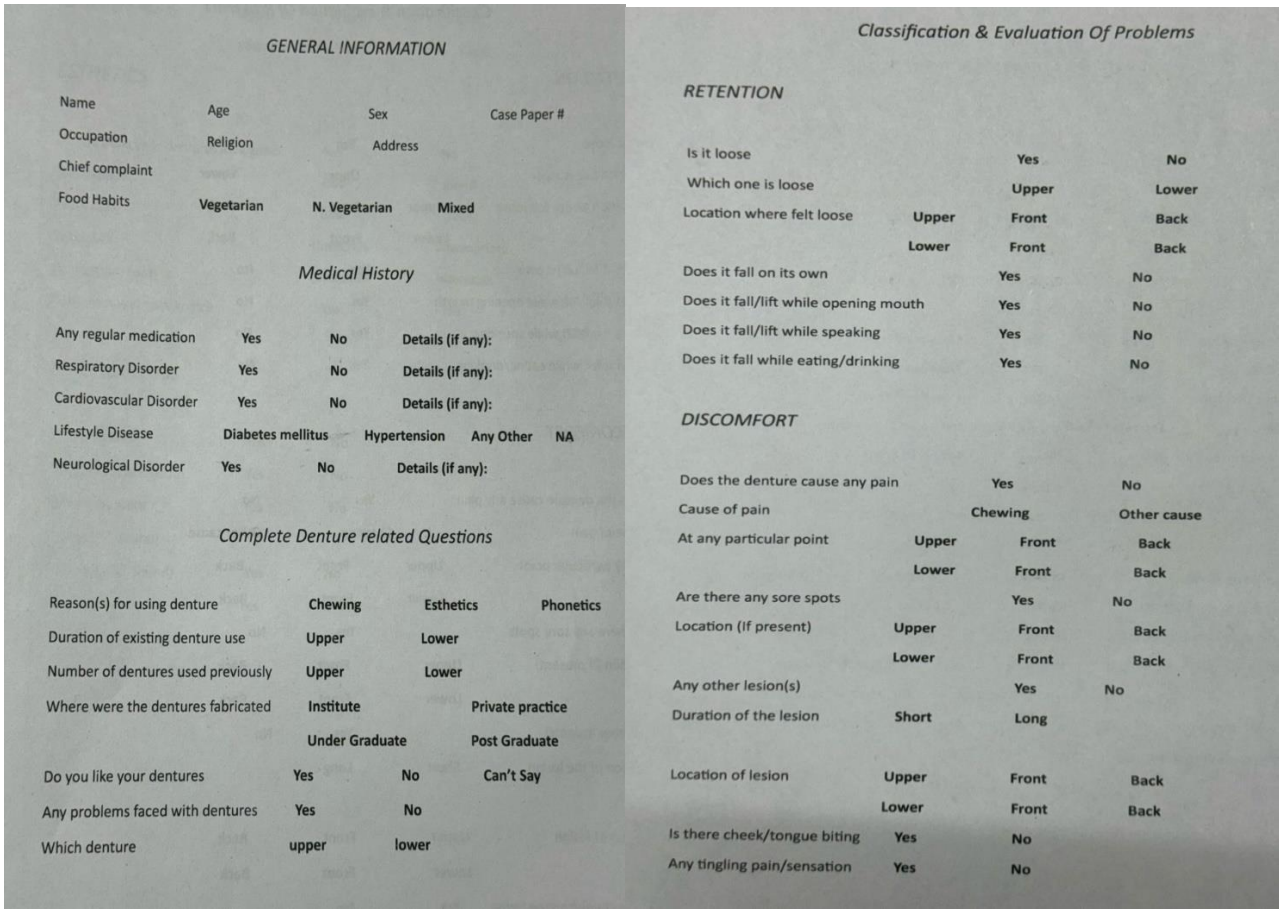


Figure 1: Graphical representation of categorization of complains

The patient was questioned about the site where loss of retention was felt. Concerns were further separated into anterior and posterior ("front and back") and maxillary and mandibular ("upper" and "lower") categories. It was asked what variables contributed to the reduction in retention. This includes the inability to hold food or liquids in the mouth when speaking or eating. Anatomical position was also used to further categorize discomfort complaints into maxillary and mandibular ("upper" and "lower") as well as anterior and posterior. ("front and back") Concerns regarding pain, painful patches, lesions, and tingling were among the questions posed. A complaint of biting of the tongue or face was also recorded. Questions about tooth shape, size, and colour were asked in the aesthetics section. We referred to these as tooth factors. Second, complaints were made over the appearance of sunken cheeks and incorrect lip support.



GENERAL INFORMATION

Name | Age | Sex | Case Paper #

Occupation | Religion | Address

Chief complaint

Food Habits: Vegetarian | N. Vegetarian | Mixed

Medical History

Any regular medication	Yes	No	Details (if any):
Respiratory Disorder	Yes	No	Details (if any):
Cardiovascular Disorder	Yes	No	Details (if any):
Lifestyle Disease	Diabetes mellitus	Hypertension	Any Other / NA
Neurological Disorder	Yes	No	Details (if any):

Complete Denture related Questions

Reason(s) for using denture	Chewing	Esthetics	Phonetics
Duration of existing denture use	Upper	Lower	
Number of dentures used previously	Upper	Lower	
Where were the dentures fabricated	Institute	Private practice	
	Under Graduate	Post Graduate	
Do you like your dentures	Yes	No	Can't Say
Any problems faced with dentures	Yes	No	
Which denture	upper	lower	

Classification & Evaluation Of Problems

RETENTION

Is it loose		Yes	No
Which one is loose		Upper	Lower
Location where felt loose	Upper	Front	Back
	Lower	Front	Back
Does it fall on its own		Yes	No
Does it fall/lift while opening mouth		Yes	No
Does it fall/lift while speaking		Yes	No
Does it fall while eating/drinking		Yes	No

DISCOMFORT

Does the denture cause any pain		Yes	No
Cause of pain		Chewing	Other cause
At any particular point	Upper	Front	Back
	Lower	Front	Back
Are there any sore spots		Yes	No
Location (If present)	Upper	Front	Back
	Lower	Front	Back
Any other lesion(s)		Yes	No
Duration of the lesion	Short	Long	
Location of lesion	Upper	Front	Back
	Lower	Front	Back
Is there cheek/tongue biting	Yes	No	
Any tingling pain/sensation	Yes	No	

Location (If present)	Upper	Front	Back
	Lower	Front	Back

ESTHETICS

Do you think your dentures look good	Yes	No
Teeth shape	Bad	Good
Teeth color	Bad	Good
Tooth Size	Unseemly	Appropriate
Lip support/fullness	Unseemly	Adequate
Sunken cheeks appearance	Yes	No

MISCELLANEOUS

Teeth clattering	Yes	No
Unable to close mouth	Yes	No
Food lodgement	Yes	No
Lisping ("s" sound)		
Whistling ("s" sound)	Yes	No
Gagging	Yes	No

Figure 2: Questionnaire

These made up the soft tissue components. Lastly, complaints were separated into speech and gagging categories under the miscellaneous complaints area. Questions about speech included clattering teeth, whistling on the "s" sound, and lisping**.**

METHODOLOGY

Patients were informed about the survey prior to any procedures being performed or survey forms being filled out, and their consent was obtained to participate as subjects. The informed consent form was then given to the patients to read and sign. The patients who signed the informed consent form and gave a favorable response to both stages were the only ones who were included in the survey. Operator asked questions in the patient's native tongue throughout the survey procedure. The survey form included markings for the responses. The patient's complete denture was therefore examined by the same operator for structural flaws and the intraoral and extraoral structures for functional deficiencies.

This was carried out in order to investigate the complaint's structural-functional analysis factors (SFA). Many times, there were several causes for the same complaint. For instance, a pain complaint could be brought on by a rough denture or a nodule on the tissue's surface. Sometimes a patient's physiological conditions were the cause of a complaint (such as gagging). Lastly, a small percentage of problems had no obvious structural or functional reason; in these cases, a probabl epsychological etiology was raised. As a result, all

potential causes were categorized into three groups, with codes allocated to each type. They were as follows:

Complaints related to retention (R)

R1 Error in denture base

R2 Error in occlusion

R3 Physiopsychological

Complaints related to esthetics (E)E1 error in denture base

E2 error in occlusion including selection and arrangement of teeth

E3 physiopsychological

Complaints related to discomfort (D)

D1 Error in denture base

D2 Error in occlusion

D3 Physiopsychological

Complaints related to miscellaneous

M1 error in denture base

M2 error in occlusion

M3 Physiopsychological

SFA factors for retention related problems

The structural-functional causes of complaints pertaining to retention were examined. An error in the denture base can be seen in the following ways: the denture is either overextended or underextended , the posterior palatal seal is not properly recorded, the posterior seal and border do not extend into the hamular notch, the labial frenum notch is excessive, the mandible's coronoid process is interfered with, the thick lingual flange causes the tongue to lift the dentures, etc. These fell into the R1 category of occlusion error.

The causes of the occlusion error, R2, comprised interceptive contacts in the occlusion, a broad posterior occlusal table that caused tongue trapping, an occlusal plane higher than the retromolar pad, and uneven contact relations between the teeth.

The following physiological factors were identified: inelasticity of the cheeks; hypersalivation; altered tissue since the impression; retracted tongue position; dry mouth (caused by alcoholism or disease); highly resorbed ridges; flabby ridges; non-resilient soft tissue; adverse anatomical structures (high or multiple frena; tongue anatomy; palatal structure design); etc. In certain instances, psychological elements were identified as the reason when no obvious structural or functional impairment was discovered.

