

Surgical Audit of Major Oral and Maxillofacial Cases in a Tertiary Hospital in South-South Nigeria – A 5-year Retrospective Review

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Abstract

The aim of this study is to an audit of the types, patterns, and indications for major oral and maxillofacial surgeries carried out at the Department of Oral and Maxillofacial Surgery, University of Benin Teaching Hospital from January 2015 to December 2019. The findings from this study should provide valuable information to develop a future strategic plan, and improve clinical care. A retrospective review of the hospital records (including theatre logbooks, theatre lists, case notes and admission notebooks in the wards) of all patients operated upon within the study period was done. Descriptive statistics were used to analyze the collected data. Two hundred and forty-two (242) patients who had two hundred and eighty-eight (288) maxillofacial surgeries in the period under review formed the population for this study. There were 180 (62.5%) males and 108 (37.5%) females giving a male to female ratio of 1.6: 1. The ages observed ranged from 3 months to 85 years (median age of 23 years and mean age of 22.36 ± 20.09). Congenital/developmental conditions formed the largest indication for surgery, accounting for 113 (39.4%) of the cases seen. The most commonly performed surgery was cleft lip/palate repair (36.1%, n = 104), followed by mandibulectomy and reconstruction using plating systems (16.7%, n = 48). Major Oral and Maxillofacial surgeries are commonly carried out in our centre. The quality of service delivery can be improved upon through adequate manpower training in microvascular surgeries to help in better patient rehabilitation and provision of needed facilities.

Keywords: Surgical audit, oral and maxillofacial surgery.

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INTRODUCTION

Globally, the field of oral and maxillofacial surgery evolved over time as a result of the need to offer care to personnel injured in World War II. Years after the war, the specialty of oral and maxillofacial surgery has continued to flourish and become a well-established surgical subspecialty. The specialty is involved in a wide range of diseases of the mouth, jaws, and facial conditions. The scope of the specialty includes orofacial infections, facial trauma, oncology, implantology, salivary gland diseases, temporomandibular joint disorders, aesthetic surgeries, orofacial pain, cleft lip, and palate as well as other facial congenital and acquired deformities among others [1, 2].

In modern health care systems, there is a growing emphasis on monitoring the outcomes of a health intervention in general and surgical procedures in

particular. This is often referred to as surgical audit in the United Kingdom or the surgeon's profiling in the United States of America. Surgical auditing is a systematic quality improvement process that seeks to improve patients' care and outcomes through a systematic review of care against explicit criteria and where indicated, changes are implemented and further monitoring is used to confirm improvement in the health care delivery system [3]. Surgical audit plays a very important role in policy formulation, research, improvement in service delivery, teaching and mentoring while also enabling prioritization and proper allocation and distribution of limited resources, especially in resource-limited countries [4, 5]. Various types of audit exist; national, regional, local as well as hospital-based audits. These are aimed at providing improved quality of care, provide continuous learning opportunities and guide appropriate use of resources.

As the specialty continues to evolve, and the demand on the available resources increases, the need to continually evaluate the current health system in order to improve its effectiveness and efficiency becomes imperative [4]. To this end, a retrospective review of the major surgical cases is one of the ways of ensuring optimal or improved service provision [6, 7].

In Nigeria, there have been few reports of audits of oral and maxillofacial surgeries [6-8]. According to Ajike *et al.*, [8], 78% of the total patients seen at the Aminu Kano Teaching Hospital, Kano, Nigeria had maxillofacial surgical diseases. They stated that trauma accounted for the majority of the maxillofacial surgical conditions with tumour and tumour-like lesions accounting for less than 21% of cases. Ibikunle *et al.*, [6] in a 5 years audit of major oral and maxillofacial surgical cases at the Usman Dan Fodio University Teaching Hospital, Sokoto, Nigeria, reported a wide range of oral and maxillofacial surgeries especially those bordering on tumour ablations. They recommended that with the observed relative frequency of tumour ablative surgeries, efforts should be intensified at prevention and post-surgical rehabilitation. They also opined that improved access to advance reconstructive techniques such as micro-vascular surgery be enhanced. It is however worthy of note that in the only study on the audit of maxillofacial surgeries carried out in the Niger Delta region of Nigeria by Adebayo *et al.*, [7], Edo State with the foremost and biggest referral centre (University of Benin Teaching Hospital) was not captured.

