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Classification of Fibro-Osseous Lesions: A Review

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ABSTRACT:
Fibroosseous lesions are a poorly defined group of lesions affecting the jaws along with craniofacial bones in which there is replacement of normal bone by a tissue composed of collagen fibers and fibroblasts that contain varying amounts of mineralized substances, which may be bony or cementum like in appearance. Classification and thus diagnosis of these lesions is difficult as there is significant overlap of clinical and histological features. Proper categorization involves good correlation of the history, clinical findings, radiographic characteristics, operative findings, and histologic appearance. FOLs include Ossifying Fibromas, Fibrous Dysplasia, and Osseous Dysplasia. Other lesions which shows resemblance to FOLs of the body are Cherubism, Paget disease, Aneurysmal Bone Cyst, Central Giant Cell Granuloma, Cementoblastoma. These should be considered in the differential diagnosis. In this article we will be enlisting the various classifications which can be helpful for both learning and diagnostic purpose.

Keywords- Fibrosseous lesions (FOLs), cementum, Central Giant Cell Granuloma (CGCG), Aneurysmal Bone Cyst (ABC).

INTRODUCTION

Fibro-Osseous Lesions of the jaw have been under frequent renaming and reclassification due to its varied features.The similarity between all the FOL of the jaw is the replacement of the normal bone with fibrous connective tissue with interspersedmineralized products,that includes osteoid, mature bone or presence of cementum like calcifications. The major challenge is further sub classifying the lesions.There has always been constant disagreement regarding thenomenclature of benign fibro-osseous lesions, due in part to the peculiar pathologicalpatterns of stroma and bone inthesegroup of lesions and even similar or identicalmicroscopic features can be in common amongsttwo or moredifferent lesions.[1]

Despite the advances in the understanding of these conditions, fibro-osseous lesions continue to present problems in classification, diagnosis, and management due to multiple histological and radiographic similarities.[2]

The classification of BFOLs has remained a challenging and controversial topic throughout the years, giving rise to many classification systems.[3]

BFOLs are separated into three disease categories:

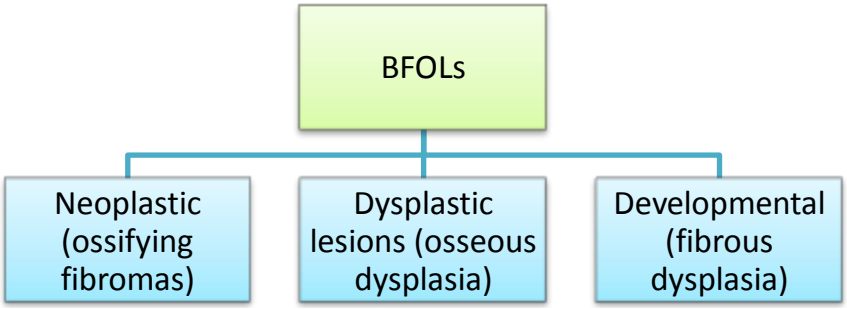

Figure 1: Classification of BFOLs

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With the systematic application of this classification system in practice, understanding of the radiological presentation and clinical behaviour of these lesions, as well as the applied therapeutic approaches evolved. Forinstance, while radiotherapy was an accepted treatment for certain BFOLs in the 1940s, it is now a known cause of sarcomatous transformation and is contra-indicated (Neville et al., 2016).[3]

CLASSIFICATION

The various classifications of FOL proposed by different authors are listed below.