SFA factors for discomfort related problems

Similar analysis was done on complaints relating to discomfort, with the causes being divided among the several categories (D1, D2, or D3). Denture base errors included nodules, rough tissue surfaces, overextended and sharp denture borders, unrelieved frenum, impingement on the mandible by the coronoid process , broken denture borders, inadequate relief over undercuts, pressure over the zygomatic process, impingement of nasopalatine nerves, and impingement of mental foramen, among other things. A

pressure-indicating paste was utilized to determine the reason and the approximate location of the problematic area. Apply the zinc oxide paste with a stiff-haired brush.

(applied to the tissue surface during the zinc oxide eugenol imprint). The application was carried out in a method that caused the denture to have "streaks". After that, denture was inserted in the patient's mouth, and fingers were used to provide pressure. After removing the denture, the streak pattern was looked at again. Three patterns were observed and utilized to get a decision: 1) The streaks remain intact, suggesting little to no touch. 2) A portion of the streaks are obscured, indicating that there is sufficient pressure or functional contact. 3) Total removal of streaks suggesting overpressurization.

Error in denture occlusion (D2) factors included sharp buccal cusp, insufficient horizontal overlap producing cheek biting, cuspal interference, and open bite generating pain in the temporomandibular joint (TMJ).

D3 variables were poor pain threshold, low tissue tolerance from malnutrition, clenching/bruxing, and maladaptation to dentures. Psychological cause was suspected when no obvious structural or functional problem was observed.

SFA factors for esthetics related complaints

Following a visual examination of the dentures, issues pertaining to aesthetics—such as tooth shape, size, and color, sunken cheek appearance, lip support, etc.—were examined. The thick maxillary anterior border, which causes bulking beneath the nose, missing or damaged teeth, and faded or stained denture base were among the factors connected to denture base errors.

Occlusion and tooth selection errors included maxillary anteriors positioned labially, occlusal plane establishing errors that resulted in increased tooth display, mouth creases

at the corners from a decreased vertical relationship, mismatches between the dental and facial midlines, inadequate lip support, etc.

Pathophysiological causes included short lip length/thickness (thus causing greater display of teeth) unrealistic expectations with apparently no fault in the denture.

Finally, a clinical examination of the denture and oral tissue was combined with various symptoms of gagging and speaking, and the results were recorded in the relevant category. The denture base errors that resulted in gagging were as follows: step-like deviation between the maxillary denture and tissue; thick denture border, particularly in the posterior lingual sulcus area; and rough denture surface . Similarly, thick palatal area of maxillary denture, under extended denture borders creating denture looseness, and frequent tongue adjustment impacting speech are all related to speech-related issues.

Occlusion errors included low maxillary occlusal planes, which might result in gagging, and lingually or palatally positioned teeth, which can restrict tongue space and cause gagging and speech difficulties. Greater vertical overlap, low horizontal dimension, and high vertical dimension (above physiological limit) A heightened gag reflex, natural speech issues (lisping), ankyloglossia resulting in an exaggerated speech complaint, and hypersalivation were among the physiological issues. Whistling on the "s" sound is caused by the tongue's deep median groove. Additionally, anxiety when wearing a denture can hinder communication. Only the entries that corresponded to the complaints were completed. The remaining fields were left empty. In a similar vein, if a patient made several complaints, numerous fields were filled.

STATISTICAL EVALUATION

The complaints part of the questionnaire (4th section) was divided into smaller sets for statistical evaluation (figure 2). Additionally, having an equal number of options made it simple to compare and draw insightful conclusions from the data. The program SPSS (Statistical Package for Social Sciences) Version 20.0 (IBM Inc.) was used to do the statistical analysis.

The following Statistical formulas were used:

Chi square test

Chi-square is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis. The test statistic is a chi-square random variable (X^2)

Kruskal-Wallis test

The Kruskal-Wallis test by ranks, Kruskal-Wallis H test or One-way ANOVA on ranks is a non-parametric method for testing whether samples originate from the same distribution. It is used for comparing two or more independent samples of equal or different sample sizes. It extends the Mann-Whitney U test when there are more than two groups. The parametric equivalent of the Kruskal-Wallis test is the one-way analysis of variance (ANOVA). A significant Kruskal-Wallis test indicates that at least one sample stochastically dominates one other sample.

Goodman Kruskal test of association

The Goodman and Kruskal tau has symbol t, the Greek letter tau. t is obtained by using the principle of proportional reduction in error. Like Lambda this is a directional measure of association, with different values depending on whether rows or columns of a cross-classification table are dependent. It has limits of zero (no association) and 1 (complete or perfect association). It can be obtained using the cross tabulation procedure of SPSS.

Level of significance:

The p-value is the probability of observing a sample statistic as extreme as the test statistic. Since the test statistic is a chi-square Chi-Square Distribution Calculator is used to assess the probability associated with the test statistic. With a confidence level of 95% and when p is set at 0.05

$p > 0.05$ Not significant

$P < 0.05$ Significant

$p < 0.01$ Highly significant

$p < 0.001$ Very highly significant

RESULT AND OBSERVATIONS

		Number of subjects	Percent of total (%)
Total number of subjects		100	100
Gender	Male	62	62
	Female	38	38
Primary reason for using dentures	Mastication	64	64
	Esthetics	27	27
	Phonetics	9	9
Number of previous denture	0	45	45
	1	49	49
	More than 1	6	6
Duration of current denture use	0-1 years	78	78
	1-3 years	19	19
	3-5 years	3	3
Complaint related to	Maxillary	24	24
	Mandibular	54	54
	Both	22	22
Satisfaction with current denture	Yes	61	61
	No	33	33
	Cant say	6	6
Retention related complaints	Maxillary anterior	28	28
	Maxillary posterior	25	25
	Mandibular anterior	37	37
	Mandibular posterior	10	10

TABLE-1: description of general demographic data

The table 1 results shows that among the 100 (100%) subjects there are 62 males and 38 females. The primary reason for using denture is mastication in 64 patients, aesthetics in 27 and phonetics in 9 patients. Among 100, no previous denture was used in 45, 1 previous denture was used by 49 and more than 1 denture was used by 6 patients. Out of 100, 78 patients have been using denture for less than 1 year, 19 patients have been using for 1-3 years and 3 patients have been using for 3-5 years. Mandible has maximum complaint i.e in 54 patients, maxillary complaint in 24 while complaint for both maxilla and mandible. Satisfaction with the current denture was

shown by 61, while 33 patients did not show any satisfaction. Retention related complaints was seen maximum in the mandibular posterior region i.e in 37, 28 in maxillary anterior, 25 in maxillary posterior and minimum 10 in mandibular posterior.

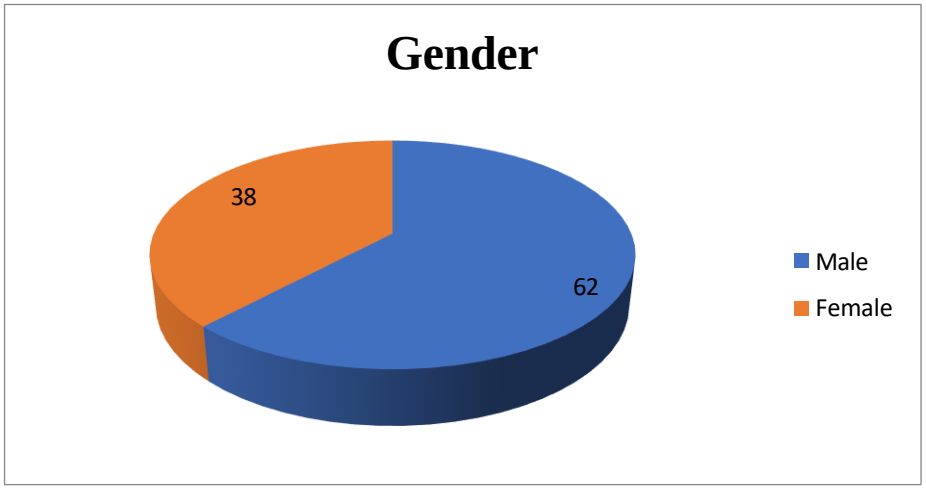


Figure 3: Graph showing distribution of patients according to sex

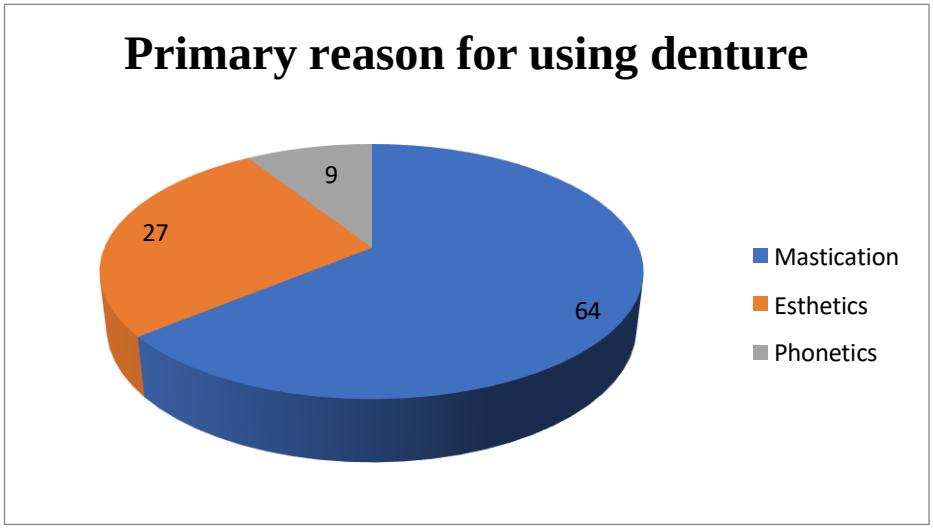


Figure 4: Graph showing distribution of patients according to the primary reason for using denture

