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Clinical and Radiographic evaluation of tumors Head and Neck: Report of Cases

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Abstract

The head and neck district represents one of the most frequent sites of cancer, and the percentage of metastases is very high both in locoregional and distant areas. Prognosis refers to several factors: a) stage of the disease; b) locoregional relapses; c) distant metastasis.

Distant metastases from head and neck cancers are present in approximately 10% of cases at diagnosis, and an additional 20-30% develop metastases during the course of their disease. The objective of the present study is to provide an update on head and neck tumors. Recent achievements in molecular profiling, the interaction between neoplastic tissue and the tumor microenvironment, concepts of oligometastatic disease, and the role of immunotherapy have profoundly changed the therapeutic approach and disease control. In the first place, we address topics such as natural history, the epidemiology of distant metastases and relevant pathological and radiological aspects. Then the focus is on the most relevant clinical aspects; special attention is reserved for EBV- and HPV-positive distant metastases and the oligometastatic concept. A substantial part of the review is devoted to different therapeutic approaches. We highlight the role of immunotherapy and the potential effects of innovative technologies. Finally, we present ethical and clinical perspectives related to frailty in cancer patients and the emerging difficulties in sustainable socioeconomic governance.

Key Words: *Head and neck oncology; Head and Neck Neoplasms; Mouth Neoplasms; Ameloblastoma. Oral cancer; keratocysts; odontomas, Cemetoblastoma.*

Introduction

Tumors Head and Neck are a group of neoplastic growths that originate from the tissues responsible for tooth formation and the periodontal apparatus of the jaw. Odontogenic tumors usually present as radiolucent defect, which makes diagnosis somewhat confusing while differentiating them from cysts. Although cystic lesions are surrounded by sclerotic borders, few odontogenic tumors share similar features.**(**1**)** They can be incidental findings of routine images in any office or found during the study of surgery or craniofacial injury. Many of these patients present with asymptomatic lesions, while others may be symptomatic.**(**2**)** The 2017 edition, like earlier editions, mainly divided odontogenic tumors into two categories, based on biologic behavior as malignant and benign. However, the 2005 classification organized benign odontogenic tumors as 'Odontogenic epithelium with mature, fibrous stroma without odontogenic ectomesenchyme, 'Odontogenic epithelium with odontogenic ectomesenchyme, with or without hard tissue formation,' and 'Mesenchyme and/or odontogenic ectomesenchyme with or without odontogenic epithelium' whereas the 2017 edition includes a simpler format such as epithelial, mesenchymal **(**ectomesenchymal**)**, and mixed odontogenic tumors. The complex and detailed malignant odontogenic tumor classification of the 2005 edition was also made simpler by this new classification. Another very important change of the new edition is to have an odontogenic cyst classification that was eliminated from the 2005 edition. The last effective WHO odontogenic cyst scheme was published in 1992. Therefore, the odontogenic cyst classification has been significantly updated since 1992. **(**3**)**

In this study we will analyze the clinical and imaging correlation of several cases of osteolytic lesions of the jaws, emphasizing the need for an early diagnosis in order to avoid the mutilating treatments that these tumors entail.

Materials and Methods

The present study was carried out to evaluate the clinical, radiographic and treatment profile of six cases of odontogenic tumors and tumor lesions of the oral and maxillofacial region. Data records from a total of 6 patients who were diagnosed with tumors of odontogenic and non-odontogenic origin were enrolled in the present study. Data files were analyzed over a time period of 2 years, and complete clinical and radiographic details were evaluated. Following were the diagnosis of lesions on the histopathologic examination was evaluated:

- Cancinoma oral.
- Ameloblastomas
- Keratoquistes
- Odontomasç
- Cementoblastoma.

Case 1: Oral Carcinoma

Epidemiology

There are more than 4000 new cases of head and neck cancers **(**including lip**)** diagnosed every year.**(**1**)** Over 600 of these cancers are oral cavity cancers. Oral cavity cancer is a highly lethal disease with a mortality rate that approaches 50%. The vast majority of oral cavity cancers are squamous cell carcinomas **(**SCC**)**, other types of oral cavity cancers such as minor salivary gland malignancies, sarcomas, malignant odontogenic tumours, melanoma and lymphoma comprise less than 10% of oral cavity cancers. Dentists and dental specialists are the common referring clinicians for a patient with oral cancer.

Risk Factors

Smoking and excessive alcohol intake **(**>5 standard drinks/day**)** are regarded as the main risk factors for the development of oral SCC in Australia. Smoking confers a 7 × relative risk of the development of oral SCC and alcohol intake of >50 g/day confers a 6 × relative risk of developing oral cancer.**(**2**)** In subcontinental countries, betel nut chewing is an important risk factor in the development of oral cancer, where oral cancers represent almost 50% of all total cancer diagnoses **(**compared with <1% in Australia**)**. There is an additional subgroup of non-smoking non-drinking mostly middle age female patients who are also recognized.**(**3**)**

Clinical Presentation

The clinical presentation of oral cancer is highly variable, and the presentation of oral cavity cancer is most often related to the primary tumors, with symptoms and signs from cervical or distant metastases much less common. Any oral cavity lesion, which fails to resolve in 2–3 weeks, should raise the suspicion of the treating clinician. **(**4**) (**Fig. 1 a-b-c-d-e**)**

Treatment-Surgery

Surgery remains the primary modality of treatment for oral cancer. Surgery can broadly be divided into 'resective' and 'reconstructive' components. Resective surgery includes the removal of the primary tumour ± management of the cervical nodes ± establishment of a surgical airway **(**tracheostomy**)** if required. Reconstructive surgery essentially involves minimising the morbidity of the resection **(**e.g. replacement of tissue, minimisation of effects on speech, swallow and mastication**)**. **(**5**)** The goal of the resection surgeon is to remove the oral cancer with a margin of normal tissue around the cancer in all 3 dimensions. Current clinical guidelines,**(**6**)** recommend that a 5 mm microscopic margin of normal tissue around the tumour should be the goal of the resective surgeon. To obtain a microscopic margin of >5 mm around the tumour, a macroscopic radial margin of 10–15 mm around the tumour is marked at the time of surgery, and the deep margin is determined by the preoperative scans and intraoperative palpation. Tumour shrinkage after resection and during pathological preparation is variable depending upon site, and may be as high as 50%. **(**6**)**

