

**RADIOGRAPHIC APPEARANCE OF COMMON
Inflammatory DENTAL & jaw DISEASES**

COMMON DENTAL DISEASES

1-Dental caries

2-Periodontal Diseases

3-pericoronitis

4-Inflammatory lesions of the jaws

5-Osteomyelitis.

1-Dental caries

Dental caries, the most common disease in the mouth, is also the most common disease of the entire body, is the common infectious disease strongly influenced by diet, affecting 95% of population.

Radiography is useful for detecting dental caries because the carious process causes tooth demineralization.

The carious lesion (the demineralized area of the tooth that allows greater infiltration of x-rays) is darker (**more radiolucent**) than the unaffected portion and may be detected on radiographs.

A clinical examination may be able to identify carious lesions on the occlusal and exposed smooth surfaces of the teeth.

However, it is nearly impossible to clinically identify caries occurring on the proximal surfaces of teeth (interproximal caries) unless there has been cavitation.

When this occurs, it usually means that the carious lesion has become large enough to be identified clinically.

An early carious lesion may not have yet caused sufficient demineralization to be detected radiographically.

Intraoral radiography can reveal carious lesions that otherwise might go undetected during a thorough clinical examination.

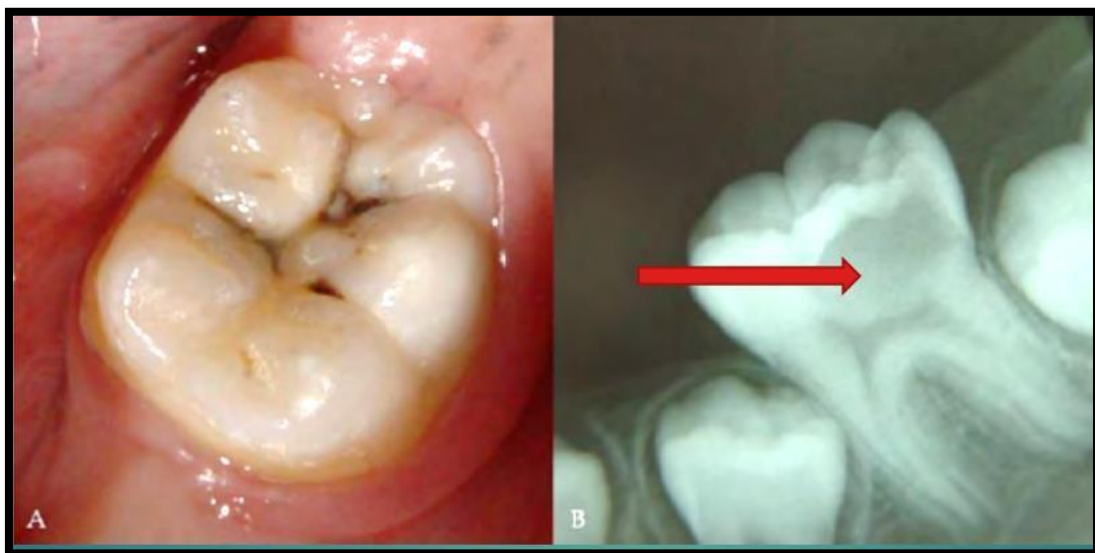
A number of studies have shown the value of dental radiographs by repeatedly demonstrating that approximately half of all proximal surface lesions cannot be seen clinically and may be detected only with radiographs

Interpretation of Dental Caries (DC) regarding to its location

Interpretation of Incipient Occlusal DC: Radiographs are usually not effective for the detection of an occlusal carious lesion until it reaches the dentin.

Interpretation of Moderate Occlusal DC: The moderate occlusal lesion is usually the first to induce specific radiographic changes.

The classic radiographic change is a broad-based, thin radiolucent zone in the dentin with little or no changes apparent in the enamel.