The aim of this retrospective study is to present an audit of the types and pattern of major oral

and maxillofacial surgeries (as well as their indications) carried out at the department of oral and maxillofacial surgery, University of Benin Teaching Hospital from January 2015 to December 2019 that would provide valuable information to develop a future strategic plan, and improve clinical care.

METHODS

This was a retrospective review of the hospital records (including theatre logbooks, theatre lists, case notes and admission notebooks in the wards) of all patients who had major surgery at the department of oral and maxillofacial surgery, University of Benin Teaching Hospital (UBTH), between January 2015 and December 2019. The data recorded were age, sex, occupation, date of admission, diagnosis, date of operation, indication for surgery, type of anaesthesia, and nature of surgery. Mortality and complications associated with the diseases and the surgery were however not included in our study.

RESULTS

Records of 242 patients who had 288 maxillofacial surgeries between 2015 and 2019 under general anesthesia formed the population for this study. The age range of cases was between 3 months to 85 years, with a median age of 23 years and mean age of 22.36 ± 20.09 . Majority of the patients were between the ages of 3 months to 9 years (39.2%, n = 113) (Table-1). There were 180 (62.5%) males and 108 (37.5%) females giving a male to female ratio of 1.6: 1. On a year to year analysis, there was a steady increase in the turnout of patient of both gender with the males consistently higher in number (Figure-1).

Table-1: Age and gender distribution of cases done

Age group	Gender		
	Male n (%)	Female n (%)	TOTAL n(%)
0 – 9 years	79 (27.4)	34 (11.8)	113 (39.2)
10 – 19 years	10 (3.5)	10 (3.5)	20 (6.9)
20 – 29 years	28 (9.7)	27 (9.4)	55 (19.1)
30 – 39 years	29 (10.1)	12 (4.2)	41 (14.2)
40 – 49 years	20 (6.9)	10 (3.5)	30 (10.4%)
50 – 59 years	5 (1.7)	7 (2.4)	12 (4.2)
60 – 69 years	6 (2.1)	7 (2.4)	13 (4.5)
70 – 79 years	2 (0.7)	0 (0)	2 (0.7)
80 – 85 years	1 (0.3)	1 (0.3)	2 (0.7)
TOTAL	180 (62.5)	108 (37.5)	288 (100)

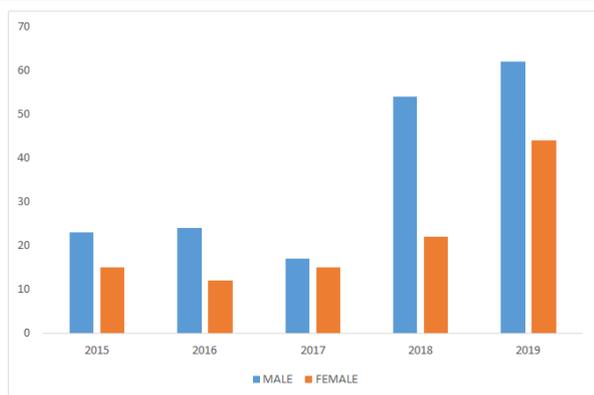


Fig-1: Gender distribution of maxillofacial surgical cases done in UBTH from year 2015 to 2019

The peak number of patients operated was in the year 2019 (36.8%, n = 106), while the least numbers were observed in the year 2017 (11.5%, n = 33). Congenital/developmental conditions accounted for the largest indication for surgery, accounting for 113

(39.4%) of the cases, with cleft lip, and cleft palate the most common indications for surgery under the category and accounting for 107 (37.1) of the cases, followed by ameloblastoma 36 (12.5%). The least indication for surgery was the cystic lesions which only accounted for 8 (2.8) of all cases seen (Table-2).

