

Pattern of Prosthodontic Rehabilitation of Completely Edentulous Patients in a Nigerian Teaching Hospital: A 10-Year Review

Tunde Joshua. **OGUNRINDE**, Oluwale Oyekunle **DOSUMU**
[Department of Restorative Dentistry, Faculty of Dentistry, University of Ibadan/University College Hospital, Ibadan. Nigeria.]

Correspondence Dr. T.J. Ogunrinde

Department of Restorative Dentistry, Faculty of Dentistry, University of Ibadan/University College Hospital, Ibadan. Oyo State, Nigeria
Email: tunde_ogunrinde2001@yahoo.com

Tunde J. Ogunrinde
<https://orcid.org/0000-0001-5816-927X>
Oluwale O. Dosumu
<https://orcid.org/0000-0002-3506-5774>

ABSTRACT

Background: The negative effects of edentulism, such as inability to chew properly, poor aesthetics, and self-esteem can be addressed by rehabilitation with different types of complete dentures.

Objective: This study retrospectively assessed the pattern of prosthodontic rehabilitation of completely edentulous patients treated at the dental centre, University College Hospital (UCH), Ibadan over a ten-year period.

Methods: A retrospective study which assessed patients who were treated with complete dentures between January 1, 2014 and December 31, 2023. Patients' details were retrieved from the medical records unit of the Dental centre, UCH, Ibadan. Data collected included socio-demographics, indications and types of complete dentures. The data generated was analysed using the IBM SPSS version 23. Analysis was done using frequency and percentages of categorical variables and Fisher's exact test was used to test for statistical significance.

Result: Case records of 85 patients treated with complete dentures were reviewed. Thirty-nine (45.9%) were males, while forty-six (54.1%) were females. The mean age of the patients was 68.71 (SD±14.25) years. Conventional dentures were the most common 81 (95.3%) type of dentures fitted for the patients and mastication (70.7%) was the major reason for requesting complete dentures. The majority, 66 (77.6%) were satisfied with treatment with complete dentures and there was a statistically significant relationship ($p=0.040$) between age of patients and satisfaction with complete dentures.

Conclusion: Periodontal disease is a leading cause of tooth loss among the elderly, often resulting in chewing difficulties that drive the demand for complete dentures, with acrylic dentures being the most common prosthodontic treatment.

Key words: Pattern, indications, types, complete dentures.

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INTRODUCTION

The prevalence of oral diseases such as chronic periodontitis, and oral cancer increases with advancing age¹ and these factors mostly account for tooth loss especially in the elderly.² The complete loss of teeth, whether due to periodontal disease, trauma, cancer or systemic disease, presents significant challenges not only in terms of function and aesthetics but also in the overall well-being of affected individuals.³ Tooth loss, which has been regarded as the final marker of disease burden for oral health,⁴ can negatively affect oral functions such as chewing, biting, swallowing, effective communication, smiling, aesthetics, and self-esteem.^{5,6} Furthermore, it can result in complication of systemic diseases, including malnutrition and difficulties with digestion, as the loss of teeth can severely hinder an individual's ability to consume varieties of foods.^{7,8}

The prosthodontic rehabilitation of completely edentulous patients with artificial replacements such as removable or fixed complete dentures is aimed at restoring the lost oral functions as well as enhancing patients' aesthetics and quality of life.⁹ Each of the rehabilitative options is associated with certain advantages and disadvantages. The application of modern prosthodontic techniques, materials, and technologies has significantly improved the outcomes of prosthodontic rehabilitation, making the process more predictable and comfortable for patients.⁹

Complete denture (CD) is a dental prosthesis that replaces all the missing teeth and associated structure in the maxilla or mandible,¹⁰ which can be fixed or removable. Removable complete denture is the most commonly employed method of rehabilitating edentulous patients, especially in developing countries because it is less expensive and readily available. The removable complete denture can be conventional, complete overdenture or immediate complete denture. Complete overdenture, compared with conventional denture has the advantages of better retention, stability, support and comfort during mastication.¹⁰ In addition, it preserves the edentulous ridge. Immediate complete denture is indicated in patients that cannot endure the state of *edentulousness* without artificial teeth especially for social or aesthetic reasons.¹¹

Improvement in material science has led to the

discovery and use of nylon-based denture base material for fabrication of complete denture as an alternative to the commonly used polymethyl methacrylate material.^{9, 12} Although, flexible denture base materials have been introduced as far back as 1950's,¹³ it is less commonly used as methylmethacrylic resin despite the favourable quality of good retention and resistance to fracture of the former.