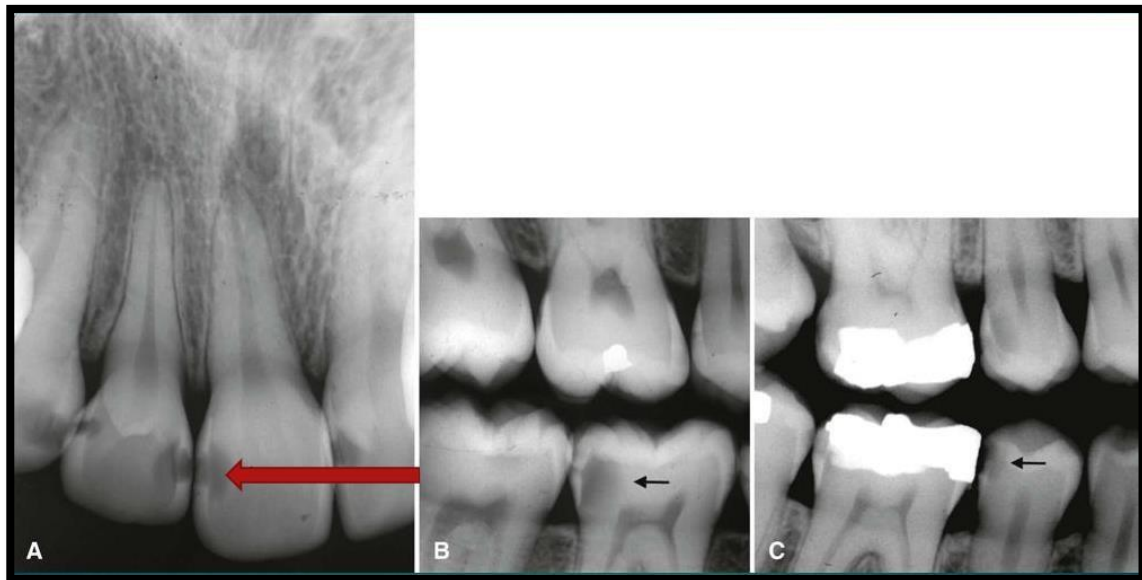
PROXIMAL CARIES

Interproximal carious lesions are most commonly found in a region that extends between the contact points of teeth apically to near the free gingival margin.

Radiographic detection of carious lesions on the proximal surfaces of teeth depends on loss of enough mineral to result in a detectable change in radiographic density.

Approximately 40% demineralization is required for radiographic detection of a lesion.

Bitewing intra oral film used to detect the proximal caries.



Facial, buccal, and lingual caries

Facial, buccal, and lingual carious lesions occur in enamel pits and fissures of teeth.

When small, these lesions are usually round, as they enlarge, they become elliptic or semilunar.

They demonstrate sharp, well-defined borders.

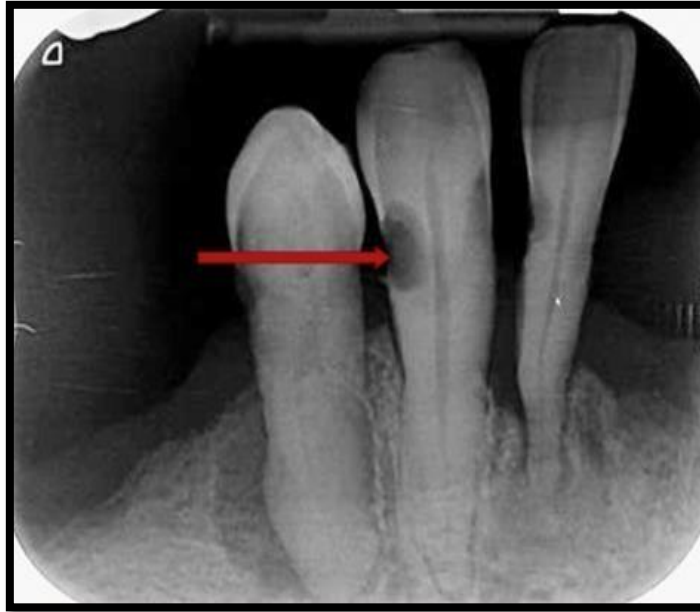
It is difficult to differentiate between buccal and lingual caries on a radiograph.



