

### A-DENTAL CARIES (figure 1)

Caries is detected radiographically only in the advanced stages when there is sufficient decalcification of tooth structures. The radiographic appearance of caries is not representative of its actual size, that is, it is much larger clinically than seen on a radiograph. Initial carious lesions are not readily visualized on a radiograph because the visibility of caries is determined by the ratio of enamel to caries through which x-rays penetrate. Bite-wing and parallel radiographs are more useful in caries detection more than bisecting technique because incorrect horizontal or vertical angulation of the x-ray beam can result in a number of illusions. Also, errors in exposure factors and errors in processing can produce radiographic illusions of dental caries. A radiographic diagnosis of caries must always be supplemented with a careful clinical examination.

**Radiolucent cervical burn-out:** This radiolucent shadow is often evident at the neck of the teeth. It is an artefactual phenomenon created by the anatomy of the teeth and the variable penetration of the X-ray beam.

### A-1:-OCCLUSAL CARIES

The spread of caries in the enamel follows the path of the enamel rods and produces a triangular appearance with the base of the triangle at the dentino-enamel junction and the apex of the triangle towards the occlusal surface of the tooth. In the dentin, the occlusal caries follows the path of the dentinal tubules and forms another triangular radiolucency but with the base of the triangle at the dentino-enamel junction and the apex towards the dental pulp.

### A-2:-PROXIMAL CARIES

Initially detected on a radiograph by a small notching on the enamel surface just below the proximal contact point. It continues to demonstrate approximately a triangular pattern with its base towards the outer surface of the tooth and with a flattened apex

towards the dentino-enamel junction. After reaching the dentino-enamel junction, the carious lesion spreads along the junction and forms a dentino-enamel junction, the carious lesion spreads along the junction and forms a Second base. From this second base, the caries proceeds towards the pulp along the path of the dentinal tubules and forms another triangular radiolucency with the apex towards the pulp.

#### **A-3:-FACIAL AND LINGUAL CARIES**

The radiographic radiolucency is well demarcated from the surrounding sound tooth structure. Its shape may be round, oval or semilunar,

#### **A-4:-ROOT CARIES (CEMENTAL CARIES)**

On a radiograph, root caries produces a saucer shaped (scooped-out) appearance. It does not occur in areas covered by a well-attached gingiva.

#### **A-5:-RECURRENT CARIES**

Recurrent caries is that which recurs in a previously treated and restored tooth. The caries may occur under a restoration or along its margins. Recurrent caries may sometimes be misdiagnosed as (the non-commercial paste of) calcium hydroxide lining used underneath an amalgam and zinc phosphate base. On a radiograph, calcium hydroxide produces a thin radiolucent line whereas recurrent caries produces a diffuse radiolucency.

#### **B- Inflammatory periodontal disease; (figure 2)**

In periodontal disease, there may initially be widening of the periodontal ligament space at the crest of the proximal bone (Trangulation). Also, there may be localized erosion of the alveolar bone ,this alveolar crestal bone loses its radiopacity and becomes irregular and diffuse with a decreased radiographic density(Crestal irregularities).