Benign tumour/lesions constituted majority of the tumour lesions seen (24.4%, n = 70), while malignancies represented 29 (10.1%). Traumatic conditions (17.8%, n = 51) and other conditions (4.5%, n = 13) accounted for the remaining proportions. The most frequently histologically diagnosed benign tumour was ameloblastoma (12.5%, n = 36) followed by the fibro-osseous lesions (5.6%, n = 16) with the least being calcifying epithelial odontogenic tumour (0.7%, n = 2) (Table-2). The most histologically diagnosed malignant tumour was squamous cell carcinoma (6.9%, n = 20) followed by the sarcomas (2.4%, n = 7) (Figure-2).

Table-2: Indications for maxillofacial surgery and their year distribution

INDICATION FOR SURGERY	YEAR n (%)					TOTAL
	2015	2016	2017	2018	2019	
BENIGN LESIONS						
Ameloblastoma	6 (2.1)	5 (1.7)	3 (1.0)	10 (3.5)	12 (4.2)	36 (12.5)
Fibro-osseous lesions*	0 (0)	1 (0.3)	2 (0.7)	4 (1.4)	9 (3.1)	16 (5.6)
Odontogenic/Desmoplastic fibroma	1 (0.3)	0 (0)	0 (0)	0 (0)	2 (0.7)	3 (1.0)
Pleomorphic adenoma/salivary gland	1 (0.3)	3 (1.0)	0 (0)	1 (0.3)	6 (2.1)	11 (3.8)
Calcifying epithelial odontogenic tumour	0 (0)	1 (0.3)	0 (0)	0 (0)	1 (0.3)	2 (0.7)
SUB-TOTAL	8 (2.8)	11 (3.8)	5 (1.4)	16 (5.6)	30 (10.5)	70 (24.4)
MALIGNANT LESIONS						
Sarcomas	0 (0)	1 (0.3)	2 (0.7)	2 (0.7)	2 (0.7)	7 (2.4)
Squamous cell carcinoma	1 (0.3)	2 (0.7)	0 (0)	8 (2.8)	9 (3.1)	20 (6.9)
Non-Hodgkins Lymphoma	2 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.7)
SUB-TOTAL	3 (1.0)	3 (1.0)	2 (0.7)	10 (3.5)	11 (3.8)	29 (10.1)
CONGENITAL ANOMALIES						
Cleft Lip/Palate	13 (4.5)	17 (5.9)	8 (2.7)	29 (9.1)	40 (13.9)	107 (37.1)
Others**	1 (0.3)	0 (0)	0 (0)	1 (0.3)	1 (0.3)	3 (1.0)
SUB-TOTAL	18 (6.3)	15 (5.2)	12 (4.2)	26 (9.1)	42 (14.6)	113 (39.4)
TRAUMATIC CONDITIONS						
Mandibular fracture	6 (2.1)	2 (0.7)	2 (0.7)	8 (2.8)	3 (1.0)	21 (7.3)
Zygomatic complex fracture	2 (0.7)	0 (0)	3 (1.0)	2 (0.7)	5 (1.7)	12 (4.2)
Lefort/Maxillary/Orbital floor fracture	1 (0.3)	0 (0)	2 (0.7)	2 (0.7)	3 (1.0)	8 (2.8)
TMJ Dislocation/Ankylosis	1 (0.3)	0 (0)	2 (0.7)	1 (0.3)	0 (0)	4 (1.4)
Panfacial fracture	0 (0)	0 (0)	1 (0.3)	1 (0.3)	3 (1.0)	5 (1.7)
Others***	0 (0)	0 (0)	3 (1.0)	3 (1.0)	4 (1.4)	10 (3.5)
SUB-TOTAL	6 (2.1)	3 (1.0)	13 (4.5)	15 (5.2)	14 (4.9)	51 (17.8)
CYSTIC LESION						
Odontogenic cysts	2 (0.7)	1 (0.3)	1 (0.3)	0 (0)	1 (0.3)	5 (1.7)
Non-odontogenic cysts	0 (0)	0 (0)	0 (0)	1 (0.3)	2 (0.7)	3 (1.0)
SUB-TOTAL	2 (0.7)	1 (0.3)	1 (0.3)	1 (0.3)	3 (1.0)	8 (2.8)
OTHERS****	1 (0.3)	1 (0.3)	0 (0)	9 (3.1)	5 (1.7)	16 (5.6)
TOTAL	38 (13.2)	34 (11.8)	33 (11.5)	77 (26.7)	106 (36.8)	288 (100)