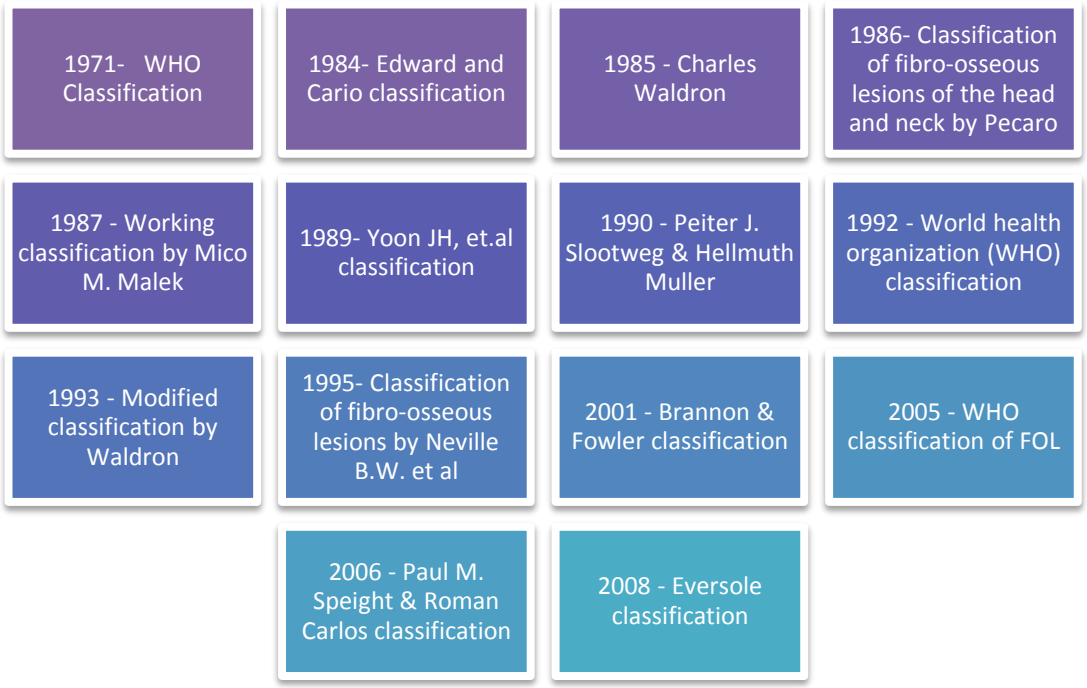

Figure 2: Classifications of FOL

WHO Classification – 1971[4]

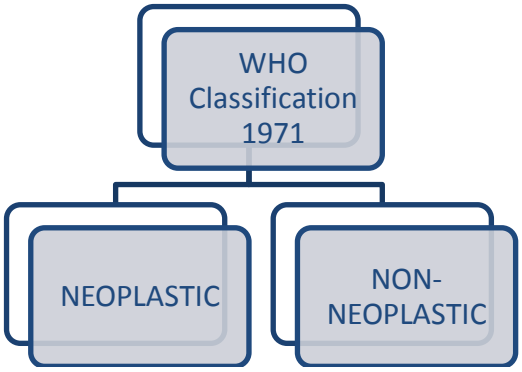

Figure 3: WHOClassifications of FOL

Neoplasms and other tumors related to the odontogenic apparatus <u>Cementomas:</u>	**Neoplasms and other tumors related to bone <u>Osteogenic neoplasm:</u>**
• Benign Cementoblastoma (true cementoma)	• Ossifying fibroma (fibro-Osteoma)
• Cementing fibroma	
• Periapical cemental dysplasia (periapical fibrous dysplasia)	
• Gigantiform Cementoma (familial multiple Cementomas)	

Table 1: WHO Classification- 1971

Non-neoplastic bone lesions:

- Fibrous dysplasia
- Cherubism
- Central giant cell granuloma
- Aneurysmal bone cyst
- Simple bone cyst

Edward and Cario classification-1984[4]

Edward and Cario classification-1984
• Benign cementoblastoma
• Ossifying fibroma
• Periapical cemental dysplasia
• Cementifying fibroma
• Cemento-ossifying fibroma

Table 2:**Edward and Cario classification-1984**

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Waldron classification – 1985[4]

