THE RADIOLOGY OF ODONTOGENIC TUMORS

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CLASSIFICATION. (Pindborg, 1970)

A. EPITHELIAL ODONTOGENIC.

1. Ameloblastoma.
2. Calcifying Epithelial Odontogenic Tumor [Pindborg]
3. Adenomatoid Odontogenic Tumor
4. Ameloblastic Fibroma.
5. Dentinoma.
6. Calcifying Odontogenic Cyst.
7. Odonto-ameloblastoma / adenomatoid Odontogenic

B. MIXED.

1. Ameloblastic fibroma -[fibro-odontoma]
2. Complex odontoma
3. Compound odontoma

C. MESODERMAL ODONTOGENIC TUMOURS

1. Odontogenic fibroma
2. Odontogenic myxoma
3. Cementomas
    a. Periapical cemental dysplasia
    b. Cementifying fibroma
    c. Cementoblastoma
    d. Gigantiform cementoma

The latest WHO terminology for cementomas is cemento-osseous lesions. Poorly demarcated non-specific opacities are sometimes referred to as florid osseous dysplasia

D. MELANOTIC NEURO-ECTODERMAL TUMOR OF THE NEWBORN

E. MALIGNANT TUMORS

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The radiographic appearance of odontogenic tumors varies, depending on their **nature**, **location**, and **stage** of development. Ameloblastomas, odontogenic myxomas, and ameloblastic fibromas that occur in the pericoronal region may resemble dentigerous cysts; later they may become multilocular. Cementomas, in their early stage of development, may resemble radicular / residual dental cysts or granulomas.

A. EPITHELIAL ODONTOGENIC TUMORS

1. **Ameloblastoma**

Develops from ameloblasts which develop from epithelial cells that occur in the enamel organ, dental follicle or periodontal membrane.

Clinically

The commonest symptom is a continuous, slow growing enlargement that may become very large before it becomes noticeable extra-orally. Four out of five ameloblastomas occur in the mandible and 80% of these are found in the ***angle*** region.

Average age: **30 - 40** years

Radiographically

a) In the early stage the lesion may appear cystic, unilocular and may resemble a dentigerous or a residual cyst.
b) Later it becomes **multilocular** with **soap-bubble** or honey-comb appearance. Size varies from very small size limited to the alveolar bone to extensive lesions with bony expansion
c) The compartments in the bone are rounded and separated by bony radiopaque septa or **trabeculae**.
d) The cortex shows **thinning** and often severe expansion
e) Often extensive **root resorption.**
f) There are often associated impacted teeth

2. **Calcifying epithelial odontogenic tumor.** (Pindborg tumor)

Found mainly in **mandibular premolar** area associated with the crown of an **impacted tooth** in 66% of cases. The tumor is locally invasive and tends to recur.

Average age +/- 40 years.

Radiographically

Often similar to ameloblastoma in early stages being multilocular and honey- comb but slightly more radiopaque. In later stages **several, well demarcated** radiopacities (**calcifications**) differentiate it often described as grape-like.

3. **Adenomatoid Odontogenic tumor. [AOT]**

Occurs most often in **second decade** and associated with **unerupted** tooth (usually **maxillary canine**) and most often in ***young women***. Resembles dentigerous cyst. It is locally invasive

Clinically. Unerupted /missing tooth and occasionally some swelling. Usually maxillary canine

Radiographically Unilocular radiolucency associated with unerupted tooth resembling dentigerous cyst (but not as lucent or well demarcated) and later may develop vague grape-like radiopacities. Lucency often large.

4. **Ameloblastic Fibroma.**

The ameloblastic fibroma and the ameloblastic odontoma are possibly varied stages in the development of the complex odontoma. Occurs in the **first two decades** of life and more frequently in the **mandible** in the **premolar-molar** region. Has a strong tendency to **recur**.

Radiographically.

Well circumscribed, large, expansive, **unilocular** radiolucency associated with crown of unerupted tooth and resembles a dentigerous cyst, ameloblastoma or adenomatoid odontogenic tumor. May cause migration of teeth

Adenomatoid Odontogenic tumor. [AOT] and the Ameloblastic Fibroma are odontogenic tumors of young people. In your practices and in the Board exams when they inform you that a patient is 14 - 18 years old, you must immediately think of these two tumors.

5. **Dentinoma.**

Composed chiefly of dentin, cementum and soft tissue

Clinically Most often associated with coronal portion of mandibular posterior unerupted tooth in young people

Radiographically.

Early stage - Radiolucent area with varying amounts of opacities around crown of unerupted tooth

Mature stage - Radiopaque mass in close proximity to the crown of an unerupted tooth.

Diff. Diagnosis - Complex Odontoma

6. **Calcifying Odontogenic Cyst.** (Also described under Cysts of the Jaws)

This cyst possesses neoplastic as well as cystic characteristics. Contains **ghost cells** with an affinity for calcium salts.

Radiographically

Well circumscribed, unilocular radiolucent area of varying size with varying amounts of radiopacities scattered throughout. Before the opacities occur it appears as a non specific lucency / cyst.

Clinically - Slow growing painless swelling occurring more often in the mandible.

