

THE PATTERN OF MANDIBULAR RESECTIONS IN A NIGERIAN TERTIARY HOSPITAL: A 10-YEAR EXPERIENCE

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ABSTRACT

BACKGROUND: Previous reports have shown that conservative resection is mostly performed in developed countries, where patients report early for treatment, unlike in developing countries.

AIM: To describe the pattern of surgical resections of the mandible at a tertiary health facility in Southern Nigeria.

MATERIALS AND METHOD: A retrospective study was designed to study the pattern and document the patients that had surgical resections of the mandible from January 2005 to July 2020 at the Department of Oral and Maxillofacial Surgery of a tertiary hospital in Nigeria. Collected data were age, gender, level of education, place of residence, occupation, tobacco use, and alcohol consumption. Other data collected were the type of lesions, type of resections performed, type of reconstruction, and treatment complications. Cross-tabulations were performed with Pearson's chi-square test. All statistics were performed with SPSS version 21 (IBM corps, Armonk, New York, US). AP-value of less than 0.05 was considered significant.

RESULTS: The data of 189 patients were collected. The age range was 15-70 years, with a mean age and standard deviation of 44.7±14.9 years. More males (63.5%) than females (36.5%). Disarticulation prevalence, segmental and marginal resections were 64.0%, 27.5%, and 8.50%, respectively. One hundred and seventy-six cases (79.4%) had no complications, 8(4.20%) had wound dehiscence, 2(1.00%) with surgical site infection, and plate exposure in 3(1.60%) cases.

CONCLUSION: The prevalence of mandibular resection was high, with the vast majority being disarticulation resection. Disarticulation resection was significantly common among alcoholics and patients that had odontogenic keratocyst.

KEYWORDS: Prevalence, mandible, resection, surgery, Nigeria

INTRODUCTION

The mandible, which forms the lower third of the facial skeleton, is an important structure for mastication, deglutition, speech, and aesthetic.¹ Neoplastic lesions of the jawbones, especially the mandible, are unique due to their odontogenic and non-odontogenic origin². While enucleation, peripheral osteotomy, decompression, and marsupialization are indicated for benign lesions, resections are used to treat borderline and malignant lesions^{3,4}. Mandibular resection, removal of the lesion with a safety margin, is commonly performed by the oral and maxillofacial surgeons worldwide.^{5,6}

Marginal, segmental, and disarticulation are mandibular resections that are well documented in the literature.⁷⁻⁹ Marginal resection, by definition, maintains the continuity of the mandible, whereas a segmental resection sacrifices continuity. A disarticulation is a segmental resection in which the condyle is sacrificed.⁷ The marginal resection is less radical, unlike segmental and disarticulation, which are more destructive with their attendant morbidity and poor quality of life⁸. In developed countries where patients present early for treatment, more conservative resections are performed. Still, in the developing countries, radical resections such as segmental and disarticulation are more common due to late presentation, lack of awareness, and poor access to health facility.¹⁰

Despite the rising incidence of neoplastic and non-neoplastic lesions of the mandible globally and the subsequent treatments of these lesion,^{11,12} there is a paucity of data on the pattern of resections of the mandible in Nigeria. This study aimed to describe the pattern of surgical resections of the mandible at a tertiary health facility in Southern Nigeria. This study will enable oral and

maxillofacial surgeons to implement an oral health education program to improve dental awareness on early presentation to health facilities among Nigerian patients.
Patients and method

This was a retrospective study designed to study the pattern and document the patients that had surgical resections of the mandible from January 2005 to July 2020 at the Department of Oral and Maxillofacial Surgery of a tertiary hospital in Nigeria. Ethical approval was granted by the Institution Ethics and Research Review Board with reference number ADM/E22/A/VOL.V11/148312107. The case notes of the patients were retrieved from the Department of Information Management of the hospital. Collected data were age, gender, level of education, place of residence, occupation, tobacco use, and alcohol consumption. Other data collected were the type of lesion, type of resection performed, type of reconstruction, and complication of treatment.

Exclusion criteria for the study included patients with incomplete records and those with mandibular surgeries other than surgical resections such as enucleation, marsupialisation, or saucerisation. Also excluded were those with follow-up of less than 12 months.