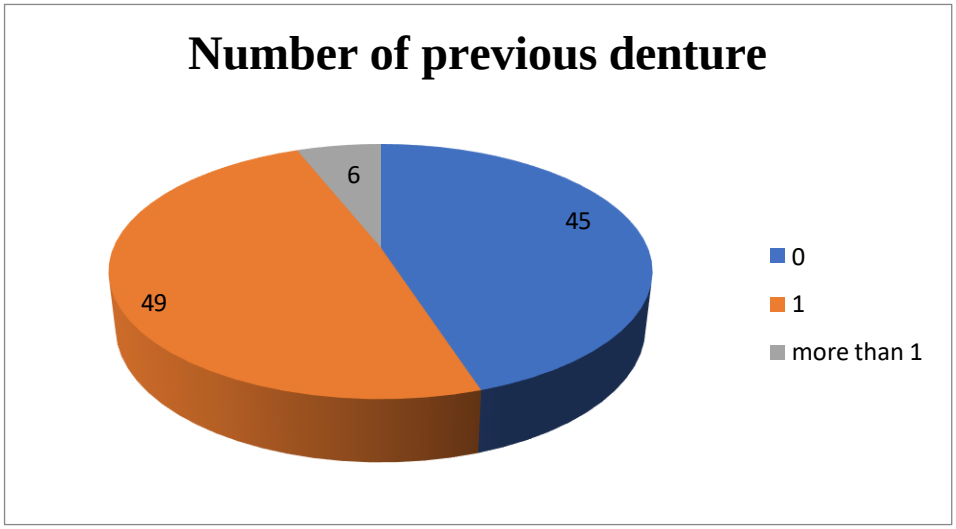


Figure 5: Graph showing distribution of patients according to the number of previous denture used.

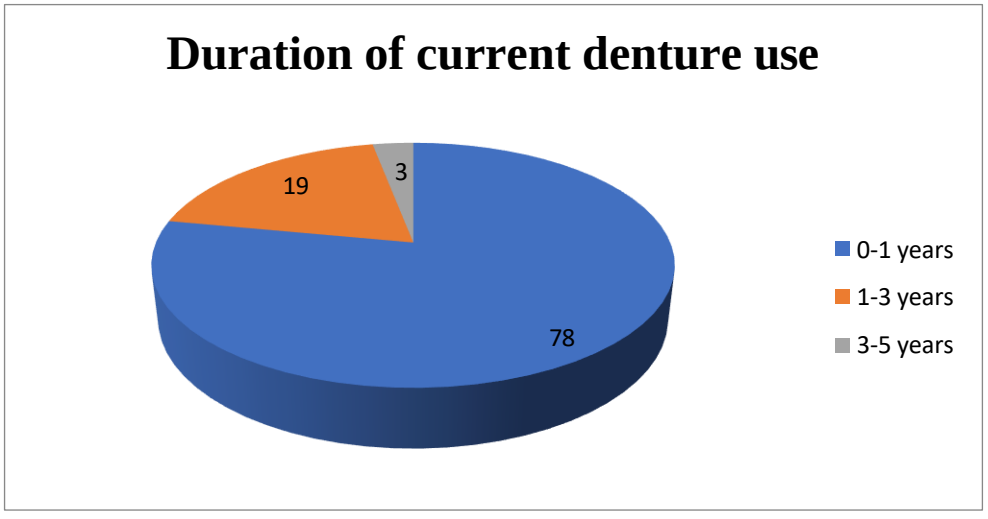


Figure 6: Graph showing distribution of patients according to the duration of current denture use

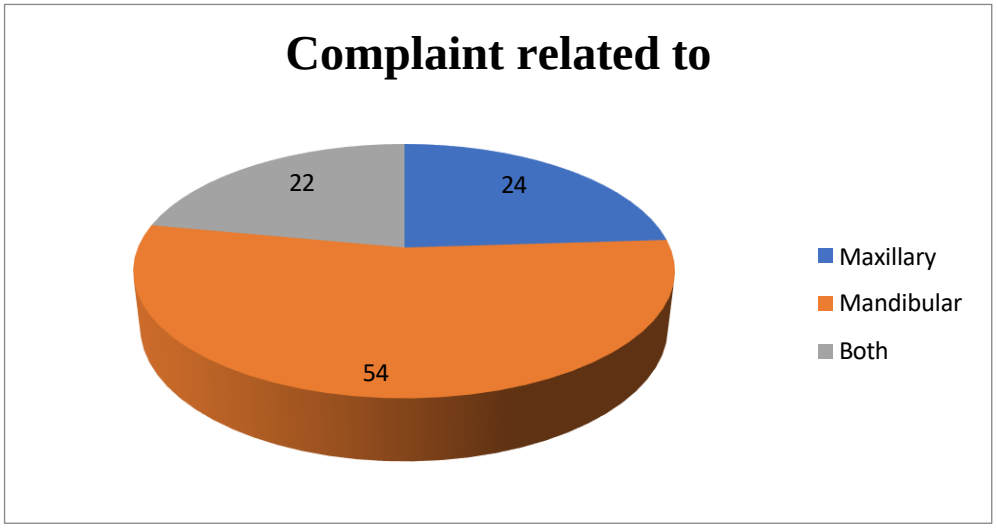


Figure 7: Graph showing distribution of patients according to the complains related to

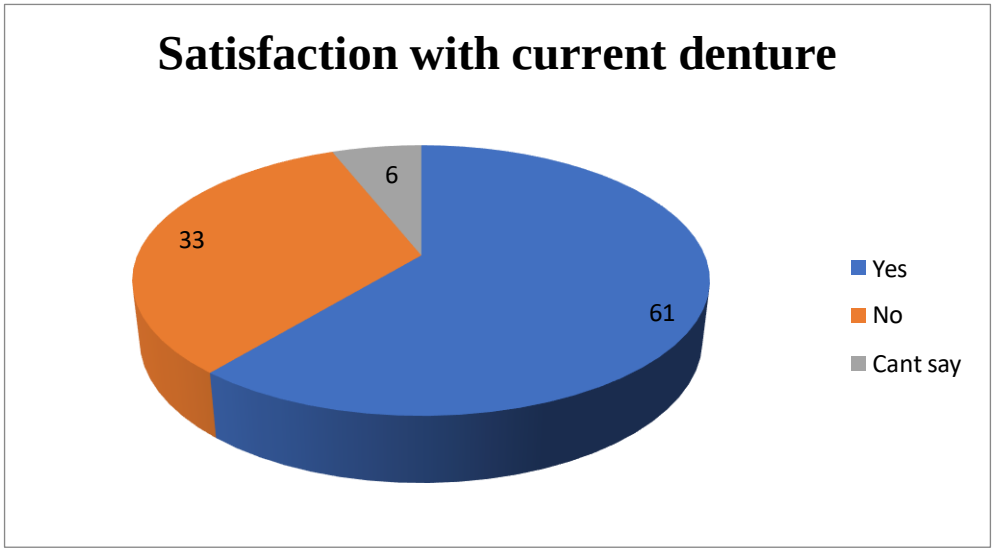


Figure 8: Graph showing distribution of patients according to the satisfaction with the current denture.

