

## Tumors of Craniofacial Region in Iraq (Clinicopathological Study)

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### ABSTRACT

Craniofacial tumors are a heterogeneous pathologic disorder with various clinical behaviors and histopathological presentation. Due to their special location, these neoplasms affect speaking and swallowing that may result in movement of teeth, bony expansion and involvement of adjacent craniofacial structures and destruction. This study aims to conduct a clinicopathological study of the management of the craniofacial tumors among patients in Iraq. A total of 319 patients, including 157 (~49%) males and 162 (~51%) females, enrolled in the study were attending the Ramadi Teaching Hospital, Zuhur Private Hospital, Razi Private Hospital and Rashid Private Hospital for diagnosis and treatment. Of the total collected samples, 75 (23%) were in the age group of 31-40 years, 168 (54%) were presented as mass, 102 (32%) were treated by surgical excision and 51 (16%) were treated by laser surgery. Many cystic and neoplastic pathosis (weather benign or malignant) are unique in craniofacial region due to aesthetic defect and functional impairment which revealed variations in geographical prevalence as well as pattern due to occupational, sociocultural, and climatic factors.

**Key words:** Craniofacial pathology, Maxillofacial pathology, Pathosis, Orofacial, mass, Histopathology, Oral lesions, tumors

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### INTRODUCTION

Neoplasm is a tissue mass that appeared because of abnormal and uncoordinated proliferation of cells even after growth stimuli have been ceased [1]. Orofacial neoplasms refer to those tumors found in the maxillofacial region that may affect the normal structure and functions, such as swallowing, mastication and speaking due to their special location [2]. Orofacial tumors are disparate pathologic neoplasms with various histopathological features and diverse clinical behaviors [3]; causing movement of teeth, bony expansion and involvement of adjacent craniofacial structures and destruction [2,3].

The demographical and epidemiological data are essential and significant parameters in clinicopathological diagnosis among populations [4]. A proper diagnosis results in a valid surgical approach [5]. The clinicopathological profiling of the various kinds of orofacial neoplasms orients the surgical management into missionary prognosis [6]. According to the World Health Organization (WHO) [7,8] classification of oral and maxillofacial tumors, published in January 2017, orofacial neoplasms are classified into benign and malignant odontogenic tumors, benign and malignant maxillofacial bone and cartilaginous tumors, benign and malignant soft tissue lesions, Fibro-osseous and Haemato-lymphoid tumors. Accordingly, surgical interventions vary into enucleation, drainage, simple surgical excision, surgical resection and laser intervention. The handling of malignant tumors was accomplished using radical surgery

and/or chemotherapy with or without deep X-ray therapy according to the histopathological grade and tumor stage [6]. Lasers are considered as standard tool of treatment and care for both patients and surgeons and be utilized as highly efficient scalpels for the excision of craniofacial tumors with maximum rescued to the vicinity craniofacial tissues [9,10]. The surgical management of orofacial tumors is presented with considerable challenges because of their location near the sensitive areas of the face. The surgical manipulating modalities are decided by maxillofacial surgeons according to the clinical examination and collated diagnostic information, taking into consideration fast healing, minimal scarring, and least deformity [11]. This study aims to conduct a clinicopathological study of the management of the craniofacial tumors among patients in Iraq.

#### MATERIALS AND METHODS

A total of 319 patients (including 157 (~49%) males and 162 (~51%) females) aged 95-90 years with a mean age of 34 years) who enrolled in the study were attending the Ramadi Teaching Hospital, Zuhur Private Hospital, Razi Private Hospital and Rashid Private Hospital for diagnosis and treatment. The research was approved by the Ethical Approval Committee at University of Anbar under the Ref.129 on 11th of July 2018.

The demographical data included the patients' names, age, gender, tumor site and their symptoms. Intra oral and extra oral clinical examinations were conducted by thorough inspection and gentle digital palpation of the both soft and bony tissues to evaluate the lesions regarding site, shape, color of overlying tissue, size, surface texture, consistency, fluctuation and examinations of loco-regional lymph nodes. Radiographical assessment was carried out using conventional radiography including (periapical, occlusal, panoramic posterior anterior, occipetomental) or computed tomography (CT) and magnetic resonance imaging (MRI). The essential laboratory investigations were requested according medical history and the clinical entity and differential diagnosis of the case. After anesthesia was obtained; an 18-gauge needle on a 5 ml syringe was used for fine needle aspiration cytology (FNAC) according to

recommended cytological procedures.

The surgical intervention was carried out either under local or general anesthesia, including incisional biopsy for large lesions before definitive treatment while excisional biopsy is preferred for unilocular tumors. Furthermore, surgical resection, mandibulectomy (segmental or hemi mandibulectomy) were conducted as treatment option. In fact, the incisional biopsy was carried out for patients with suspected malignant lesions before proceeding to the complete removal of some lesion. Enucleation and marsupialization were performed in cystic lesions removal of the jaws and facial bones that considered as a safe surgical technique without damaging surrounding structures.