In the descriptive statistics, the continuous variables were summarised in range, means and standard deviations while the categorical variables were done in frequencies and percentages. Cross-tabulations were performed with Pearson's chi-square test. All statistics were performed with SPSS version 21 (IBM corps, Armonk, New York, US). A P-value of less than 0.05 was considered significant.

Results

A total of 194 patients underwent resections of the mandible during the 15-year study period, of which only 189 cases that had complete information were included in the study. This constituted 97.4% of the cases. The age range from the study was 15-70 years, with a mean age

and standard deviation of 44.7±14.9 years. One hundred and nine (57.7%) of the patients were younger than 45 years, while 80 (42.3%) of them were 45 years or older. Table 1 shows the socio-demographic and clinical characteristics of patients, respectively.

Table 1: Socio-demographic and clinical characteristics of patients (n=189)

Variable	Category	Type of resections			P-value
		Disarticulation	Marginal	Segmental	
Age	<45	73	9	27	0.59
	≥45	48	7	25	
Gender	Female	44	6	19	1.00
	Male	77	18	13	
Place of residence	Rural	76	11	34	0.96
	Urban	42	5	18	
Level of education	None	35	3	17	0.32
	Primary	45	9	20	
	Secondary	11	0	8	
Tobacco use	Tertiary	27	4	7	0.19
	No	109	16	50	
Alcohol consumption	Yes	12	0	2	0.03
	No	109	16	52	
Occupation	Yes	12	0	0	0.62
	Skilled	21	2	10	
	Semi-skilled	14	4	6	
	Unskilled	76	8	34	
	Dependent	10	2	2	
Type of lesion	Solid ameloblastoma	33	3	11	0.00
	Osteosarcoma	2	0	3	
	Haemangioma	3	1	0	
	Osteomyelitis	3	0	2	
	SCC	2	0	2	
	Adenocystic carcinoma	4	0	1	
	GCOC	3	0	2	
	CEOT	2	0	5	
	Rhabdomyosarcoma	1	0	3	
	Unicystic ameloblastoma	18	7	8	
	OKC	34	0	0	
	Ameloblastic fibroma	1	2	3	
	Odontogenic myxoma	3	2	1	
	Ameloblastic carcinoma	3	0	4	
	MFH	5	0	3	
	CCOC	2	1	2	
Chondrosarcoma	2	0	3		
Reconstruction	None	10	0	5	0.74
	Kirshner wire	0	0	17	
	NVBG	0	0	5	
	VBG	0	0	0	
	Reconstruction plate	101	1	50	
	RP + VBG	0	0	0	
Complication	RP + NVBG	0	0	0	0.18
	None	119	13	44	
	Wound dehiscence	5	0	3	
	Surgical site infection	1	1	0	
	Plate exposure	3	0	0	
	Plate fracture	0	0	0	
Screw loosening	0	0	0		

SCC = Squamous cell carcinoma; GCOC = Ghost cell odontogenic carcinoma; CEOT = Calcifying epithelial odontogenic tumour; OKC = Odontogenic keratocyst; MFH = Malignant fibrous histiocytoma; COCC= Clear cell

odontogenic carcinoma; VBG = Vascularised bone graft; NVBG=Non vascularised bone graft; RP = Plate reconstruction

The frequencies of the three types of resections of the mandible were higher in patients who were less than 45 years compared to those older than 45 years (Table 1). The age of the patient did not affect the type of mandibular resection. ($P = 0.59$). There were more males (63.5%) than females (36.5%), with a male: female ratio of 1.7:1. One hundred and twenty-four (65.6%) patients reside in the rural areas, and 65(34.4%) of cases live in urban areas (Figure 1).