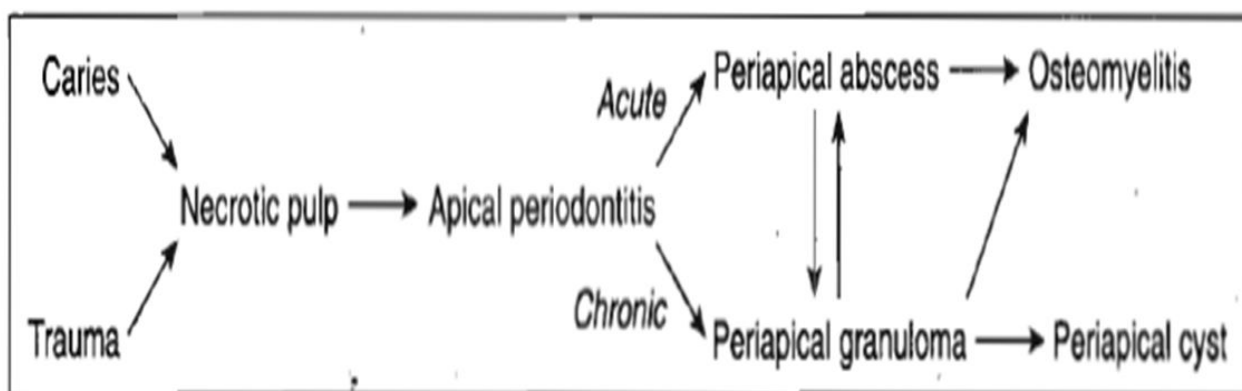
In advanced periodontal disease one of the changes is the loss of crestal bone. Normally, the crestal bone is usually situated 1 to 2 mm apical to the cemento-enamel junction. When there is bone loss, the crestal bone is more than 2 mm apical to the cemento-

enamel junction. Bone loss is considered horizontal when the crest of the proximal bone remains parallel to an imaginary line drawn between the cemento-enamel junctions of adjacent teeth. Horizontal bone loss may be localized or generalized. Generalized bone loss suggests a systemic etiology. Bone loss is considered vertical (angular) when the crest of the proximal bone is not parallel to the imaginary line drawn between the cemento-enamel junctions of adjacent teeth. Vertical bone loss is usually localized and related to such factors as trauma, calculus, subgingival plaque, overhanging restorations, and food impaction. In a multirrooted tooth, bone loss involving the bifurcation (or trifurcation) of a root is called furcation involvement.

### C-APICAL LESIONS (figure 3)

#### C-1:- PERIAPICAL GRANULOMA, RADICULAR CYST AND APICAL ABSCESS

The most common pathologic conditions that involve teeth are the inflammatory lesions of the pulp and periapical areas. Early apical change widening of the radiolucent periodontal ligament space (no radiographic evidence of an apical lesion) and loss of the radiopaque lamina dura (early periapical abscess). Extensive destructive acute inflammation diffuse, ill-defined area of radiolucency at the apex (periapical abscess). Low grade chronic inflammation diffuses radiopaque area at the apex (sclerosing osteitis). Longstanding chronic inflammation well-defined area of radiolucency surrounded by dense sclerotic bone (periapical granuloma or radicular cyst).



Representation of (Dynamic of inflammation signs)

**Radiographically granulomas form small well-defined radiolucencies. They are the most common periapical lesions and constitute approximately 50% of all periapical radiolucent lesions.**

**Radiographically, a radicular cyst forms a large well-defined radiolucency with or without a radiopaque(hyperostotic) border. approximately 40% of all periapical radiolucent lesions at the apex of an untreated asymptomatic tooth with a nonvital or diseased pulp.**

**An apical abscess In the acute stage, the onset of infection is so sudden that there is no radiographic evidence of an apical lesion. An apical abscess can develop also from a pre-existing granuloma or cyst. Radiographically apical abscesses form large radiolucencies with diffuse irregular borders approximately 2% of all periapical radiolucent lesions.**

#### **C-2:- APICAL SCAR**

**is an area at the apex of a tooth that fails to fill in with osseous tissue after endodontic treatment. well circumscribed radiolucency. When observed radiographically over the years, it will either remain constant in size or diminish slightly.**

#### **C-3:- CONDENSING OSTEITIS**

**Is a reaction to periapical infection resulting in the formation of dense bone. This dense radiopacity surrounding the rarefying osteitis.**

#### **C-4:- CEMENTOMAS**

**All the three types of cementomas have three radiographic appearances :**

- Early or osteolytic stage appears radiolucent.**
- Mixed or cementoblastic stage appears as a radiolucency containing radiopacities .**
- final or calcified stage appears as a homogeneous radiopacity surrounded by a thin radiolucent border.**

All cementomas are associated with teeth having vital pulps unless, otherwise involved with caries or trauma.