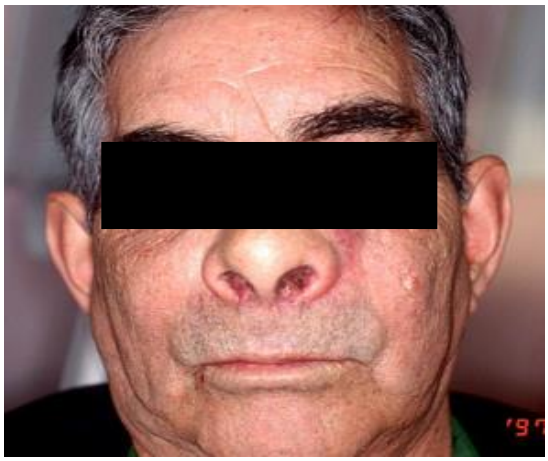

Fig 1a.- Extraoral photograph of the patients

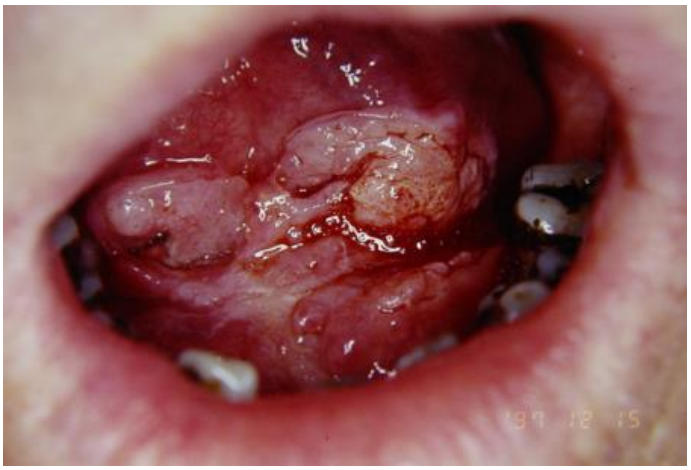

Fig.1b.- intraoral photograph with tumor growth in the floor of the mouth.

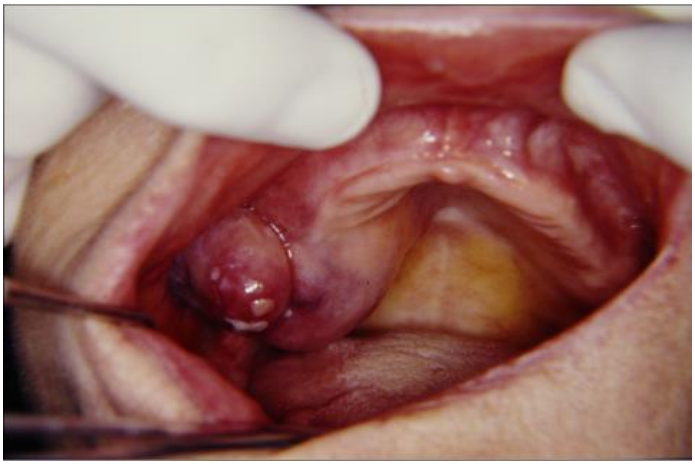

Fig.1c.- Intraoral examination with tumor lesions in the upper right side of the jaws

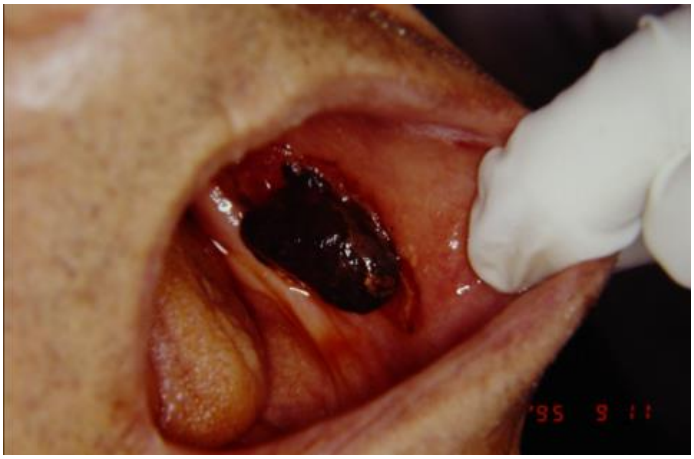

Fig.1d.-Intraoral examination with tumor growth in the mandibular vestibule

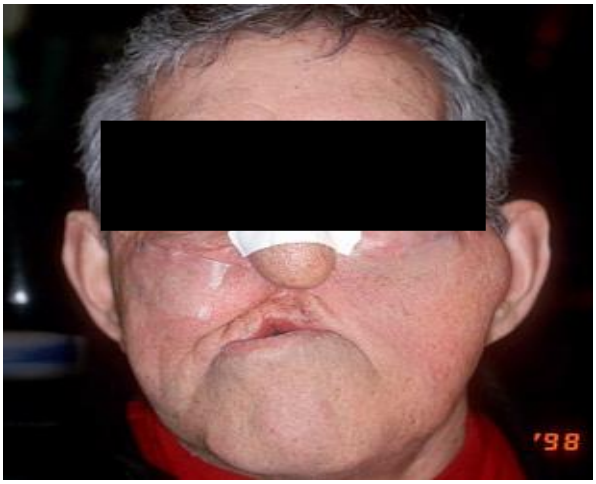

Fig.1e.- Extraoral photography after surgery a total maxilectomy

Case 2: Osteosarcoma jaws

Osteosarcoma **(**OS**)** accounts for about 20% of all sarcomas and is the most common primary malignant bone tumor **(**excluding bone marrow tumors**)** in children and adults and it constitutes about 1% of all head and neck malignancies. The OSs of jaws account for only about 6%–10% of all OSs. Although rare, these tumors, are the seventh most common malignancy of childhood and they have high mortality rates. **(**7,8**)** These mandibular and maxillary primary OSs behave differently than OSs of long bones and have a

slightly better prognosis than them. **(**9**)** They usually affect patients who are 10–20 years older than those afflicted by long bone OSs. The incidences of distant metastasis are lesser in jaw OSs **(**JOSs**)**. The histopathologic variables seen are more favorable and the survival rates are higher. The difference in the clinical presentation of OSs in the jaws from that of long bones is in the fact that swelling is the most common complaint in patients with JOS followed by pain, while bone pain during activity is characteristic of long bone OSs. Thus, the biological behavior of JOS differs from OSs involving long bones. **(**10**)**

