

Relative frequency and pattern of usage of stock teeth in removable partial dentures in a clinical setting in Nigeria

Olugbenga Adetokunbo Adenuga-Taiwo, Adolphus Odogun Loto, Adenike Ololade Awotile, Ifeoma Nkiruka Menakaya

ABSTRACT

Aims: The current study was designed to determine the frequency of usage of acrylic stock teeth in RPDs using variables such as age, gender, jaw quadrants and jaws respectively. **Methods:** This random retrospective study reviewed the laboratory cards of 2,266 adult patients who requested for RPDs from the Dental Centre of Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria. Data on the frequency of usage of stock teeth relative to the sides of each jaw as well as both jaws, age and gender were recorded and analysed. **Results:** There were 2,774 acrylic partial dentures supplied during the period of study. Males (67.7%) used upper dentures compared to females (59.4%); and more females (40.6%) requested for lower dentures as against 32.3% males. A decline in the number of teeth replaced was seen progressively towards the posterior region of each jaw. No marked difference was seen between the distribution of teeth provided for the right and left sides of each jaw. There were more acrylic stock teeth demanded for the upper jaw compared to the lower jaw. **Conclusion:** The request for RPDs was

more in females than males; though, more use of acrylic stock teeth were seen in males compared to females. There was no marked difference between the distribution of teeth provided for the right and left sides of each jaw. More acrylic teeth were used in the upper jaw compared to the lower jaw.

Keywords: Acrylic stock teeth, Clinical setting, Removable partial denture

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INTRODUCTION

Removable partial denture (RPD) is a type of prosthesis used to replace missing teeth in partial edentulous patients. It is a common prosthodontic treatment for patients in the south western region of Nigeria. Recent investigations analysed the trends in demand for prosthodontic treatment in the United States and found that as the full edentulous condition decreases, the use of removable partial dentures (RPD) increases [1, 2]. Similarly, as the rate of total tooth loss decreases, the need for removable partial denture treatment increases [3-5]. In addition, it was found that with the improved level of awareness of preventive oral care, there has been an increase in the number of patients who require

prosthodontic treatment with RPDs [6–8]. However, other treatment options to replace missing teeth include the use of conventional fixed bridge, resin-bonded bridge, and implant–retained prosthesis [1]. These treatment options are found to be expensive especially in the low socio-economic areas where highest rate of tooth loss occur and may limit their demand for them [9–11].

It has also been observed that there is greater demand and provision of acrylic resin based RPDs than cobalt-chromium based RPDs because they are more affordable to patients [2] as well as the possibility of altering the acrylic prosthesis should further tooth loss occurs [10].

Consequently, in many developing countries, the construction of acrylic denture is a popular treatment option based on its cost effectiveness and easy availability. To this end, the most important reason why patients seek prosthetic replacement of missing teeth is to improve their appearance [3, 10]. However, other reasons include the restoration of speech, mastication, confidence and psychological well-being.

Furthermore, the effect of age and sex on the demand for RPDs have been investigated [9], but the influence of social status on the pattern of demand and other major reasons are yet to be fully investigated in our environment [7]. Provision of RPD is often initiated by patient's demand [4]. However, it is not clear sometimes, why patients who are in need of prostheses do not care while those who are not necessarily indicated requested for them [11]. The aim of this study was to determine the frequency and distribution pattern of stock teeth in the provision of RPDs with a view of having a better understanding of budgeting, purchasing and stocking of acrylic teeth.

MATERIALS AND METHODS

The data for this study were collected by retrospectively reviewing laboratory cards/records of patients who were treated at Lagos State University Teaching Hospital (LASUTH) dental laboratory between 2011 and 2014. The study parameters included: patients' ages, distribution of stock teeth in frequency and percentage with respect to gender, jaw/jaw quadrants and tooth type, distribution of RPD in frequency and percentage according to sex and jaw location of replaced teeth.

The inclusion criteria include: the anonymity and confidentiality of the patients whose laboratory records were employed for the study; indication of the missing tooth/teeth to be replaced on the laboratory cards; and evidence of delivery of the RPDs to the patients, which must be shown on the laboratory cards.