#### **D- TOOTH ROOT FRACTURES**

Most of the horizontal fractures confined to the root occur in the middle third of the root. The ability of an image to reveal the presence of a root fracture depends on the relative angulation of the incident x-ray beam to the fracture plane and the degree of distraction of the fragments. If the x-ray beam is well aligned with the fracture plane, a single sharply defined radiolucent line confined to the anatomic limits of the root may be seen. If, however, the orientation of the x-ray beam is not well aligned and meets the fracture plane in a more oblique manner, the fracture plane may appear as a more poorly defined single line or as two lines that converge at the mesial and distal surfaces of the root. The appearance of a comminuted root fracture may also appear less well defined. Most nondisplaced root fractures are usually difficult to demonstrate radiographically, and several views at differing angles may be necessary. In some instances when the fracture line is not visible, the only evidence of a fracture may be a localized increase in the width of the periodontal ligament space adjacent to the fracture site . Longitudinal(vertical) root fractures are relatively uncommon but are most likely in teeth with posts that have been subjected to trauma. The width of the fracture plane tends to increase with time, probably because of resorption of the fractured surfaces. Over time calcification and obliteration of the pulp chamber and canal may be seen.

#### **E- Tooth resorption**

##### **E-1:- Physiologic Root Resorption**

The roots of a deciduous tooth undergo resorption before the tooth exfoliates. This is a normal physiologic phenomenon. Resorption can occur with or without the presence of a permanent successor tooth.

## **E-2:- Idiopathic Tooth Resorption**

**Idiopathic tooth resorption is resorption that occurs either on the internal or external surface of a tooth from an obscure or unknown cause.**

## **E-3:- Pathologic Tooth Resorption**

**i) Pressure exerted by an impacted tooth produces a smooth resorbed surface on the adjacent tooth.**

**ii) Apical infection produces an irregular resorbed root surface with destruction of the periodontal membrane and lamina dura.**

**iii) Neoplasms of expansive nature tend to produce smooth tooth resorption (for example, odontomas, and slow growing ameloblastomas).**

**iv) Trauma produces irregular tooth resorption.**

## **F- Pulp Calcification**

### **F-1:- Pulp stones (denticles)**

**As round or ovoid opacities within the pulp. They may be free within the pulp or attached to the inner dentinal walls.**

### **F-2;- Secondary or reparative dentin**

**Calcified layer between normal pulp tissue and a large carious lesion. It is frequently associated with the successful use of calcium hydroxide as a pulp-capping material.**

### **F-3:- Pulpal obliteration (calcific metamorphosis of dental pulp) .**

**Is the partial or complete calcification of a pulp chamber and canal .**

## **G- Tooth structure loss**

### **G-1;- ATTRITION**

Smooth wearing of the incisal and occlusal surfaces of teeth.

