PATTERN OF MAJOR MAXILLOFACIAL SURGERIES AT ADDIS ABABA UNIVERSITY TIKUR ANBESSA SPECIALIZED HOSPITAL ORAL&MAXILLOFACIAL SURGERY AFFILIATE HOSPITALS: 3 YEARS RETROSPECTIVE ANALYSIS

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ABSTRACT

Background: Oral and maxillofacial (OMF) region is an area that is prone to multitude of disease conditions which may be of developmental nature or acquired nature which require surgical intervention in many occasions.

Objectives: To describe the indications, pattern and types of major oral and maxillofacial surgical procedures carried out at Addis Ababa university Oral & Maxillofacial Surgery (OMFS) affiliate Hospitals (Yekatit 12 Hospital Medical College and St.Peters Specialized Hospital) in a period of 3 years from January 2017 to December2019.

Methods: A retrospective study of operation records of all patients who had undergone oral and maxillofacial surgeries under general anaesthesia at Yekatit 12 Hospital Medical College and St.Peters Specialized Hospital in a period of 3 years from January 2017 to December 2019 was done. Descriptive statistics such as bio-data, indication for surgery and type of surgery were recorded and analyzed using the Epi info version 7 software.

Time frame: The study was conducted from November 2019 to August 2020.

Result: A total of 689 patients with oral and maxillofacial conditions were managed during the study period. The male to female ratio was 2.48:1, and the mean age of patients was 29.05 years with standard deviation of ±15.5.The predominant indications for surgery were traumatic conditions (50.71%, n=354), followed by neoplastic(benign and malignant)conditions (18.7%, n=129), and tumorlike /cystic conditions (16.5%, n=115). Open reduction and internal fixation the most common (43.7%,n=313) surgical procedure performed under general anaesthesia.

Conclusion: The field of Oral and Maxillofacial surgery in our climes is a relatively new one, however, it is evolving and its relevance is growing. With the observed relatively high frequency of traumatic conditions, especially among younger populations, efforts geared at prevention and adequate preparedness for proper surgical management of such patients should be commenced.

***Key words**: oral and maxillofacial surgery, patterns, trends*

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TABLE OF CONTENTS

ACRONYMS

BSSO-Bilateral Sagittal Split Osteotomy

CLP: cleft lip and palate

ENT: Ear,Nose and Throat

GA-General Anesthesia

I&D: Incision and Drainage

IMF-Intermaxillary Fixation

MMF-Maxillomandibular Fixation

OKC-Odontogenic Keratocyst

OMFS-Oral and Maxillofacial Surgery

ORIF-Open Reduction and Internal Fixation

SCC-Squamos Cell Carcinoma

TMJ-Temporomandibular Joint

CHAPTER ONE

INTRODUCTION

1.1 Background information

Oral and maxillofacial (OMF) region is an area that is prone to multitude of disease conditions which may be of developmental nature (e.g.,vascular anomalies) or acquired nature (such as neoplasms, trauma and infections) which require surgical intervention in many occasions. Thus, the scope of OMF surgery includes the diagnosis and treatment of diseases affecting the mouth, jaws, face and neck(1). Diseases requiring surgical intervention have been estimated to account for 11 % of the global burden of disease(2).Despite the magnitude of these estimates, surgery remains a neglected aspect of health systems development in low- and middle-income countries in which inadequate workforce remains a major challenge in surgical capacity building(3,4).Ethiopia as a developing country, and Maxillofacial surgery as recently commenced specialty training in the country(the first cohort of OMF surgeons graduated from Jimma University in 2016), it is not an exception to this challenge(5).

In modern health care systems, there is a growing emphasis on monitoring the outcomes of health intervention in general and surgical procedures in particular. As healthcare evolves and the demands on the available facilities increase, the need for evaluating existing health systems in order to improve their efficiency becomes more obvious(6,7).

To achieve this, there is often a need to assess the demands being placed on the system, the challenges being experienced and the successes being accomplished. A retrospective review of surgical services provided is one of the ways of ensuring optimal or improved service delivery(8).

1.2. Statement Of the problem

Oral and maxillofacial, orofacial, craniofacial, and sometimes head and neck diseases are some of the terminologies that have been used to describe diseases affecting the mouth and perioral tissues. The spectrum of oral and maxillofacial diseases includes infectious disease, traumatic injuries, neoplastic and developmental diseases, cysts, and congenital defects(9).

The burden of maxillofacial diseases and conditions varies worldwide with the major impact being placed on developing countries. Although the burden for specific etiologic type varies remarkably between regions of the world, the vast majority of OMF surgeries in sub-Saharan Africa are due to traumatic facial injuries(10,11)

Regarding Epidemiological distribution of maxillofacial surgical conditions, evidences suggest that wide range of individuals in different age groups happen to be affected including extremes of age with fairly similar distribution in both sex in general(12).

Maxillofacial trauma is a major cause of morbidity and mortality globally. Facial fractures have functional, aesthetic and psychological effects on the victims, as well as a socioeconomic impact on health systems and often represent a large proportion of the indications for surgery in the oral & maxillofacial specialty in different countries. Maxillofacial fractures are challenging and difficult for clinical and radiological evaluation because of anatomical complexity of the region and difficulties to obtain high-quality imaging study in severely traumatized patients due to their clinical conditions and inability to cooperate(13–15).

Head and neck cancers make about 10% of all malignant neoplasms diagnosed in humans. As much as 90% of neoplasms are ectodermal origin and they are mostly squamous cell carcinomas (SCC).They may affect different anatomical structures, such as lips oral cavity oropharynx, naso-and laryngopharynx, nasal cavity, paranasal sinuses, larynx and salivary glands. The deformity and functional defect due to neoplastic diseases and their surgical treatment may lead to different stages of dysfunction, compromising basic vital functions like mastication, swallowing, and speaking(16).