Studies on demographic characteristics and common complaints among complete denture wearers^{14,15,16} have been done. However, we did not find any study on pattern of utilization of various types of complete denture among the Nigerian population in our literature search. Furthermore, the few clinical reviews of patients managed with complete denture prostheses in the country were done a long time ago and it is essential that such data are continuously updated for proper planning and review of our clinical protocol especially with current advances in technology and material sciences in the field of Prosthodontics. The aim of this study was therefore to review cases of edentulous patients treated with complete dentures at the prosthetics clinic of a Nigerian teaching hospital, over a period of ten years with the following specific objectives:

- i. To assess the causes of tooth loss among the patients.
- ii. To assess the indications and satisfaction with complete denture services by the patients.
- iii. To assess the level of utilization of complete denture services annually by the patients.
- iv. To assess the various types of complete dentures provided for the patients.
- v. To assess the level of utilization of various materials available for complete denture fabrication.

METHODS

This is a retrospective study of all completely edentulous patients treated with complete denture at the prosthetic clinic, Dental centre, University College Hospital (UCH), Ibadan from January 1, 2014 to December 31, 2023. UCH is located in Ibadan North, Local Government Area of Oyo State, Nigeria. All case records that had relevant information such as age, gender, causes of tooth loss, reasons for demand for complete dentures, types of complete dentures provided and satisfaction with the dentures were

included in the study while case records with inadequate information were excluded.

Permission to obtain case records of patients treated with complete denture was obtained from the Head, Information Technology Department, University College Hospital (UCH), Ibadan. Names and case numbers of patients that presented with complete edentulism and treated with complete dentures from January 1, 2014 to December 31, 2023 were obtained from the daily clinic-books of the prosthetic unit of the institution. The names and case numbers of the patients were subsequently used to obtain the patients' case files from the record unit, Dental Centre, UCH, Ibadan. The demographic data, causes of tooth loss, reasons for demand for the prostheses, the types of complete denture provided and their satisfaction with the denture were obtained from their case records.

Data obtained were entered into IBM-Compatible micro-computer and analyzed using the statistical packages of social sciences (SPSS) version 23. Analysis was done using frequency and percentages

of categorical variables and Fisher's exact test was used to test for relationship between socio-demographic (Age, and Gender), types of denture, indication for denture and patients' satisfaction. Statistical significance was set at $p \leq 0.05$. Ethical approval was obtained from the institutional ethical committee (UI/EC/25/0108).

RESULT

The prosthetic clinic day-book records revealed that 92 complete edentulous patients presented for consultation during the study period. However, eighty-five patients had complete information in their case records and were included in this study.

Table 1 showed the Socio-demographic characteristics of the patients. The age of the patients that were treated with complete dentures ranged from 25 to 97 years with a mean age of 68.71 (SD± 14.25) years. The majority, 67 (78.8%), were 60 years and above, while only 5 (5.9%) of the patients were below forty years of age. Thirty-nine (45.9%) of the patients were males while forty-six (54.1%) were females. More than half, 43 (50.6%) were retirees and 12 (14.1%) were traders

Table 1: Socio-demographic characteristic of the patients.

Socio-demography	Frequency (n)	Percentage (%)
Age (years)		
Less than 40	5	5.9
40-49	7	8.2
50-59	6	7.1
60-69	18	21.2
70-79	32	37.6
80 and above	17	20.0
Gender		
Male	39	45.9
Female	46	54.1
Occupation		
Retirees	43	50.6
Traders	12	14.1
Business man/woman	7	8.2
Clergy man	4	4.7
Others (technician, students, farmer, carpenter, civil servant etc)	19	22.4
Total	85	100

Age range = 25 - 97; Mean Age = 68.71± 14.25

Table 2 shows the annual distribution of complete dentures provided for the patients. The number of patients seen varied from 6 to 15, with an average of 9 complete denture patients per

year. The highest number of patients 15 (17.6%) was seen in the year 2020, while the least, 6 (7.1) was seen in 2018.

Table 2: Annual distribution of edentulous patients treated with complete dentures.

Years	Frequency (n)	Percentage (%)
2014	8	9.4
2015	7	8.2
2016	13	15.3
2017	6	7.1
2018	6	7.1
2019	8	9.4
2020	15	17.6
2021	7	8.2
2022	7	8.2
2023	8	9.4
Total	85	100.0

Thirty-four (40%) of the patients came for replacement dentures, while 51 (60%) were having their complete dentures for the first time. Majority, 41 (48.2%) had upper and lower complete dentures

while 18 (21.2%) had only lower complete dentures. Almost all 81 (95.3%) had acrylic dentures. Also, 81 (95.3%) had conventional dentures while a few, 4 (4.7%) had immediate complete dentures (Table 3)

Table 3: Types of complete denture fitted for the patients.