OS within the medullary cavity of the bone is histologically classified into the conventional OS, telangiectatic OS, small cell OS and low-grade central OS, according to the WHO Classification of Tumours of Soft Tissue and Bone in human medicine, fourth edition. Conventional OS accounts for 80%–90% of all OSs and has a broad spectrum of morphology divided into three main histologic subtypes based on the prominent matrix they secrete with minimal prognostic significance. These are-osteoblastic, chondroblastic, fibroblastic. Other morphologic variants include Giant cell-rich, osteoblastoma-like, epithelioid variant, clear cell, chondroblastoma-like, chondromyxoid-fibroma like and small cell variant. **(**12-13**) (**Fig.2a-b-c**)**

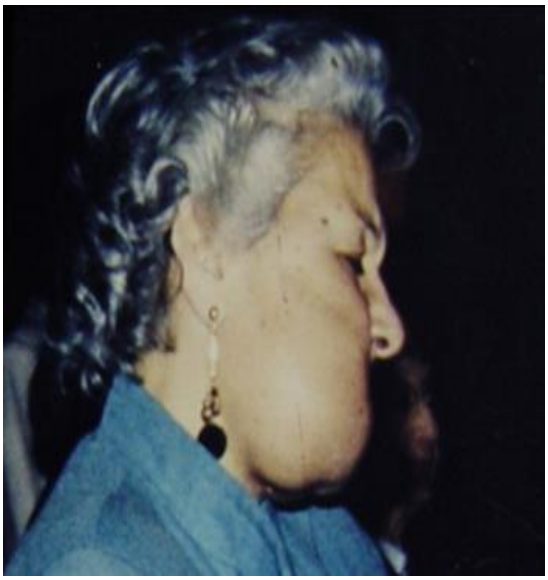

Fig. 2-a Extraoral photograph with severe tumor growth on the right side of the face.

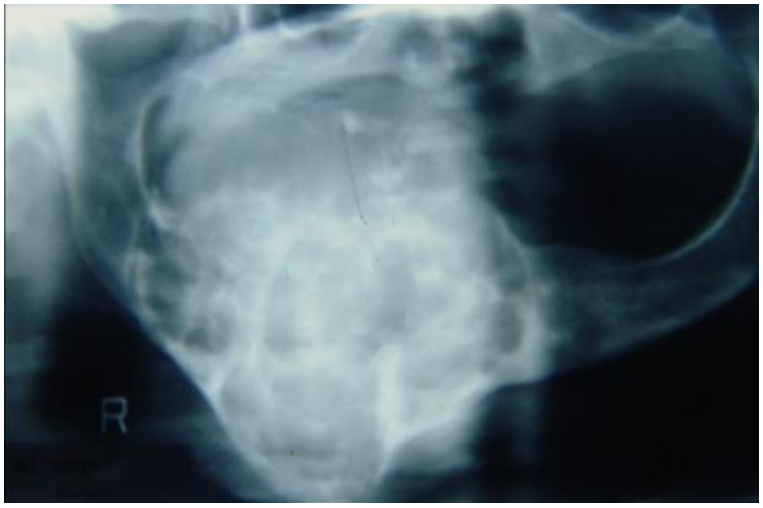

Fig.2-b.- Lateral radiograph showing a radiopaque shadow compatible with osteosarcoma

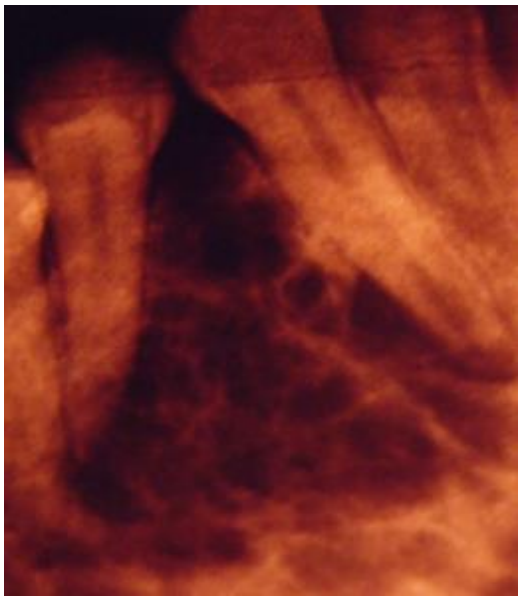

Fig.2c.- Periapical radiography where the typical osteosarcoma of the jaws is observed. Loss of the two periodontal ligaments and displacement of the dental roots.

Case 3: Odontogenic keratocyst

The term ‘odontogenic keratocyst’ was first used in 1956 to describe an odontogenic cyst lined with keratinized stratified squamous epithelium. In 1992, the World Health Organization **(**WHO**)** introduced the term ‘odontogenic keratocyst’, synonymous with ‘primordial cyst’, todenote benign cysts of odontogenic origin and specific histological appearance. However, in 2005, considering a high risk of recurrence, aggressive clinical course, mutations in the tumor suppressor gene **(**PTCH1**),** the occurrence of satellite cysts, and the association with the Gorlin–Goltz syndrome, WHO reclassified this pathology as a benign keratocystic odontogenic tumor **(**KCOT**).(**12**)**

In 2017, though, WHO released a new classification of head and neck tumors. As there was insufficient evidence to categorize the abovementioned pathology as a neoplastic lesion, KCOT was moved back into the cyst category under the name of odontogenic keratocyst **(**OKC**)**. However, the term ‘keratocystic odontogenic tumor’ is still in use. The authors of the 2017 classification do not specifically recommend any strict guidelines for OKC treatment. Nevertheless, it has been observed that conservative surgical management is not necessarily associated with recurrences characteristic of neoplastic disease.1–3. **(**Fig.3 a-b-c**)**