Orofacial tumors are a heterogenous group of lesions due to the different degrees of intertissue interaction and various growth patterns.
Facial tumors have a devastating effect; due to the anatomical site they result in extreme disfigurement or disability, and associated functional effects, bone expansion, tooth mobility, and adjacent structure destruction. They can grow to impressive size and have a capability to distort the facial appearance of patients and bring about bothersome functional debilitation(17,18)

Acute orofacial infections are a common surgical emergency which cause considerable patient morbidity and occasionally, mortality.Hospital-based management of deep-space infections engender significant costs world-wide(19).

Although there is an assertion that Temporomandibular joint(TMJ) Disorders are a rare condition, the impact that it poses on affected individuals is considerable. Studies demonstrate that significant number of patient with TMJ disorders experiences moderate to severe depression, psychosocial dysfunction and nonspecific physical symptom scores(20).

Although few studies examined the pattern of distribution of specific member of the spectrum such as orofacial neoplasm and odontogenic tumor(21–23), Trauma(24),Oral cancer(25) and Temporomandibular joint (26),there is a dearth of information on the total spectrum of OMF surgical procedures in Ethiopia. This study was therefore undertaken with an aim of reporting on the indications, pattern and types of major OMF surgical procedures carried out in Yekatit 12 Hospital Medical College and St. Peters Specialized Hospital which are affiliates of Addis Ababa University Tikur Anbessa Specialized Hospital OMFS department.

1.3. Significance of the study

The pattern, indications and types of major maxillofacial surgical procedures in Ethiopia has not been studied so far. This study was undertaken with an aim of characterizing the pattern of major OMF surgical diseases and procedures. The result of this study plays vital roles in service delivery improvement and teaching, while also enabling informed distribution of resources by elucidating the demands and challenges being exerted on the system, and the successes being accomplished.

The findings of the study can be used to fill the scientific knowledge gap in this field of study. Moreover, it provides a baseline data for further researches that will be undertaken on similar topic.

CHAPTER TWO

LITERATURE REVIEW

A study done in Bangladesh in two academic hospitals over 10years revealed that benign tumor was the most common pathology comprised 27.8% from a total of 5663 patients, with Ameloblastoma being the most common lesion (58%) among them. Malignant tumor lies the second most common lesion consisted 21.5%, and Squamous cell carcinoma was the preponderance (62.2%).Moreover, the study also revealed 20.3% jaw bone fracture, followed by 15.8% Cystic lesion and 7.3% infection. The mandible was involved in 47% of jaw fracture cases making it the commonest site to be fractured. Dredging method and excision were the main treatment modalities in ameloblastoma and other benign tumors. Regarding malignant tumor, excision and/or bone resection and/or neck dissection were performed. Jaw bone fractures were managed by close(n=560,48.7%) and open(n=589,51.3%)Reduction with IMF (Intermaxillary fixation) by arch bar wiring. Bilateral sagittal split ramus osteotomy (BSSRO) and Le fort I osteotomy were the commonest among the few case of orthognathic surgery(27).

A3years detailed data was collected retrospectively with an objective of evaluating the performance of Oral and maxillofacial surgery department at Hayatabad medical complex from 2013 to 2016.It was found out that Trauma was more (75.28%) as compared to pathology (24.72%)among 704 total patients who were included in the study. Regarding gender distribution for trauma and pathology there were 82.1% male patient suffered trauma and only 22.8% suffered pathology, while 50.7 % female suffered trauma and 49.3% pathology. Mandible was the most common bone (49.05%) to be involved followed by zygomatic complex, maxilla and their combination. Common treatments given were open reduction and internal fixation (ORIF) with maxillomandibular fixation (MMF) (35.28%), ORIF only (33.39%), and MMF only (11.32%).Malignant tumors were most frequent occurring pathology followed by cystic lesions,benign tumors, fascial space infection, trigeminal neuralgia and temporomandibular joint ankylosis. Common treatment given to patients were Excision with or without reconstruction,

enucleation, neck dissection, bone grafting, peripheral neurectomies and TMJ arthroplasty(28).

One year retrospective survey of 768 surgical cases managed at the inpatient department of Oral and Maxillofacial Surgery, Dhaka Dental College Hospital reveals that the most common diagnosis was maxillofacial injuries (35 %), followed by oral squamous cell carcinoma (22 %) and odontogenic tumours and hamartomas (11 %). Maxillo-mandibular fixation or wiring was the main modality of treatment(29).

A research done on indications for surgery and types of surgery in 146 patients who had major oral and maxillofacial surgeries at Usmanu Danfodiyo University Teaching Hospital in Nigeria from January, 2013 to August, 2017 shows that Tumours and tumour-like lesions were the major indications for surgery (58.2%). The most commonly performed surgery was mandibulectomy (19.6%), followed by Open Reduction and Internal Fixation (ORIF)(18.4%).The most frequent histologically diagnosed benign and malignant lesions were ameloblastoma 8.2%,and squamous cell carcinoma 8.2%, respectively. Parotidectomies were the predominantly performed procedure (63.6%,) among the Salivary gland excisions which itself is infrequently done (6.9%).

Corrective surgeries such as cleft lip/palate repair and temporomandibular joint surgeries accounted for 12.3% of the cases, with temporomandibular joint ankylosis releasing procedures constituting the majority (55.6%).

Among the cases that had ORIF, 2.0 mm mini-plates were used in 62.1% of cases, while wire osteosynthesis and reconstruction plates were used in 37.9% cases. Immediate reconstruction following tumor ablation was done in 7.6% patients, while secondary reconstruction was done in 1.3%. Mandibulectomy defects were reconstructed in 77.4% and left unreconstructed in the remaining cases. Flaps were used in 10 patients with the pectoralis major muscle 20%, cervical and platysma flaps being the most frequently utilized(30).