* Ossifying fibroma, Fibrous dysplasia and Osteoma

** Pre-auricular facial defect and Ankyloglossia

*** Lip avulsion, Laceration of the tongue and Post-operative mandibular defect

**** Reconstruction plate exposure, Retained suspension wire and Osteomyelitis

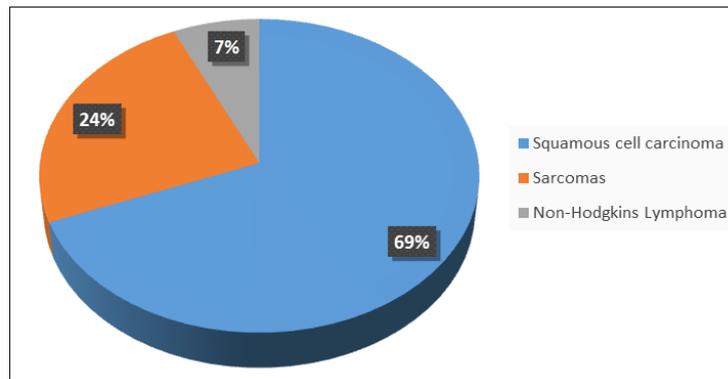


Fig-2: Distribution of malignant lesions seen from 2015 to 2019

The most commonly performed surgery was cleft lip/palate repair (36.1%, n = 104), followed by mandibulectomy and reconstruction (16.7%, n = 48). All patients who had mandibulectomy, also had immediate mandibular reconstruction done with titanium reconstruction plate and where disarticulation was done, a prosthetic condylar head inserted. Open

Reduction and Internal Fixation (ORIF) with titanium fracture and adaption plates, lag screws, and reconstruction plate were done in 45 (15.6%) cases. Examination and suturing under General Anaesthesia (GA) and close reduction were infrequently done (0.7%, n = 2 each) (Table-3).

Table-3: Yearly distribution of maxillofacial surgical procedures

NATURE OF SURGERY	YEAR n (%)					TOTAL
	2015	2016	2017	2018	2019	
Cleft lip/Palate repair	13 (4.5)	17 (5.9)	8 (2.7)	25 (8.7)	37 (12.8)	104 (36.1)
Maxillectomy	1 (0.3)	3 (1.0)	0 (0)	5 (1.7)	7 (2.4)	17 (5.9)
Mandibulectomy	6 (2.1)	6 (2.1)	5 (1.7)	12 (4.2)	19 (6.6)	48 (16.7)
ORIF	9 (3.1)	2 (0.7)	9 (3.1)	13 (4.5)	12 (4.2)	45 (15.6)
Close reduction and Fixation	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.7)	2 (0.7)
Incisional/ Excisional biopsy	3 (1.0)	3 (1.0)	0 (0)	5 (1.7)	9 (3.1)	20 (6.9)
Wound exploration	0 (0)	0 (0)	1 (0.3)	4 (1.4)	1 (0.3)	6 (2.1)
Suturing under GA	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.7)	2 (0.7)
Excision of lesions	1 (0.3)	0 (0)	0 (0)	1 (0.3)	1 (0.3)	3 (1.0)
Neck dissection	0 (0)	0 (0)	0 (0)	1 (0.3)	2 (0.7)	3 (1.0)
Facial / lip reconstruction	1 (0.3)	0 (0)	1 (0.3)	0 (0)	5 (1.7)	7 (2.4)
Sequestrectomy	1 (0.3)	0 (0)	0 (0)	3 (1.0)	0 (0)	4 (1.4)
Parotidectomy	0 (0)	0 (0)	0 (0)	1 (0.3)	5 (1.7)	6 (2.1)
Enucleation	2 (0.7)	1 (0.3)	0 (0)	2 (0.7)	0 (0)	5 (1.7)
Paring down	0 (0)	1 (0.3)	2 (0.7)	0 (0)	2 (0.7)	5 (1.7)
Reconstruction plate removal	0 (0)	1 (0.3)	0 (0)	2 (0.7)	2 (0.7)	5 (1.7)
TMJ reduction/Arthroplasty	1 (0.3)	0 (0)	2 (0.7)	1 (0.3)	0 (0)	4 (1.4)
Partial glossectomy	0 (0)	0 (0)	0 (0)	2 (0.7)	0 (0)	2 (0.7)
TOTAL	38 (13.2)	34 (11.8)	33 (11.5)	77 (26.7)	106 (36.8)	288 (100)