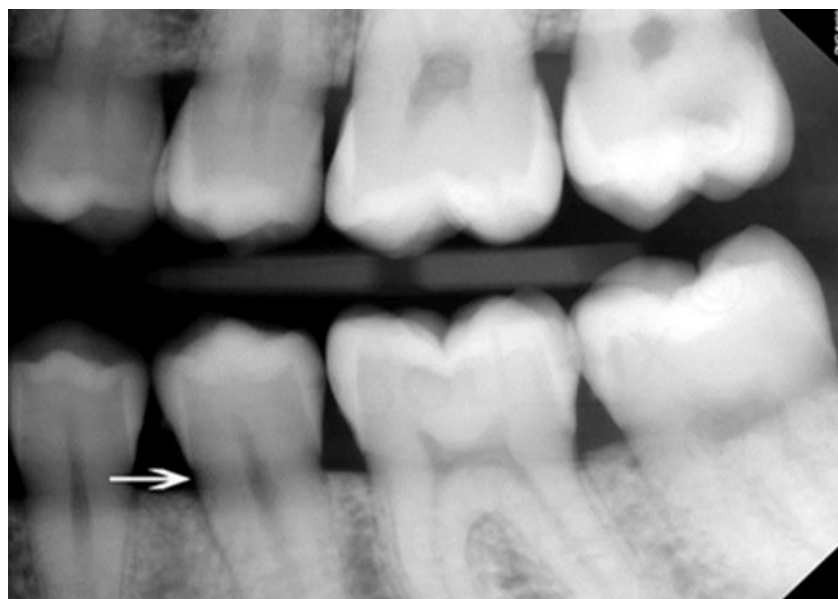
ROOT SURFACE CARIES

also called cemental caries, it involves both cementum and dentin. Its prevalence is approximately 40% to 70% in an aged population.

The tooth surfaces most frequently affected are (in order) buccal, lingual, and proximal.



* **Cervical burn out:** radiolucent band running across the tooth in area not covered by enamel or alveolar bone (neck of the tooth) because it absorbs less x ray than areas below and above.



Recurrent caries

Recurrent caries is that occurring immediately next to a restoration.

It may result from poor adaptation of a restoration, which allows for marginal leakage, or from inadequate extension of a restoration.

In addition, caries may remain if the original lesion is not completely evacuated, which later may appear as residual or recurrent caries.

The radiographic appearance of recurrent caries depends on the amount of decalcification present and whether a restoration is obscuring the lesion