For enucleation; semilunar, two-sided or three-sided flaps were applied, mucoperiosteal reflection was done, bone removal was carried out manually or by surgical handpiece, then the cyst membrane was exposed and curetted completely with meticulous normal saline irrigation, apicectomy or extraction of the affected tooth or teeth were performed, then the flap was replaced in position and sutured using 3/0 black silk suture. Regarding marsupialization; after the exposure of superficial cyst lining the cystic contents were evacuated then the lining was sutured to the surrounding mucosa, meticulous normal saline irrigation was practiced, then the cystic cavity was packed with iodoform gauze, each patient was instructed to keep a good oral hygiene to prevent accumulation of food debris and to preserve a patent surgical opening during follow up visits.

Other modalities include resection, also known as en bloc resection, which is the surgical removal of the entire tumor; this maneuver was conducted in cases of aggressive tumors to overcome any recurrence; or mandibulectomy (segmental or hemi mandibulectomy) that the resected specimen included the lesion with 1cm safe bony margins around the clinical and radiographical boundaries of the lesion. Or Laser surgery that includes Diode laser 940 nm (Epic™, Biolase, USA) applying 3-5 Power, CP1 Mode with fiber optic delivery system. BIOLASE epic X 940nm is considered as a class IV laser; therefore, skin and eyes should be safeguarded using safety goggles.

Postoperative instructions were clarified, and

medications were prescribed for each patient i.e proper antibiotics, metronidazole and non-steroidal anti-inflammatory analgesics with intraoral antiseptics using listerine mouth wash (Johnson & Johnson limited; UK) for 30 seconds throughout postoperative period. Sutures were removed after 7-10 postoperative days. At the department of Histopathology, the entire samples were mounted in paraffin embedding blocks and stained with hematoxylin and eosin (H & E) for histopathological examination by two independent oral & maxillofacial pathologist and general pathologist for confirmation of the diagnosis. (Figures 1-3). All clinical and histopathological procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2008. The research was approved by the Ethical Approval Committee at University of Anbar under the Ref.129 on 11th of July 2018.

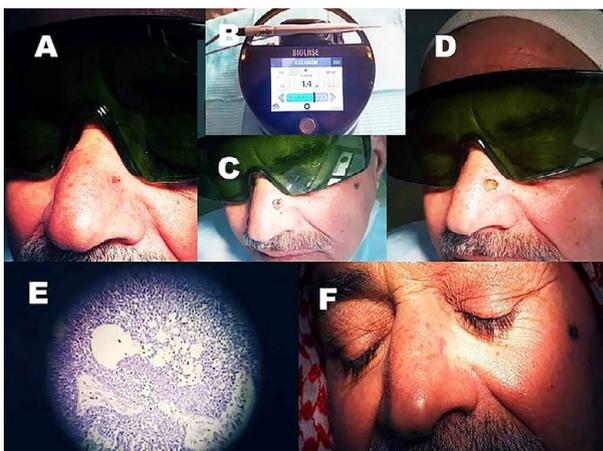


Figure 1: (A. Preoperative view, B. Laser parameters, C and D. Lesion removal, E. Histopathological view, F. Postoperative view).

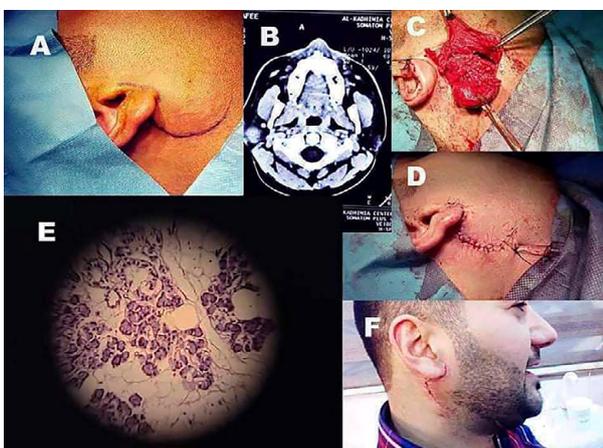


Figure 2: (A. Preoperative view, B. Axial Section CT scan, C. Lesion removal, D. Suturing and placing of drain, E. Histopathological view, F. Postoperative view).

