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Review Article

**TYPES OF MANDIBULAR CYSTS AND TUMORS AND
CHARACTERISTICS**

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Article Received: December 2019 **Accepted:** January 2020 **Published:** February 2020**Abstract:**

Introduction: A variety of cyst, tumor, and cyst or tumor-like lesions occur in maxillofacial regions. Mandible being one of the common sites for such pathological and non-pathological lesions. Many of these lesions are asymptomatic and found on routine dental imaging. A detailed clinical history along with physical examination may help in the differential diagnosis. Further radiographic and histopathological analysis confirm the final diagnosis of and determine the line of treatment.

Aim of the Study: The article is an overview of major cystic lesions (odontogenic and non-odontogenic) and tumors of the mandible in brief.

Methodology: The review is a comprehensive research of PUBMED since the year 1999 to 2011.

Conclusion: Cystic lesions and tumors in mandible arise from both odontogenic and non-odontogenic sources. With knowledge of a wide range of pathological characteristics, the insight of nature and course of the lesion, embryonic characteristics, imaging findings, location in mandible and prevalence of a particular lesion, not only make the diagnosis and treatment efficient but also help to differentiate it with other lesions, hence guiding treatment appropriately.

Keywords: The mandibular cystic lesion, Mandibular tumors

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INTRODUCTION:

According to WHO classification published in 'Histologic typing of odontogenic tumor' (Kramer, Pindborg, Shear), the cyst of jaws can be classified as ^[1]

Epithelial		Non-epithelial
1. Developmental		Solitary bone cyst (traumatic/simple/ haemorrhagic)
<u>Odontogenic</u>	<u>Non-Odontogenic</u>	
Gingival cyst of infant	Naso-palatine duct cyst	Aneurysmal bone cyst
Odontogenic keratocyst	Nasolabial cyst	
Dentigerous cyst	Midpalatine raphe cyst	
Eruption cyst	Median palatine cyst	
Lateral periodontal cyst	Globulomaxillary cyst	
Gingival cyst of the adult		
Glandular odontogenic cyst		
Calcifying odontogenic cyst		
2. Inflammatory Cysts		
Radicular cyst		
Residual cyst		
Paradental cyst		
Inflammatory collateral cyst		

Jaw tumors can be classified as:^[2]

Benign Tumors

Odontogenic epithelium with mature fibrous stroma, without odontogenic ectomesenchyme	Odontogenic epithelium with odontogenic ectomesenchyme, with or without hard tissue formation	Mesenchyme or odontogenic ectomesenchyme with or without epithelium	Bone related Lesions
<ul style="list-style-type: none"> Ameloblastoma (Solid/multicystic, Extraosseous/peripheral Desmoplastic, Unicystic) Squamous odontogenic tumor Calcifying epithelial odontogenic tumor Adenomatoid odontogenic tumor A keratocystic odontogenic tumor (formerly OKC or odontogenic keratocyst) 	<ul style="list-style-type: none"> Ameloblastoma (Fibroma, Fibrodentinoma, Fibro-odontoma) Odontoma (Complex and compound) Odonto-ameloblastoma Calcifying cystic Odontogenic a tumor (formerly-Gorlin cyst) Dentinogenic ghost cell tumor 	<ul style="list-style-type: none"> Odontogenic Fibroma Odontogenic myxoma Cementoblastoma 	<ul style="list-style-type: none"> Fibrous dysplasia Ossifying fibroma Osseous Dysplasia Central Giant cell lesion Cherubism Aneurysmal bone cyst Simple bone Cyst

Malignant Tumors: Odontogenic carcinoma:

Metastasizing ameloblastoma, ameloblastic carcinoma, primary intraosseous squamous cell carcinoma, clear cell odontogenic carcinoma, ghost cell carcinoma

Odontogenic Sarcoma:

Ameloblastic fibrosarcoma, Ameloblastic fibrodentino and fibro-odontosarcoma.

A cyst is defined as a pathological cavity that may contain fluid or semifluid content, not formed by the accumulation of pus. According to Killely and Kay, it's a pathologic epithelium-lined cavity that may contain fluid or semisolid material.^[1] The cyst lined

by epithelium is known as a true cyst such as a dentigerous cyst, while those not lined by epithelium are known as true cysts such as mucous extravasation cysts. The epithelial cyst is more commonly seen in jaw bone than another part of the body.^[3]

Odontogenic Cysts

Dentigerous cyst:

It is the second most common odontogenic cyst, typically occurs in the mandible and in the third or fourth decade of life. The cyst usually forms around the crown of unerupted tooth as fluid collects between epithelium and enamel or layers of the epithelium. The size of cyst may vary but a dentigerous cyst is suspected when size exceeds 5mm more than normal follicle space (2-3mm), have potential to enlarge beyond 5mm causing displacement of adjacent teeth, pathological fracture, and superimposed infection can develop with larger lesion which requires surgical drainage and marsupialization as treatment while the small cysts can be treated with simple enucleation.^[4]