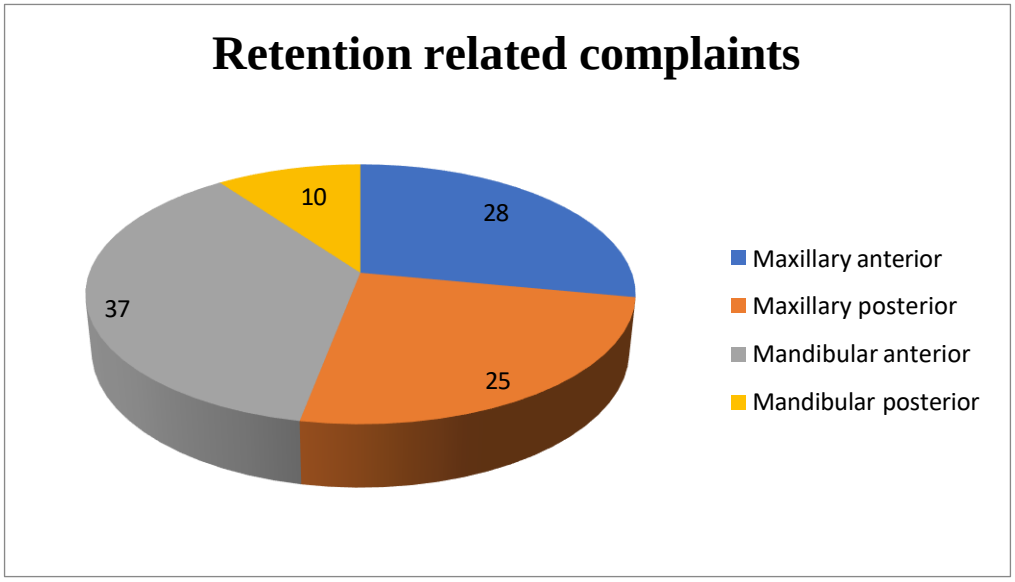


Figure 9: Graph showing distribution of retention related complains

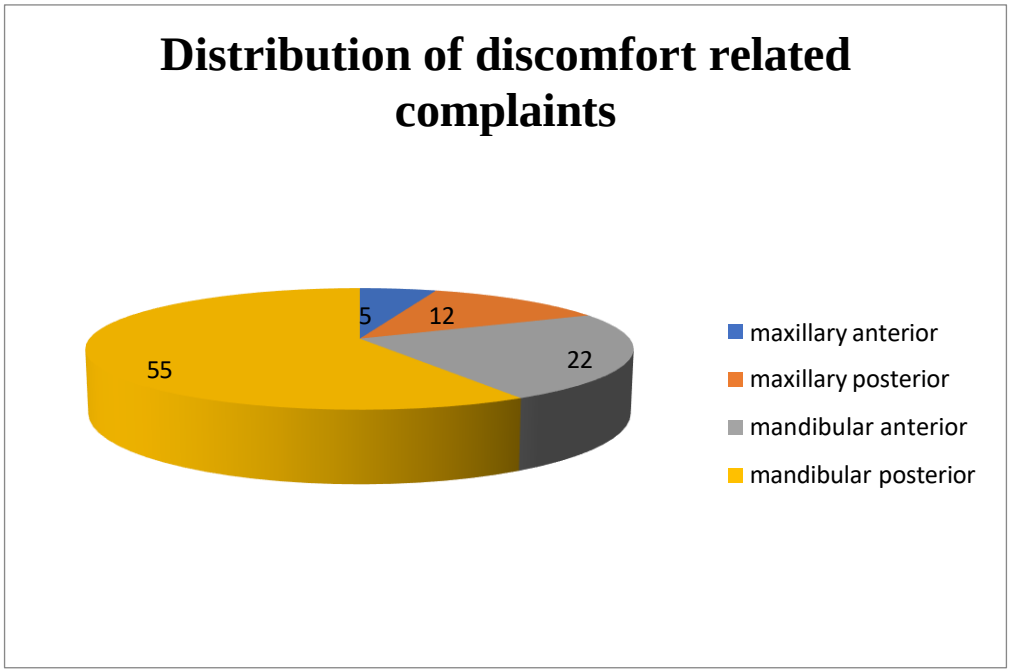


Figure 10: Graph showing distribution of discomfort related complains

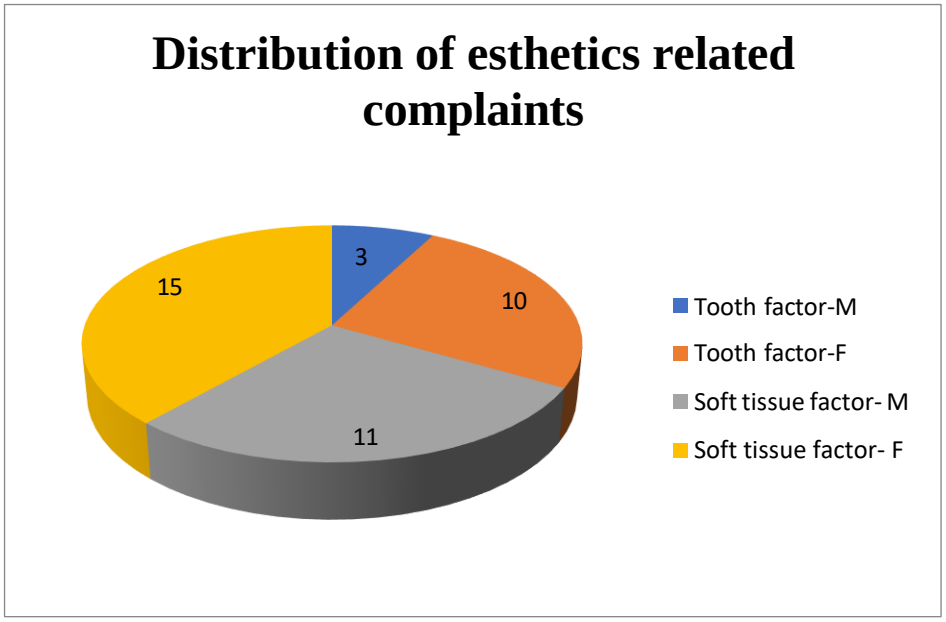


Figure 11: Graph showing distribution of esthetics related complains

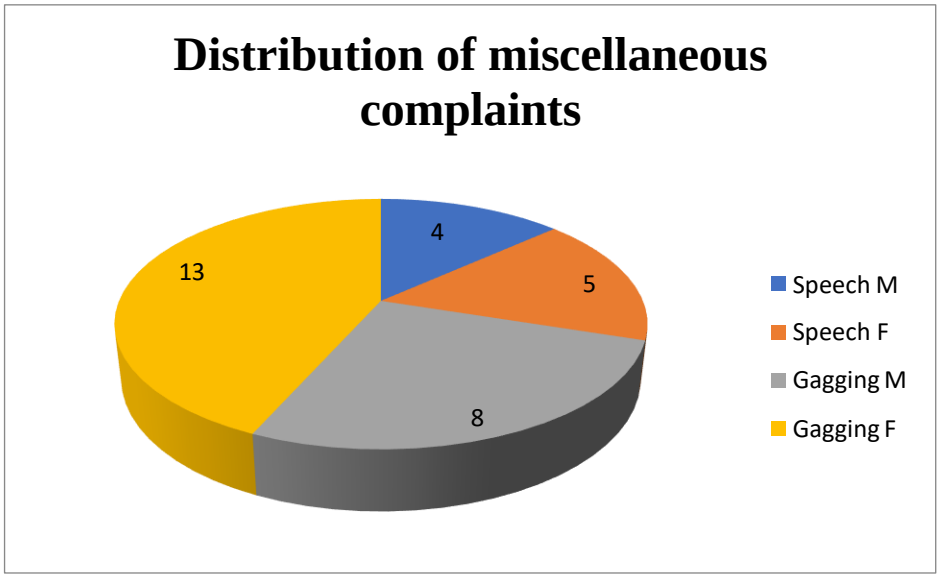


Figure 12: Graph showing distribution of complains according to miscellaneous factors

		Mean rank	Kruskal-wallis test (p-value)
Retention	R1	192.50	<0.001
	R2	134.00	
	R3	125.00	
Discomfort	D1	182.50	<0.001
	D2	142.00	
	D3	127.00	
Esthetics	E1	150.50	0.615
	E2	153.50	
	E3	147.50	
Miscellaneous	M1	165.50	<0.001
	M2	140.00	
	M3	146.00	

TABLE-2 : Structurofunctional analysis (Kruskal-Wallis test)

The table-2 result shows the relative mean rank based on kruskal wallis test. According to this test errors in denture base was statistically significant as far as retention, discomfort and miscellaneous related complaints were concerned ($p<0.05$). although the same factor was high for aesthetics it was not found to be statistically significant ($p>0.05$).

		Gender		Chi-square (p-value)
		Male	Female	
Retention	No complaint	10(26.3%)	10(16.1%)	0.216
	Complaint	28(73.7%)	52(83.9%)	
Discomfort	No complaint	6(15.8%)	8(12.9%)	0.686
	Complaint	32(84.2%)	54(87.1%)	
Esthetics	No complaint	25(65.8%)	48(77.4%)	0.204
	Complaint	13 (34.2%)	14 (22.6%)	
Miscellaneous	No complaint	28 (73.7%)	45 (72.6%)	0.904
	Complaint	10 (26.3%)	17 (27.4%)	

TABLE-3 : Chi Square analysis of complains according to the gender

The table-3 shows parson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the gender of the patient. It was seen that overall majorly complain was seen from the females as compared to the males but the difference was not statistically significant (p>0.0.5).

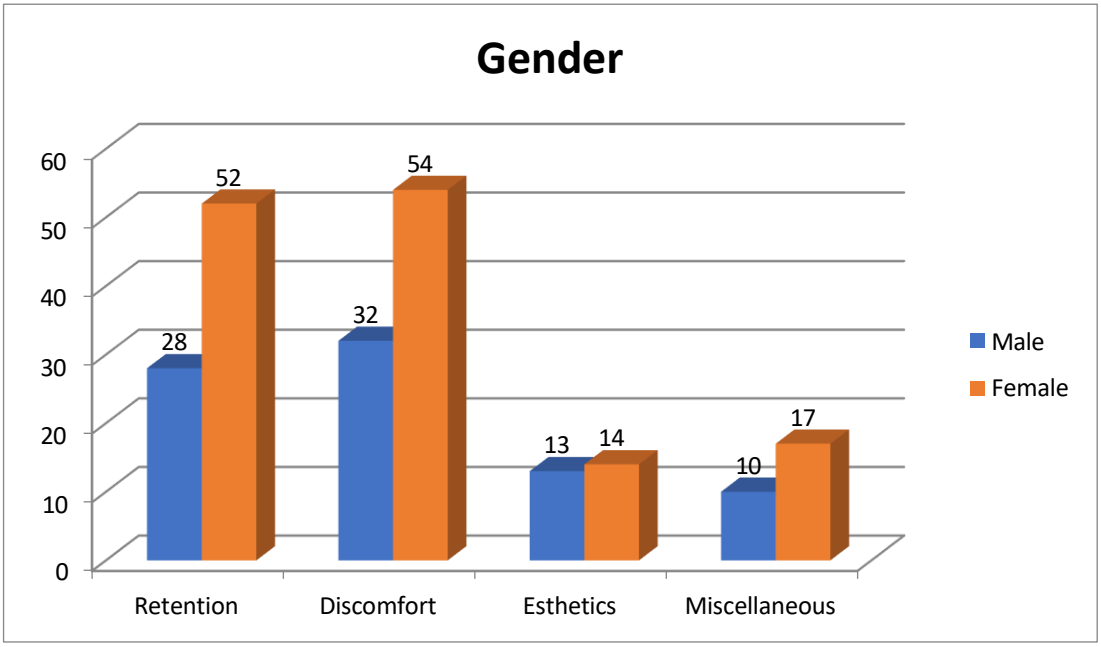


FIGURE-13 : Bar graph showing Chi Square analysis of complains according to the gender

		Primary reason for using denture			Chi-square (p-value)
		Mastication	Esthetics	Phonetics	
Retention	No complaint	6 (9.4%)	10 (37%)	4(44.4%)	0.002
	Complaint	58(90.6%)	17 (63%)	5(55.6%)	
Discomfort	No complaint	7(10.9%)	4 (14.8%)	3 (33.3%)	0.191
	Complaint	57(89.1%)	23 (85.2%)	6 (66.7%)	
Esthetics	No complaint	49 (76.6%)	21 (77.8%)	3 (33.3%)	0.019
	Complaint	15 (23.4%)	6 (22.2%)	6 (66.7%)	
Miscellaneous	No complaint	43 (67.2%)	24 (88.9%)	6 (66.7%)	0.094
	Complaint	21 (32.8%)	3 (11.1%)	3 (33.3%)	

TABLE-4: Chi Square analysis of complains according to primary reason for using denture.