Types of complete denture fitted for the patients		Freq. (n)	Percent. (%)
Based on previous denture experience	New denture wearers	51	60.0
	Old denture wearers	34	40.0
Based on location	Upper	28	30.6
	Lower	18	21.2
	Upper and Lower	41	48.2
Based on materials	Acrylic	81	95.3
	Flexible	4	4.7
Based on time of placement	Conventional	81	95.3
	Immediate	4	4.7

Table 4 showed that periodontal disease was the major cause of tooth loss 66 (77.6%) among the cases assessed, while ectodermal dysplasia was the least cause of tooth loss, 2 (2.4%). The most common reason why the patients demanded complete

denture was for mastication, 45 (52.9%), followed by aesthetics and mastication, 22 (25.9%). Sixty-six (77.6%) patients were satisfied with their dentures while 19 (22.4%) were not satisfied.

Table 4: Distribution of Causes of teeth loss, Reasons for demand and Satisfaction with complete dentures.

Causes of teeth loss	Frequency (n)	Percentage (%)
Caries	3	3.5
Periodontal disease	66	77.6
Aggressive Periodontitis	3	3.5
Surgery	3	3.5
Trauma	8	9.4
Ectodermal dysplasia	2	2.4
Reasons for demand for denture		
Aesthetics	15	17.6

Mastication	45	52.9
Aesthetics and mastication	22	25.9
Others (Psychological, speech)	3	3.6
Satisfaction with dentures		
Satisfied	66	77.6
Unsatisfied	19	22.4
Total	85	100.0

Table 5 showed the proportion of patients that were less than 65 years and were satisfied with their complete dentures (23:2) was greater than those patients that were 65 years and above and were satisfied with their dentures (43:12). The relationship between age and satisfaction with complete dentures was statistically significant ($P = 0.040$).

However, fisher's exact test showed no significant relationship between satisfaction with denture and gender of the patient ($P=0.540$), types of denture (new or replacement dentures ($P=0.632$); upper or lower dentures ($P=0.632$); acrylic or flexible dentures ($P=0.356$), and indications for denture ($P=0.0$).

Table 5: Relationship between patients' Age, Gender, Types of denture, Reason for demand and satisfaction with dentures.

Patients' age, gender, types of denture and indication for denture		Patients' satisfaction		Chi-square
		Satisfied	Not satisfied	
Age group	< 65	23	2	0.040
	65 yrs & above	43	17	
Gender	Male	30	9	0.540
	Female	36	10	
Type of dentures	Replacement Denture	29	5	0.132
	New Denture	37	14	
Denture Locations	Upper denture	23	5	0.632
	Lower denture	13	3	
Denture Materials	Upper & lower denture	30	11	0.356
	Acrylic	62	19	
Denture type	Flexible	4	0	0.356
	Conventional	62	19	
Reason for Demand	Immediate	4	0	0.052
	Mastication	30	15	
	Aesthetics	14	1	
	Mastication & Aesthetics	20	2	
	others	2	1	

DISCUSSION

The results of this study revealed that eighty-five patients were given complete dentures over a period of ten years, and the number of patients seen per year ranged between 6 and 15. This distribution showed a low complete denture patient turn-out at the centre when compared with a previous report¹⁵ of thirty complete denture patients within a year. This low patient attendance may be due to poor economic status of the study population

compared with the previous study which was done in an urban city in Nigeria. In a study on tooth replacement in an older suburban population by Ibiyemi et al.,¹⁷ it was reported that the most common reason for non-use of denture was financial constraints. Other reasons for the low attendance may be due to the incessant strike actions by various unions in the health sector and the lack of insurance cover for dental prosthesis. Nevertheless, the highest number of patients was seen in the year 2020. The

rise in attendance coincides with the period a resident doctor was subsidizing the cost of treatment for complete denture patients that were included in his research project.¹⁸ This shows that subsidizing prosthodontic treatment cost and making prosthetics care more affordable will motivate patient to seek care and increase patient attendance. Also, improved community awareness, public health education on use of dentures to improve the quality of life of edentulous patients, as well as advocacy for insurance coverage of prosthetic treatment can improve patient attendance.

The majority of the patients were 60 years and above. This agrees with a previous study by Charlene et al.,¹⁹ which reported an increase in demand for complete dentures from age 60 years and above. The reason for this is because complete edentulism is prevalent among the elderly due to the cumulative effect of chronic periodontal disease²⁰ which was the major cause of tooth loss among the patients in this study. The majority of the participants (54.1%) were females, and this is contrary to the report of previous studies,^{15,16} which depicted higher number of male patients demanding for complete dentures when compared to the females. However, the result of this study corroborates that of Esan et al.,¹⁴ where predominance of female participants was reported. The reason for more females in this study could be because the females are more concerned about their oral health and quality of life, so they present at the hospitals for treatment more regularly than their male counterparts.

