

## PROSTHODONTIC REHABILITATION OF MAXILLOFACIAL DEFECTS IN A NIGERIAN TEACHING HOSPITAL: A 9-YEAR REVIEW

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### SUMMARY

**Objectives:** The objective was to review patients treated with maxillofacial prostheses in a Nigerian teaching hospital to assess the types of prostheses provided for them.

**Methodology:** This was a retrospective study of patients treated with maxillofacial prostheses over a period of nine years. The socio-demographic data of the patients, types of defect, causes of defects, location of defect, types of maxillofacial prostheses and the indications for prostheses were obtained from the patients' case records. Case records with incomplete information were excluded. All data generated were analysed using the IBM SPSS version 20. Fisher's exact test was used to test for statistical significance.

**Result:** Case records of eighty-two patients treated with maxillofacial prostheses were reviewed. Forty-three (52.4%) of the patients were males while 39 (47.6%) were females. The age ranged from 6 to 76 years with the mean age being of 38.76 (SD±18.3) years. The majority, 58 (70.7%) of the patients were of lower social-economic class. Sixty-six (80.5%) patients had prostheses for maxillary defects, while only one (1.2%) patient had prosthesis for nasal defect. Twenty (30.3%) of the 66 patients that had maxillary defects had definitive obturators, while only three (4.5%) had all the three types of obturator. Surgical recession of tumours of the jaw was the major cause (85.4%) and mastication (70.7%) was the major indication for the prescription of obturators.

**Conclusion:** The majority of the patients were of the lower social class and maxillary obturator was the major form of maxillofacial prostheses provided for patients in this study. Most of the defects are caused by surgical recession of tumours of the jaw and mastication was the major indication for the prescription of obturators.

**Key words:** Management, Oral and maxillofacial defects, Obturator, Prosthetic.

### INTRODUCTION

The face is an anatomical structure in front of the head and span from the hairline to the chin, with certain characteristics and details that confer unique features to each individual.<sup>1</sup> These features proffer unique aesthetic look and allow acceptance of the individual within and outside a group or race.<sup>2</sup> Any alteration in the shape and form of the face usually draws attention and this affects the individual social and psychology wellbeing.<sup>3</sup> Alteration of the face can result from trauma, tumour, congenital malformation, infection and surgical resection of tumour.<sup>4</sup> The most common cause of alteration or defect of the maxillofacial region is head and neck tumour.<sup>4</sup> The annual incidence of head and neck tumour is on the increase and oral and pharyngeal cancer, grouped together is the sixth most common cancer worldwide.<sup>5</sup>

The standard treatment of head and neck tumour depends on whether it is malignant or benign. Usually surgical resection alone is adequate for benign lesion while for malignant lesion other adjunct treatment such as chemotherapy or radiotherapy is necessary. Surgical resection leads to tissue loss or facial defects with attendant loss of aesthetics and function such as speech, mastication and swallowing.<sup>6</sup>

The tissue loss or facial defect can be replaced by plastic reconstruction or prosthetic rehabilitation. The prostheses help to improve the patients' social life after surgical resection of tumour. It has the following advantages over surgical management: It is less invasive, helps patients to avoid complications associated with surgery, less expensive and may provide

better aesthetic result. In addition, it provides predictable and a reasonable level of functional restoration to the patients.<sup>6,7</sup>

Maxillofacial prostheses can be classified into several categories: based on the location as intra oral and extra oral prostheses.<sup>8</sup> The extra oral prostheses include nasal, ocular, ear and composite prostheses, while the intra oral can be sub classified into maxillary and mandibular prostheses.<sup>7</sup> The maxillary prostheses include obturator for hard palate defects, speech bulb and palatal lift appliances for soft palate defects.<sup>6</sup> The maxillary obturators can be classified based on the time of placement into surgical, interim/provisional and definitive obturator. The surgical obturator is fitted immediately after surgery while the provisional is usually fitted between 10 days to two weeks after surgery. The definitive obturator is usually fitted about six months post operatively.<sup>9, 10</sup>

Several studies<sup>11,12</sup> carried out in our country are limited to prosthetic rehabilitation of patients with palatal or maxillary defects. Furthermore, there are few and old clinical audits of patients managed with maxillofacial prostheses especially in the few centres where such facilities exist in Nigeria and it is imperative that such data are continuously updated for proper planning and review of our clinical protocol. Therefore, this study sought to review patients treated with maxillofacial prostheses at the Prosthetic clinic of the University College Hospital, Ibadan to assess their demographic characteristics, causes of defects, types of maxillofacial prostheses and the indications for the prostheses. The study also aimed to compare the results with the report obtained about a decade ago from a study<sup>11</sup> at the centre to see if there is any change in the maxillofacial prosthetic treatment provided.