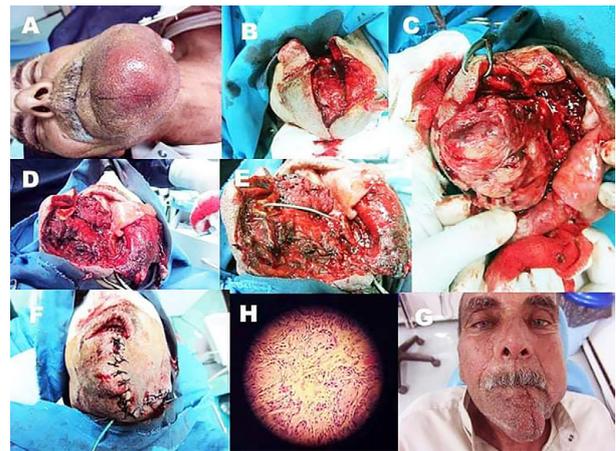


Figure 3: (A. Preoperative view, B. Midline incision, C. Exposure of operative field, D. Tumor removal, E. K-Wire was placed, F. Suturing and placing of drain, G. Postoperative view, H. Histopathological view).

**RESULTS**

From our study sample, the most affected age group was found to be the 31–40-year group (Table 1). The male to female ratio was 1:1, that is lower than different reported literature as that of Gaspar et al 5 and Busquets et al 12, who concluded a ratio of 3:1 and 5:1. The craniofacial lesions were mostly presented as mass 168 (53%), cyst as 130 (41%) and 21 (6%) were presented as other entities, including 4% as ulcer and 2% as pigmented lesions. The most affected site was benign tumors (≈87%), which are much more common than malignant tumors (≈13%). However, the types of cancerous lesions most prevalent in a community will vary with demographical, economical, geographical, and environmental status and people habits of the, including their diets.

Regarding diagnosis, squamous cell carcinoma was found in 14 cases (4%), pyogenic granuloma in 28 (8%) and radicular cyst in 31 (9.7%) while the concerning site distribution 38 (18%)

Table 1: Demographical findings.

Demographical findings			
Age group (years old)	Male	Female	N(%)
0-10			
Nov-20	10	11	21(6.7%)
21-30	25	26	51(16%)
31-40	37	38	75(23.5%)
41-50	42	44	86(27%)
51-60	16	18	34(10.5%)
61-70	13	14	27(8.5%)
71-80	10	8	18(5.5%)
81-90	2	2	4(1.3%)
Total	2	1	3(1%)
	157(≈49%)	162(≈51%)	319(100%)

involved the face, 13(6%) the maxilla, parotid 7 (3.3%) and buccal mucosa 21(10%).

Ameloblastoma was found as the most prevalent odontogenic tumor in 9 (3%); dentigerous cyst was found in 13 (4%). Other non-odontogenic tumors mostly reported as pyogenic granuloma in 28 (9%) and giant cell granuloma 3 (0.9%); fibro-osseous lesions 2 (0.6%), jaw cysts 80 (25%) including Periapical (37 cases), radicular (31 cases) and gingival cyst (12 cases) while parotid swelling was presented pleomorphic adenoma in 5 (1.6%). Malignant tumors comprised of squamous cell carcinoma 14 (4.4%), Burkitt's lymphoma 4 (1.3%) and Basal cell carcinoma were found in 18 (5.6%) cases.

Regarding treatment options, surgical excision was carried out in 102 (32%) of the cases; surgical superficial parotidectomy was done in 5 (1.6%), radical surgical resection in 18 (6%), including 14 (4.4%) squamous cell carcinoma cases with subsequent chemotherapy and/or radiotherapy, while laser surgery was used to treat 51 (16%) of the cases. In contrast, enucleation and marsupialization were done for 105 (33%) of the cases and surgical curettage, drainage and incision were carried out in 38 (12%). Furthermore, as site distribution, 38 (18%) of the cases were found on the face; 17(8%) in the mandible and 13(6.2%) in the maxilla (Figure 4 and Figure 5).

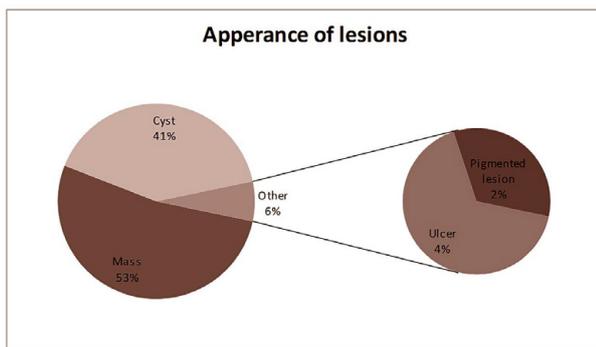


Figure 4. Appearance of the lesions.

