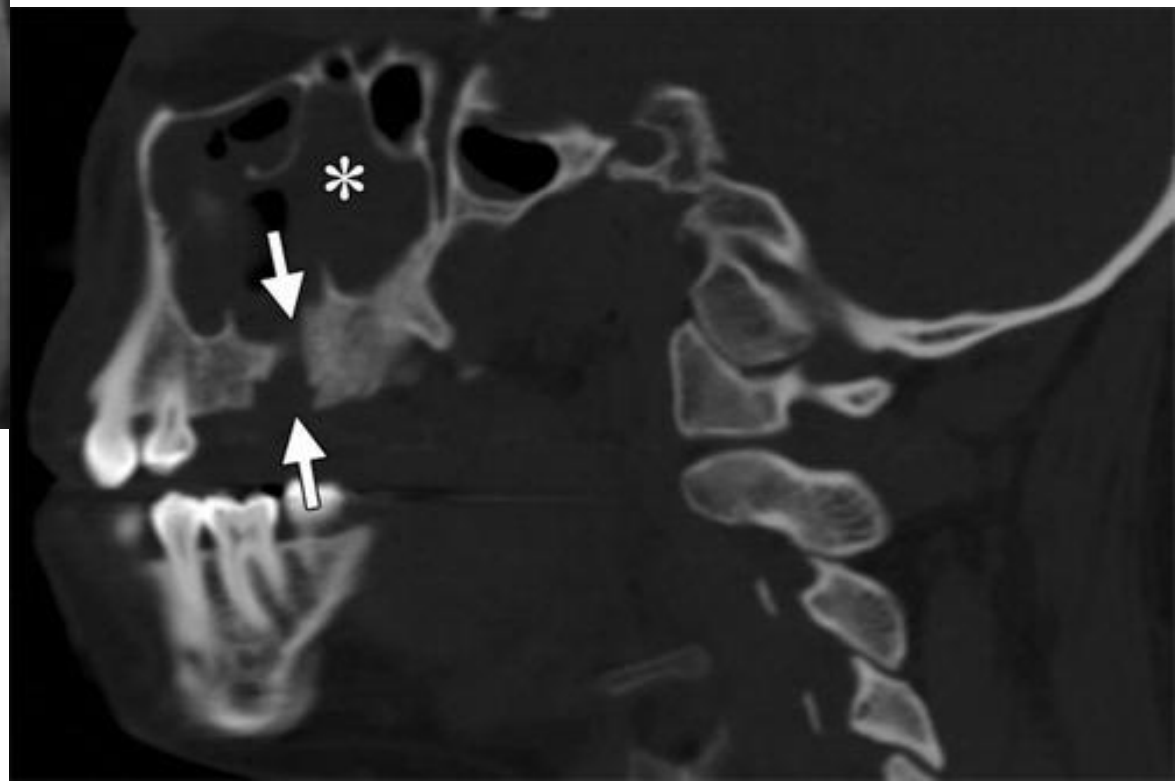
Radiographical interpretations of common diseases (22)



Prof Abbas AT Taher

1-Dental caries: dental carise 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 (i.e., more radiolucent) than the unaffected portion and may be detected on radiograph**s.

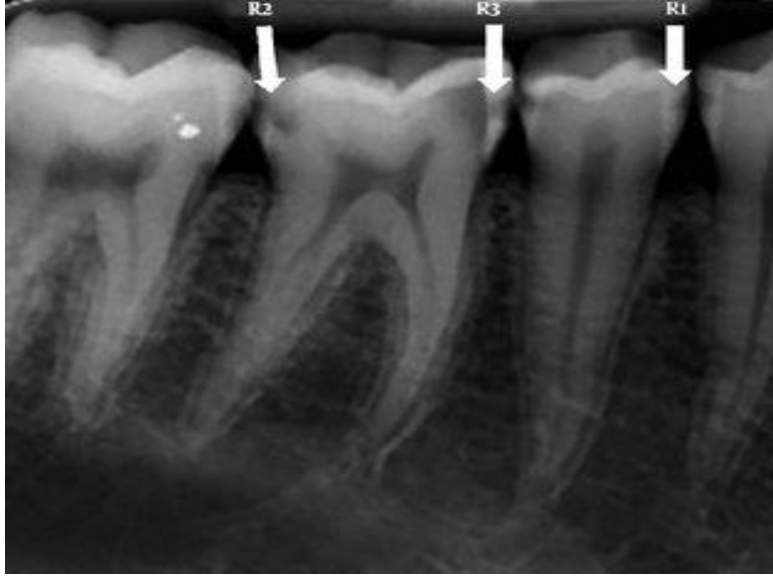
An early carious lesion may not have yet caused sufficient demineralization to be detected radiographically. Intraoral radiography can reveal carious lesions that otherwise might go undetected during a thorough clinical examination. A number of studies have shown the value of dental radiographs by repeatedly demonstrating that approximately half of all proximal surface lesions cannot be seen clinically and may be detected only with radiographs.