## METHODOLOGY

This was a retrospective study of patients treated with maxillofacial prostheses in a Nigerian teaching hospital. Names and case numbers of patients that presented with maxillofacial defects over a period of nine years (January 2010 to December 2018) were gotten from the prosthetic clinic's daybooks. These were used to obtain the patients' case files from the record department. The demographic data, types of defect, causes of defects, types of maxillofacial prostheses and the indications for the prostheses were obtained from their case records. Case records with incomplete information were excluded from the study. Patients were classified into four socio-economic classes according to classification by Croxford.<sup>13</sup> All data generated were entered into a personal computer and analysed using the IBM SPSS version 20. Fisher's exact test was used to test for association between categorical

variables and level of significance placed at  $P \leq 0.05$ . Ethical approval was obtained from the institutional ethical committee (UI/EC/20/0070).

## RESULT

The daybook record revealed that 96 patients were diagnosed with maxillofacial defects and planned for treatment during the study period. However, eighty-two patients had complete information in their case records, five case records were not found while nine patients (two each with ear and mandibular defects, and five with maxillary defects) did not return for treatment.

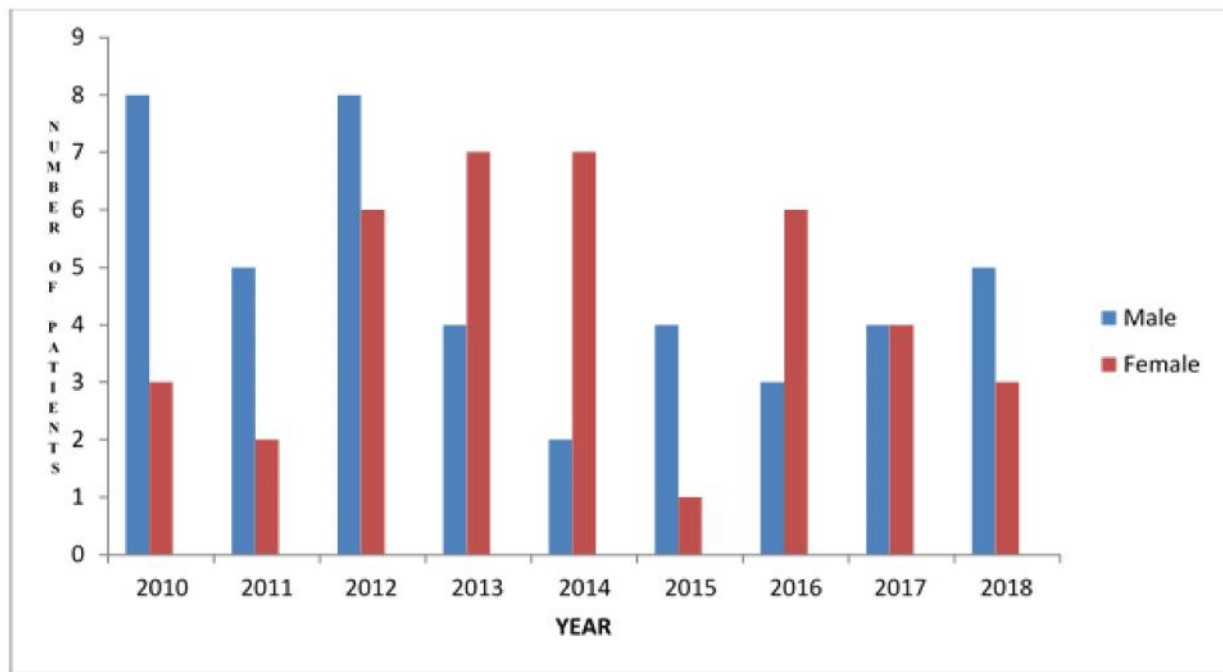
**Table 1:** Socio-demographic characteristic of the patients.

Age group (Years)	Frequency(n)	Percentage (%)
< 20	16	19.5
20 - 40	27	32.9
41 - 60	30	36.6
> 60	9	11.0
Mean	38.76 ( $\pm 18.32$ )	
<b>Gender</b>		
Male	43	52.4
Female	39	47.6
<b>Occupation</b>		
Upper middle class	5	6.1
Lower middle class	19	23.2
Lower class	58	70.7
<b>Total</b>	82	100.0

Table 1 shows the age distribution of the patients. The age of the patients ranged from six to seventy-six with a mean of 38.76 (SD  $\pm 18.32$ ) years. Thirty-nine (47.6%) of the patients were above forty years of age while only 16 (19.5%) patients were below twenty years of age. Forty-three (52.4%) of the patients were males while thirty-nine (47.6%) were females. The majority 58 (70.7%) of the patients belonged to lower socio-economic class while none belong to the upper class.