Odontogenic Keratocyst (OKC):

OKC originates from the remnants of dental lamina before odontogenesis is complete. Recently WHO recommended the term cystic neoplasm and now known as keratocystic odontogenic tumor since it better reflects aggressive clinical behaviors, high mitotic rate histologically and its association with genetic and chromosomal abnormalities. OKC is twice common in mandible than maxilla with a predilection for angle and ascending ramus. Clinically it presents as swelling with or without pain, growing in medullary space of bone in the anteroposterior direction. Displacement of adjacent teeth, perforation of cortical plates with larger lesion and bony expansion observed on the radiograph. Enucleation, marsupialization and resection are the treatment options according to the size of the lesion.^[5,6]

Other Odontogenic Cysts:

The other odontogenic cysts are less common such lateral periodontal cyst which is often misdiagnosed to be endodontic in origin, it is defined as a non-keratinized and non-inflammatory developmental cyst located adjacent or lateral to the vital tooth, most commonly premolars. Most of the lesion are 1 cm in diameter, well-circumscribed with round or oval radiolucency and sclerotic margins and seldom presents with pain. Bohn's nodule, Epstein's pearls and gingival cyst of the newborn are seen on alveolar ridges on newborns and believed to be fragments of dental lamina that remains within the alveolar ridge mucosa and then proliferate to form these small multiple keratinized cyst or solitary nodule, generally asymptomatic and produce no discomfort to the infant. The gingival cyst of adults is a rare

entity, small, non-inflammatory developmental cysts of gingiva which originate from rests of the dental lamina.^[7,8,9]

Non-Odontogenic Cysts:

Stafne bone cyst is one of the rare mandibular defects present as asymptomatic, well-demarcated, unilateral radiolucency that indicates lingual invagination of cortical bone, first reported by Stafne in 1942. The lesion is usually discovered by chance and does not require treatment unless symptomatic. A solitary cyst is an epithelium less bone cavity benign in nature which is either empty or filled with fluid. It is known by various other names such as traumatic bone cyst, simple bone cyst and hemorrhagic bone cyst which incorrectly imply the presence of epithelium. The etiology is unknown and may vary from trauma to developmental lesion. The lesion commonly saw the second decade of life and clinically present as an asymptomatic one. Radiographically it varies from smooth well defined to poorly defined, classically said to scallop around the associated roots, the larger lesion may be multilocular and cause bone expansion and is often associated with root resorption. Curettage of bony walls is the treatment option. An aneurysmal bone cyst(ABC) is another non-odontogenic benign cystic lesion characterized by rapid growth and bony expansion, composed of blood-filled spaces which are separated by connective tissue septa containing fibroblasts, osteoclast-giant cells and reactive woven bone. The etiology is controversial with occurrence in the second decade of life at body, ramus and angle mandible, though it has also been reported at condyle and coronoid process, which makes the presentation of ABC extremely variable, ranging from small asymptomatic lesion to rapidly growing, expansile, destructing lesion with pain, swelling, pathological fracture, perforation and neurological symptoms. Treatment options include removal of lesion, percutaneous sclerotherapy, curettage, block resection and reconstruction systemic calcitonin therapy as well as radiotherapy.^[10-12]

Inflammatory cyst:

Radicular cysts or periapical cyst is the most common cysts of the jaw. It is often seen in the third or fifth decade and usually do not present with pain and is associated with a large carious lesion or deep restoration with a persistent chronic infection which ultimately lead to cyst formation. The radicular cyst is formed by a series of progression of inflammatory events leading to the formation of periapical inflammatory lesion secondary to necrosis of pulp of the tooth. The cysts are unilocular, round or pear-shaped with usually less than 1 cm in diameter and may displace the adjacent teeth with the incidence of mild root resorption. Radicular cysts can be treated with enucleation of cysts along with root canal

treatment, extraction and apical surgery. If the periapical cysts persist after extraction of the associated tooth then it is referred to as residual cyst.^[13]

Odontogenic Tumors:

The abnormal proliferation of tissues and cells involved in odontogenesis gives rise to odontogenic tumors. The tumors are classified according to the stage of tooth development. Many of these tumors may show cystic appearance such as a keratocystic odontogenic tumor. The tumor can also be classified as benign and malignant and requires close evaluation to distinguish, the benign lesion shows directional root resorption while the malignant ones show nondirectional root resorption.^[4,14]

Ameloblastoma:

Ameloblastoma is benign yet locally aggressive epithelial odontogenic tumor originate from remnants of the dental lamina, surface epithelium, or pluripotential epithelial cells lining the odontogenic cysts. 5% of the epithelial lining of the dentigerous cyst gives rise to ameloblastoma. 80% of ameloblastoma is located within the mandible. Ameloblastoma is commonly seen in the third or fourth decade of life with no sex predilection and presents as slow-growing painless mass and swelling. The radiographic appearance of ameloblastoma is variable. The solid or multicystic variant is most common and most aggressive with high recurrence rate compare to other variants of ameloblastomas, appear as a multiloculated radiolucency with internal separation giving it a typical 'honeycomb' or 'soap-bubble' appearance, while the unicystic variant is a less aggressive single cystic cavity lined by epithelium, occurs due to luminal proliferation of epithelial cells or mural infiltration of cyst wall. It is a well-circumscribed corticated unilocular radiolucent lesion on radiograph and often mistaken as a dentigerous cyst. It can be distinguished from dentigerous cysts by having a solid component, internal bony septa. The peripheral variant presents a soft-tissue tumor occurs on the tooth-bearing parts of jaws and is histologically similar to intraosseous ameloblastoma, appears solid on imaging and has a benign course. The desmoplastic variant shows multiple coarse internal calcifications with surrounding cortical destruction. Malignant ameloblastoma is a term given to tumors that display metastasis even with benign appearance histologically. The treatment of ameloblastoma varies according to size and variant. It mostly requires surgical excision with wide free margin, wide en bloc resection for tumors that infiltrate through cyst wall, however, the unicystic variant can be treated with enucleation/curettage alone.^[15,16]

Odontogenic myxoma:

It is a true odontogenic tumor, benign in nature, slow-growing, painless lesion, arises from a mesodermal portion of odontogenic apparatus. They are most commonly seen in the second and third decades of life and equally present in maxilla and mandible. They tend to be locally aggressive and show rapid growth leading to osseous destruction and cortical expansion. Radiographically, odontogenic myxoma is a radiolucent region separated by bony trabeculae, contains multiple thin separations and exhibits honeycomb-like structures and may mimic ameloblastoma, central giant cell granuloma. The treatment includes a wide margin of surgical resection due to their tendency to infiltrate and recur.^[4,17]

A calcifying cystic odontogenic tumor (CCOT):

Most of the CCOT are discovered incidentally on a routine radiographic examination. The tumor presents as asymptomatic swelling on both intraosseous or extraosseous location and often appear on tooth-bearing areas of jaw or gingiva. Radiographically, it appears as a unilocular or multilocular radiolucency with variable calcification areas, resorption of root and divergence are seen. Enucleation is the choice of treatment for intraosseous lesion while surgical excision for extraosseous form.^[18]

Dentinogenic ghost cell tumor(DGCT):

It is a solid variant of the calcifying odontogenic cyst and is an uncommon odontogenic tumor that occurs in the elderly population over 50 years of age with a slight male predilection and tendency to occur in the anterior segment, equally in maxilla and mandible. The tumor may present with pain or discomfort in certain cases. Radiographically, it is a well-defined unilocular or multilocular radiolucent-radiopaque lesion with bicortical expansion seen on occlusal radiographs. The treatment may vary according to the nomenclature of the lesion, cystic lesion requires enucleation while the tumor may need en bloc resection.^[19]

Odontoameloblastoma (OA):

OA is an uncommon mixed odontogenic tumor characterized by the occurrence of ameloblastoma and compound or complex odontoma simultaneously. It occurs equally in mandible and maxilla and presents with intermittent or dull pain which otherwise not a typical feature of other odontogenic tumors. OA expands and infiltrates between bony trabeculae and has a high recurrence rate hence it should be aggressively treated like ameloblastoma.^[20]

Other odontogenic tumors:

The other less common odontogenic tumor which may show cystic appearance are primordial cyst, central odontogenic fibroma, and ameloblastic

fibroma. A primordial cyst is a rare entity which develops instead of a tooth, appears non-expansile, well-defined radiolucent lesion without associated tooth on the radiograph. The central odontogenic fibroma is another rare benign odontogenic tumor of the odontogenic apparatus that includes periodontal ligament and dental papilla. It appears as a well-defined heterogeneous lesion causing cortical expansion on the radiograph. An ameloblastic fibroma is composed of enamel and embryonic connective tissues. On a radiograph, it appears as pericoronal, well-defined radiolucent lesion, most of them are multiloculated and is often associated with impacted teeth or seen in the posterior mandible.^[21]

SUMMARY:

A numerous variety of cystic lesions and tumors occur in mandible, presents with different characteristics. Most cystic lesions and tumor presents with swelling and without pain unless symptomatic or large in size causing significant damage to adjacent structures. Cystic lesion and the tumor may appear as unilocular or multilocular radiolucencies on the dental radiograph, which can cause bone remodeling, weakening of bone, predisposing patients to root resorption, deviation, pathological fracture, bone expansion may be typical of a tumor. The relationship of these lesions with an adjacent structure such as root, unerupted tooth and canal is important since most of the symptom arises due to disruption of any. Knowing the course, nature, prognosis along with correct diagnosis radiographically and histopathologically of cysts and tumors, a treatment line can be established accordingly. Tumors either mild or aggressive in nature mostly requires resection while enucleation and marsupialization is a treatment of choice for most cysts.

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