The table-4 shows parson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the primary reason for using denture. The result shows that during mastication retention was the most common complaint which was also statistically significant ($p<0.05$). The remaining variables- discomfort, aesthetics and miscellaneous do not show statistically significant difference ($p>0.05$).

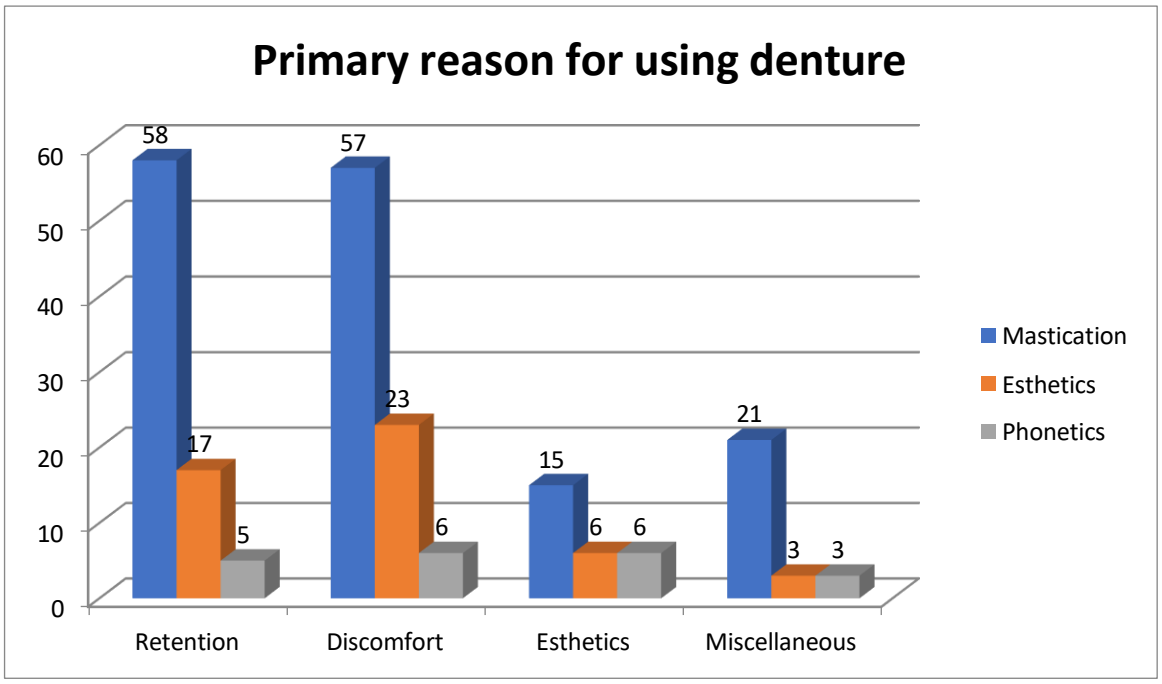


FIGURE-14: bar graph showing Chi Square analysis of complains according to primary reason for using denture.

		Number of previous dentures used			Chi-square (p-value)
		0	1	More than 1	
Retention	No complaint	9(20%)	8(16.3%)	3(50%)	0.150
	Complaint	36(80%)	41(83.7%)	3(50%)	
Discomfort	No complaint	7(15.6%)	7(14.3%)	0(0%)	0.586
	Complaint	38(84.4%)	42(85.7%)	6(100%)	
Esthetics	No complaint	30 (66.7%)	43 (87.8%)	0 (0%)	0.001
	Complaint	15 (33.3%)	6 (12.2%)	6 (100%)	
Miscellaneous	No complaint	30 (66.7%)	40 (81.6%)	3 (50%)	0.112
	Complaint	15 (%)	9 (%)	3 (50%)	

TABLE-5: Chi Square analysis of complains according to primary reason for using denture.

The table-5 shows parson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the number of previous denture used. The result shows that patients who have used more than 1 denture complained of more aesthetics and the result was statistically significant. ($p<0.05$). The remaining variables- retention, discomfort and miscellaneous do not show statistically significant difference ($p>0.05$).

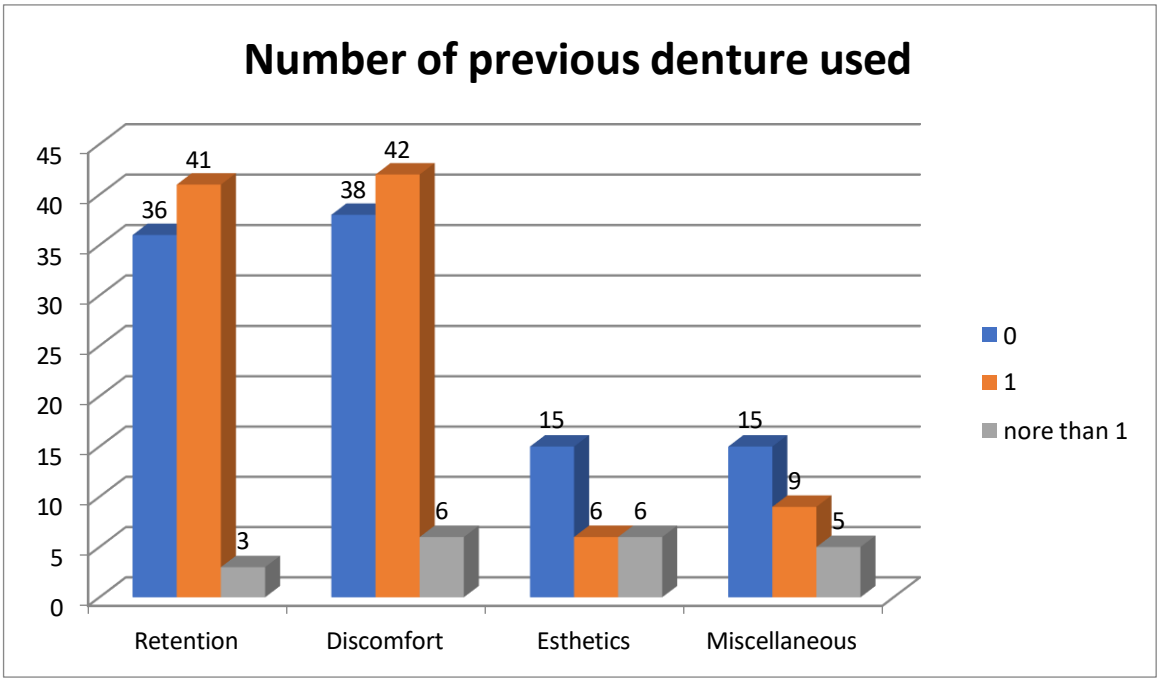


FIGURE-15: bar graph showing Chi Square analysis of complains according to number of previous denture used.

		Duration of use			Chi-square (p-value)
		0-1 year	1-3 year	3-5 year	
Retention	No complaint	13(16.7%)	4(21.1%)	3(100%)	0.002
	Complaint	65(83.3%).	15(78.9%)	0(0)	
Discomfort	No complaint	14(17.9%)	0(0%)	0(0%)	0.101
	Complaint	64(82.1%)	19(100%)	3(100%)	
Esthetics	No complaint	54 (69.2%)	19 (100%)	0 (%)	<0.001
	Complaint	24(30.8%)	0(0%)	3(100%)	
Miscellaneous	No complaint	54 (69.2%)	16 (84.2%)	3 (100%)	0.237
	Complaint	24 (30.8%)	3 (15.8%)	0 (0%)	

TABLE-6: Chi Square analysis of complains according to duration of use

The table -6 shows parson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the duration of use. The result shows that patients who have used denture for less than 1 year has more complaint related to retention and the result was statistically significant. ($p<0.05$). The patients using denture for 3-5 years had more compliant related to aesthetics with statistically significant result ($p<0.05$). The remaining variables- discomfort and miscellaneous do not show statistically significant difference ($p>0.05$).