The exclusion criteria cover patients that were less than 17 years of age or patients whose work authorisation forms contained less information and those that demanded for complete dentures, denture repairs, over denture, transitional and fixed partial dentures.

The obtained data were presented in tabular forms; and managed on Computerized SPSS Window version 20.0 (SPSS Inc. Chicago Illinois, USA) to generate descriptive statistics (frequency, percentage, mean, SD).

Comparisons of relative usage of stock teeth with respect to the study parameters were carried out using Chi Square Test (X^2). In addition, the results of the current study were also statistically compared with other local studies [6, 7].

RESULTS

A total of 2,266 patients received removable partial dentures (RPDs) during the four year study period. Among these patients, 1,414(62.4%) were males and the remaining 852(37.6%) were females. The ages of patients (n) ranged from 17 to 89 years (Mean± SD=1.26) and median age was 35 years. The age group 28-38 years was the most frequently affected and this was followed closely by age group 17-27 years (Table 1).

Regarding the frequency of usage of removable prostheses, a total of 2,774 (100%) RPDs were supplied; and greater number of males (61.5%) used dentures than females (38.4%). In both sexes, there was a significantly higher usage of RPDs in the upper jaw (1790) compared to the lower jaw (984) while the use RPDs in males were significantly higher than females (Table 2). The results demonstrated that there was no statistically significant difference in the number of stock teeth provided for each side of the jaws in both sexes (Tables 3 and 4).

The maxillary central incisors (2,251) (45.3%) were the most principally replaced teeth followed by the maxillary lateral incisors (798) (16.1%) (Table 5). The number of missing teeth that were replaced with stock teeth in RPDs was higher in males than females in both maxilla and mandible. The difference was statistically significant ($P=0.000$) (Table 5).

A greater number of missing maxillary teeth were replaced with stock acrylic teeth in RPDs compared to the missing mandibular teeth. This was statistically significant (P -value=0.000) (Tables 6 and 7). The current study showed that the frequency of replacing missing teeth with stock teeth was higher than other previous Nigerian studies in respect of upper and lower RPDs (Table 8). Finally, the findings of the current study were also comparable with previous Nigerian studies (Table 8).

DISCUSSION

In the present study, more males requested for removable acrylic dentures. This is in agreement with earlier studies carried out in Nigeria [6, 12] where they reported that more males requested for removable prostheses. However, Arigbode and Taiwo [7] in another Nigerian study and Ferreira et al [8] demonstrated a female predominance. This might be attributed to the

Table 1: Age and sex distribution of patients

Age group (years)	Sex of patients				Total	Statistic
	Male		Female			
	Frequency	Percentage	Frequency	percentage		
17-27	342	15.1	158	7.0	500(22.1)	X ² =15.195 df=6 P=0.019*
28-38	360	15.9	241	24.1	601(26.5)	
39-49	282	12.4	167	7.4	449(19.8)	
50-59	182	8.0	122	5.4	304(13.4)	
60-69	157	6.9	117	5.2	274(12.1)	
70-79	82	3.6	45	2.0	127(5.6)	
80-89	9	0.4	2	0.1	11(0.5)	
Total	1414	62.4	852	37.6	2266 (100.0)	

*P= P-value sig @ ≤0.05

df=degree of freedom

X²= chi square

About two-third (62.4) of patients were males. This is statistically significant (P=0.019)

Table 2: Distribution of RPD according to sex and jaw

	Sex		Total	Statistic
	Male (%)	Female (%)		
Jaws				
Upper	1157(67.7)	633(59.4)	1790(64.5)	X ² =5.269 df=1 P-value=0.022
Lower	551(32.3)	433(40.6)	984(35.5)	
Total	1708(100.0)	1066(100.0)	2774(100.0)	

Table 3: Distribution of mandibular stock teeth that were utilized in RPD based on sex and jaw quadrants