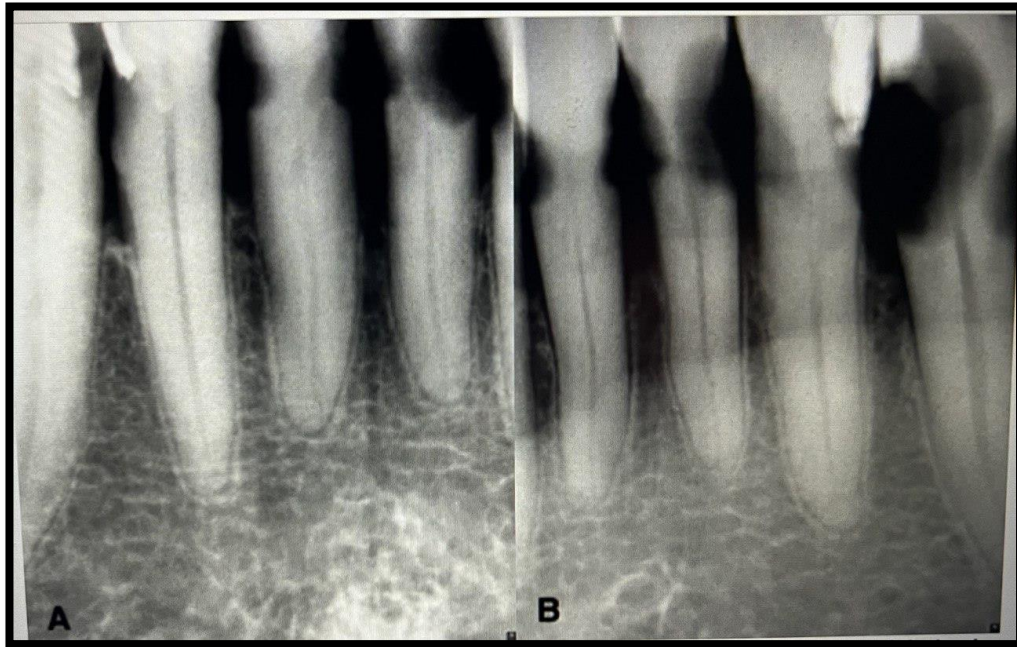


Rampant caries

is the term used to describe rapid progression with severe and widespread involvement.

This is most often seen in young children who have poor oral hygiene habits coupled with poor dietary habits (e.g., going to sleep with a bottle of milk or juice).

Imaging examinations of these patients can demonstrate advanced, generalized caries, involving smooth surfaces and teeth that usually do not present carious lesions.



2-Periodontal Diseases

The most common of periodontal disease are **gingivitis and periodontitis**.

Assessment of Periodontal Disease, contributions of radiographs

Radiographs play an integral role in the assessment of periodontal disease. They provide unique information about the status of the periodontium and a permanent record of the condition of the bone throughout the course of the disease.

It is important to emphasize that the clinical and radiographic examinations are complementary.

The clinical examination should include periodontal probing, a gingival index, mobility charting, and an evaluation of the amount of attached gingiva.

Features that are not well delineated by the radiograph are most apparent clinically, and those that the radiograph best demonstrates are difficult to identify and evaluate clinically.

Radiographic features of healthy periodontium

A healthy periodontium can be regarded as periodontal tissue exhibiting no evidence of disease.

However, to be able to interpret radiographs successfully clinicians need to know the usual radiographic features of healthy tissues where there has been no bone loss.

The only reliable radiographic feature is the relationship between the crestal bone margin and the cemento-enamel junction (CEJ).

If this distance is within normal limits (2-3 mm) and there are no clinical signs of loss of attachment., then it can be said that there has been no periodontitis



Radiographic features of periodontal disease

Acute and chronic gingivitis

Radiographs provide no direct evidence of the soft tissue involvement in gingivitis.

Periodontitis

Periodontitis is the name given to periodontal disease when the superficial inflammation in the gingival tissues extends into the underlying alveolar bone and there has been loss of attachment.

The destruction of the bone can be **either localized affecting a few areas of the mouth, or generalized affecting all areas.**

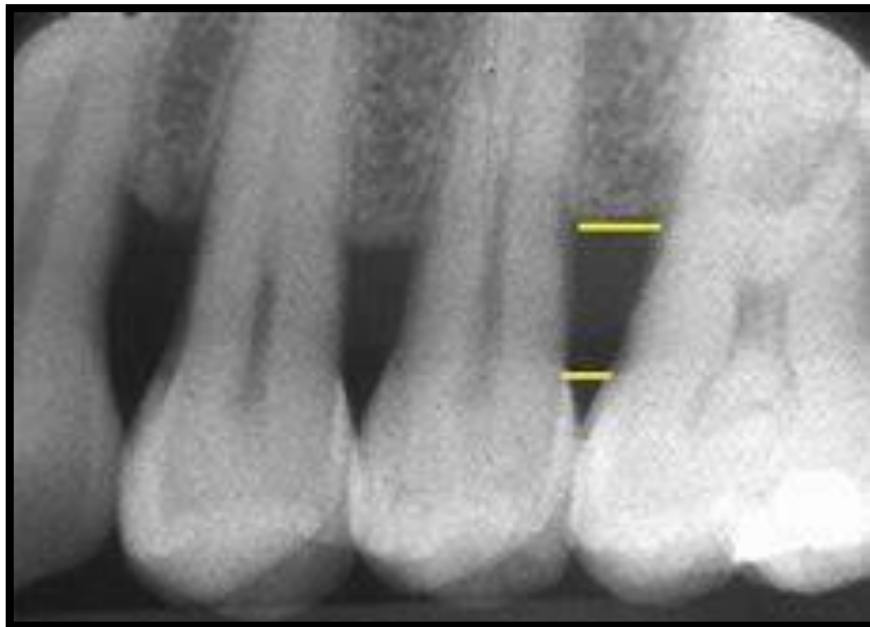
The radiographic features of the different forms of periodontitis are similar; it is the distribution and the rate of bone destruction that varies.