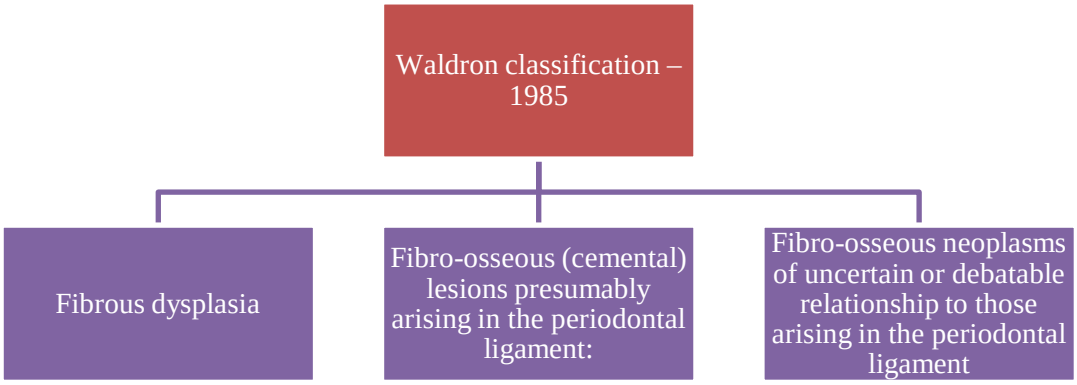

Figure 4:Waldron classification – 1985

Fibrous dysplasia:

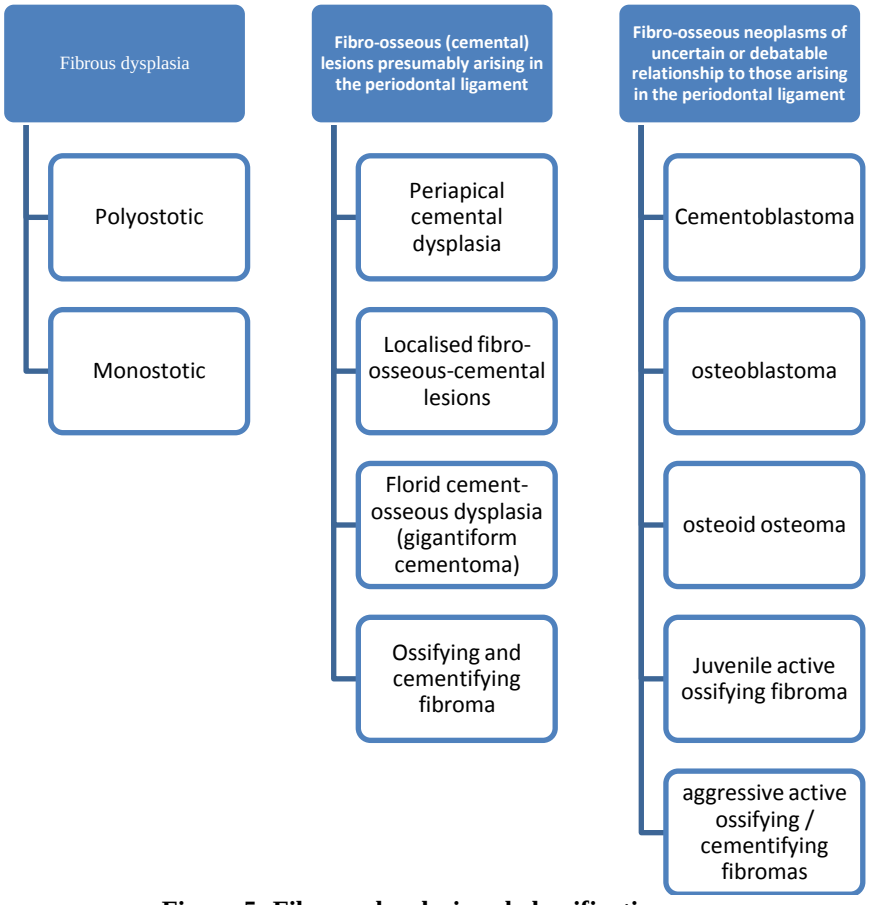

Figure 5: Fibrous dysplasia subclassification.