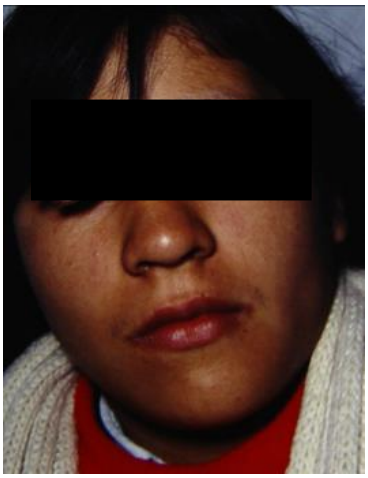

Fig. 3 a.- Extraoral photograph of the patient showing facial asymmetry

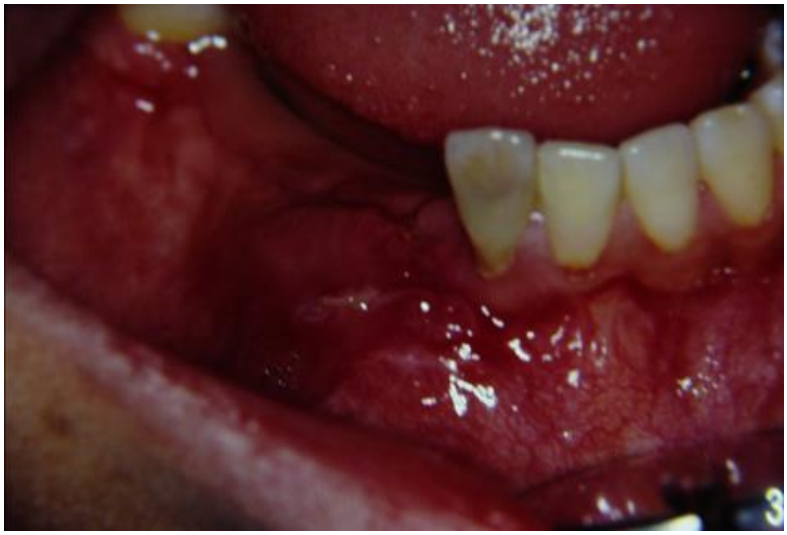

Fig.3 b.- Intraoral examination photograph shows a tumor on the left side of the jaw.

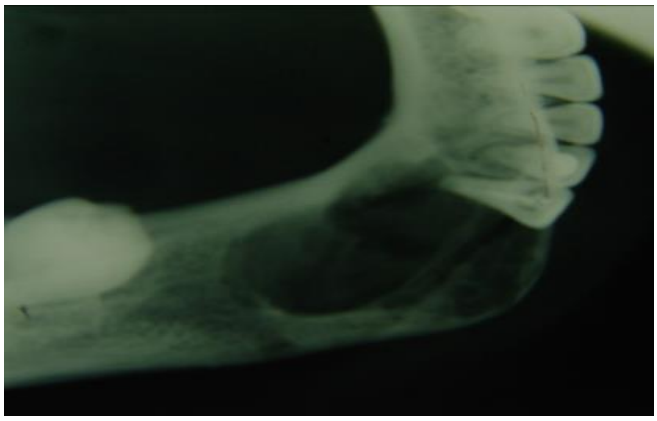

Fig.3 c.- Occlusal radiography shows a radiolucent shadow that compromises the left hemimaxilla.

Keratocyste

Case 4: Ameloblastoma

The word ameloblastoma derives from the early English word “amel,” meaning enamel and the Greek word “blastos,” meaning germ. They are rare, odontogenic tumors, thought to be composed of the epithelium of ectodermal origin, which means they are tumors arising from the cells around the tooth root, or in close approximation, derived from the ectoderm germ layer. Ameloblastomas represent about 1% of all jaw tumors, but they are the second-most common odontogenic tumor. They are much more common in the lower jaw than in the upper jaw, and more common in the posterior mandible as compared to the anterior. The vast majority of the time, they are a benign tumor with aggressive behavior; however, rarely they can develop into, or be associated with, a malignancy **(**malignant ameloblastoma or ameloblastic carcinoma**)**. It is extremely rare to find ameloblastomas outside the maxilla and mandible due to the association with teeth and their structures. There are 20 deciduous teeth **(**“baby teeth”**)** and 32 permanent teeth **(**generally depending on third molar development or wisdom teeth**)** that start to appear in the mouth around 6 years of age. The last four permanent teeth to erupt are third molars or "wisdom teeth," each of which may or may not grow in. Among deciduous teeth, ten usually are found in the maxilla **(**upper jaw**)**, and ten are in the mandible **(**lower jaw**)**. For permanent teeth, 16 are in the maxilla, and 16 are in the mandible. **(**13**)**

There are specific anatomic landmarks unique to each type of tooth which define them as incisors, molars, canines, etc. The anatomy of the tooth itself consists of the root which is hidden in the gums, and the crown, or visible part. The root of the tooth is anchored to the bone to which it is associated and allows for blood flow and nerve supply to the tooth to maintain viability. This system of ligamentous attachment connecting the tooth to the surrounding socket is called the periodontium. The hard tissue covering the crown is the enamel. The root is covered by cementum, a substance that is a hardy mineral but softer than enamel. The vast majority of ameloblastomas are benign and slow-growing, with locally aggressive behavior, which can lead to significant pathology and require extensive surgical treatment. The abnormal cell growth easily infiltrates local tissue, typically bone. Surgical excision is usually needed to treat this disorder. It has a high propensity for local recurrence even with proper surgical management and requires lifelong follow up for surveillance. **(**14**)**

Amelomlastomas spread locally, invading surrounding tissues. They spread through bone and can invade soft tissues as well if given enough time to do so. However, this is a benign tumor so metastasis to lymph

nodes, distant sites, etc., is rare and changes the staging to malignant. The thinking is that malignant ameloblastomas comprise less than 1% of all ameloblastomas. **(**15**) (**Fig.4 a-b-c-d-e-f-g-h**)**