The terms used to describe the various appearances of bone destruction include:

- **Horizontal bone loss**
- **Vertical bone loss**
- **Furcation involvements.**

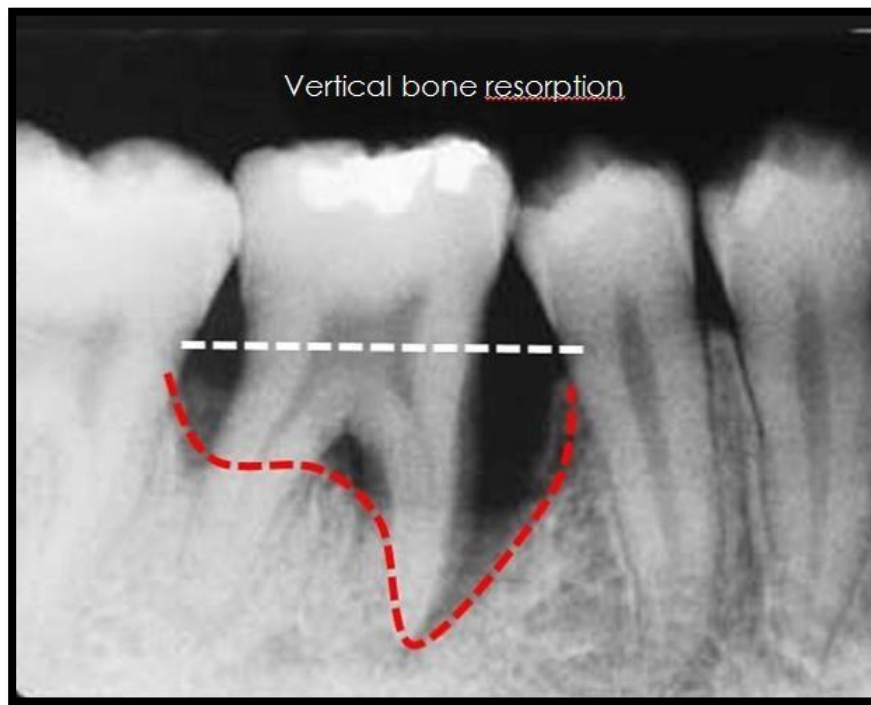
The terms horizontal and vertical have been used traditionally to describe the direction or pattern of bone loss using the line joining two adjacent teeth at their cemento-enamel junctions as a line of reference.

The amount of bone loss is then assessed as mild, moderate or severe.