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Classification of fibro-osseous lesions of the head and neck by Pecaro B.C. (1986)[4]

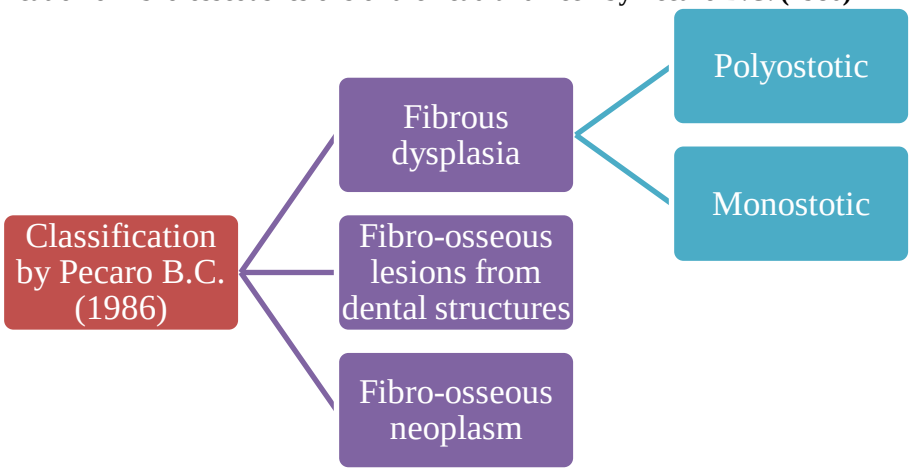

Figure 6: Classification by Pecaro B.C.

Fibro-osseous lesions from dental structures:
Periapical fibrous dysplasia
Cemento-osseous dysplasia
Cemento-ossifying fibroma
Fibro-osseous neoplasm:
Cementoblastoma/Osteoblastoma(osteoid osteoma)
Aggressive active ossifying fibroma

Working classification of fibro-osseous lesions by Mico M. Malek, 1987 [5]

Developmental disorders	**Reactive reparative lesions**
a. Fibrous cortical defects (non ossifying fibroma)	a. Traumatic periosteitis
b. Fibrous dysplasia	b. Periosteitis ossificans c. Osseous keloid
	d. Periapical cemental dysplasia & florid cemento-osseous dysplasia
	e. Sclerosing osteomyelitis (focal & diffuse type)
	f. Osteitis deformans

Table 3: **Classification of fibro-osseous lesions by Mico M. Malek, 1987**

Yoon JH, et.al classification—1989[4]

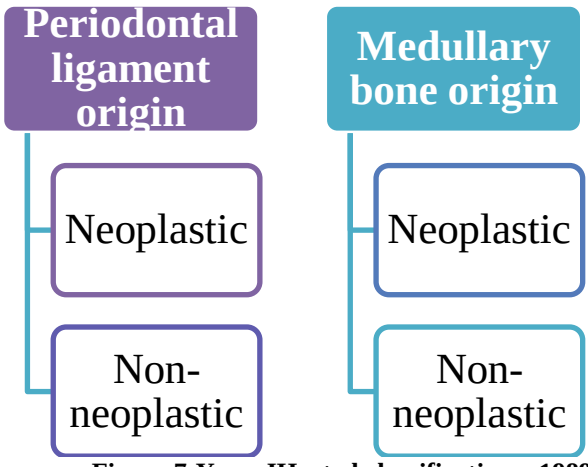

Figure 7:Yoon JH, et.al classification—1989

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Periodontal ligament origin:

Neoplastic	Non-neoplastic
i. Cemetifying fibroma	i. Periapical Cemental dysplasia
ii. Benign cementoblastoma	
iii. Gigantiform cementoma	
iv. Cemento-ossifying fibroma	
v. Ossifying fibroma	

Table 4: Periodontal ligament origin subclassification.

Medullary bone origin

Neoplastic:	Non-neoplastic:
i. Osteoma	i. Chronic sclerosing osteomyelitis
ii. Osteoblastoma	ii. Fibrous dysplasia

Table 5: **Medullary bone origin subclassification**

Peiter J. Slootweg & Hellmuth Muller,1990 [5]