DISCUSSION

There was a steady increase in the number of major surgeries done year on year except for the year 2017 which was characterized by incessant disruption of industrial harmony between the hospital management and her staff. The significant increase in the number of surgeries seen in the year 2018 and 2019 may not be unrelated to the increased awareness of maxillofacial surgical specialty among the populace due to the frequent surgical outreaches carried out by volunteer maxillofacial surgeons. Furthermore, the improved surgical skills acquired by surgeons of the hospital that were sent for training have expanded the scope of

surgery done by the department. It is therefore pertinent that continuous training of personnel will improve patient care.

More of the patients treated were males and this is consistent with findings from similar studies [6-10]. This could be attributable to the paternalistic tendencies in the health-seeking behavior in our environment [11, 12]. Also, our findings may be a reflection of the fact that males have a higher prevalence of malignancy worldwide [13, 14], more are exposed to hazardous jobs and are involved in a lot of vehicular movement as the breadwinner increasing the chances of traumatic injuries.

The age range of patients seen in this study is similar to reports in the literature [15, 16], with most of the patients in the first decades of life. This is however at variance with similar studies by Adebayo *et al.*, [17] that reported the third decade as the modal age, and Ibinkunle *et al.*, [18] that reported the 4th decade. This observed difference in age range could be ascribed to the fact that the commonest indication for surgery in our department was congenital deformities and the availability of the “Smile train” free surgical care for such conditions in the hospital. These anomalies are common in the first decade of life and parents are quite apprehensive and desirous of immediate repair of such defects.

Tumour and tumour-like lesions were the second commonest indication for major oral and maxillofacial surgery in our centre. The most occurring pathologic lesion in this study was ameloblastoma, an odontogenic tumour and this is in agreement with previous studies [10, 15]. However, Saleh *et al.*, [19] in a study of histologically diagnosed oral and maxillofacial lesions reported odontogenic keratocyst to be the commonest benign odontogenic tumour.

Studies [16, 18, 20] have reported squamous cell carcinoma to be the predominantly occurring malignancy of the orofacial region and our finding was in consonance. The increasing prevalence of oral squamous cell carcinoma may be attributable to the reported rise of the major predisposing factors such as high-risk strains of human papillomavirus, increasing intakes of alcohol and tobacco smoking and precancerous lesions such as hyperplastic candidiasis, erythroplakia [21, 22].

Contrary to previous reports [15, 16] of traumatic injuries been the commonest indication for maxillofacial surgeries, our study found trauma to be the third commonest indication for surgery following congenital defects and tumours. Our findings could be due to the imposed ban on the use of motorcycles in the city metropolis by the government and the strict enforcement of the speed limit and the use of crash helmets for cyclists. In our study, the use of bio-compatible titanium mini and microplates has remained the mainstay of fracture reduction and immobilization except for very few cases where the inability of patients to pay for miniplates resulted in the use of inter-maxillary fixation.

Mandibular fractures were the most commonly seen of the types of maxillofacial fractures. This is in agreement with various studies in the literature [23-25]. Obuekwe *et al.*, [23] and Oginni *et al.*, [24] reported the mandible as the most often fractured facial bone. Obimakinde *et al.*, [25] reported that mandible was the most prominent skeletal injury and the body of the mandible was the most common site of fracture. However, this is at variance with other studies, where

maxillary fractures were more frequently diagnosed [26, 27]. Hwang *et al.*, [28] reported the nasal bone fracture as the most frequently encountered maxillofacial injuries. This is due to the more prominent nature of the nasal bones among the Caucasians compared to the blacks that have the mandible as the more prominent bone [29]. Maxillofacial injuries represent a major contributory indication for surgery in the oral and maxillofacial specialty in many countries with its attendant socio-economic burden on the affected individuals and family caregivers [7, 30].