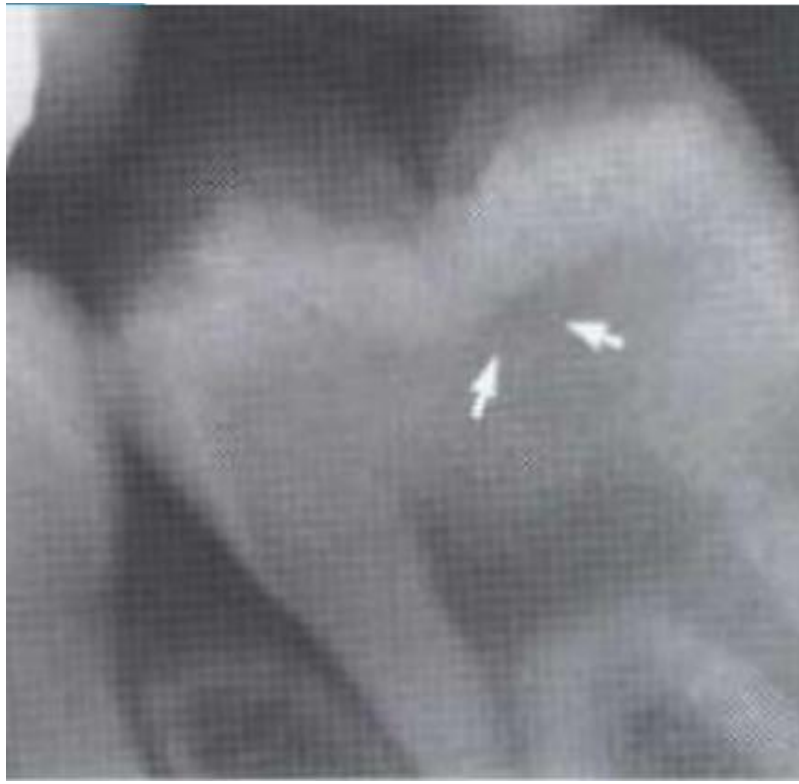
Interpretation of Incipient Occlusal Lesions

Radiographs are usually not effective for the detection of an occlusal carious lesion until it reaches the dentin.

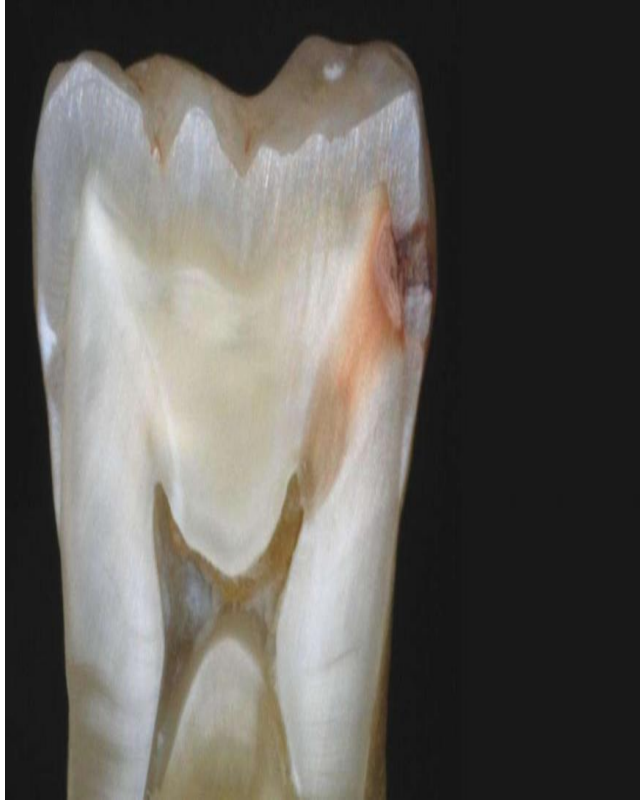
I nterpretation of Moderate Occlusal Lesions