A study conducted in Tanzania in 2017 reports that, out of the total 1110 patients, the predominant indications for surgery were benign neoplastic conditions (36.8%, n=409), traumatic conditions (22.3%, n=248) and malignant neoplastic conditions (18.4%, n=204).Open reduction and internal fixation (21.0%, n=233) and mandibulectomy (18.3%, n=203) were the most common surgical procedures performed under general anesthesia. The common conditions to be surgically

managed in males were trauma (35.9%), followed by benign neoplasms (31.2%), while females were frequently operated for benign neoplastic conditions

(43.2%), and malignant neoplastic conditions (20.8%). The study also reports that more than 200 different types of OMF conditions were managed under General Anesthesia(GA) with Ameloblastoma being the most frequently operated condition, followed by mandibular fracture and ossifying fibroma(31).

CHAPTER THREE

OBJECTIVES

3.1. General Objectives

To describe the indications, pattern and types of major Oral and Maxillofacial surgical procedures carried out under general anesthesia in Yekatit 12 Hospital Medical College and St. Peters Specialized Hospital in a period of 3 years from January 2017 to December 2019.

3.2. Specific Objectives

To determine the indications of major maxillofacial surgeries at Yekatit 12 Hospital Medical College and St.Peters Specialized Hospital from January 2017 to December 2019.

To describe the pattern and trends of major maxillofacial surgeries at Yekatit 12 Hospital Medical College and St. Peters Specialized Hospital from January 2017 to December 2019.

To identify types of major maxillofacial procedures performed at Yekatit 12 Hospital Medical College and St. Peters Specialized Hospital from January 2017 to December 2019.

CHAPTER FOUR

METHODS AND MATERIALS

4.1. Study area and period

The study was conducted at Yekatit 12 Hospital Medical College and St. Peters specialized Hospital which is an affiliate of Addis Ababa University, Tikur Anbessa Specialized Hospital, Department of Dentistry, Oral and Maxillofacial surgery unit. Department of Dentistry was established in 1991 as a center with aim of training mid-level dental professionals. After training 55 dental therapists till 2001, the center upgraded its training capacity to train 231graduates with Bachelor of Dental Science degree till 2003 and further escalated its capacity to train undergraduate students in Doctor of Dental medicine level after it was incorporated under college of health sciences, Addis Ababa University. Enrollment of Maxillofacial surgery residents in 2016 was a recent development of the department which marked the initiation of specialty training for the first time. Addis Ababa is the biggest and a capital city of Ethiopia. The city is located at an elevation of 2,355 meter above sea level and is home for more than 3.8 million people as per 2008 population census.

This study was undertaken from November 2019 to August 2020.

4.2. Study design

A **retrospective Cross-sectional descriptive design** was used.

4.3. Source Population

All patients' logbook and medical records (charts) that had major maxillofacial surgery at Yekatit 12 Hospital Medical College and St. Peters specialized Hospital.

4.4. Study Population

All patients who underwent Maxillofacial surgery at Yekatit 12 Hospital Medical College and St. Peters specialized Hospital during the study period whose document fulfill inclusion criteria

4.5. Sample size and sampling technique

No sample size was determined as all source population was included as the study subjects provided that the documents are complete for the variables of interest.

4.6. Data Collection

The data was collected by five personnel: principal investigator and four dental interns by predesigned and structured checklist (format) on which required variables was filled from the patient registry logbooks and medical records.

4.7. Data Analysis

After data collection was finished; cleaning, checking of the content was done. Further data cleaning was performed to check for missed values and any data inconsistency before data analysis. Finally, data was entered into EPI INFO version 7.2software and analysis of different variables done.

4.8. Quality Control

Completeness of data was checked by principal investigator and orientation was given to other colleagues involved in the study.

4.9. Study Variables

4.10.1. Independent variables

- ✓ Age
- ✓ Sex

4.10.2. Dependent variables

- ✓ Indications of major surgery (Diagnosis)
- ✓ Types of major surgery

4.10. Inclusion criteria

All patients who underwent major maxillofacial surgery at specified area and period except those who **meet exclusion criteria** was included in the study.

4.11. Exclusion Criteria

Patients who underwent major maxillofacial surgery at specified area and period, but whose document has any of the following information missing or incomplete

Age

Sex

Indications of surgery (Diagnosis)

Types of performed surgery

4.12. Ethical Consideration

Ethical clearance was obtained from Addis Ababa public health research and emergency management directorate for Yekatit 12 Hospital medical college and and ethical review committee office of st.Peter specialized hospital.

4.13. Operational Definition

Indications of surgery: The reasons (conditions or diseases) for which patients seek maxillofacial surgical intervention which could be broadly classified as either pathology or trauma.

Types of surgery: It is a kind of surgical procedures performed for patients who presented with maxillofacial diseases and conditions.

Patterns of surgery: It is the frequency and repetitiveness of the surgical cases and surgical procedures performed for the cases.

Trends of surgery: It is frequency distributions of maxillofacial surgical procedures performed over a defined time period, usually annually, of similar duration at different time.

4.14. Limitations

- ✓ This study is hospital based study and its design is cross-sectional. As such, it is difficult to be generalized for entire population.
- ✓ Secondary data, which was kept not for research purpose, was used. Some records are incomplete and missing entirely.

CHAPTER FIVE

RESULT

In this study, data of 689 patients who underwent surgical procedure under GA in the OMF region between the years 2017 to 2019 was analyzed. On average, about 230 cases were operated per year, with the number of surgeries performed per year increasing from 121 cases in year 2017 to 322 cases in year 2019(*figure1*).