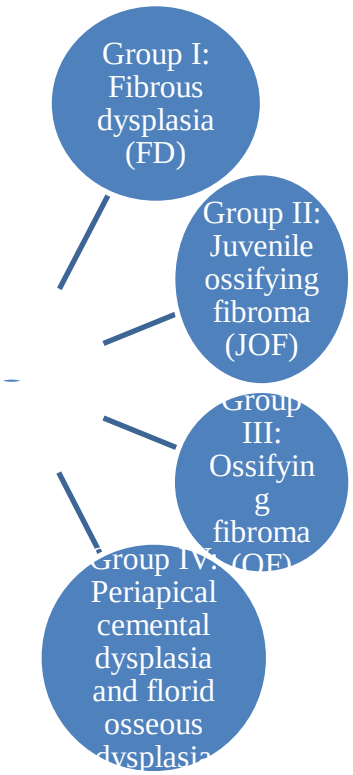

Figure 8:Peiter J. Slootweg & Hellmuth Muller,1990

WHO Classification – 1992[5]
Osteogenic neoplasms:
Cemento-ossifying fibroma (cementifying fibroma, ossifying fibroma)
Non-neoplastic bone lesions:
Fibrous dysplasia of jaw
Cemento-osseous dysplasia
i. Periapical cemental dysplasia
ii. Florid cemento-osseous dysplasia
iii. Other comments-osseous dysplasia
Cherubism (familial multilocular cystic disease of the jaw)
Central giant cell granuloma
Aneurysmal bone cyst
Solitary bone cyst

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Modified Classification by Waldron,1993 [5]

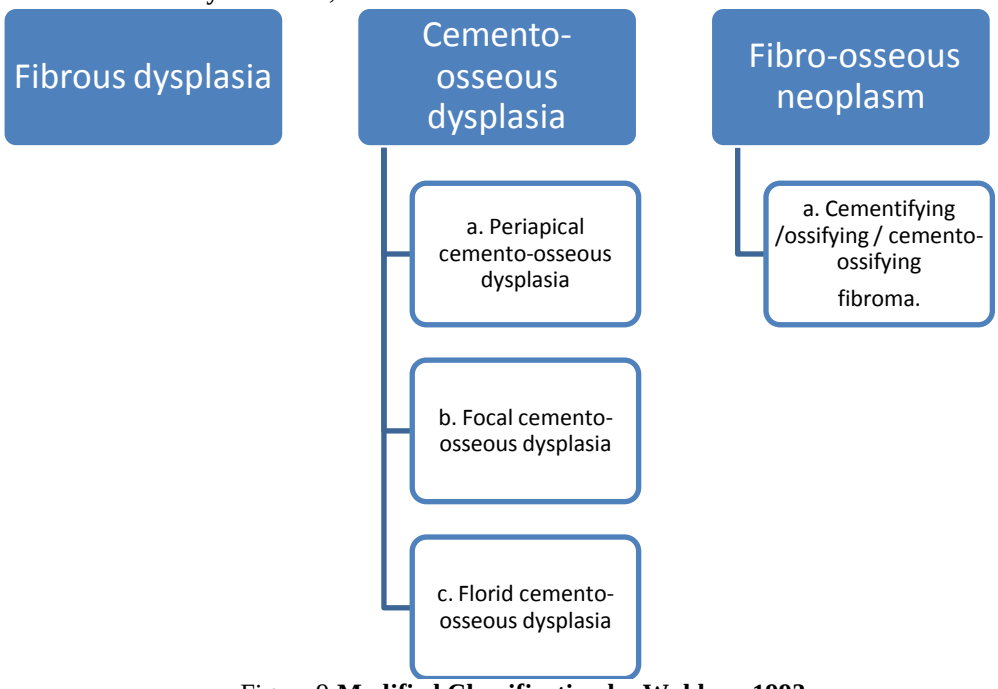

Figure 9:**Modified Classification by Waldron,1993**

Classification of fibro-osseous lesions by Neville B.W. et al (1995)[4]