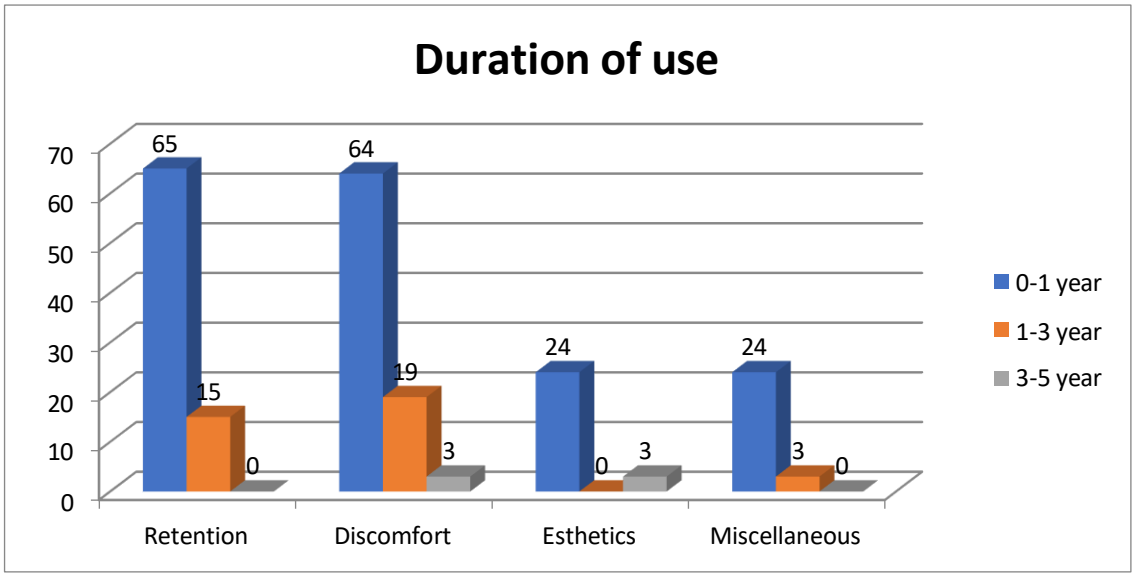


FIGURE-16: bar graph showing Chi Square analysis of complains according to duration of use

		Complaints related to			Chi-square (p-value)
		Maxilla	Mandible	Both	
Retention	No complaint	0(0)	15(27.8%)	5(22.7%)	0.017
	Complaint	24(100%)	39(72.2%)	17(77.3%)	
Discomfort	No complaint	3(12.5%)	7(13%)	4(18.2%)	0.814
	Complaint	21(87.5%)	47 (87%)	18 (81.8%)	
Esthetics	No complaint	24(100%)	35(64.8%)	14(63.6%)	0.003
	Complaint	0(0%)	19 (35.2%)	8 (36.4%)	
Miscellaneous	No complaint	12 (50%)	42 (77.8%)	19 (86.4%)	0.011
	Complaint	12 (50%)	12 (22.2%)	3 (13.6%)	

TABLE-7 :Chi Square analysis of complains according to the complains related.

The table-7 shows pearson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the complaints related to maxilla, mandible or both. The result shows that patients retention related issue more with maxilla, less complaints in maxilla aesthetically and more miscellaneous complaint related to maxilla and the result was statistically significant ($p<0.05$). The remaining variables- discomfort do not show statistically significant difference ($p>0.05$).

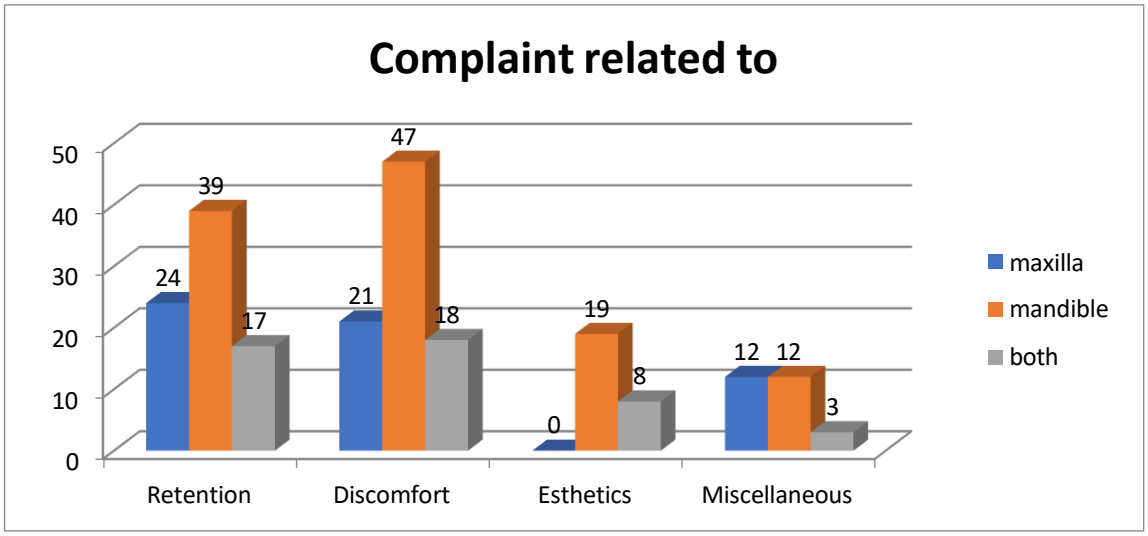


FIGURE-17: bar graph showing Chi Square analysis of complains according to the complains related.

		Satisfaction with current denture			Chi-square (p-value)
		Yes	No	Cant say	
Retention	No complaint	17(27.9%)	0(0)	3(50%)	0.001
	Complaint	44(72.1%)	33(100%)	3(50%)	
Discomfort	No complaint	11(18%)	3 (9.1%)	0(0%)	0.292
	Complaint	50 (82%)	30(90.9%)	6 (100%)	
Esthetics	No complaint	47 (77%)	26 (78.8%)	0 (0%)	<0.001
	Complaint	14 (23%)	7 (21.2%)	6 (100%)	
Miscellaneous	No complaint	44 (72.1%)	26 (78.8%)	3 (50%)	0.334
	Complaint	17 (27.9%)	7 (21.2%)	3 (50%)	

TABLE-8: Chi Square analysis of complains according to the satisfaction with the current denture

The table-8 shows pearson chi-square value for the variables- retention, discomfort, aesthetics and miscellaneous based on the satisfaction with current denture. The result shows that patients who does not show satisfaction with the current denture had complaints related to retention and aesthetics and the result was statistically significant. ($p<0.05$). The remaining variables- discomfort and miscellaneous do not show statistically significant difference ($p>0.05$).

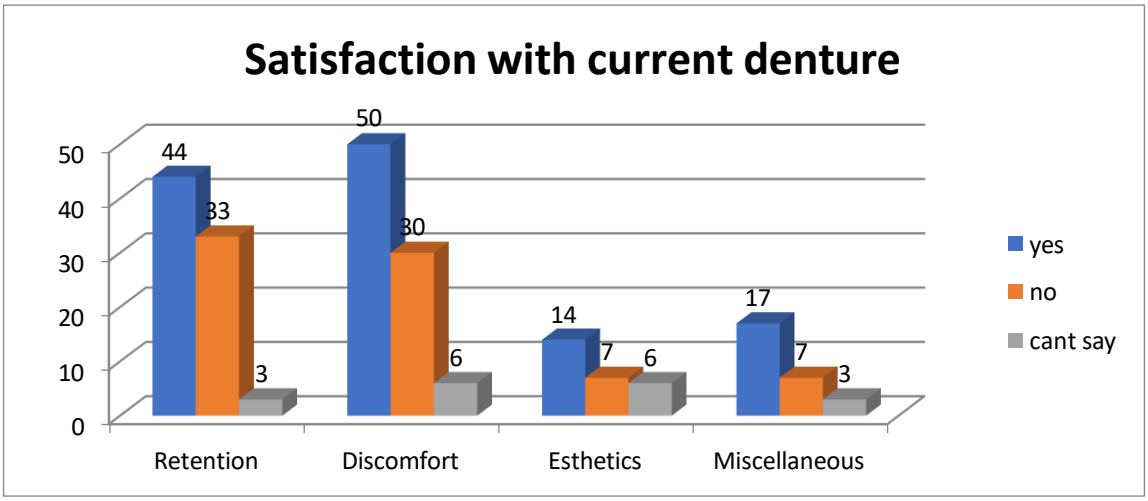


FIGURE-18: Bar graph showing Chi Square analysis of complains according to the satisfaction with the current denture

	Retention			Discomfort			Esthetics			Miscellaneous		
	R1	R2	R3	D1	D2	D3	E1	E2	E3	M1	M2	M3
No.of cases	59	20	14	55	28	17	9	11	7	20	3	7
% of cases	63.5	21.5	15	55	28	17	33.3	40.7	26	66.6	10	23.4