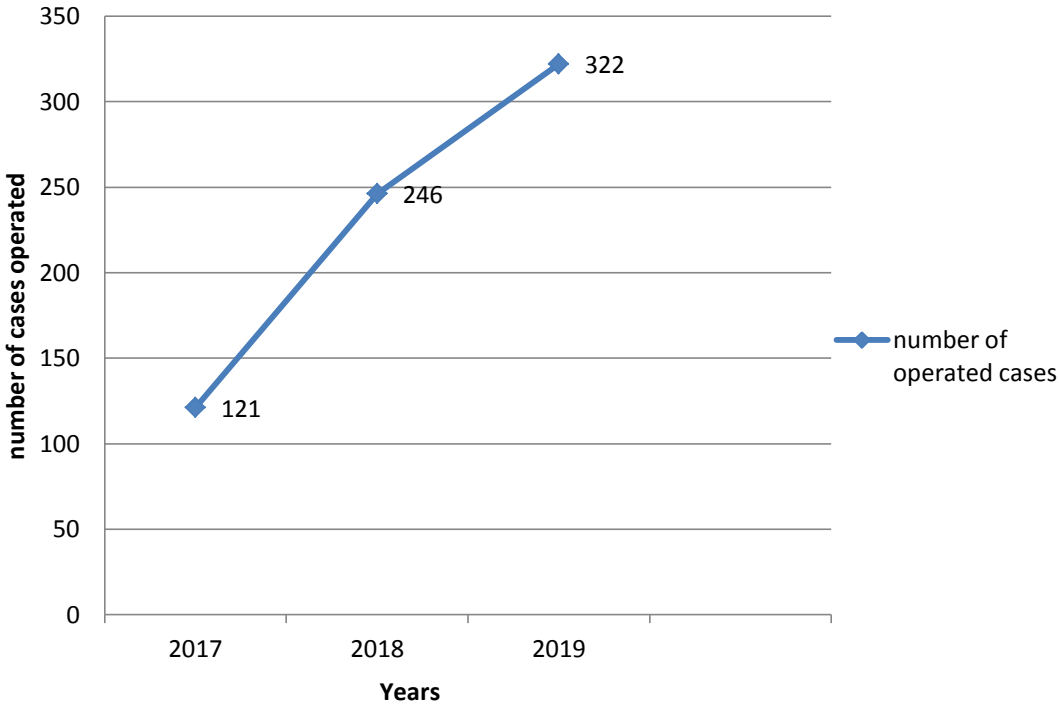

Figure1:number of cases operated in each year from 2017 to 2019

Of all the patients who underwent surgery, males were significantly more than females (71%, n=491) giving the male to female ratio of 2.48:1. The age range of the patients was from 04 months to 84 years with the mean age of 29.05 years and standard deviation of ±15.5, and the most common age groups to be managed were 21–30 years (35.85%, n=247) and 31–40 years (19.01%, n=131)(*figure 2&3*).