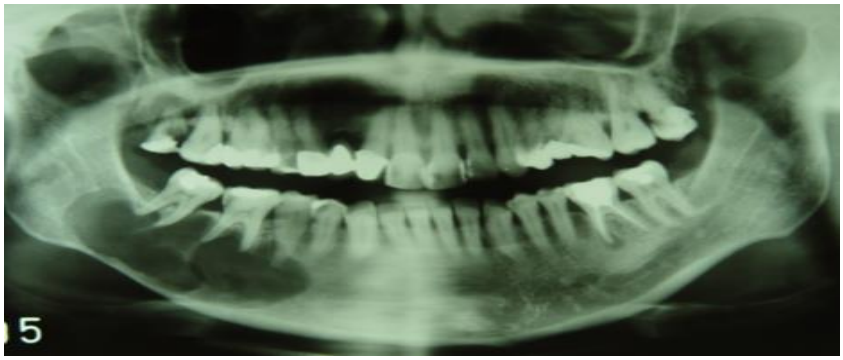

Fig 4 a.- Panoramic X-ray showing a radiolucent shadow compatible with Amaloblastoma.

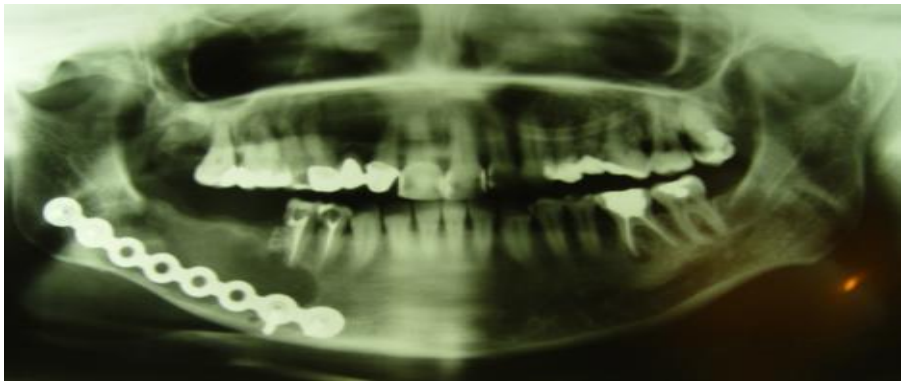

Fig.4 b.- Panoramic X-ray where we can see the plates after surgery.

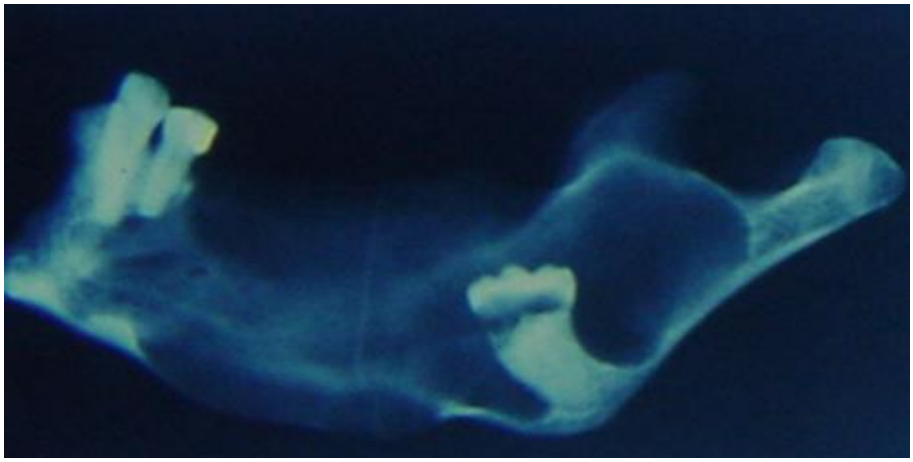

Fig 4c.- Radiograph showing a radiolucent shadow with destruction from a retained lower third molar.

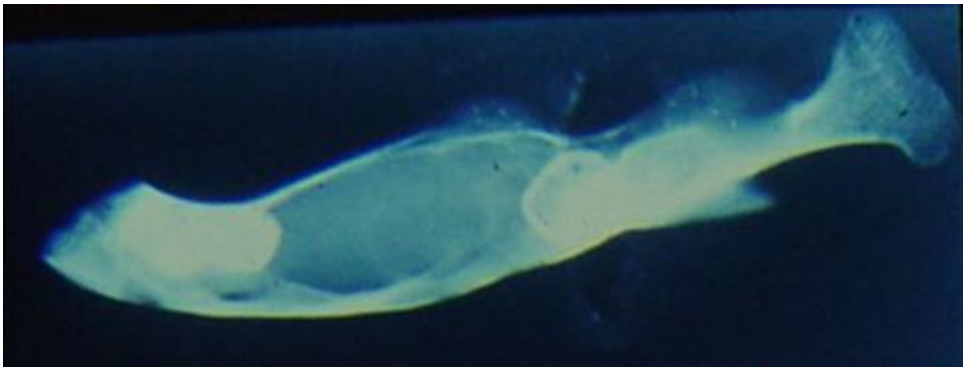

Fig 4d.- Occlusal radiograph showing a radiolucent shadow with destruction from a retained lower third molar.

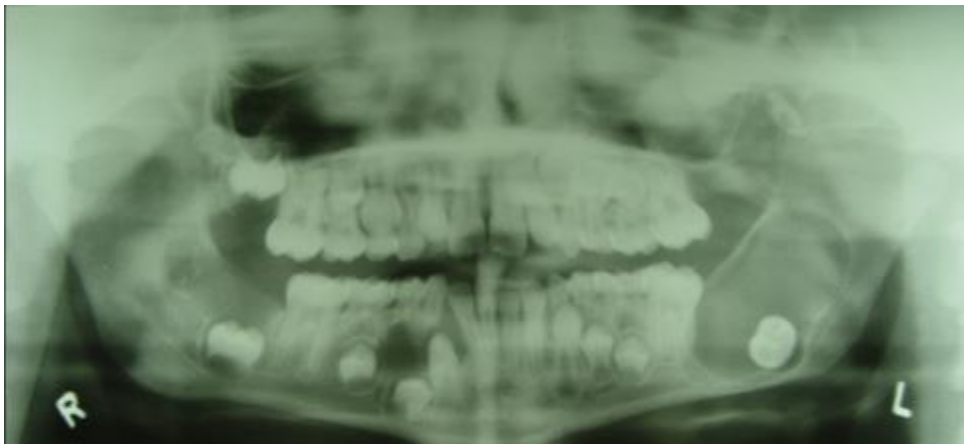

Fig 4 e.- Panoramic radiograph showing a radiolucent shadow on the left side with destruction from a retained lower third molar.