TABLE 9: Description of SFA data according to the subcategories

KEY:-

RETENTION

R1- error in denture base

R2- error in occlusion

R3- pathophysiological

DISCOMFORT

D1- error in denture base

D3- error in occlusion

D4- pathophysiological

ESTHETICS

E1- error in denture base

E2- error in occlusion

E3- pathophysiological

MISCELLANEOUS

M1- error in denture base

M2- error in occlusion

M3- pathophysiological

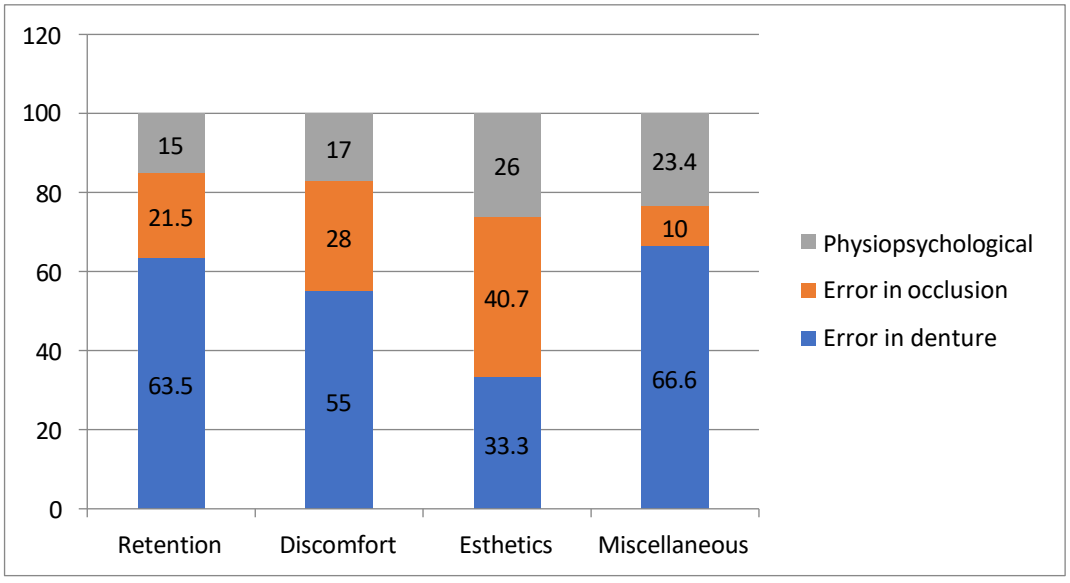


FIGURE 19: Graph showing distribution of SFA sub factors in relation to different complaints

DISCUSSION

An essential component of complete denture therapy is the management of post-insertion problems. It is a difficult process to catalog these complaints, and it is made even more difficult to classify them because of the large quantity, variety, and significant overlap of the concerns. But figuring out the reason behind these complaints is more important. [21, 84] The majority of patients can now be provided with an appropriate oral prosthesis owing to advancements in denture treatment technology. Despite this, a lot of patients will refuse to wear a pair of dentures that are technically sound.[53] In fact, it has frequently been observed that while a well-made denture has not been well received, a poorly constructed one has been linked to little or no complaints.[7,22-24].

This suggests that concerns about complete dentures are related to a number of different issues. [3, 4, 11, 59, 61, 71]

The local population's demographics, the accessibility of dental treatment, and prevailing societal mores and values are only a few of the variables that make it difficult and confusing to generalize about this problem universally. Therefore, in order to better meet the unique needs of that particular region, it is imperative that a thorough dataset and the resulting analytics be generated and maintained for a particular population in relation to their complaints.

In this context, a survey was conducted in a teaching hospital in Lucknow, India, to analyse prevalent issues linked with complete denture and their associated linkages with the problem of denture related complaints.

The research employed a cross-sectional analytical design and a convenience,

random, and simple sampling strategy. In other words, the study covered all patients who visited the department between January 2022 to December 2023, and who met the inclusion and exclusion criteria.

Inclusion criteria were the patients who wear their complete dentures on a regular basis, have both jaws edentulous, and had their complete denture produced within the last five years. In order to prevent complications from combination syndrome, complete edentulousness in both jaws was selected.[85] Since a five-year timeframe was most similar to the typical denture use period, it was selected. [26, 63, 65] The following were the exclusion standards: Patients with poor health, since multiple studies show a connection between health issues and concerns about dentures.[57, 86-89, 90] Second, individuals with neurological and psychological conditions such as dementia, Parkinson's disease, motor neuron illnesses, etc., as it would be challenging to clinically validate the stated problems. Lastly, patients who have had jaw reconstruction surgeries because these are atypical cases.

A customized questionnaire was used to perform the survey-based study (appendix A).

The main factors that influenced the formalization of the questionnaire were: the patient's ease of understanding; the questions' clear language; their framing to elicit a binary (yes/no) response (to facilitate statistical analysis using SPSS, as also done by Corrigan[76]); the number of questions kept to a minimum while eliciting maximum information; the questions covered all major areas of denture complaints; the general demographic questions; the history of the patient's denture experiences; etc. There were just two questions in the entire questionnaire that required information (in case of gagging and in case of existence of any oral lesion).

The first part of the survey inquired about the patients' name, age, sex, occupation, religion, and eating preferences (vegetarian or non-vegetarian). The medical history comprised pharmaceutical history, lifestyle disorders, and nervous system, cardiovascular, and respiratory illnesses. These criteria were selected because numerous publications link a number of post-insertion symptoms to the patient's medical and pharmacological history. [24, 57, 86-89, 91] The reason for fabricating the denture, its history (length of use currently, number of dentures used previously), the location of fabrication, the operator's credentials, and the patient's opinion on the denture were the last questions pertaining to dentures. To make the question easier to understand, the word "like" was employed. (instead of utilizing terms with specific connotations like "satisfied" or "efficient") and in order to get the patients to respond spontaneously.

Specific complaints regarding dentures were addressed in the second section of the questionnaire. A system to categorize the complaints was developed due to the volume of complaints and the potential for the same problem to be expressed in multiple ways depending on the patient's prolixity. Depending on the extent of their research, different writers have categorized complete denture complaints[4-7,18,25,27-30,71,76] Patients most frequently complained about discomfort when wearing dentures, pain when chewing, pain when wearing dentures, loss of retention, improper chewing, excessive salivation, difficulty speaking, stability, food buildup under the denture, etc. These essentially made up the structural complaints, or complaints arising from the denture's mechanical and physical aspects. Psychosocial problems associated with an entirely distinct set of complaints. These included aesthetic problems, gag reflex, feeling full or having a huge denture, and wearing dentures for extended periods of time without taking a break.

Four categories—retention, discomfort, aesthetics, and miscellaneous—were developed in order to incorporate all or the majority of the issues. Retention and discomfort were further subdivided in this questionnaire into maxillary and mandibular (upper and lower, respectively) and anterior and posterior (front and back) anatomical categories. A few additional questions were used in the retention area to further qualify the complaint regarding retention: does it fall on its own, does it fall or lift while opening the mouth, does it fall or lift while speaking, and does it fall while eating or drinking. In assessing the complaints linked to discomfort, additional questions were posed to elucidate the complaint in addition to the anatomical subclassification.

These included inquiries about the origin of the pain, its location, whether there were any painful patches or traumatic lesions, their length and position (if any), and any discomfort brought on by cheek/tongue biting were noted; to complete the discomfort related complaints a final question was included about sensation/tingling in any location orally.

Two elements were taken into consideration for issues connected to aesthetics: soft tissue considerations and teeth factors. The characteristics of the teeth were colour, shape, and fullness; the characteristics of the skin included sunken cheeks that appeared even with dentures and lip support or fullness. Lastly, speaking and gagging were the two main categories in the miscellaneous part. Speech-related complaints such as clattering of the teeth, whistling on the "g" sound, and lisping on the "" sound were observed. The questions about gagging and food loafing were also included.

Numerous causes, such as pain in the lower posterior region from improper occlusion, a nodule on the tissue surface, or denture roughness, have been linked to

the same condition on numerous times. Three SFA components were selected to represent all potential causes: denture base error, occlusion error, and pathophysiological. Coding was done by prefixing the related complaint category thus getting an alphanumeric code as shown in table 10.

100 patients which fell into the inclusion criteria of the study were selected for the present study. Total sample included 62 male and 38 female subjects giving us a ratio of 1.63:1

Studies have shown that male attendance was higher than female attendance[14-15,34,67.] The finding that males have a higher incidence of full edentulism can be used to explain the higher male attendance.[17]

Additionally, women are more likely to seek out restorative therapy, which helps delay tooth loss. This translates to more men visiting hospitals since there are more complete dentures made for them than for women.

The present study concluded that almost half (49%) of the selected subjects had used dentures previously that was 1 in number whereas 45% subjects had not used dentures in their lifetime and 6% of subjects used more than 1 denture in their lifetime. This states that the difference in the complaint of previously denture usage patients and fresh patients is non-significant These results are in coincidence with a study conducted by Muhammad Rizwan *et al* where he concluded that 57% of his selected samples were previously denture wearers. More than 78% of subjects in the present study were denture wearers for a duration of 0-1 year followed by 19% subjects for 1-3 years and rest 6% for a duration of 3-5 years.

When evaluating the difference in complaints based on duration of denture use (0-1 year; 1-3 years; 3-5years) the result shows that patients who have used denture for less

than 1 year has more complaint related to retention (65%) and the result was statistically significant. This might be the result of poor tissue adaptation brought on by the prosthesis's gradual deterioration and an increase in residual ridge resorption.[65,75]The patients using denture for 3-5 years had more compliant related to aesthetics with statistically significant result. The remaining variables- discomfort and miscellaneous do not show statistically significant difference.

When evaluating the difference in complaints based on sex (male and female) it was seen that there was no statistically significant difference between sex of the subject on one hand and all the complaints. It was seen that overall majorly complain was seen from the females as compared to the males but the difference was not statistically significant .Gendered nature of denture complaints have been studied extensively. On one hand Brunell[7], Dorey,[72] Powter,[67] Salih,[82] and Ogurinde[17] have not found any link between gender and denture related complaints. While other studies show a link between the two (Langer[34] and Heartwell[86]). According to Massler [107] sex differences exist in the ability of patients to adapt to complete dentures and is especially evident in women at the menopause and during the postmenopausal period similar conclusion are drawn in classic textbooks [108-109]

Error in denture base was the most common reason identified in all four categories of complaints during the evaluation of the complaints' causes (SFA factors). What was different was however its lead over the rest when seen in different complaint categories. There was an obvious dominance of error in denture base factor in retention, discomfort, and miscellaneous. In aesthetics related complaint the second category (error in occlusion and teeth selection) was dominant .