	Mandible		Total (%)	Statistic
	Right (%)	Left (%)		
Male				X ² = 4.301 df=6 P=0.636
Central incisor	112(14.9)	141(16.8)	253(15.9)	
Lateral incisor	144(19.1)	152(18.1)	296(18.6)	
Canine	56(7.4)	76(9.0)	132(8.3)	
First premolar	60(8.0)	75(8.9)	135(8.5)	
Second premolar	73(9.7)	83(9.9)	156(9.8)	
First molar	163(21.7)	172(20.5)	335(21.0)	
Second molar	144(19.1)	141(16.8)	285(17.9)	
Total	752(100.0)	840(100.0)	1592(100.0)	
Female				X ² =2.769 df=6 P=0.837
Central incisor	156(29.3)	148(27.0)	304(28.1)	
Lateral incisor	63(11.8)	56(10.2)	119(11.0)	
Canine	18(3.4)	22(4.0)	40(3.7)	
First premolar	27(5.1)	30(5.5)	57(5.3)	
Second premolar	38(7.1)	34(6.2)	72(6.7)	
First molar	127(23.8)	143(26.0)	270(25.0)	
Second molar	104(19.5)	116(21.1)	220(20.3)	
Total	533(100.0)	549(100.0)	1082(100.0)	

No significant difference was observed in the number of stock teeth used in both sides of the jaw, which received RPDs in both male and female.

tendency of females to attend clinics regularly than men owing to their earlier presentation of tooth loss, which could be as a result of underlying periodontal disease aggravated by pregnancy [13].

The higher demand for RPDs in males, according to this study, might be related to the fact that tooth loss, as a result of trauma, is highly prevalent in the male population [14]. Esan et al [9] who observed a significant

tooth loss among male commercial motorcyclists (Okada) involved in road traffic accidents in Lagos support this. The most commonly affected age group in this study was 28-38 years; and this was followed by 17-27 years [15].

In addition, the mean age of patients in this study was 35 years; and it was comparable with the study of Hassan et al [16] who reported 35.5 years but seriously

Table 4: Distribution of maxillary stock teeth that were utilized in RPDs based on sex and jaw quadrants

	Maxilla		Total (%)	Statistics
	Right (%)	Left (%)		
Male				
Central incisor	870(48.5)	865(46.6)	1735(47.6)	X ² =3.145 df=6 P=0.732
Lateral incisor	232(12.9)	352(19.0)	584(16.0)	
Canine	122(6.8)	116(6.3)	238(6.5)	
First premolar	164(9.2)	132(7.1)	296(8.1)	
Second premolar	150(8.4)	158(8.5)	308(8.4)	
First molar	153(8.5)	126(6.8)	279(7.7)	
Second molar	101(5.6)	106(5.7)	207(5.7)	
Total	1792(100.0)	1855(100.0)	3647(100.0)	
Female				
Central incisor	257(38.5)	259(39.5)	516(39.0)	X ² =4.058 df=6 P=0.669
Lateral incisor	114(17.1)	100(15.2)	214(16.2)	
Canine	34(5.1)	38(5.8)	72(5.4)	
First premolar	60(9.0)	54(8.2)	114(8.6)	
Second premolar	57(8.5)	66(10.1)	123(9.3)	
First molar	95(14.2)	80(12.2)	175(13.2)	
Second molar	50(7.5)	59(9.0)	109(8.2)	
Total	667(100.0)	656(100.0)	1323(100.0)	

No significant difference was observed in the number of stock teeth used in both sides of the jaw, which received RPDs in both male and female.