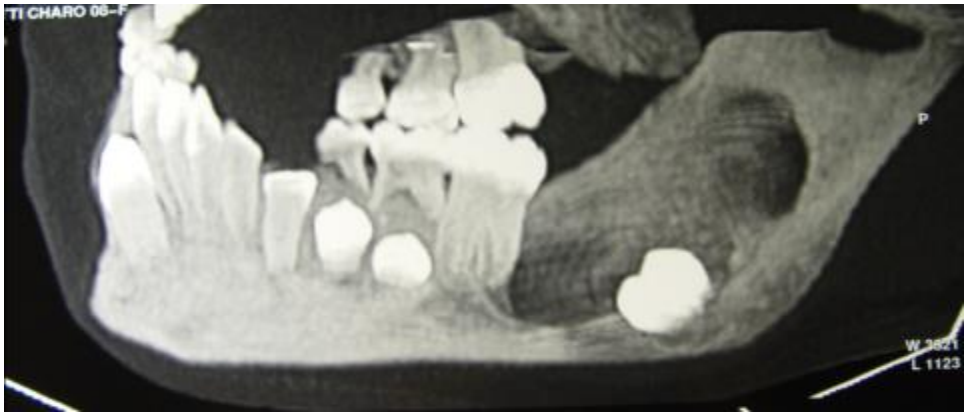

Fig 4 f.- Tomography showing the destruction with etiology of the retained lower third molar.

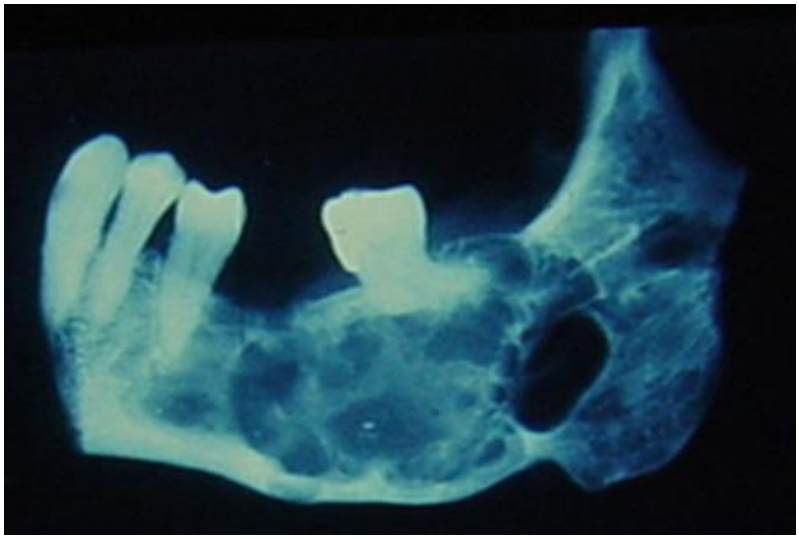

Fig 4 g.- X-ray showing the destruction of the lower jaw with resorption of the dental root.

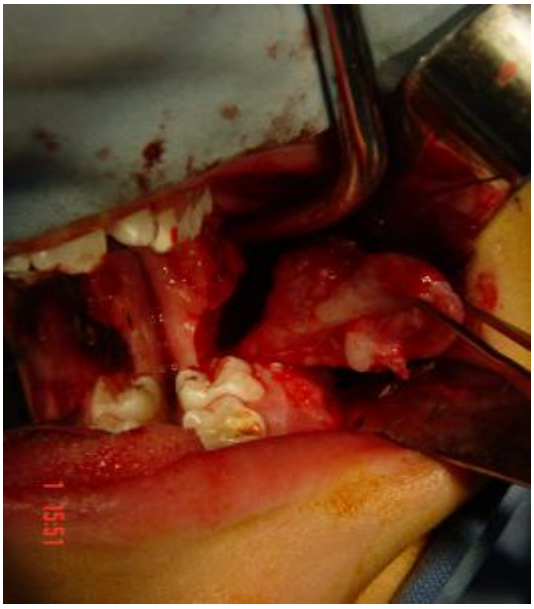

Fig 4 h.- Photograph at the exact moment of tumor enucleation

Case 5: Odontomas

Odontomas are tumors of odontogenic origin, which shows completely differentiated epithelial and mesenchymal cells (11). Tooth structures are found, i.e., enamel and dentine, and sometimes cement and pulp tissue (12), in varying proportions and degrees of development (13). By World Health Organization (WHO) odontomas are of several type: ameloblastic fibro-odontoma, odontoameloblastoma, complex odontoma, and compound odontoma (14). The compound odontoma is a type of benign tumor, formed of odontogenic tissue that has an orderly pattern (11). It consists of unilocular conglomerate of multiple tooth like structures, describe sometimes as being mini teeth. This tumor is considered by some specialists to be included in the category of supernumerary teeth (13). The etiology of the odontoma is unknown, but some association is suspected to trauma of deciduous teeth, inflammatory and infectious processes, hereditary anomalies and genetic mutations (13, 15). Compound odontomas can be localized anywhere in the dental arch es, but most frequently are found in the anterior region of the maxilla (12). This lesion is usually asymptomatic and shows a slow and painless growth (15). Bone expansion is observed in an important part of the cases (7). Also, other common signs are over retention of deciduous teeth, impacted permanent teeth and sometimes malposition of adjacent teeth (12). It is usually discovered in relation to a missing teeth, or by routine radiography (12, 15). The radiographic aspect of odontoma is characteristic, i.e., a radiopaque mass suggestive for multiple small calcified structure that resemble to mini teeth, surrounded by a radiolucent zone (8,12). Odontomas are treated by surgical re moval and if needed with additional dental treatment for the associated sides effects or complications, e.g., orthodontic traction for included tooth. Generally, odontomas are painless and non-aggressive lesions, after excision showing a positiveevolution, without relapse (15). Recurrence is very rare but can occur, for example if odontoma was removed in the early stages of its formation (10). Infrequently has been presented odontomas erupting in the mouth, generally spontaneously but sometimes being linked to factors as history of traumatic injury in its area (10–12). Fig.5