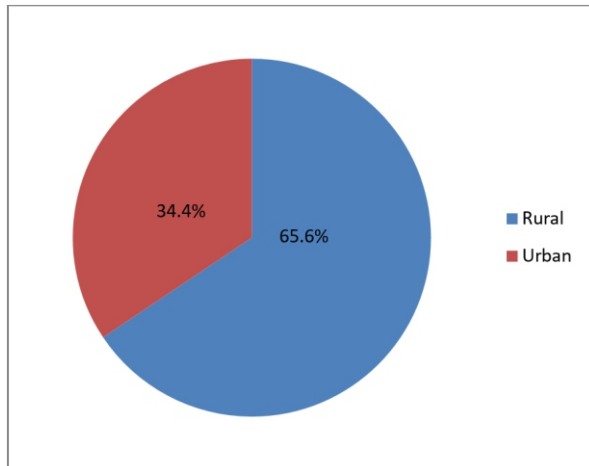


Figure 1: Place of residence of patients

Fifty-eight (30.7%) of the patients had no formal education, 74(39.2%) had primary, 19(10.1%) had secondary, and 38(20.1%) had tertiary education (Figure 2).

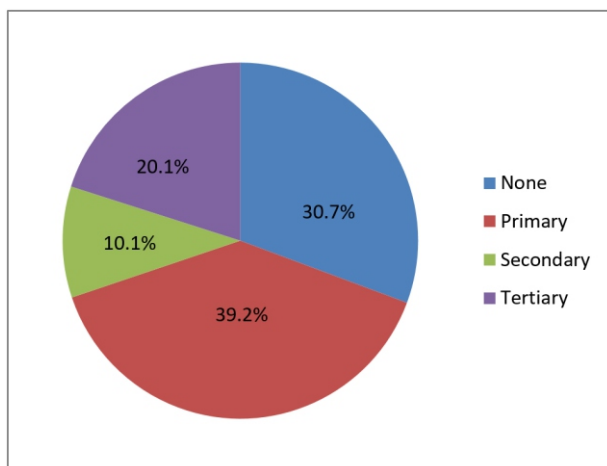


Figure 2: Level of education of patients

The disarticulation and marginal resections of the mandible were more in males, while segmental resections were more in females (Table 1). However, the mandible's resection pattern differences were not significant ($P = 1.00$).

The patients from the rural areas had more disarticulation, segmental and marginal resections of the mandibles compared to those from the urban areas, though this difference in the pattern was not statistically significant, as shown in Table 1($P=0.96$)

There was more disarticulation than other forms of

resections of the mandibles at all levels of education, but these findings were not statistically significant ($P = 0.23$) (Table 1). Of the 14 patients that use tobacco, 12 had disarticulation, 2 had segmental, and none had marginal resection (Table 1), but this was not statistically significant ($P=0.19$). All the cases that consumed alcohol had disarticulation, and none had any other form of resection, and this finding was significant ($P= 0.03$). Almost two-thirds (62.4%) of the patients had unskilled occupations (Table 1). The disarticulation, segmental and marginal resection were mainly performed on the unskilled subjects compared to the dependants where these resections were least common. Still, these findings were not statistically significant (Table 1).

Forty-seven (24.9%) patients had mandibular resections due to solid ameloblastoma, closely followed by odontogenic keratocyst (18.0%), as shown in Table 1. Disarticulation resection was mostly performed on the individuals with odontogenic keratocyst and least performed on cases with rhabdomyosarcoma and ameloblastic fibroma. Marginal and segmental resections were most common among patients with unicystic ameloblastoma. These findings were statistically significant ($P = 0.00$). More than half (64.0%) of the patients had resections with disarticulation of the TMJ, while a few (8.50%) of the patients had marginal resections of the mandible (Table 2). One hundred and fifty-two patients had plate reconstruction, 17(9.00%) had Kirshner wire insertion, and 5(2.65%) had a non-vascularised bone graft. No patient had any other form of mandibular reconstruction (Table 1). In the patients with disarticulation, 101 cases had plate reconstruction, and 10 cases didn't have any reconstruction. In the segmental resection group, 5 cases had no reconstruction, 17 cases had Kirshner wire insertion, 5 cases had a non-vascularised bone graft, and 51 cases had plate reconstruction. There was no significant difference between the groups of resections in terms of the type of reconstruction (Table 1). One hundred and seventy-six cases (79.4%) recorded no complications, 8(4.20%) had wound dehiscence, 2(1.00%) had surgical site infection, and plate exposure in 3(1.60%) cases (Table2). In the group with disarticulation, 119 cases had no complications, 5 cases had wound dehiscence, one patient had surgical site infection, and 3 cases had plate exposure. In the segmental and marginal resection groups, 44 and 13 cases had no complications, respectively (Table 1). There was no significant difference between the three groups of resections in this regard ($P=0.18$).