The moderate occlusal lesion is usually the first to induce specific radiographic changes, prompting a definitive decision regarding the presence of caries. 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 :



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. Because the proximal surfaces of posterior teeth are often broad, the loss of small amounts of mineral from incipient lesions or the advancing front of more advanced lesions is often difficult to detect on a radiograph. For this reason, the actual depth of penetration of a carious lesion is deeper than may be detected radiographically. Approximately 40% demineralization is required for radiographic detection of a lesion

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.

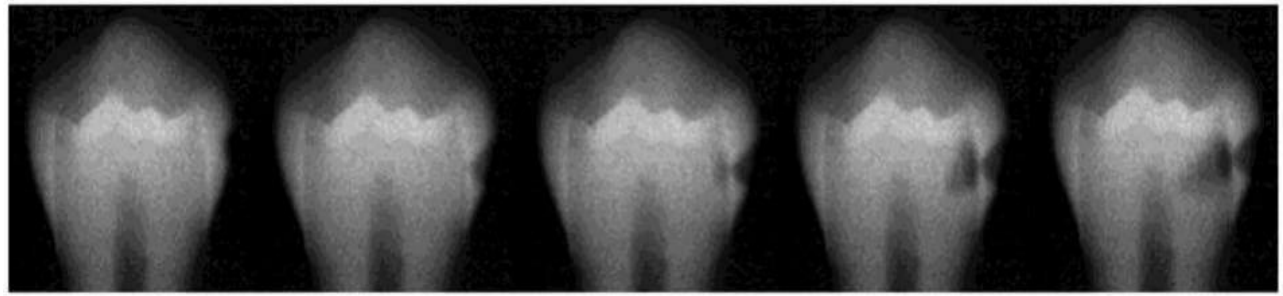
Root surface caries Root surface caries (also called cemental caries) involves both cementum and dentin. Its prevalence is **approximately40% to 70% in an aged population**. The tooth surfaces most frequently affected are, in order**, buccal, lingual, and proximal.**

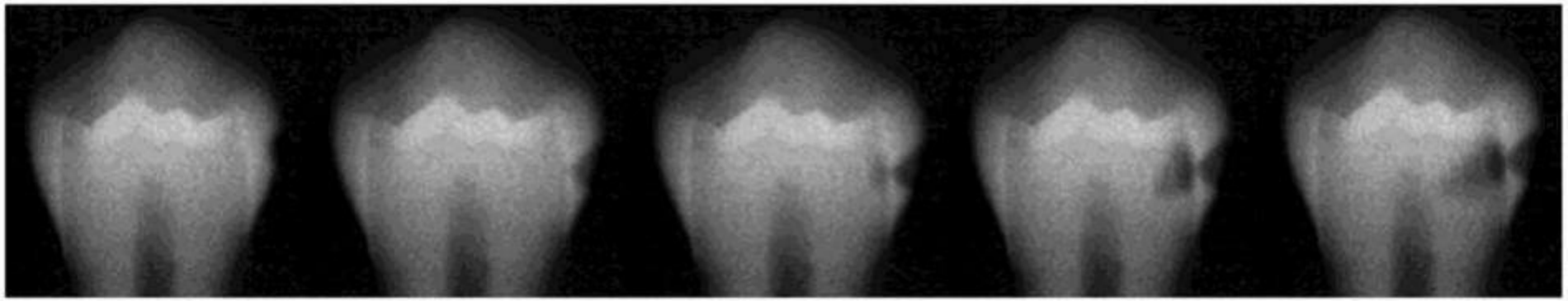
1-Interproximal caries:-

The intra oral radiographic film, notably the bitewing film or the radiogram made with the paralleling technique is extremely useful in detecting interproximal carious lesions.