B. MIXED ODONTOGENIC

1. Ameloblastic Fibroma [odontoma]. RARE.

The tumor usually occurs during the **first** decade of life, most often in the mandibular premolar-molar region. When associated with an unerupted tooth, it is situated in the pericoronal region. Develops from the dental follicle. Can be considered as a **transition stage** between a dentinoma and a complex odontoma

Clinically

A slow growing swelling that may retard the eruption of teeth

Radiographically

Usually discovered during radiographic examination. Well circumscribed, unilocular radiolucency with smooth borders and *may* contain varying amounts of radiopacities that are separated from the adjacent bone. Cystic in appearance and often very large..

2. Complex Odontoma.

Contains all elements of dental structure but laid down in a haphazard fashion and does not resemble a tooth

Clinically Occurs most frequently in the mandibular premolar/ molar region.

Age: 10 - 25 years

Radiographically Often diagnosed because of a radiographic search for a missing tooth. Well circumscribed [but irregular] non-descript radiopaque mass surrounded by a radiolucent zone representing the connective tissue capsule

Diff Diag. Cementifying fibroma, gigantiform cementoma

3. **Compound Odontoma.**

Found most often in the **canine premolar** region in the mandible and the maxilla. Usually consists of several conical teeth with single roots. Matures at approximately the same time as do teeth of the permanent dentition. Often prevents eruption of teeth or causes malpositioning of teeth

Radiographically. Well demarcated, radiopaque masses resembling small teeth often surrounded by radiolucent areas representing the periodontal and dental follicle. Often first discovered on radiographic examination.

C. **MESODERMAL ODONTOGENIC TUMORS**

I. **Odontogenic fibroma** - Very rare

Clinically - Occurs in young adults in the mandible in association with unerupted teeth. There may be a painless swelling

Radiographically

Well circumscribed multilocular radiolucency often associated with an impacted tooth. Very similar to ameloblastoma or dentigerous cyst

II. **Odontogenic myxoma (myxofibroma)**

Develops from mesenchymal portion of tooth germs. As these myxomas are only found in the jaw they are considered odontogenic. Is a locally infiltrating neoplasm

Clinically

Age : 20-30 years.

Site: More often the mandible and often in association with an impacted tooth

Radiographically May be small or may cause cortical expansion. **Honey-comb, multilocular** with marked trabeculations and may cause displacement of teeth. Root resorption is less frequent.

Diff Diagnosis - giant cell granuloma, ameloblastoma, aneurysmal cyst, central hemangioma.

III. **Cementomas.** (See also Fibro-osseous lesions)

1. **Periapical cemental dysplasia.**

Found most commonly at the apex of **mandibular anterior teeth** in middle aged, **black females**. Commonly several teeth are involved

Clinically - nothing
Note: - Affected **teeth are vital**

Radiographically. Early/osteolytic stage: well circumscribed round, periapical lucencies usually of **anterior mandibular** teeth. Radiographically they resemble granulomas or small radicular cysts. Often **several teeth** are involved. There may be no maturation.
Later / osteoblastic stage: radiopacities occur in central radiolucent zones as cementum is deposited.
Root resorption does not occur

2. **Cementifying fibroma.**

Found more often in the mandible in middle aged black females WHO now calls them cemento-ossifying lesions

Clinically Initially nothing. Later gradual, painless swelling

Radiographically Very variable depending on age of lesion.

Early stage - usually of short duration - fairly well circumscribed radiolucent area. Later - radiolucent area becomes flecked with radiopacities until the region becomes an extremely radiopaque, well demarcated mass with irregular but clearly defined borders. **Displacement** of adjacent teeth is common. The central cementifying fibroma and the central ossifying fibroma grow by expansion in all directions. The inferior border of the mandible is expanded in continuity with the outline of the tumor mass. The mature lesion may be surrounded by a thin radiolucent line

3. **Benign Cementoblastoma** - Rare but always asked in the Board exams

Clinically Usually found under 25 years of age more often at the apex of

mandibular premolar/first molar, permanent teeth. The associated tooth is **vital** but **root resorption** does occur. **Expansion** of the cortical plates may occur
Radiographically - Seen as well circumscribed radiopaque mass at the apex of a tooth that may show root resorption. The radiopacity is surrounded by a uniform radiolucent area. Periodontal ligament space in the area is lost

4. **Gigantiform Cementoma** - Rare

Shows **familial tendency**. Most common in black adult females. Consists of highly calcified, acellular cement, with poor blood supply - may result in infection and suppuration

Radiographically. - Diffuse radiopaque masses that may occur in all four jaw quadrants sometimes more or less symmetrically. If large may expand jaw

Diff. Diag. Pagets; with infection - sclerosing osteomyelitis

D. **MELANOTIC NEURO-ECTODERMAL TUMOR OF NEWBORN** - RARE

Also called pigmented ameloblastoma and congenital epulis. Develops from neural crest. Occurs in first few months of life.

Clinically Seen in **anterior maxillary** region of infants. Darkly pigmented, rapidly growing tumor

Radiographically - Appears as invasive malignancy. THIS IS A BENIGN LESION

E. **MALIGNANT ODONTOGENIC TUMORS** - Rare and radiographically non specific.

Ameloblastic sarcoma - Rare

Represents the malignant counterpart of the ameloblastic fibroma. Adequate histological study therefore important.

Clinically.

Occurs mainly in mandible associated with a history of rapid swelling and pain

Radiographically - not characteristic. Has irregular borders and may contain septa giving a multicystic appearance but there may be diffuse destruction of bone