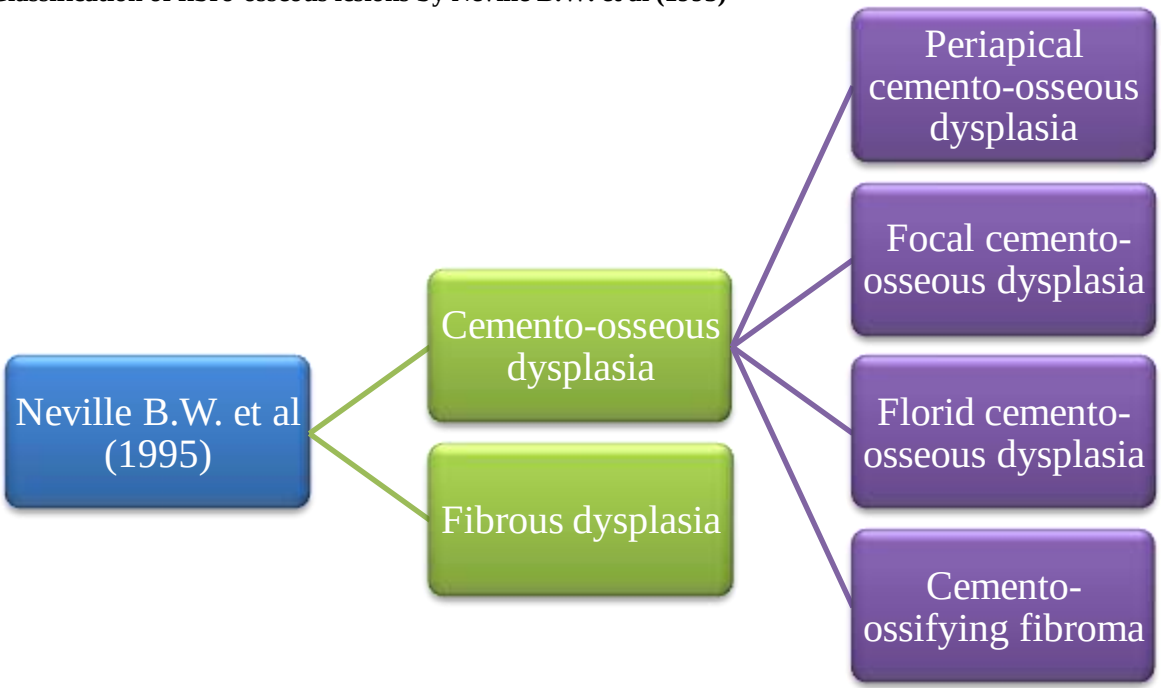

Figure 10:Classification of fibro-osseous lesions by Neville B.W. et al

Brannon & Fowler classification, 2001[5]

1. Osseous dysplasia (OD) (reactive)	2. Fibro-osseous neoplasm	3. Fibrous dysplasia	4. Giant cell lesions	5. Miscellaneous benign fibro-osseous lesions

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a. Non-hereditary	a. Ossifying fibroma (OF)	a. Polyostotic FD	a. Central giant cell granuloma	a. Cementoblastoma
i. Periapical	b. "Juvenile", "Active" or "Aggresive" variants of OF	b. Monostotic FD	b. Aneurysmal bone cyst	b. Tori/exostoses
ii. Focal		c.Craniofacial FD	c. Cherubism	c. Osteoma
iii. Florid				
b. Hereditary (developmental)				
i. Familial gigantiform cementoma				

Table 6:**Brannon & Fowler classification, 2001**

WHO Classification of FOLs, 2005 [5]