A wide range of surgical procedures was carried within the period under review with observed successes and challenges. Repair of congenital defects mainly cleft lip and palate were the most surgeries carried out. While various techniques of repair of cleft lip and cleft palate have been advocated in the literature, Millard’s technique (unilateral cleft lip), Clayton de Hoan (bilateral cleft lip), and the V-Y technique (cleft palate) were most used by the surgeons in our institution. Several reasons could be adduced for the large number of cleft lip and palate surgeries. First, our hospital is reputed in the South-South region of Nigeria as a centre of excellence in the care of cleft deformities with her functional multidisciplinary cleft team. Second, there is a growing awareness among the populace of this condition and the possibility of repair necessitated by the frequent public enlightenment carried out by the Community Dentistry department of the hospital. Third, is the very significant role of the “Smile train” project in our hospital that allows for these patients to receive free surgical and supportive care that were hitherto the source of hindrance to receiving treatment. The impact of the Smile train project is well documented in the literature [31].

Mandibulectomies were the most common ablative surgeries in this audit. This may be because most of the tumours were ameloblastoma and squamous cell carcinoma that has a high predilection for the mandible and the mandibular mucosa respectively [32]. Most of the patients who had mandibulectomy had immediate mandibular reconstruction done using the titanium reconstruction plates and were indicated also had condylar prostheses. A few cases of bone grafting using iliac crest done where the defect was less than 10cm were done. Soft tissue losses that could not be closed primarily were closed using either pedicled local or distant flaps.

The increased dependence on reconstruction plates for the mandibular defects in this study brings to the fore the need for the department to embrace the use of microvascular graft and flaps. These techniques have revolutionized reconstructive surgery because it provides adequate vascular supply, provides predominantly compact bone with sufficient rigidity, good contour and resistance to infections [33, 34]. Also,

they are suitable for long span defects, which are commonly encountered following tumour ablation in our clime owing to the late presentation of patients [35]. There is, therefore, the urgent need by the hospital management for concerted manpower training and provision of necessary facilities that will help in improving patient management and outcomes.,

Maxillectomy is also a common tumour ablative technique done in our hospital. The major indication for maxillectomy was antral carcinoma. Other indications for maxillectomy in our study were osteosarcoma, adenomatoid odontogenic tumour, and maxillary ameloblastoma. The defects created were all reconstructed with obturators

A few of combined maxillo-mandibular resections were carried out in this study. These resulted mainly from the contiguous spread of advanced lesions from one jaw to another. The majority of cases who had mandibular resection on account of squamous cell carcinoma had elective neck dissection. This is consistent with literature that advocates elective neck dissection for malignancies of the head and neck region [36, 37].

Salivary gland surgeries were relatively few. However, it is important to note that in our hospital, salivary gland surgeries are also performed by the Otorhinolaryngologist and the general surgeons. Thus, our report does not represent the frequency of salivary gland surgeries in the hospital. Parotidectomies accounted for the majority of the salivary gland surgeries with pleomorphic adenoma being the major indication for surgical intervention. This is in agreement with studies by Ajayi *et al.*, [38] and Okoturo *et al.*, [39] that stated that pleomorphic adenoma was the commonest salivary gland tumour. Furthermore, Olu-Eddo *et al.*, [40] reported that the parotid gland is the most common site for salivary gland cancers. Submandibular gland excisions following protracted submandibular sialadenitis were also performed.

CONCLUSION

The field of oral and maxillofacial surgery in the last three decades has come to be a well-established surgical specialty with commendable strides. The audit reveals an array of procedures done in the hospital. However, there is an urgent need to invest in manpower training and facilities to enable microvascular surgeries to be carried out. This will in no small measure improve the surgical outcome as well as improve patient's quality of life.

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