**Table 2:** Distribution of the location and causes of maxillofacial defect.

Location of defect	Frequency (n)	Percentage (%)
Hard palate	66	80.5
Soft palate	3	3.7
Mandible	11	13.4
Others (nose, composite)	2	2.4
<b>Causes of defect</b>		
Surgery	70	85.4
Infection	2	2.4
Trauma	7	8.5
Congenital	3	3.7
<b>Reason for Surgery</b>		
Benign tumour	42	51.2
Malignant tumour	28	34.2
Not applicable	12	14.6
<b>Total</b>	82	100.0



**Fig. 1:** Gender and yearly distribution of the patients.

The highest number of patients (17.1%) consisting of eight males and six females were seen in the year 2012 while the least 5 (6.1%) were seen in 2015 (Figure 1). The most common site of the defect was the hard palate 66 (80.5%), followed by the mandible 11 (13.4%), while the least was the nose and the defect affecting the eye and cheek (composite) (1.2%) respectively. Surgical resection (85.4%) was the main cause of the defects while the least (2.4 %) was infection. Benign tumour was the major reason 42 (51.2%) for surgery (Table 2).

**Table 3:** Distribution of the maxillary defects according to Aramany classification.

Aramany's classification	Frequency	Percentage
Class I	37	62.7
Class II	7	11.9
Class III	3	5.1
Class IV	10	16.9
Class V	0	0.0
Class VI	2	3.4
Total	59	100.0

Table 3 shows that Aramany class I was the most common 37 (62.7%) form of surgical maxillary defects, while Aramany class V was the least with zero incidence. Table 4 shows the distribution of the types of lesion and Aramany's classification of the defects. Benign lesion was the reason for surgery in greater number (22, 4 and 6) of patients with Aramany class I, II and IV defects respectively when compare with malignant lesion which was the reason for surgery in 15, 3 and 4 patients with Aramany class I, II and IV defects respectively. Figure 1 shows that mastication was the major indication 58 (70.7%) for requesting for maxillofacial prostheses, followed by aesthetic 11 (13.4%).

Table 5 shows the distribution of obturator fitted for the patients. Twenty-one (25.6%) had surgical obturator, while the majority, 39 (47.6%) had definitive obturator. Only 3 (3.7%) patients had all the three types of obturator. Ten patients with benign lesion and 11 with malignant lesion as the causes of palatal defects had surgical obturator, while 20 with benign lesion and

**Table 4:** Distribution of the types of lesion and Aramany classification of defects.

Types of lesion	Aramany's classification (Class)							Total
	I	II	III	IV	V	VI	Not applicable	
Benign	22	4	1	6	0	1	8	42
Malignant	15	3	2	4	0	1	3	28
Not tumour	0	0	0	0	0	0	12	12
Total	37	7	3	10	0	2	23	82

**Table 5:** Types of obturator fitted for the patients with palatal defects.

Obturator types	Frequency	Percentage
Surgical	21	25.6
Intermediate	33	40.2
Definitive	39	47.6
All the type	3	3.7

**Table 6:** Distribution of the types of lesion and type of obturator fitted for the patients.

Types of lesion	Types of palatal obturator			All
	Surgical	Intermediate	Definitive	
Benign	10	19	20	2
Malignant	11	12	9	1
Non Tumour	0	2	10	0
Total	21	33	39	3

nine with malignant lesion as the causes of defects had definitive obturators (Table 6). Fisher exact test shows no statistical significant relationship between maxillofacial prosthesis and gender ( $p=0.407$ ) or age of the patients ( $p= 0.114$ ) (Table 7).

especially fibro osseous lesions accounted for many of the defects in our study. These lesions are more common before the age of forty years.<sup>15</sup> A slightly higher proportion of male (52.4%) patients than females were seen, which is in agreement with the findings of Akinbobola *et al.*,<sup>16</sup> but in contrast with report of Omo *et al.*<sup>12</sup> The reason for this gender variation could be a reflection of the higher prevalence of jaw tumours documented in males.<sup>17</sup> About 70% of the patients belonged to lower socio-economic class which is in agreement with previous study<sup>18</sup> and could be due to the fact that oral tumours are more common among the lower socio economic individuals because of habits like poor oral hygiene, smoking, malnutrition that are common with the group.<sup>19</sup> Poor nutrition has been reported by several studies<sup>18,19</sup> as a major predisposing factor to development of tumour. This is because of formation of free radical that are not mopped up causing damage to gene (DNA) and cancer progression. Antioxidant vitamins in balanced diet prevent oxidative damage to DNA.<sup>20</sup>

The most common site of defects (70.5%) managed with prostheses was the maxilla, and it is in accordance