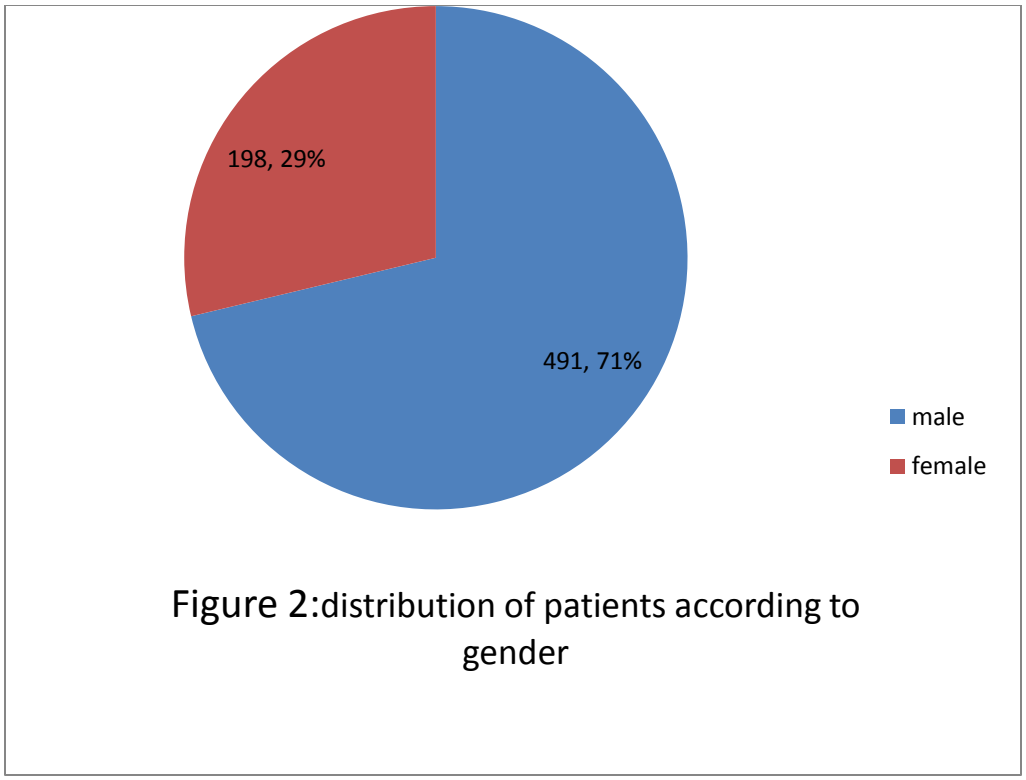

Figure 2:distribution of patients according to gender

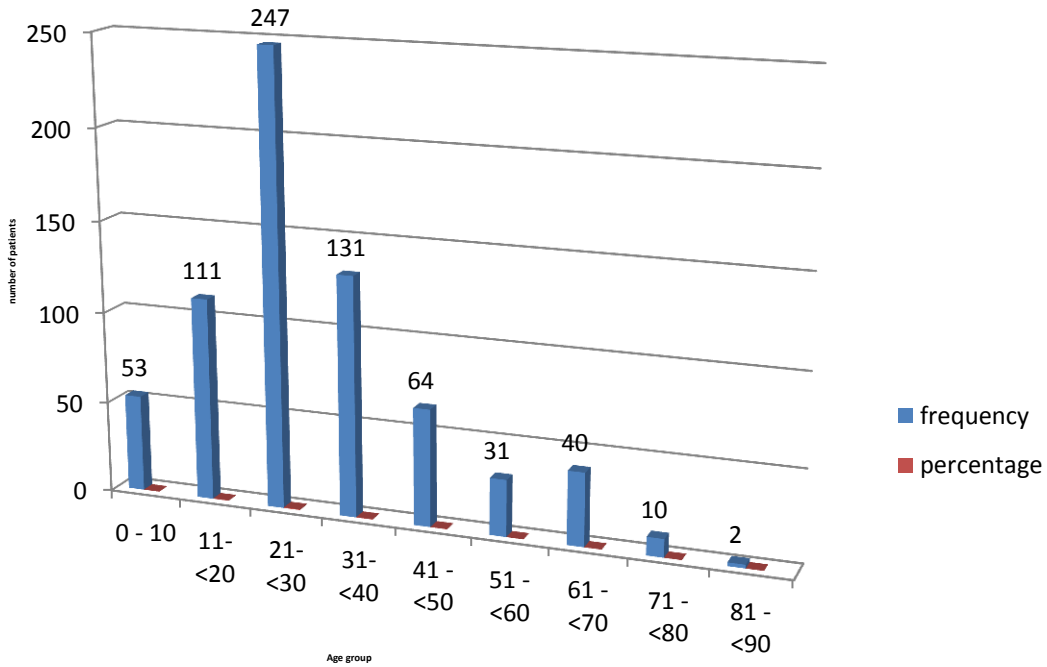

Figure 3: distribution of patients according to age group

More than half of the OMF cases managed surgically were traumatic conditions (50.71%, n=354), followed by benign and malignant neoplastic conditions (18.7%, n=129), and tumorlike /cystic conditions (16.5%, n=115). Infective and inflammatory conditions which includes conditions like infections of fascial spaces of head and neck and osteomyelitis of the jaw (5.4%, n=38), and sialolithiasis(1.8%,n=13)contributed the lowest as an indications of major

surgery(*figure4*).

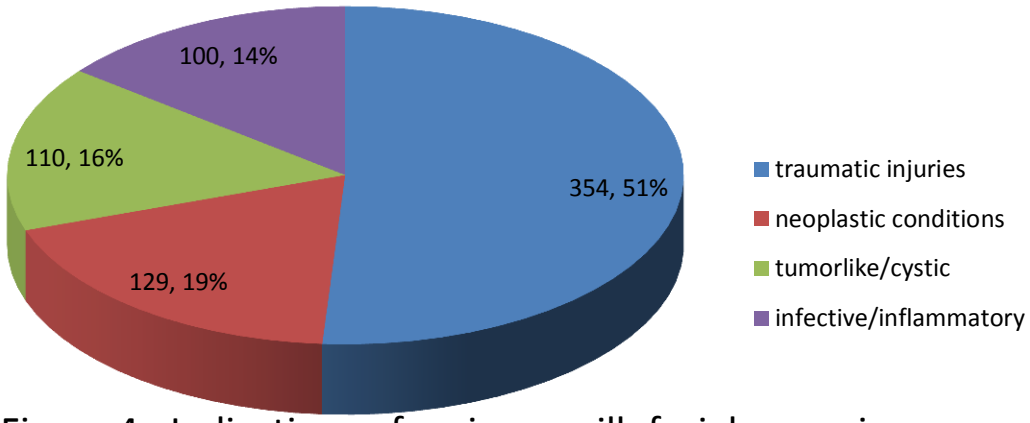

Figure 4: Indications of major maxillofacial surgeries

The common conditions to be surgically managed in males were trauma (63.7%, n=313) followed by tumorlike/cystic conditions (13.6%, n=67), while females were frequently operated for neoplastic conditions (32.3%, n=64) and inflammatory/infective conditions (26.7%, n=53).Furthermore, trauma was the fewest condition to be managed surgically in females in contrary to that in males (20.7%, n=41)(*figure5*).