### **G-2:- ABRASION**

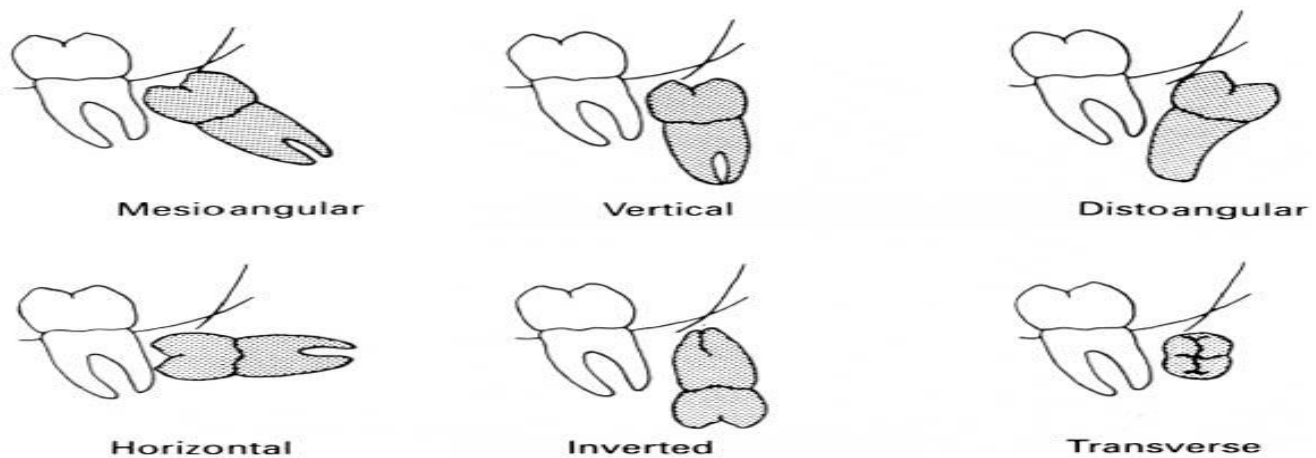
Pathologic (mechanical) wear, that is, from friction of a foreign body on a tooth surface.

### **G—3:- EROSION**

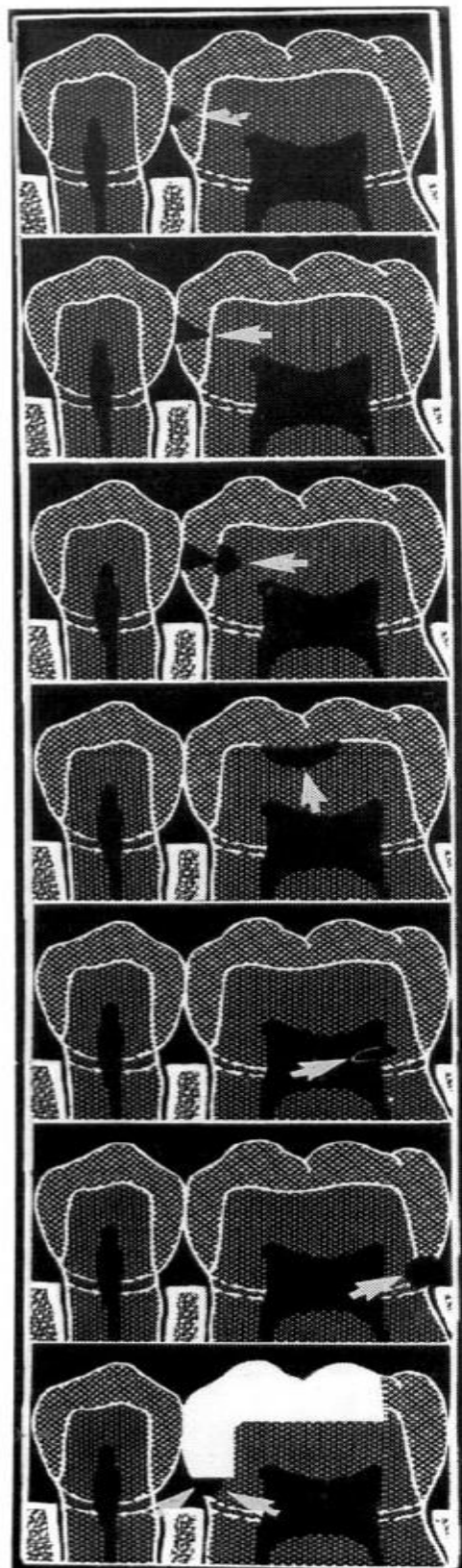
Is the loss of tooth structure that results from a chemical action not involving a bacterial process. It usually involves all surfaces of teeth but may sometimes involve only one type of surface. severe cases appear as radiolucent defects on tooth crowns.