**Table 7:** Relationship between patient's Age/Gender and types of maxillofacial prosthetics.

Gender/Age group	Types of prostheses				Fisher's Value	P value
	Obturator for hard palate	Speech bulb (soft palate)	Mandibular prosthesis	Extra- oral		
Gender						
M	35	1	7	0	2.896	0.407
F	31	2	4	2		
Age group						
≥20	10	2	4	0	11.374	0.114
21-40	21	1	4	1		
41-60	26	0	3	1		
> 60	9	0	0	0		
Total	66	3	11	2		

## DISCUSSION

A total number of 82 patients at the rate of nine patients per month were reviewed compare with 53 patients at the rate of five per month previously reviewed<sup>11</sup> at this centre. This shows an increase in the numbers of maxillofacial prostheses prescribed and fitted in the centre. This is probably due to increase in the number of patients treated with surgical resection of jaw tumours.

In this study, 43 (52.4%) patients were below 40 years old. This is contrary to the report by Omo *et al.*,<sup>12</sup> and Akinmoladun *et al.*,<sup>14</sup> in which most of their subjects were over 40 years. This is because benign tumour

with previous studies.<sup>11,12,16</sup> Although, other studies<sup>20,21</sup> have reported more cases of mandibulectomy than maxillectomy in our country, these studies were not carried out in the prosthodontic clinics and hence might not report the pattern of presentation at prosthodontic clinic. Furthermore, many mandibulectomies do not lead to extensive defect and hence do not require extensive rehabilitation. More patients however, tend to come for obturators for maxillary defects possibly because of associated complications such as oro-nasal and oro-antra communication leading to hyper-nasal speech, difficulty in mastication, nasal discharge to oral cavity and severe degree of un-aesthetic appearance.

Cleft of the soft palate is the only defect caused by congenital malformation seen in this study. The few cases of cleft could be due to preference for surgery in management of cleft patients. In addition, the part sponsorship of surgical care of facial clefts by Smile-train International, a United States of America based organization has brought some improvement in access to cleft surgery in Nigeria.<sup>22</sup> No ocular or orbital cases were seen during the period because orbital defects are managed by the ophthalmology team.

The major reason for requesting for prostheses was mastication 70.7%, This is in line with the report of Akinmoladun *et al.*,<sup>14</sup> where it was documented that chewing was the most important domain to patients with maxillectomy defects. Although most of the patients in the present study had both anterior and posterior teeth missing, one would have expected them to express more concern about their look than mastication. The reason for their concern about mastication could be due to the difficulty usually experienced in mastication immediately post operatively. This could have played a dominant role than their aesthetic concern.

In this study, only few patients had the three types of obturator; surgical, intermediate and definitive. Surgical obturator is constructed from an adjusted pre-operative cast and fitted immediately after surgery. It serves the purpose of support for surgical packing, support for the split thickness skin graft if used, minimizes wound contamination, enhances speech and swallowing immediately after surgery.<sup>6,12</sup> Provisional obturator replaces the surgical obturator and is worn in the postoperative healing period. It usually has clasps for retention and can have anterior teeth for esthetics and early social integration.<sup>6</sup> Definitive obturator is fabricated when the surgical site is stable usually between three months to a year. It is fabricated from a working cast made from a precise impression of the defect. It usually replaces the missing teeth and has hollow bulbs to reduce the weight of the prosthesis and improve the retention and comfort of the patient.<sup>6,23</sup> The finding that few patients had the three type of obturators is similar to the result of Omo *et al.*,<sup>12</sup> and Akinmoladun *et al.*,<sup>14</sup> The reason could be financial constraint, challenges of retention and care of the prostheses. The care of obturator can be cumbersome and challenging especially to patient that are being wean from psychological trauma of tumour resection and those on radiotherapy. Greater proportion of patients with benign lesion as cause of defect had definitive obturator when compare with those with malignant lesion. This could be because of longer life span of patient with benign lesion and possibility of such

patients presenting for replacement definitive obturators.

Aramany class I defect was the most common maxillary defect followed by class IV. This is contrary to finding of Dosumu and Arigbede's study<sup>11</sup> in which class IV was the most common defect. The reason for this could be because benign tumour was the major cause of defect in this study unlike the previous study<sup>11</sup> which had malignant lesion that requires radical surgery as the major cause of the defects. Another possible reason could be the fact that this study considered midline palatal defect with posterior teeth as Aramany class I unlike the previous study<sup>11</sup> that proposed and recognised the group as unclassified defects.

## CONCLUSION

Maxillary obturator is the major maxillofacial prostheses provided for patients and there is improvement in its utilisation though only few patients had the three types of obturator. Most of the defects are caused by surgical recession of tumours of the jaw and mastication was the major indication for the prescription of obturators.

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