Almost all (96.5%) of the patients had acrylic dentures. Methyl-metacrylate is the most common material used for fabrication of complete denture because it is relatively cheap, readily available, requires less sophisticated equipment and operational skills.^{9,21} Previous studies^{14,22} also reported acrylic denture as the most common material for fabrication of complete denture. Although, flexible denture has the advantages of better retention, fracture resistance and less release of monomer when compared with acrylic denture,²³ it is poorly utilized for complete denture fabrication at the centre. This is possibly because laboratory services for flexible denture fabrication were not available at the centre during the reviewed period. The laboratory fabrications of the dentures for the few patients treated with flexible dentures at the centre during the period were done at a private laboratory and this made the cost of treatment far higher than the cost of acrylic dentures. In addition,

there are different opinions on the retention of flexible complete denture due to the flexibility of the denture base material. Fitzpatrick²⁴ in his systemic review on standard of care of edentulous mandible reported that the flexibility of the resins allows it to be easily adapted to bilateral tissue undercut to provide good retention, while Gehan²⁵ stated that flexibility is not an advantage where there are no undercuts, because the peripheral seal is often broken during function leading to loss of retention.

Furthermore, majority of the patients had conventional dentures while very few, had immediate dentures. This is because majority of the patients were completely edentulous with or without previous complete dentures before presentation. This excluded them from the option of immediate dentures. In addition, the complexity and cost associated with relining shortly after placement of immediate complete denture may be a discouraging factor for the elderly among other reasons such as cost of transportation and longer chair-side time.

More than half of the patients demanded complete denture to enhance mastication. This is in agreement with a previous study¹⁵ in which all their patients requested complete dentures to improve their chewing ability. Mastication is a major concern among the elderly because of missing teeth which make it difficult for them to chew and enjoy their choice diet.^{26,27}

The majority of the participants were satisfied with their dentures after a week's review. This is in agreement with a previous study²⁸ in which the participants were highly satisfied with their complete dentures. Also, Oweis et al.,²⁹ reported satisfactions with complete denture in 60% of their patients at one week's review. This finding may be due to compliance with standard clinical protocol at the centre in the fabrication of complete denture.³ In addition, the possibility of early adaptation to the dentures, because majority were previous denture wearers could account for the report of satisfaction with the dentures by many of the patients.

Satisfaction with complete denture therapy might be affected by several factors such as clinician's skill, patients' age, personality, previous denture wearing experience, and patients' expectations.²⁹ In this study, there was a statistically significant relationship between the patients' age group and satisfaction with complete denture, with higher proportion of younger age group that were satisfied

with their denture when compared with the older age group. This finding may be because of better denture bearing area among the younger age group due to less residual ridge resorption. Residual ridge resorption is a chronic, continuous process after tooth loss and it is more severe after a long period of *edentulousness*.³⁰ This may affect retention, stability and consequently satisfaction with complete denture among the older age group that had been edentulous for a long period.

The findings of this study, however, showed no significant relationship between patients' gender and level of satisfaction with their complete dentures, which was in accordance with the study of Golebiewska et al.³¹ On the contrary, Awad and Feine³² reported that patient's satisfaction with their complete dentures was dependent on their gender. Although the proportion of previous complete denture wearers who were satisfied with their denture was higher than the non-previous complete denture wearers, there was no statistically significant relationship between these types of complete denture and patients' satisfaction. The better satisfaction among previous denture wearers could be due to the previous period of neuromuscular adaptation to the complete denture, which involves previous experience to adapt the muscles of the lips, cheek, and tongue during function to the denture borders.

CONCLUSION

This 10-year review highlighted periodontal disease as the main cause of tooth loss among the elderly, with mastication being the primary reason for seeking complete dentures, and acrylic dentures were most common.

Limitations of the study.

One of the limitations of this study is the inability to classify the patients into proper socio-economic classes because the educational level, occupation before retirement and the basic income of majority of the patients were not available in their case records. This prevents relating the satisfaction of the patients with their socio-economic status. Another limitation is inability to grade the level of satisfaction of the patients because of the retrospective nature of the study. Although some factors like retention, stability, and aesthetics were mentioned in relation to satisfaction, the information was not consistent, and satisfaction was stated in the case file in two categories: satisfied or not satisfied with the denture.

This prevents proper grading of patients according to their level of satisfaction and adequate comparison with other studies.

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Conflict of interest

None declared

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