Table 5: Comparison of frequency and distribution of stock teeth that were used in RPDs based on jaw and sex

	Sex		Total (%)	Statistics
	Male (%)	Female (%)		
Maxilla				
Central incisor	1735(47.6)	516(39.0)	2251(45.3)	X ² =61.787 df=6 P=0.000
Lateral incisor	584(16.0)	214(16.2)	798(16.1)	
Canine	238(6.5)	72(5.4)	310(6.2)	
First premolar	296(8.1)	114(8.6)	410(8.2)	
Second premolar	308(8.4)	123(9.3)	431(8.7)	
First molar	279(7.7)	175(13.2)	454(9.1)	
Second molar	207(5.7)	109(8.2)	316(6.4)	
Total	3647(100.0)	1323(100.0)	4970(100.0)	
Mandible				
Central incisor	253(15.9)	304(28.1)	557(20.8)	X ² =114.241 df=6 P=0.000
Lateral incisor	293(18.6)	119(11.0)	415(15.5)	
Canine	132(8.3)	40(3.7)	172(6.4)	
First premolar	135(8.5)	57(5.3)	192(7.2)	
Second premolar	156(9.8)	72(6.7)	228(8.5)	
First molar	335(21.0)	270(25.0)	605(22.6)	
Second molar	285(17.9)	220(20.3)	505(18.9)	
Total	1592(100.0)	1082(100.00)	2674(100.0)	

The number of missing teeth that were replaced with stock teeth in RPDs was higher in males than females in both maxilla and mandible. The difference was statistically significant (P=0.000).

Table 6: Distribution of stock teeth for RPD based on Jaws and jaw quadrants

Stock Teeth	Sex of patients (Male and Female combined)				Total (%)
	Maxilla		Mandible		
	Right (%)	Left (%)	Right (%)	Left (%)	
CI	1127(45.8)	1124(44.8)	258(20.9)	289(20.8)	2808(36.7)
LI	346(14.1)	452(18.0)	207(15.1)	208(15.0)	1213(15.9)
C	156(6.3)	154(6.1)	74(5.8)	98(7.1)	482(10.00)
P1	224(9.1)	186(7.4)	87(6.8)	105(7.6)	602(7.9)
P2	207(8.4)	224(8.9)	111(8.6)	117(8.4)	659(8.6)
M1	248(10.1)	206(8.2)	290(22.6)	315(22.6)	1059(13.9)
M2	251(6.1)	165(6.6)	248(19.3)	257(18.8)	821(10.7)
Total	2459(100.0)	2511(100.00)	1285(100.0)	1398(100.0)	7644(100.0)

Table 7: Comparison of stock tooth types that were utilized in RPDs based on jaw

	Male and female sexes combined Jaw		Total (%)	Statistics
	Maxilla (%)	Mandible (%)		
Central incisor	2251(45.3)	557(20.8)	2808(36.7)	X ² =768.610 df=6 P=0.000
Lateral incisor	798(16.1)	415(15.5)	1213(15.9)	
Canine	310(6.2)	172(6.4)	482(6.3)	
First premolar	410(8.2)	192(7.2)	602(7.9)	
Second premolar	431(8.7)	228(8.5)	659(8.6)	
First molar	454(9.1)	605(22.6)	1059(13.9)	
Second molar	316(6.4)	505(18.9)	821(10.7)	
Total	4970(100.0)	2674(100.0)	7644(100.0)	

A greater number of missing maxillary teeth were replaced with stock acrylic teeth in RPDs compared to the missing mandibular teeth. This was significant (P-value=0.000).

Table 8: Distribution of stock teeth supplied for upper and lower RPDs in the current study in comparison with previous Nigerian studies