A Kruskal-Wallis examination of the data was done to determine the relative relevance of the various SFA variables. This demonstrated a statistically significant relationship in three areas (all but aesthetics) and the biggest mean rank in all four categories, indicating unequivocally the preponderance of error in denture base components. indicating that occlusion problems and physiopsychological factors were not as significant contributors to the complaints as denture base issues were.

However, there were several restrictions on the study. Such a study needs to be conducted on a bigger geographical scale, encompassing diverse races and areas, especially in a country as populous as India. To fully represent the range of treatments offered, the survey should include not only hospitals and other healthcare facilities but also private clinics. As Lechner[25] also pointed out, the categorization of complaints prevented each one from being examined in great detail. Lastly, the social aspect of the edentulism issue and the ensuing complaints about complete dentures were overlooked as told by Friske[32] and others[111,112]

A more comprehensive understanding of the scope of the problem can be obtained through additional research that addresses the aforementioned constraints and is carried out throughout a wider region with various representative patient groups of the problem of common denture complaints.

CONCLUSION

We can draw the conclusion that complete denture complaints are a common occurrence. Patients have voiced a variety of concerns, but the two main ones are discomfort and retention loss. male attendance was higher than female attendance. The finding that males have a higher incidence of full edentulism can be used to explain the higher male attendance.

Error in denture base was the most common reason identified in all four categories of complaints during the evaluation of the complaints' causes (SFA factors). There was an obvious dominance of error in denture base factor in retention, discomfort, and miscellaneous. In aesthetics related complaint the second category (error in occlusion and teeth selection) was dominant.

It was seen that overall majorly complain was seen from the females as compared to the males.

Retention related problems was more commonly seen in mandibular anterior region while discomfort related problems was more commonly seen in mandibular posterior region.

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BABU BANARASI DAS UNIVERSITY

BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

BBD UNIVERSITY

Dr. Lakshmi Bala
Professor and Head, Deptt of Biochemistry and
Member-Secretary, Institutional Ethics Committee (IEC) of BBD University, Lucknow

Communication of the Decision of the VIIIth Institutional Ethics Committee Meeting

IEC Code: 40 **BBDU/MDS/40/2024**

Date: 27/02/2024

Title of the Project: An Assessment Of Common Problems Associated With Complete Denture Based On A Survey Of Complaints Made By The Patients Reporting To Dental College In Lucknow.

Principal Investigator: Dr. NAMRA KAUSAR ZAIDI **Department: Department of Prosthodontics**

Name and Address of the Institution: BBD University, Lucknow
Type of Submission: Modified, MDS Dissertation proposal.

Dear Dr. Namra Kausar Zaidi,
The meeting of the Institutional Ethics Committee (IEC) was held on 06-02-2024 in Conference room, First Floor, BBDCODS, BBD University, Lucknow. Following members were present:

1	Dr. Chandishwar Nath Rtd. Chief Scientist, CDRI, Lucknow.	Chairman
2	Dr. JS Srivastava, Rtd. Chief Scientist, CDRI, Lucknow.	Member
3	Dr. Manodeep Sen, Professor, Department of Microbiology, RMLIMS, Lucknow	Member
4	Dr. Shaleen Chandra, Professor & Dean, Dental Sciences, Atal Bihari Vajpai Medical University (ABVM University), Lucknow	Member
5	Dr. Manuka Khanna, Professor, Deptt. of Political Science, Lucknow University, Lucknow	Member
6	Mr Abhishek Chaudhary, Advocate, Lucknow	Member
7	Dr. Puneet Ahuja, Professor of Oral Pathology and Principal, BBD College of Dental Sciences, BBD University, Lucknow	Member
8	Dr. Lakshmi Bala, Professor & Head, Department of Biochemistry, BBD College of Dental Sciences, BBD University, Lucknow	Member-Secretary

The committee reviewed and discussed your submitted documents of the research proposal in the meeting. Following comments were suggested and communicated.

Comments:

1. PID & Consent to be taken from patients
2. In google form to include line: "My participation is purely voluntary in the study."and I understand that Privacy & Confidentiality will be maintained.

Thereafter, the proposal was revised by Principal Investigator and duly approved by the Supervisor and Head of the Department.

Decisions: The committee approved the above proposal from ethics point of view.

Lakshmi Bala 27/02/24

(Dr. Lakshmi Bala)
Member-Secretary IEC
BBD University
Ethics Cell (Vth Floor, BBDCODS)
ethics@bbdu.ac.in

Dr. LAKSHMI BALA
Member-Secretary
Institutional Ethics Committee
BBD University, Lucknow-28

Page No. 2 of 2

CONSENT FORM ENGLISH AND HINDI

1. I confirm that I have read and understood the Participant Information Document for the above study and have had the opportunity to ask questions. **OR** I have been explained the nature of the study by the Investigator and had the opportunity to ask questions.
2. I understand that my participation in the study is voluntary and given with free will without any duress and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected.
3. I understand that the sponsor of the project, others working on the sponsor's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the trial. However, I understand that my Identity will not be revealed in any information released to third parties or published.
4. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).
5. I agree to participate in the above study. I have been explained about the complications and side effects, if any, and have fully understood them. I have also read and understood the participant/volunteer's Information document given to me.

1. मैं पुष्टि करता हूं ष्टक मैंने प्रष्टतभागी सूचना दस्तावेज ष्टदनाूंक . को पढ़ और समझ ष्टिया है उपरोक्त अध्ययन के ष्टिए और प्रश्न पूछने का अवसर ष्टमिा है। या मुझे अन्वेषक द्वारा अध्ययन की प्रकृ ष्टत के बारे में बताया गया है और मुझे प्रश्न पूछने का अवसर ष्टमिा है।
2. मैं समझता हूं ष्टक अध्ययन में मेरी भागीदारी स्वैच्छिक है और ष्टबना ष्टकसी दबाव के स्वतूंत्र ष्टि के साथ दी गई है और मैं ष्टबना कोई कारण बताए और अपनी ष्टचष्टकत्सा देखभाि या कानूनी अष्टिकारोूं को प्रभाष्टवत ष्टकए ष्टबना ष्टकसी भी समय वापस ि ने के ष्टिए स्वतूंत्र हूं।
3. मैं समझता हूं ष्टक पररयोजना के प्रायोजक, प्रायोजक की ओर से काम करने वाि अन्य, नैष्टतकता सष्टमष्टत और ष्टनयामक प्राष्टिकरणोूं को वततमान अध्ययन और ष्टकसी भी आगे के शोि के सूंबूंि में मेरे स्वास्थ्य ररकॉर्त को देखने के ष्टिए मेरी अनुमष्टत की आवश्यकता नहीूं होगी। इसके सूंबूंि में आयोष्टजत ष्टकया जा सकता है, भि ही मैं परीक्षण से हट जाऊूं। हाि ाूंष्टक, मैं समझता हूं ष्टक तीसरे पक्ष को जारी या प्रकाष्टशत ष्टकसी भी जानकारी में मेरी पहचान प्रकट नहीूं की जाएगी।
4. मैं इस अध्ययन से उत्पन्न होने वाि ष्टकसी भी र्ेटा या पररणामोूं के उपयोग को प्रष्टतबूंष्टित नहीूं करने के ष्टिए सहमत हूं, बशते ऐसा उपयोग के वि वैज्ञाष्टनक उद्देश्योूं के ष्टिए हो।
5. मैं उपरोक्त अध्ययन में भाग ि ने के ष्टिए सहमत हूं। मुझे जष्टटिताओूं और दुष्प्रभावोूं के बारे में समझाया गया है, यष्टद कोई हो, और उन्हें पूरी तरह से समझ ष्टिया है। मैंने प्रष्टतभागी/स्वयूंसेवक के मुझे ष्टदए गए सूचना दस्तावेज को भी पढ़ और समझ ष्टिया है।

PLAGIARISM REPORT

Annexures

PLAGIARISM REPORT

DrillBit

The Report is Generated by DrillBit Plagiarism Detection Software

Submission Information

Author Name	NAMRA KAUSAR ZAIDI
Title	AN ASSESSMENT OF COMMON PROBLEMS ASSOCIATED WITH COMPLETE DENTURE BASED ON A SURVEY OF COMPLAINTS MADE BY THE PATIENTS REPORTING TO DENTAL COLLEGE IN LUCKNOW(BBDCODS)
Paper/Submission ID	1466272
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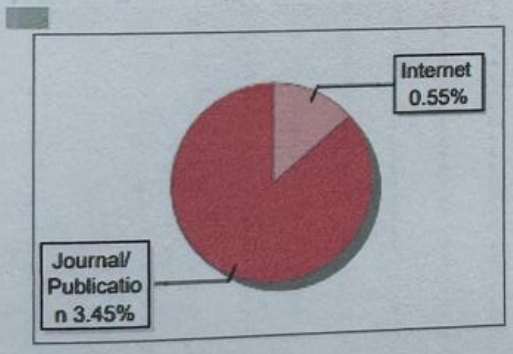

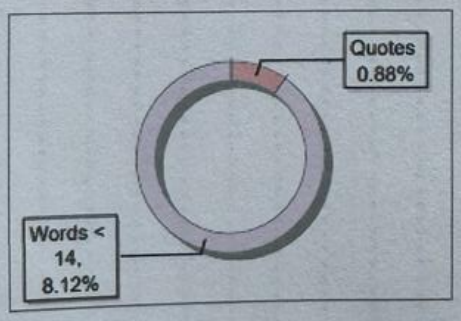

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Quotes	Excluded
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Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

STATISTICAL ANALYSIS SHEET

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Annexures