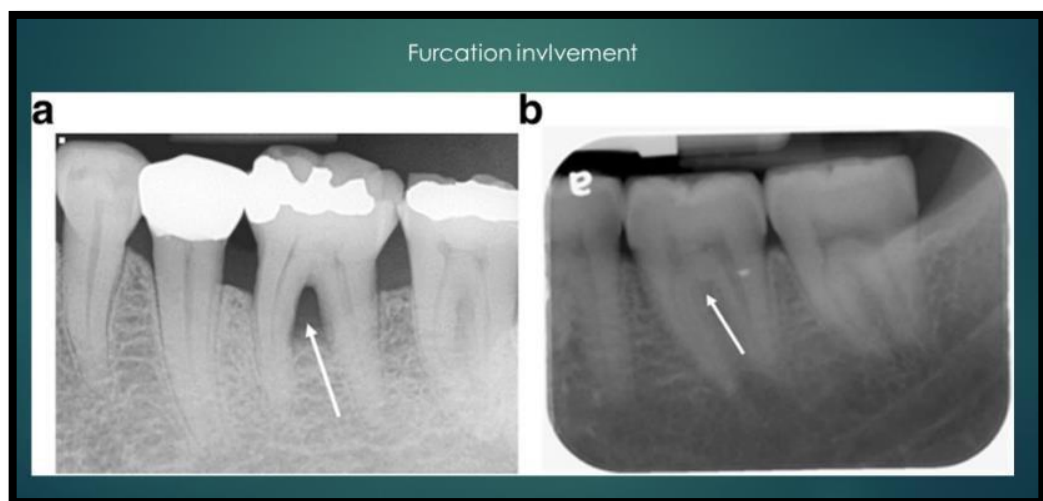
Horizontal bone loss

Severe vertical bone loss, extending from the alveolar crest and involving the tooth apex causing (perio- endo lesion)



The term furcation involvement describes the radiographic appearance of bone loss in the furcation area of the roots which is evidence of advanced disease in this zone.

Although central furcation involvements are seen more readily in **mandibular molars**, they can also be seen in maxillary molars 1



3-PERICORONITIS

Clinical Features

As mandibular third molar is the most commonly impacted tooth and its position is in such a way that its pericoronal flap gets frequently traumatized, it is the most commonly affected region.

Patient usually presents with swelling in affected area and inability to open the mouth completely. Patient may be having severe pain.

Radiographic Features

The most common radiographic feature of pericoronitis of mandibular third molar is that there is presence of distal bone loss.

This distal bone loss is semilunar or circumferential in shape.

In the case of mesially tilted impaction, bone loss is present on the mesial side.



Inflammatory lesions of the jaws

Inflammation is the most common disease process that the dentist encounters in practice. Whether acute or chronic, localized or generalized, dentists are responsible for identifying the important radiologic features of inflammation and for determining the extensiveness of bone involvement. Imaging plays a

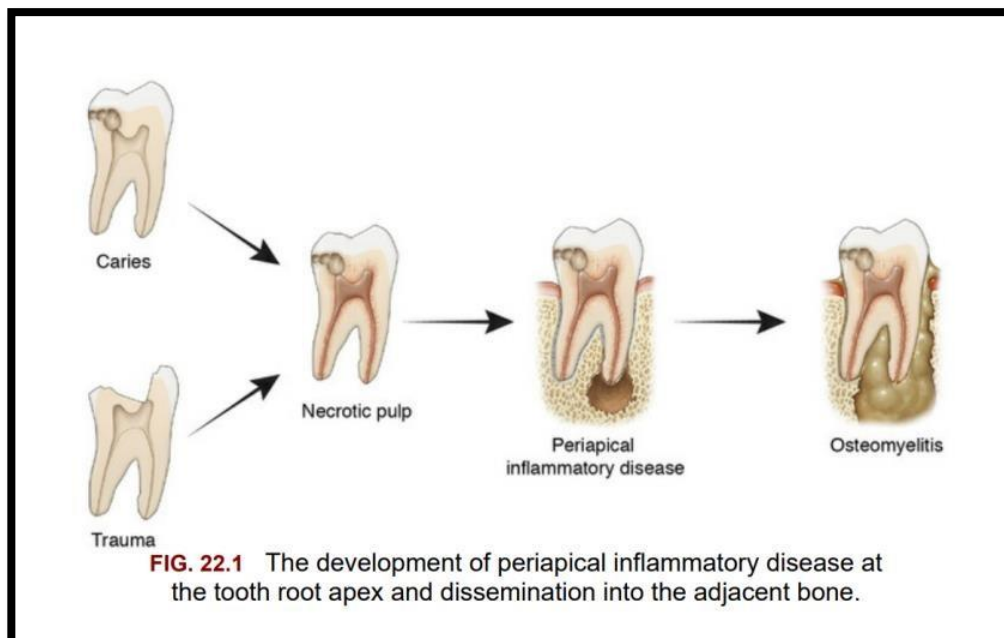
key role in this process, and is an important first step in patient diagnosis and management.