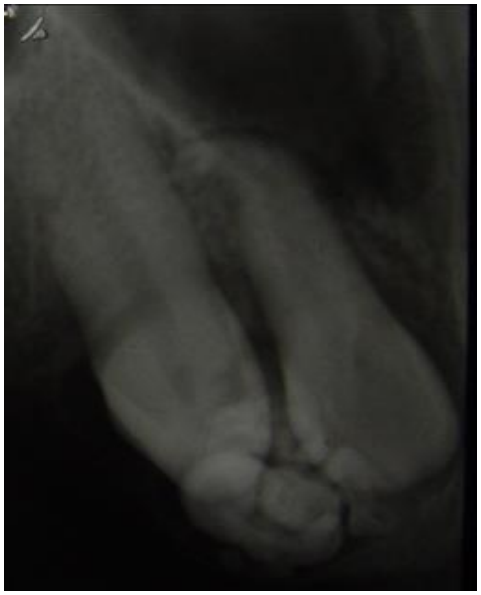

Fig. 5.- Periapical radiography shows multiple microteeth Odontomas

Case 6: Cementoblastoma

Cementoblastoma, formerly known as benign cementoblastoma **(**true cementoma**)**, is a relatively uncommon benign odontogenic mesenchymal tumor associated with and adherent to the roots of the teeth. It is considered to be the only true neoplasm of cemental origin. **(**11**)** Cementoblastoma is frequently observed in the second and third decades of life. **(**11**)** Well-documented cementoblastomas occurring in the first decade of life are rare with less than 15 reports. published so far. Here we describe a rare case of cementoblastomas occurring in a 35-year-old male patient with a brief review of the literature. **(**16**) (**Fig.6 a-b-c**)**

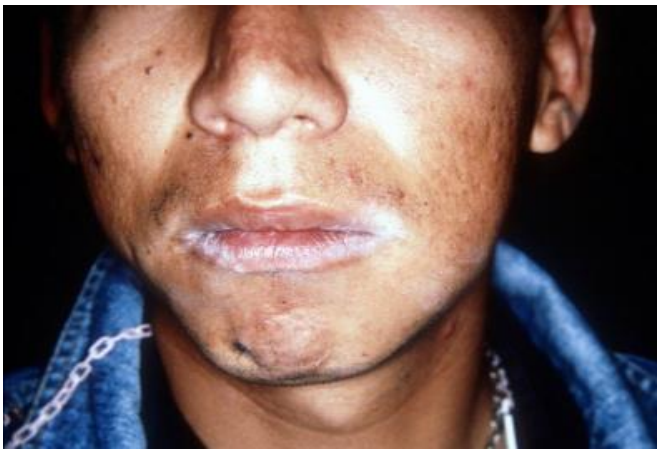

Fig.6a. Photograph of the patient with facial swelling

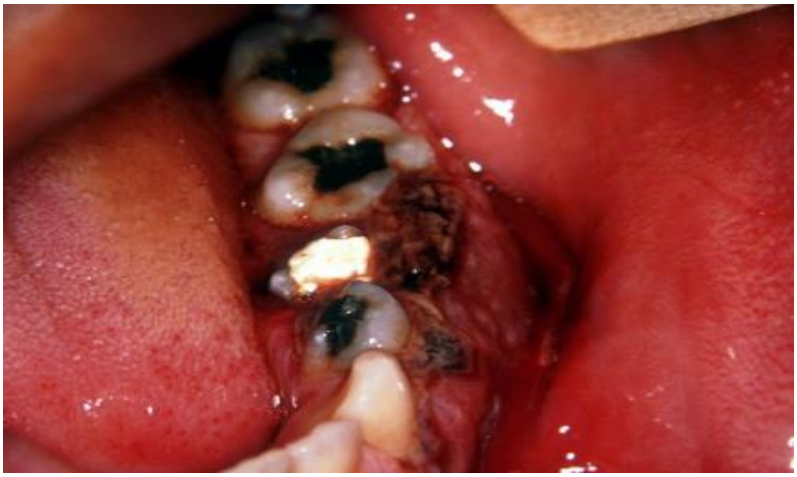

Fig.6 b.- Intraoral view with growth at the mandibular level

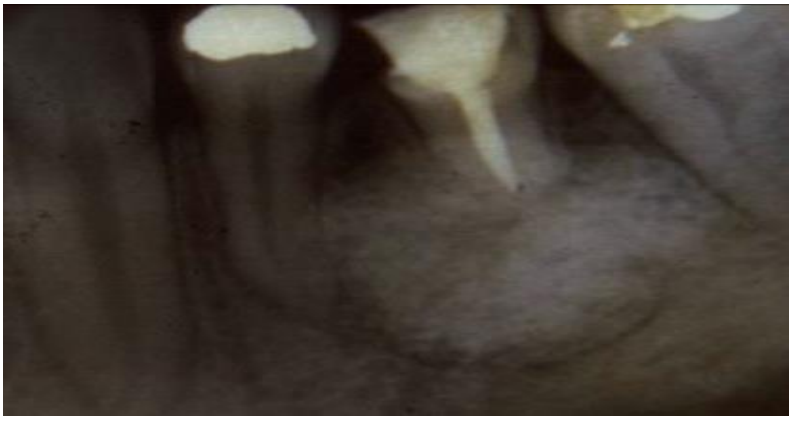

Fig.6 c.- Radiograph shows a mixed radiopaque mass with a distinct radiolucent rim attached to the root of the mandibular right second premolar.

Fig.6 d.- Occlusal radiography where a vestibular radiopaque shadow can be seen.