**DISCUSSION AND CONCLUSION**

Learning the clinicopathological features of craniofacial disorders were relevant in early diagnosis that could be significant among populations. Orofacial tumors cause morbidity and mortality for people globally. Therefore, accurate diagnosis is essential for the proper management of cases. This study focused on

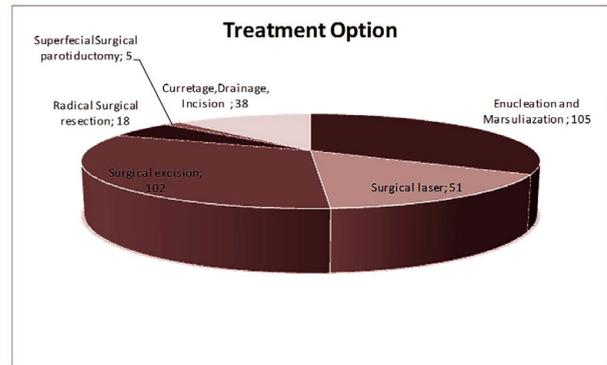


Figure 5. Treatment options.

nonodontogenic tumors, a group of tumors, as shown by previous reports, known to be frequent in the craniofacial region [8,12]. Among the higher age group, most neoplasms in this study found in the third decade of life. This conflict partly attributed to age groups and pathologic lesions varieties of the sample that were included and compared with another research [4,6].

Many odontogenic tumors were originated from tooth germs in which termination of crown formation at age of 4 to 5-year Olds in most permanent dentitions; that is why they developed after that age. In our finding, ameloblastoma was found to be the most expected because conventional ameloblastoma is common in the sampled age group during their third to the fourth decade of life [12].

In this clinicopathological study, 13% of the tumors were found to be malignant, which is different from other conducted studies in Africa that stated 43-67% were malignant tumors with an increased Burkitt's lymphoma incidence [13]. The parotid tumors were the most tumors affecting the salivary glands in (33.33%), and the palate is the most frequent site for tumors of the minor salivary glands that is agreed with other clinical researches [14,15].

Racial and geographic verities are attributed to this discrepancies and differences in the studies samples in comparison with different studies that such data could help clinicians to give proper and definitive evaluations and diagnosis. In the current clinicopathological study, odontogenic cysts occurred more in males that is supported with other reports [14-16]. The mandibular bone was the most anatomical site affected, that was similar to the findings of Meningaud et al. [17] and Koseoglu et al. [18] and disagreed with few other studies [19,20].

According to our findings; radicular cysts represented the most frequent type of the cystic lesions 46.875% that is similar to the results of Tay 20 who mentioned prevalence of 50.7% , Mosqueda et al. [21] (52%) and Shear et al. [22] (52.3%).

The majority of the observed malignancies involved both soft and hard tissues as a result of contiguous spread, which may be attributed to the late presentation by patients. Malignant epithelial lesions were the most common malignancies, with SCC making up over 95% of the observed malignant epithelial lesions. This conforms with other reports in the literature [2].

Furthermore, the proportion of oral SCC in comparison with other malignancies was quite high, and this may be a reflection of increasing alcohol consumption and the use of tobacco in its various forms among the populace [5,7,8]. The lower lip and tongue were identified as a common site for SCC in this study; no case of primary involvement of the upper lip was identified. Remarkably, all the patients with SCC of the lower lip were males; this may be an indication of the detrimental effects of excessive exposure to ultraviolet rays [12]. This may be related to the fact that the population studied by them consisted mainly of Caucasians who are mostly fair-skinned, unlike in this study. Furthermore, this study lends credence to reports that SCC is the most prevalent epithelial malignancy of the orofacial region. Moderately differentiated SCC was most frequently seen [20,23,24]. Moreover, Sarcomas accounted for most of the observed mesenchymal tumors, which we deem to be a rare malignancy. Only one case was reported with the peak age of incidence in literature. Burkitt's lymphoma was the most common lymphoproliferative tumor seen, most of which affected the mandible and/or maxilla. The high proportion of Burkitt's lymphoma observed is dissimilar to reports from studies in the Western world but like those conducted in Africa [2,12,25,26].

Current evidence suggests that all causes of malignancies specifically originated from mutations in proto-oncogenes and tumor suppressor genes that linked directly to the types of DNA damage associated with cancer-causing agents i.e, UV-light and tobacco tar, thus providing evidence of "direct cause and

effect"; also viruses playing an important role in carcinogenesis by directly altering the expression of proto-oncogenes and indirectly through the inactivation of tumor suppressor proteins [2,25,27].

As laser technology is developing rapidly, it is finding greater application in the field of craniofacial surgery. Hence, it becomes important for the surgeon to acquire knowledge about the same so that he or she can perform surgical procedures more effectively and efficiently. Identifying situations where using a laser would prove to be superior to using conventional techniques and utilizing them is of prime importance. The surgeon must also be aware of the safety considerations and strictly follow safety guidelines. Nowadays lasers are a standard effective tool in the surgical management of a wide range of pathological conditions affecting craniofacial region with greater efficiency and efficacy [9,28].

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