Fibro-osseous Lesions

A group of lesions affecting the craniofacial skeleton and characterized microscopically by fibrous stroma containing various combinations of bones and/or cementum-like material fall under the term **benign fibro-osseous lesions**. They include a wide variety of lesions of developmental, dysplastic, and neoplastic origins with different clinical and radiographic presentation & behavior. Because of the histologic similarities between these diverse diseases, proper diagnosis requires **clinical findings**, **radiographic features**, **surgical notes** and **histopathologic correlation** to establish a specific diagnosis.

Commonly included among the fibro-osseous lesions of the jaw are the following:

1. Fibrous dysplasia.
2. Focal cemento-osseous dysplasia.
4. Ossifying fibroma

**Fibrous Dysplasia (FD):**

FD is a skeletal anomaly in which normal bone is replaced and distorted by poorly organized & inadequately mineralized, immature, woven bone & fibrous connective tissue.

The disease may affect a single bone (**monostotic**) or multiple bones (**polyostotic**). Polyostotic FD is less common, occurring in only 25% to 30% of cases. A few of these cases (~3%) may be associated with skin pigmentation & endocrine abnormalities, a condition known as the **McCune-Albright syndrome**, which is more common in females.

**Etiology & Pathogenesis:**

The nature of this condition has not been firmly established. The name dysplasia was originally intended to indicate that the condition represented a dysplastic growth resulting from deranged mesenchymal cell activity or a defect in the control of bone cell activity.
Clinical Features of FD:

The condition presents commonly an asymptomatic, slow enlargement of the involved bone. FD may involve a single bone or several bones concomitantly. Monostotic FD is the term used to describe the process in one bone. Polyostotic FD applies to cases in which more than one bone is involved.

- **McCune-Albright syndrome** consists of polyostotic FD, cutaneous melanotic pigmentations (café-au-lait macules) and endocrine abnormalities.

- **Jaffe-Lichtenstein syndrome** is characterized by multiple bone lesions of FD & skin pigmentations.

Monostotic FD is much more common than the polyostotic form, accounting for as many as 80% of cases.

Jaw involvement is common in this form of disease. Other bones that are commonly affected are the ribs & femur.

- **Radiographic Findings:**

FD has a variable radiographic appearance that ranges from a radiolucent lesion to a uniformly radiopaque mass. Classical presentation is ground-glass effect, which results from the superimposition of poorly calcified bone trabeculae arranged in a disorganized pattern.

Radiographically, the lesions of FD are not well demarcated. The margins blend into the adjacent normal bone so that the limits of the lesion may be difficult to define.

*An important feature of FD is the poorly defined radiographic and clinical margins of the lesion that blend into the surrounding normal bone.*

- **Lab Findings:**

Serum calcium, Phosphorus & Alkaline phosphatase are normal in monostotic FD, but altered in McCune-Albright syndrome.

- **Histopathology:**

FD consists of a slight to moderate cellular fibrous connective tissue stroma that contains foci of irregularly shaped trabeculae of immature bone. The bone trabeculae assume irregular shapes linked to Chinese characters.
and they do not display any functional orientation, without osteoblastic activity at the bone trabeculae margins.

- **Treatment & Prognosis:**
  After a variable period of pre-pubertal growth, FD stabilizes, although a slow advance may be noted into adulthood.
  
  Small lesions → No treatment
  
  Large lesions → cosmetic or functional deformity: Surgical recontouring

**Ossifying Fibroma:**

OF is a benign neoplasm of bone that has the potential for excessive growth, bone destruction & recurrence.

Clinically & microscopically similar to cementifying fibroma, it is composed of a fibrous connective tissue stroma in which new bone is formed. OF is a true neoplasm with a significant growth potential.

**Clinical Features:**

Tends to occur during the 3rd & 4th decades of life, in females more than in males. It is a slow growing asymptomatic & expansile lesion. OF may be seen in the jaw & craniofacial bones. Lesions in the jaw arise in the tooth-bearing region, mostly in the molar & premolar area. The tumor may cause expansion of the buccal and lingual cortical plates.

**Radiographic Findings of COF:**

Well circumscribed, sharply demarcated border is the most common presenting radiographic feature, although OF may present as relatively lucent or opaque depending on the density of the calcification present.

- **Histopathology:**
  
  COF is composed of fibrous connective tissue with well- differentiated spindle fibroblasts. Cellularity is uniform but may vary from one lesion to the next. Bone trabeculae or islands are evenly distributed throughout the fibrous stroma. The bone is immature & often surrounded by osteoblast (osteoblast rimming). Osteoblasts are infrequently seen.

- **Treatment & Prognosis:**
  
  Surgical removal using curettage or enucleation. The lesion can typically be separated easily from the surrounding bone. Recurrence is rare.
**Juvenile Ossifying Fibroma:**

Is a well circumscribed rapidly growing neoplasm lack the continuity with adjacent normal bone. Lesions are circumscribed radiolucenties in some cases contain central radio-opacities (Ground glass) opacification may be observed. Two different neoplasm have been reported: (1) **Trabecular** and (2) **Psammomatoid**. The latter neoplasm occur more than the trabecular type in a ratio of approximately 4:1

- **Histopathology:**

Both patterns are non-encapsulated but well demarcated from the surrounding bone. Tumors consist of cellular fibrous connective tissue with variants areas of loose and other are so cellular, mitotic figures are found but rare, areas of hemorrhage and small clusters of multinucleated giant cells are usually seen.

**Cemento-osseous Dysplasia (COD):**

The term COD refers to a disease process of the jaws for which the precise etiology is unknown.

COD includes:

- Periapical COD.
- Focal COD.
- Florid COD.

All the 3 disease processes have the same features, only distinguished on the basis of the extent of involvement of the affected portions of the jaw.

1. **Periapical COD:**

Represents a reactive or dysplastic process rather than a neoplastic one. It may represent an unusual response of periapical bone & cementum to some undetermined local factor.

- When not associated with a tooth apex **Focal COD.**

**Clinical Features:**

A common phenomenon, that occurs at the apex of vital teeth. A biopsy is unnecessary because the condition is usually diagnosed by clinical & radiographic features. Females are affected more than males. PACOD occurs in females at middle age (around 40 years) & rarely before the age 20. The mandible, especially the anterior periapical region, is far more commonly
affected than other areas. More often, the apices of two or more teeth are affected.

- The condition appears 1st as a periapical lucency that is continuous with the periodontal ligament space. To be differentiated from Periapical granuloma vitality test.
- As the condition progresses, the lucent lesion develops into a mixed or mottled pattern because of bone repair.
- The final stage appears as a solid, opaque mass that is surrounded by a thin, lucent ring (after months – years).

2. Florid COD:

The FCOD is an exuberant form of PACOD. FCOD represents the severe end of the spectrum of this unusual process. The patient is asymptomatic except when complication of osteomyelitis occurs. Females are more commonly affected (black women); between 25-60 years of age. The condition is typically bilateral & may affect all four quadrants.

Radiographically, FCOD appears as diffuse radiopaque masses throughout the alveolar segment of the jaw. A ground-glass or cyst-like appearance may also be seen.

- **Histopathology of COD:**

All 3 types show a mixture of benign fibrous tissue, bone, and cementum. The calcified tissue is arranged in trabeculae, spicules or larger irregular masses. Numerous small blood vessels & free hemorrhage is typically noted throughout the lesion. The proportion of the mesenchymal component to the mineralized material is variable depending on the stage and from area to area in the same lesion.