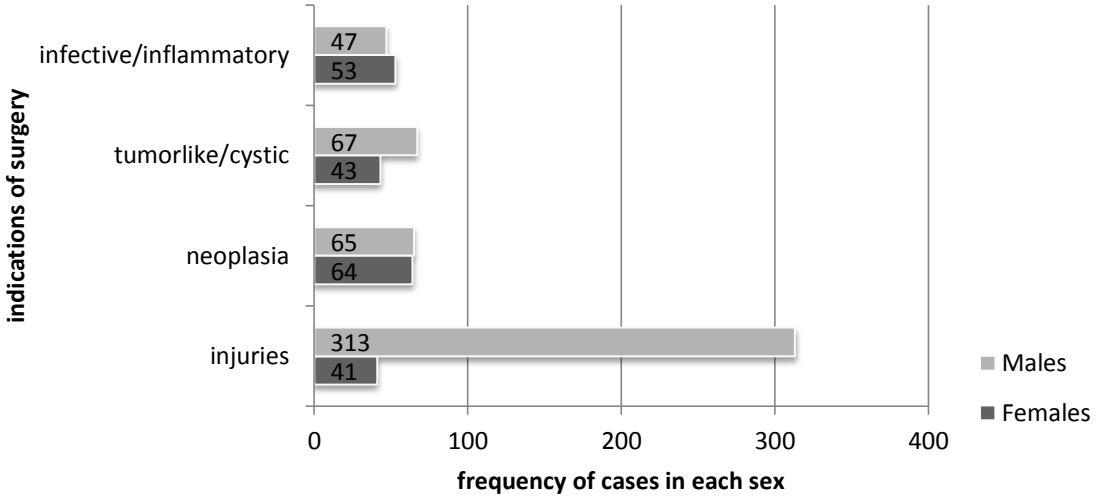

figure 5: distribution of indications of surgery according to gender

Traumatic injuries were the most common indication for majority of age groups with the exception of age groups above 61 years, who were frequently operated for benign and malignant neoplastic conditions (*Table 1*).

Table 1.Indications of surgery according to age group among patients who were operated at Yekatit12 and st.peter Hospitals from 2017 to 2019

Age group	Indications of surgery				Total
	Injuries	Neoplasia	Tumorlike/cystic	Infective/inflammatory	
0-10	20	9	7	17	53
11-20	42	31	24	14	111
21-30	164	27	34	22	247
31-40	79	19	22	12	132
41-50	29	12	13	10	64
51-60	9	8	6	9	32
61-70	11	15	4	12	42
71-80	0	6	0	4	10
81-90	0	2	0	0	2
total	354	129	110	100	693

During the study period more than 50 different types of OMF conditions were managed under GA. The most frequently operated condition was mandibular fracture (32.2%, n=223), followed by zygomatic complex and panfacial fracture combined (12.5%, n=87), space infections and osteomyelitis(5.4%,n=38),ameloblastoma(4.3%,n=30) and odontogenic keratocysts (3.9%, n=27)(*Table 2*).

Table 2: Oral and maxillofacial conditions that were commonly managed surgically among patients who were operated at Yekatit12 and st.peter Hospitals from 2017 to 2019

Diagnosis	Number of cases	Percent
Mandibular fracture	223	32.2
Zygomaticomaxillary fracture	47	6.8
Panfacial fracture	40	5.7
Space infections and osteomyelitis	38	5.4
Ameloblastoma	30	4.3
OKC	27	3.8
Dentigerous cyst	24	3.4
Pleomorphic adenoma	22	3.1
TMJ ankyloses	17	2.4
Radicular cyst	17	2.4
STI	15	2.1
SCC	14	2.0
Sialolithiasis	13	1.8
Midface fracture	13	1.8
Fibrous dysplasia	11	1.5
Nasopalatine duct cyst	10	1.4

N.B: the conditions presented are those with frequency of above 10

Out of the total 716 surgical procedures performed for managing the conditions indicative of surgery, open reduction and internal fixation (ORIF) was the most common(43.7%,n=313), followed by cyst enucleation(11.45%,n=82) and tumour excision(9.1%,n=65).Procedures that involved jaw bone resection (mandibulectomy and maxillectomy) were performed on 55 patients, Of which partial mandibulectomy accounted for more than two thirds of all mandibulectomy cases(n=37),followed by hemimandibulectomy (32.4%, n=12).Almost all (94.4%) maxillectomy cases performed in our setting were partial maxillectomies except one case(n=18).Surgical(total or partial) excision of different salivary glands and incision & drainage were performed in forty five (45) and twenty two (22) cases respectively. Sequestrectomy(2.2%,n=16),surgical shaving of bone dysplasias(1.67%,n=12),and neck dissection(1.3%,n=9) were among the procedures performed with lowest frequencies (*Table3*).

Table 3: **Frequently performed oral and maxillofacial surgical procedures among patients who were operated at Yekatit12 and st.peter Hospitals from 2017 to 2019**

Type of surgical procedure	Number	Percentage
ORIF	313	43.7
Cystectomy	82	11.5
Tumor excision	65	9.0
Sialadenectomy	45	6.3
Mandibulectomy	37	5.2
Debridement,repair	31	4.3
Closed reduction&stabilization	23	3.2
I&D	22	3.0
Maxillectomy	18	2.5
Arthroplasty	17	2.4
Sequestrectomy	16	2.2
Surgical shaving	12	1.7
Neck dissection	9	1.3
Others	26	3.6

CHAPTER SIX

DISCUSSION

OMF region is an area that is prone to multitude of disease conditions which may be of developmental nature (e.g., vascular anomalies) or acquired nature (such as neoplasms, trauma and infections). These conditions require surgical intervention in many occasions. This study was undertaken to analyze the indications and pattern of OMF surgeries in our institute which can be considered as the beginning of efforts to put forward in characterization of the most prevailing maxillofacial diseases and ultimately its detection, treatment and possibly prevention.

In this study, 689 patients with maxillofacial conditions were operated with 230 surgeries performed per annum in average. Number of operated cases steadily increased from 121 in first year to more than two fold (n=246) in the second year and almost three folds in the third year (n=322). The obvious increase in number of cases operated per annum in our institutes can be explained by recruitment of more trained OMF surgeons in both Tikur Anbessa Specialized Hospital and two affiliate hospitals (from two surgeons in 2017 to four at present) and initiation of the OMF surgery service at the second affiliate hospital (St.Peter specialized) in the second quarter of first study year. Other reasons include increasing awareness of maxillofacial surgery specialty and the services offered among the populace and the medical community.

The results of current study revealed that there were more male patients than their female counterparts. Similar results have been reported in other studies (32)(33), however they differed from what was reported by Moshy et al (31). The ratio of male to female differed in all the studies, and this can be attributed to difference in socioeconomic status.