1-Periapical lesions

Inflammatory lesions are by far the most common pathologic condition of the jaws.

When the initial source of inflammation is a necrotic pulp and the bony lesion is restricted to **the region of the tooth apex**, the condition is called a **periapical inflammatory lesion**.

When the infection spreads in the **bone** marrow and is no longer contained, it is called **osteomyelitis**.



It must be emphasized that the names of the various inflammatory lesions tend to describe their clinical and radiologic presentations and behavior.

Terminology

Apical periodontitis (acute and chronic).

(periapical, radicular, or periradicular) abscess.

(periapical, radicular, or periradicular) granuloma.

(periapical, radicular, or periradicular) cyst.

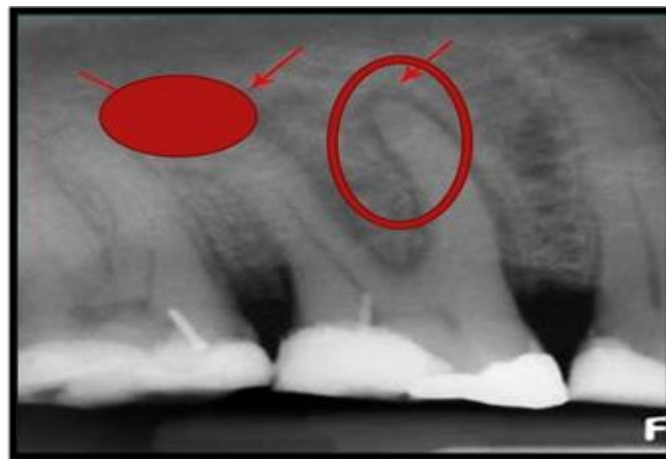
The radiographic features of periapical inflammatory lesions vary depending on the time course of the lesion

A-Early periapical inflammatory lesions

may show no radiographic change in the normal bone pattern.

The earliest detectable change is loss of bone density, which usually results in widening of the periodontal ligament space at the apex of the tooth and later involves a larger diameter of surrounding bone.

At this early stage no evidence may be seen of a sclerotic bone reaction.



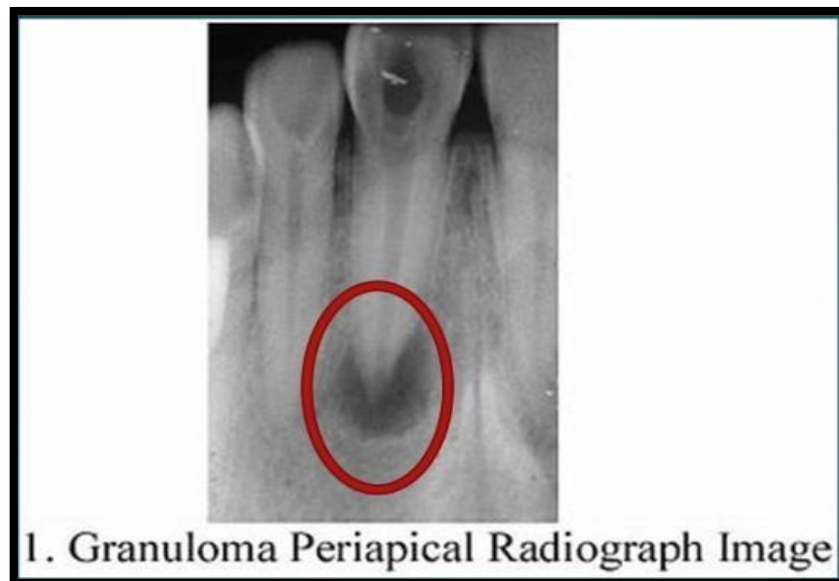
B- Periapical granuloma:

It is a mass of inflamed granulation tissue at the apex of a non-vital tooth

Clinical Features

Patient is usually asymptomatic. In some cases, pain occurs which is mild in intensity. Vitality test of the tooth is negative. Due to periapical lesion, tooth may feel elongated in the socket. Swelling is usually not present

Radiographically: granuloma is the most common periapical radiolucencies encountered in dental practice the lesion is not fully dark but it has greyish appearance with well-defined borders , there is a loss of lamina dura in relation with the affected tooth , the size of radiolucency is less than 1.5 cm in diameter if the size larger so it consider periapical cyst.