Teeth type	Current study n=7644		Arigbede and Taiwo (2011) n=2140		Olusile and Esan (2002)n=695	
	Right (%)	Left (%)	Right (%)	Left (%)	Right (%)	Left (%)
RCI	1127(14.74)	268(3.51)	419(19.58)	172(8.04)	106(15.25)	45(6.47)
LCI	1124(14.70)	289(3.78)	399(18.64)	180(8.41)	95(13.67)	43(6.19)
RLI	346(4.53)	207(8.04)	137(6.40)	94(4.39)	42(6.04)	35(5.04)
LLI	452(5.91)	208(2.72)	147(6.87)	95(4.44)	39(5.61)	33(4.75)
RC	156(2.04)	74(4.39)	43(2.01)	24(1.12)	12(1.73)	17(2.45)
LC	154(2.01)	98(1.28)	35(1.64)	24(1.07)	7 (1.01)	13(1.87)
UP1	224(2.93)	87(1.14)	27(1.26)	20(0.93)	19(2.73)	14(2.01)
LP1	186(2.43)	105(1.37)	36(1.68)	19(0.89)	12(1.73)	12(1.73)
RP2	207(2.71)	111(1.45)	17(0.79)	17(0.79)	9(1.29)	11(1.58)
LP2	224(2.93)	117(1.53)	19(0.89)	18(0.84)	5(0.72)	11(1.58)
RM1	248(3.24)	290(3.79)	26(1.21)	33(1.54)	18(2.59)	21(3.02)
LM1	206(2.69)	315(4.12)	23(1.12)	45(2.10)	13(1.87)	18(2.59)
RM2	151(1.98)	248(3.24)	14(0.65)	24(1.21)	13(1.87)	13(1.87)
LM2	165(2.16)	257(3.36)	11(0.51)	22(1.03)	11(1.58)	8(1.15)
Total	4970(65.02)	2674(34.98)	1353(63.22)	787(36.78)	401(57.70)	294(42.30)

contradicted by Curtis et al [17] who reported mean age of 55 years in their study.

Furthermore, the prevalence of young age groups in this study might be due to the fact that they are more concerned about their appearance; and are economically capable. This study also established the fact that greater use of acrylic stock teeth in the anterior region of the maxilla as compared with the mandible. Aesthetics could also be the driven factor for the greater demand for replacement of anterior teeth compared to the posterior missing teeth.

Consequently, most people would rather wear the upper removable prostheses compared to the lower ones for aesthetic reason; and this is regardless of the sex of the patients.

However, the vulnerability of anterior teeth to trauma and loss had been established by various studies [18–21], which observed that the most commonly traumatized teeth were the maxillary incisors because of their conspicuous position. The maxillary central incisors were found to be the most replaced teeth, followed by the maxillary lateral incisors and the mandibular incisors in this study. These findings were in agreement with the study carried out in

South-South, Nigeria by Arigbede, Taiwo [7]. Canine was the least lost tooth in this study. This might be due to its long, deep and firm root coupled with its position at the angle of the mouth that kept it away from direct frontal impact as well as its low susceptibility to caries.

Moreover, apart from aesthetics particularly in educated and young individuals, speech defect could play a contributory motivating factor in the demand for prosthetic teeth when anterior teeth are missing. The loss of maxillary anterior teeth may prevent clear reproduction of certain sounds, particularly F and V, which are pronounced by the lower lip contacting the edges of the maxillary incisors [22].

The frequency of usage of acrylic stock teeth in the posterior segment was limited in this study and this was supported by previous studies [6, 7]. This pattern of replacement of posterior teeth is expected even in developed countries where spaces in the premolar and molar areas are accepted by people of all ages [23] using the principle of shortened dental arch concept.

The clinical significance of this study is that the findings obtained will assist in making concrete decisions concerning budgeting, purchases and stocking

of acrylic teeth for removable partial dentures. This will also prevent wastage of scarce resources and funds.

LIMITATION

Patients were not physically involved in this study. Therefore, the reasons for relative demand for the replacement of the different tooth types could not be ascertained. The socio-economic factors of patients as well as the level of awareness of patients with respect to other forms of tooth replacement could not be determined.

The present study showed that the frequency of usage of acrylic stock teeth in RPDs were more in males than females; and maxillary incisors were more replaced than others. The study suggests that aesthetics, rather than function, might be the dominant factor concerning demand for removable prostheses among the studied patients at LASUTH.

CONCLUSION

There was no marked difference in the distribution of teeth provided for the right and left sides of each jaw. The results of the study also showed that more acrylic stock teeth were demanded for the upper jaw compared to the lower jaw with the exception of first and second upper molars where a lower demand was made compared to the lower counterparts.

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Author Contributions

Olugbenga Adetokunbo Adenuga-Taiwo – Substantial contributions to conception and design of the article, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Adolphus Odogun Loto – Substantial contributions to conception and design of the article, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

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Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Consent Statement

Written informed consent was obtained from the patient for publication of this study.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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