The age range of the patients is similar to reports in the literature, with most of the patients being in the 3rd decade of life(34)(35).However, some other authors report varying modal decades in their studies. Ibikunle et al. on their study conducted at Usmanu Danfodiyo hospital in Nigeria, reported the 4th decades of life as the modal decades(36).

The management of injuries to the maxillofacial complex remains a challenge for OMF surgeons, demanding both skill and a high level of expertise(37).It remains the serious clinical problems because of the specificity of this anatomical region and constitute approximately 45% of the work load on Oral and Maxillofacial surgeons worldwide(38).

Similar to the findings of other studies (39,40), maxillofacial trauma was the principal indication for surgery in this study(50.7%,n=354). However, to the contrast of the current study, the maxillofacial trauma was the second frequent indication for surgery in other study(32). The relatively higher proportion of maxillofacial injuries may be because both Hospitals at which this study is conducted are an urban area, where population is exposed to the hazards of high-speed travelling. Furthermore, most of the cases of maxillofacial fractures are observed in the younger age groups who are active and likely to involve in Interpersonal violence and various risky job(41,42).

Mandibular fractures were more commonly encountered than any other maxillofacial fracture(63%,n=223).This finding is comparable to other reports in the literature(43–45). However, it is at variance with some other studies where nasal bone fractures were reported to be the most frequently encountered maxillofacial fracture(46),which in our setting contributed few proportion(2.26%,n=8) to the injuries that demanded surgical management. Also, Gassner et al.(47) reported maxillary fractures to be the most frequently diagnosed injury site in their study, which was only 3.67%(n=13) of the total injuries in this study. Mandibular fractures are believed to occur frequently because of its prominence(48,49).

Neoplastic conditions often represent a variable proportion of the indications for surgery in the oral & maxillofacial specialty in different countries(32,50).Neoplastic conditions, most of which were benign(72.8%,n=94), were the second most frequent indication for surgery in this study. This is at variance with some studies in the literature, where it were in the majority(51).The most commonly observed benign tumors were ameloblastoma(32%,n=30),pleomorphic

adenoma(23%,n=22),ossifyingfibroma(10%,n=9) similar to the reports of various authors except that ossifying fibroma and pleomorphic adenoma interchange their places in some literatures(52–56). Ameloblastomas are among the most common benign tumours and its higher prevalence can be explained by its heterogeneous epithelial origin(57).Conversely, Saleh et al., in a study of biopsied oral & maxillofacial lesions reported the most common benign tumor to be keratocystic odontogenic tumor(58).

The cases of malignant neoplasms were also treated surgically, though not frequent (5.1%, n=35). These cases were just a portion of all malignant neoplastic conditions that were received in Tikur Anbessa specialized Hospital, where patients with malignancies of advanced lesions causing severe morbidity, deformity and at times metastasis to other organs and as such rendered inoperable, receive palliative treatment because of their late presence. In agreement with findings from other studies(32,59–62),the common malignant condition that was managed surgically was squamous cell carcinoma (40%,n=14) in our center.

Studies on oral and maxillofacial disease have included limited data on the prevalence of odontogenic cysts in all populations (63–67).In this study, cystic and tumorlike conditions contributed significant proportion of indications for surgery (16%, n=110) with commonest entities being Odontogenic keratocyst(24.55%,n=27), dentigerous cyst(21.8%,n=24) and radicular cyst(15.4%,n=17) in decreasing order. This is not consistent with findings in literatures that found out radicular cyst and dentigerous cyst as the leading cysts among others (63,68). This could be explained by the fact that, only few proportion of radicular cyst which are not comfortable for patients and the surgeon for removal under local anesthesia are operated under GA in our center.

The prevalence of space infection and osteomyelitis is significantly scanty (5.48%, n=38) in this study, since most of the infective cases were operated in minor surgery under local anesthesia and were not admitted to the In-patient department. Pus drainage and curettage, debridement and sequesterecomy were the main outline of treatment in those patients.

The findings of this study elucidate that the most frequently performed surgical procedures were those procedures related to management of orofacial traumatic

conditions such as ORIF, exploration and debridement, closed reduction and stabilizations. ORIF demands direct exposure of the fracture site followed by alignment of the bone segments and fixation(69). Fixation may be rigid (e.g., using plates) or semi-rigid (e.g., intra-osseous wires). The cases that were managed by ORIF included all those with unfavourable fracture of mandible and midfacial bone fractures. Most cases of ORIF were performed using intra-osseous wires (83.07%, n=260) due to limited availability of metal implants (plates and screws).This is in agreement with finding from other studies (31),(50).

Enucleation of cysts and excision of tumors has been defined as a surgical procedure that involves dissection of an intra-osseous cavity while preserving its integrity and dissection of a well demarcated soft tissue lesion with preservation of soft tissues surrounding it respectively(70). Such procedures were often performed on cystic lesions and clinically well-defined tumors such as ossifying fibromas, unicystic ameloblastoma and mucus retention phenomena of salivary glands accounting for a significant proportion of the surgeries (20.5%, n=147).

Resection of the jaws entails removal of the mandible or the maxilla either in part or as whole. Mandibulectomy (n=37)contributed significant proportion of the surgical procedures in this study, though it is not the leading procedure in contrast to the finding of a study from Nigeria (32) in which it was the most common procedure. Ameloblastomas being the most common benign tumor, it was managed by performing mandibulectomy since its cure is undoubtedly surgical. There are various proposed treatment options for ameloblastomas ranging from conventional to radical methods of therapy. The traditional techniques involve curettage, enucleation as well as cryosurgery; while the extreme techniques are marginal, segmental as well as composite resections (70,71). In our centers, majority of ameloblastomas were treated radically. Other indications for jaw resection included myxoma, aggressive variants of ossifying fibromas, and malignant conditions such as osteosarcomas, and carcinomas that had infiltrated the jaw; hence, as part of wide tumour excision, maxillectomy or mandibulectomy was performed.