## **H- IMPACTED TEETH**

An impacted tooth is a tooth which is prevented from erupting due to crowding of teeth or from some physical barrier or an abnormal eruption path. An embedded tooth is one which has no eruptive force. Mandibular third molar is the most commonly impacted tooth; followed by the maxillary third molar, maxillary cuspid and premolar. Tooth impaction may be vertical, horizontal, mesioangular (crown tipped mesially) or distoangular (crown tipped distally). A retained impacted tooth has the potential to develop a dentigerous cyst or a neoplasm (ameloblastoma).



**Figure of impacted mandibular third molar**



Approximal caries  
confined to enamel

Approximal caries  
extending to EDJ

Approximal caries  
extending into  
dentine

Occlusal caries  
extending into  
dentine. No  
obvious enamel  
shadow

Buccal/lingual  
caries

Root caries

Recurrent  
caries

Cervical  
'burn-out'

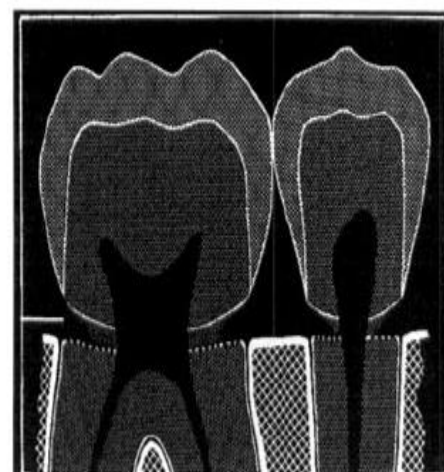


Figure 1: dental caries

cervical burn -out



Figure 2: ABC horizontal bone loss

DE vertical bone loss

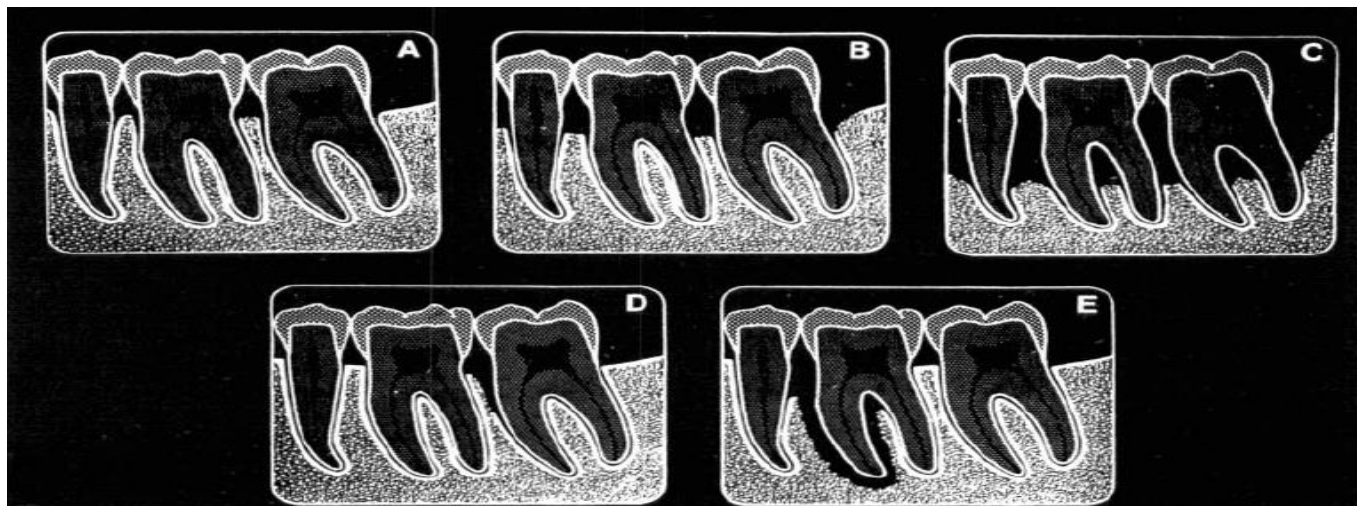


Figure 3 various radiographic appearance of apical inflammation