Differential Diagnosis

Differences between cyst and granuloma: It is not easy to differentiate periapical granuloma from periapical cyst on the basis of radiographs.

It is accepted that lesions having a diameter smaller than 1.5 cm are apical granulomas and lesions bigger than this are periapical cysts

Difference between granuloma and apical abscess: Apical abscesses form large radiolucencies with diffuse irregular borders.

Periapical scar: Periapical scar is associated with endodontically treated tooth

C- Periapical abscess

- **Acute periaical abcess:** : The tooth is painful, tender to percussion with systemic manifestation such as fever, swelling and lymphadenitis.

Radiographically: acute abscess shows No radiographic changes, but in some cases we may see a widening of the apical PDL space.

- **Chronic periapical abcess:** It may develop from acute abscess or from a granuloma. It may cause minimal discomfort only because the pus drain through the sinus at the apical region or through the PDL space . Radiographically: It requires 10 days or more for an infection to erode bone and cause radiolucenent appearance with ill-defined margin.

it is difficult to differentiate it from granuloma or cyst.



Differential Diagnosis

There are many normal radiographic landmarks as well as pathological conditions which can be included in differential diagnosis.

The normal radiographic anatomical landmarks include normal foramina, inferior dental canal and a large marrow space.

All these conditions can be diagnosed by looking at the lamina dura.

Lamina dura in all three conditions is intact.

The periapical abscess may be confused with a pathological condition named periapical osteofibrosis (the most common fibro-osseous lesion), but in this condition tooth is vital.



D- periapical cyct (radicular cyst):

It develops over a long period of time in pre-existing granuloma. This cyst is asymptomatic, unless secondary infection is occurring. Radiographically: identical with granuloma but with greater size due to longer duration, exhibits a thin radiopaque line around the periphery of radiolucent area which represented bone reaction to the slowly expanding mass.

E. Condensing ostitis:

band of radio-opacity associated with the tooth apex reflected the bone defense mechanism .

Differential Diagnosis

Condensing osteitis should be differentiated from:

- Idiopathic osteosclerosis (radio-opacity is separated from the apex).
- hypercementosis (lamina dura is inside the lesion).

OSTEOMYELITIS

Osteomyelitis is an inflammation of bone.

The inflammatory process may spread through the bone to involve the marrow, cortex, cancellous portion and periosteum.

Clinical Features

Osteomyelitis of the maxilla is much less frequent than that of the mandible because the maxillary blood supply is far more extensive.

Clinically, patients present with facial swelling, localized pain and tenderness to percussion ,low-grade fever, draining sinus tracts, suppuration, dental loss and sequestrum (i.e. necrotic bone fragment) formation

Radiographic Features.

Acute osteomyelitis: Very early in the disease no radiographic changes are identified.

The first radiographic evidence of the acute form of osteomyelitis is slight decreased density of the involved bone. There is loss of sharpness of the existing trabeculae. With time bone destruction becomes more profound, resulting in an area of radiolucency in one focal area or in scattered regions throughout the involved bone.

Sequestra may be present but usually more clearly seen in chronic form of the disease. It can be identified by closely inspecting a region of bone resorption (radiolucency) for an island of non vital bone.



FIGURE 44.14 Osteomyelitis seen in mandible – sequestra surrounded by radiolucency.

Differential Diagnosis

Osteomyelitis should be differentiated from malignancy, Paget disease and eosinophilic granuloma. In the case of malignancy, there is no formation of sequestration which is very typical feature of osteomyelitis. Usually patient is aged below 40 years in case of osteomyelitis and in case of malignancy patient is above 40 years.

In Paget disease, bone involvement is multiple and in case of osteomyelitis bone involvement is single. Margins of eosinophilic granuloma are better defined if we compare it with osteomyelitis.