In consonance with other similar studies(72),the relatively fewer numbers of salivary gland surgeries(6.28%,n=45) done may be related to the fact that the specialty of oral and maxillofacial surgery is comparatively new in our country and

a large percentage of the salivary gland surgeries are referred to other surgical specialties for treatment. With the continued development of the oral and maxillofacial surgery specialty in our locality and the attendant increase in awareness, it is believed that more salivary gland surgeries will be done at OMFS department.

Management of temporomandibular joint (TMJ) ankylosis predominantly aims at providing a satisfactory mouth opening, re-establishing normal jaw function and preventing re-ossification in long term especially in children (73). Even though no single standard treatment protocol for TMJ ankylosis has been reported until now due to high reankylosis rate; a number of treatments for this condition have been described in the literature, including simple arthroplasty, interposition arthroplasty and reconstruction of the joint using acrylic, titanium, or autogenous material prostheses in end stage diseases(74,75). In the institutes where this study was carried out, the most preferred method was interpositional arthroplasty (64.71%) in agreement with other studies report(76–78).However, a study conducted four years back in Ethiopia reports that Gap arthroplasty was the most utilized surgical management(79).

The frequency of performing hard and soft tissue reconstructive surgeries is fairly low in our institute, whereby some of the patient who had mandibulectomy procedure had reconstruction of the mandible with reconstruction plates. For soft tissue defects that could not be closed primarily, local flaps were used.

Microvascular surgery offers considerable advantages over the traditional methods of maxillofacial reconstruction(80,81).However; it was not utilized in this study owing to a number of challenges such as limited theatre time, financial incapacitation and inadequate staff. In general, the fewer cases of reconstruction can be attributed to low economic empowerment of most of the patients, as majority of the patients are usually in the lower and intermediate socio-economic group hence making out-of-pocket payment for their treatments and this is often challenging.

Corrective surgeries like orthognathic surgeries and cleft lip and palate (CLP) surgeries are almost not performed in our department during study period. The probable reason behind few numbers of CLP patients include availability of many

national and international voluntary organizations providing services and reporting of the patients to other disciplines like plastic surgery, ENT (Ear,Nose and Throat) and pediatric surgery.

Few limitations could be acknowledged in this study. Firstly, our study population represents a specific study group limited only to those undergoing OMF surgical procedures under GA. Secondly, there were some operation lists that had been incomplete and missing.

Overall, the present study cast the light on the spectrum of OMF surgeries that are performed in our institutes. Results of this study will aid the relevant authorities to make appropriate evidence-based plans and decisions during procurement of materials needed for managing patients with OMF conditions in future

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATION

The field of Oral and Maxillofacial surgery in our climes is a relatively new one, however, it is evolving and its relevance is growing. There has been an annual increase in number of OMF surgical procedures performed in our institute. Males and patients in their third decades of life are commonly seen in this study. Traumatic injuries of orofacial region are the most common indication for OMF surgeries, with mandibular fracture being the commonest diagnosis. A wide range of oral and maxillofacial surgical procedures were done during the study period, with ORIF being most frequently performed procedure under GA.

With the observed relatively high frequency of traumatic conditions, especially among younger populations, efforts geared at prevention and adequate preparedness for proper surgical management of such patients with regards to armamentarium, emergency theatre arrangement, professional and support staff training should be commenced. Additionally, there is a need to improve accessibility to advanced reconstructive procedure after tumor ablation, especially with regards to microvascular surgery.

Squamous cell carcinoma is the most common malignant tumor presented to our department and mostly is diagnosed late. Proper consideration should be given for timely diagnosis and prevention of cancer and odontogenic tumors like ameloblastomas by educating the community and dentists so that the extent of deformity will decrease and reconstruction complexity will be easy.

Finally, our department should exert all the possible efforts to avail necessary equipment and launch procedures like orthognathic surgery, CLP surgery, and hard and soft tissue reconstructive surgeries by free tissue transfer.

CHAPTER EIGHT

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CHAPTER SEVEN

ANNEXES

7.1: Data collection format

Data collection checklist (format) for retrospective study on the pattern of major maxillofacial surgery at AAU, Oral and Maxillofacial surgery department affiliate hospitals (Yekatit 12 Hospital Medical College and St. Peters specialized Hospital)

S.No.	Information to be filled	Proposed outcome(variable)		
1.	Age			
2.	sex	1.Male		
		2.Female		
3.	Indications of surgery	1.neoplastic conditions	1.Benign	Ameloblastoma Pleomorphic adenoma myxoma Central giant cell tumour Ossifying fibroma Haemangioma others
			2.Malignant	SCC Osteosarcoma Adenocarcinoma Mucoepidermoid carcinoma Adenoid cystic carcinoma Others

		2.Trauma	1.Mandible 2.Midface 3.Panfacial 4.Zygomatic complex 5.Nasal 6.Soft tissue injury	
		3.Inflammatory/Infective conditions	1.TMJ ankylosis 2.Sialolithiasis 3.space infections 4.Others	
		4.Tumorlike conditions&cysts	1.dentigerous cyst 2.OKC 3.Fibrous dysplasia 4.dermoid cyst 5.Others	
4.	Types of major surgeries	Open reduction and internal fixation(1.plate 2.wire) Mandibulectomy (total, hemi or partial) Enucleation&curettage Wide tumor excision		

		Maxillectomy (hemi or partial) Surgical shaving Condylectomy Sialoadenectomy Arthroplasty (interposition or gap) Sequesterectomy I&D Others