DISCUSSION

The defects that often result from extensive mandibular resections can result in functional and aesthetic disabilities, leading to low self-esteem and quality of life. Mandibular resections are one of the major oral and maxillofacial procedures performed in our environment. Mandibular resection is a procedure that results in a defect that can significantly affect function, aesthetics, and the individual's overall well-being.¹³ It can constitute quite a significant portion of the workload of the oral and maxillofacial surgeon, especially in developing countries. A large defect that usually results from radical mandibular resections is best restored by micro-vascular reconstruction¹⁴ but with the limited resources and workforce in microvascular reconstruction in developing countries, this is not sometimes feasible.

More cases of 189 were reviewed compared to Obiadazie et al.⁸ and Akinmoladun et al.,⁷ which reviewed 81 and 177 cases, respectively. This may be because data were acquired for a longer period of 15 years in the present study. The mean age of 44.7 years observed in the present study differs from the 30.4 years reported by Akinmoladun et al.⁷ No reason could be advanced for these age differences. More males required mandibular resections than female patients, which is similar to the findings of Obiadazie et al.⁸ and Carlson,⁹ who reported more males. This is, however, at variance with the findings of Akinmoladun et al.,⁷ who observed more females in their study. The reason for the male preponderance in the present study could be due to the poor health-seeking behaviour of males¹⁴. When stratified for the type of mandibular resection, it was observed that disarticulation was most prevalent in both male and female patients than in other forms of resection though this difference was not statistically significant. Overall, the rural preponderance of 65.5% was observed in the study, which may be related to poor access to health facilities experienced by rural dwellers. The majority of patients who had mandibular resections, especially the disarticulation type, were either not educated or poorly educated. Those well-educated presented early for treatment due to their level of oral health awareness.¹⁵ The disarticulations were significantly more among those patients that consumed alcohol. The likely reason for this higher prevalence of disarticulation among alcoholics could be due to health negligence behaviour by some of these groups of people.¹⁶ However, there was no previous study for comparison of this finding.

Odontogenic keratocyst was also significantly related to the pattern of mandibular resections. The majority of these patients had disarticulations compared to the more conservative types of marginal and segmental resections. The probable reason could be associated with the anteroposterior growth pattern of odontogenic keratocyst.¹⁷ The prevalence of disarticulation of the mandible was 64.0%. This finding is at variance with the 5% reported by Carlson,⁹ and this difference could be due to the early presentation of patients in the developed countries.¹⁷ It is important to reconstruct the mandibular defect and restore functions and aesthetics postoperatively. Mandibular defects resulting from disarticulation represent some of the most challenging defects to restore function, which the oral and maxillofacial surgeon has to deal with. While some defects can be adequately treated with a non-vascularised bone graft or titanium plate, many defects require advanced microsurgical skills to achieve optimal results.¹⁷ The majority (80.0%) of our patients had plate reconstruction as permanent reconstruction. No patient had microvascular reconstruction, which could be related to the lack of facility for such procedure in our center. Eight percent of the patient had no reconstruction of any form, while 9% had Kirshner wire insertion after surgery as a temporary measure. The outcome of mandibular resection in the current study was satisfactory as 6.80% of patients had complications that vary from wound dehiscence (4.20%), plate exposure (1.60%), to surgical site infection (1.00%). From the stratification of the complication of treatment, it was observed that the majority of these complications were from patients that had disarticulation. The reason could be the challenging nature of the reconstruction of the condylar head.¹⁸

Although this study bears the limitations of all retrospective studies, it is hoped that the data would

provide baseline information on the clinical relevance of the study that patients in our environment present late for treatment. In conclusion, the prevalence of mandibular resection was high, with the vast majority being disarticulation. Disarticulation was significantly common among alcoholics and patients that had odontogenic keratocyst. Implementing an oral health education program by oral and maxillofacial surgeons to improve dental awareness on early presentation to health facilities among Nigerian patients is recommended.

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CONFLICT OF INTEREST: There is no conflict of interest for declaration.

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