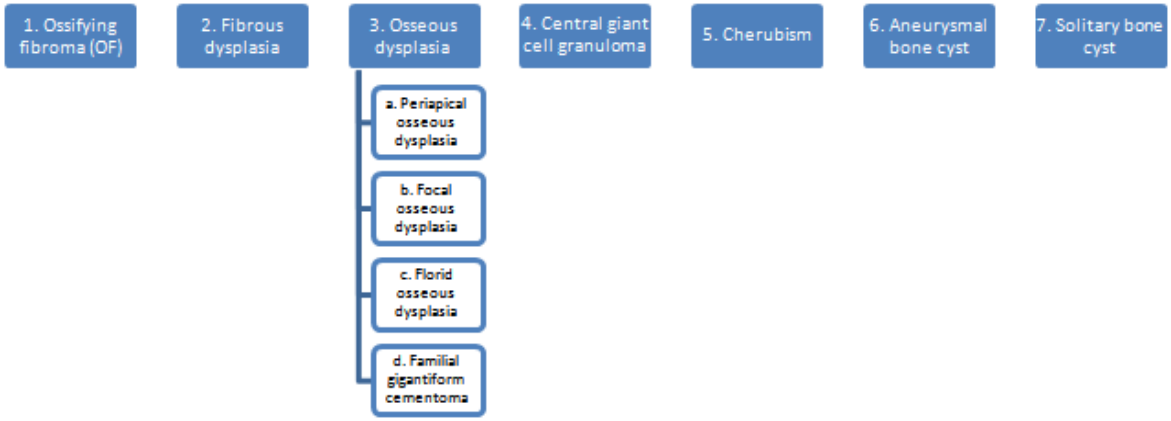

Figure 11:WHO Classification of FOLs, 2005

Paul M. Speight & Roman Carlosclassification, 2006 [5]

1. Fibrous dysplasia	**2. Osseous dysplasia**	**3. Ossifying fibroma**
a. Monostotic FD	a. Periapical osseous dysplasia	a. Conventional ossifying fibroma
b. Polyostotic FD	b. Focal osseous dysplasia	b. Juvenile trabecular ossifying fibroma
c. Craniofacial FD	c. Florid osseous dysplasia	c. Juvenile psammomatoid ossifying fibroma

	d. Familial gigantiform cementoma	

Table 7:**Paul M. Speight & Roman Carlosclassification, 2006**

Eversole classification, 2008 [5]

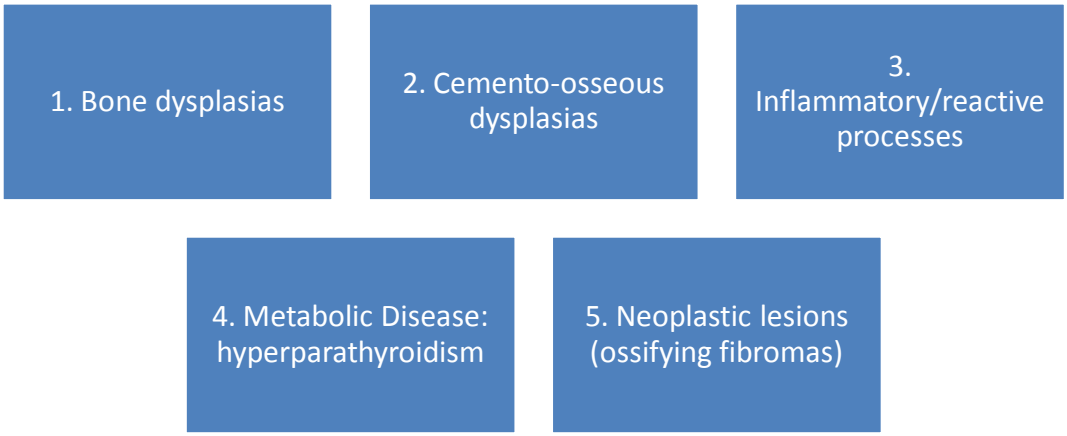

Figure 12:**Eversole classification, 2008**

1. Bone dysplasias
a. Fibrous dysplasia
i. Monostotic
ii. Polyostotic
iii. Polyostotic with endocrinopathy (McCune-Albright)
iv Osteofibrous dysplasia
b. Osteitis deformans or Pagets disease
c. Pagetoid heritable bone dysplasias of childhood
d. Segmental odontomaxillary dysplasia
2. Cemento-osseous dysplasias
a. Focal cemento-osseous dysplasia
b. Florid cemento-osseous dysplasia
3. Inflammatory/reactive processes
a. Focal sclerosing osteomyelitis
b. Diffuse sclerosing osteomyelitis
c. Proliferative periostitis
4. Metabolic Disease: hyperparathyroidism
5. Neoplastic lesions (ossifying fibromas)
a. Ossifying fibroma
b. Hyperparathyroidism jaw lesion syndrome
c. Juvenile ossifying fibroma
i. Trabecular type
ii. Psammomatoid type
d. Gigantiform cementomas

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