Discussion

Oral squamous cell carcinoma (OSCC) contributes remarkably i.e. 84-97% to oral cancer. OSCC commonly results from potentially malignant lesions or normal epithelium linings. Potentially malignant disorders (PMDs) such as inflammatory oral submucosa, fibrosis, erythroplakia, leukoplakia, candidal leukoplakia, dyskeratosis congenital, and lichen planus are indicators of the preclinical phase of oral cancer (5). Tobacco consumption including smokeless tobacco (SLT), betel-quid chewing, excessive alcohol consumption, poor oral hygiene, nutrient-deficient diet, and sustained viral infections, i.e. human papillomavirus (HPV) are some of the risks associated with the occurrence of oral cancer. Lack of knowledge, exposure to extreme environmental conditions, and behavioral risk factors are indicators of a wide variation in the global incidence. (2). Inflammation plays an important role in tumorigenesis and inflammation produced by viral and bacterial infections, and inflammatory bowel diseases may cause malignancy. Various socio-ecological and behavioral factors such as exposure to smoke, silica, asbestos, and other carcinogenic elements may lead to cancer (2). Tobacco consumption (in any form) is a prime cause of cancer, prominently in developing nations. Apart from tobacco, chewing paan containing leaves of piper betel with areca nut, lime, catechu, cinnamon, etc., is a leading source of oral malignancy, (6). The continued activity of chewing paan causes prolonged exposure of oral mucosa along with abrasion of epithelium linings. SLT consumed both orally and nasally, shows association with potentially malignant oral disorders and oral cavity cancers.

Various conventional clinical techniques such as physical and histopathological examination, staining, biopsy, spectroscopic and radiological techniques, etc. are used routinely to detect oral cancer. The diagnosis of cancer in the early stage is a key factor to check further physical, psychological, and financial losses to the patient. Upon early diagnosis, timely and proper treatment can be initiated that may improve the survival rate up to 90%. With advancements in science and technology, numerous novel techniques are developed that have advantages as compared to the currently practiced conventional diagnostic methodologies. (9)

Osteosarcoma of the jaws (OSJ) is a relatively rare disease, accounting for between 2% and 10% of all cases of osteosarcoma. It is morphologically and radiologically identical to the trunk and extremity variant, but distinct in several crucial aspects. (10) The lesion is characterized by sarcomatous cells which produce a variable amount of osteoid bone. It arises centrally within the bone and can be subdivided into osteoblastic, chondroblastic and fibroblastic subtype, depending on the predominant cell type.

Radiographically, these tumors display a spectrum of bone changes from well-demarcated borders to lytic bone destruction with indefinite margins and variable cortical bone erosion or, in some cases, images of sclerotic bone. **(**11**)** Therapeutic options for OSJ include surgery, chemotherapy and radiotherapy, which are employed according to age of the patient, histological classification and localization of the tumor. Today, there is no general consensus in the treatment guidelines for the OSJ though surgery represents the key to the treatment. The main prognostic factor deeply influencing the patient's prognosis remains the complete tumor resection with negative surgical margins. The aim of the present review is to describe state of the art regarding diagnostic and surgical treatment aspects of the primary osteosarcoma of the jaws. **(**12**)**

OKC and ameloblastoma might show similar radiographic findings, leading to difficulty in providing differential diagnosis. Many studies have investigated these lesions regarding treatment and recurrence rate. However, details of the radiographic findings of these lesions, including association with impacted tooth, displacement of adjacent teeth, root resorption and bone expansion remain limited. Therefore, we aimed to study the image features of OKCs and ameloblastomas to help differentiate between them. The mean age of patients in OKCs and ameloblastomas in this study was in agreement with related reports. **(**13**)** It has been reported that a slight male predominance exists regarding both OKC and ameloblastoma. However, no sex predilection of OKCs and ameloblastomas was found in the present study. **(**14**)** The term FCOD was first suggested by Melrose et al. in 1976 to describe a condition of exuberant multiquadrant masses of cementum and/or bone in both jaws. **(**5,6**)** FCOD is a non-neoplastic, reactive fibro-osseous lesion confined to the alveolar areas of the jaws and seen to have a typical female predilection affecting black women in fourth-fifth decades with a mean age of 42 years. Similar lesions were found in oriental population and Caucasian females with identical age groups but a definite female predilection of the condition has not been explained.[6] In our case patient was a 40-year-old female.

Radiographic appearance of FCOD depends upon the maturation of lesion. Proliferative, immature FCOD lesions appear radiolucent, later stages of maturation are characterized by dense radiopaque masses. In our case, multiple radio-dense lesion seen on CBCT. The hyperdense mass in 35 tooth region was surrounded by hypodense area and attached to root of 35.

The pathogenesis of the condition still remains largely obscure. Some authors accredit to the proliferation of the fibroblastic mesenchymal stem cells in the apical periodontal ligament, which are cementoblastic precursor stem cells, while others hold the view that it may arise from the remnants of the cementum left

after tooth extraction.**(**7**)** Waldron proposed that reactive or dysplastic changes in PDL might be the cause.[4] Some authors attribute to the trauma from deep bite or heavy bite causing attrition of the teeth that may activate and cause proliferation of the fibroblasts in PDL causing FCOD. The diagnosis of FCOD is principally based on clinical findings, localization of the lesion, patient's age, gender and ethnicity as well as radiological features. The patients usually remain asymptomatic except when the disease is complicated by chronic osteomyelitis. **(**7,8,9**)**

Differential diagnosis includes diffuse chronic sclerosing osteomyelitis, Gardner's syndrome, osteoma, complex odontome.**(**10**)** Biopsy is usually not done as the lesion is asymptomatic and can be diagnosed clinico-radiologically. Most authors have reported that biopsy and extraction leads to poor healing, osteomyelitis and sequestrum formation thus complicating the condition. **(**3,5,6**)**.

Conclusion

Head and neck tumors in a group of lesions that can be detected by doctors and dentists. These tumors are very aggressive and leave very serious sequelae, so their early detection is very important. the oncology specialist is in charge of treating them when these lesions are malignant. The dentist has an important role because it is in this area of human anatomy that he is best prepared. therefore it is the task in most cases to detect it in time. With this review of cases, this study aims to refresh knowledge about the most aggressive cases of head and Neck injuries, where the doctor and dentist analyzed clinically and radiographically in order to guide the clinician to a possible diagnosis.

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