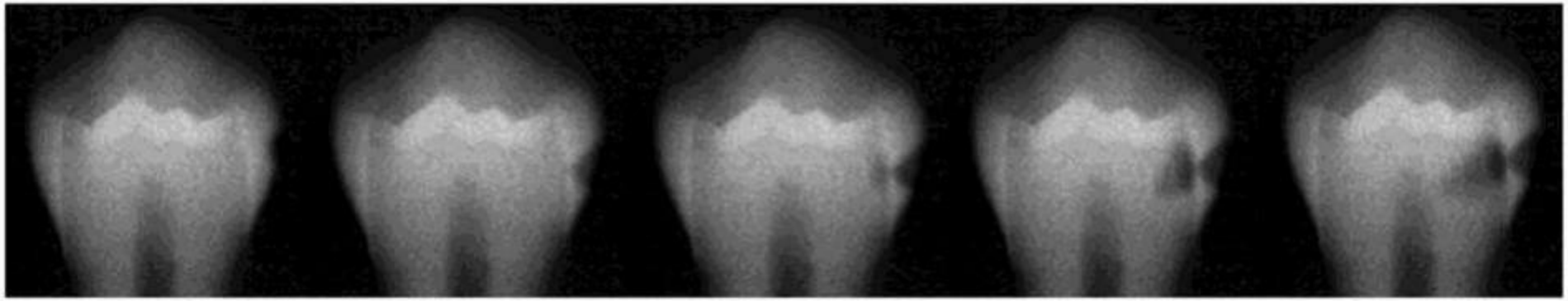
The first evidence of the interproxinal carious lesion consists of an extremely small notching in the enaml surface below the interproximal contact point

As the carious lesion in the enamel increase in size, it continues to demonstrate a more or less triangular pattern with its base toward the outer surface of the tooth and with somewhat flattened apex toward the dentino-enamel junction





The carious lesion then tend to spread in it from this second base the carious process proceeds toward the pulp, roughly along the dentinal tubules, and form another triangular radiolucency this is happen due to paths of the dentinal tubules. When the under mind enamel fracture the entire carious lesion appear a kind of V shape.

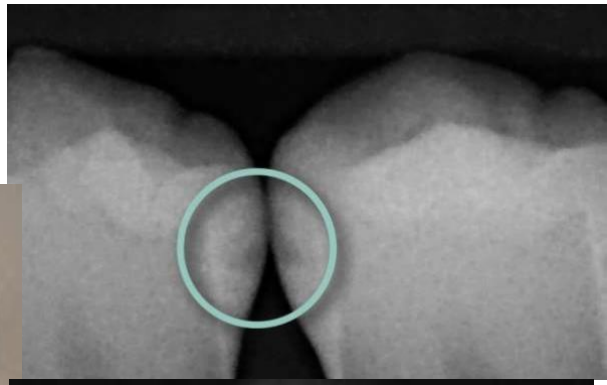


Case 1 Case 2 Case 3 Case 4 Case 5

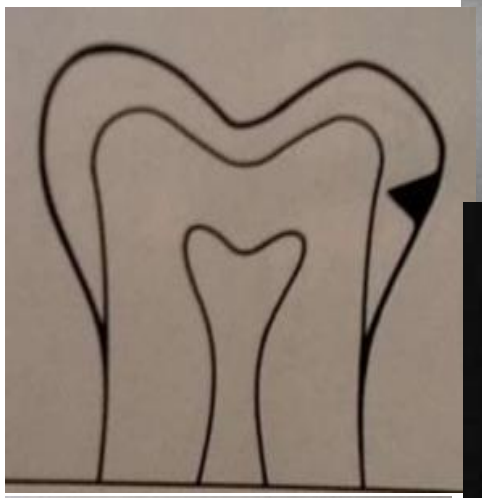
the caries follow the path of dentinal tubules

An incipient interpraximal lesion extends less than halfway through the thickness of enamel,

The term incipient means beginning to exist or appear. An incipient lesion is seen in enamel only.

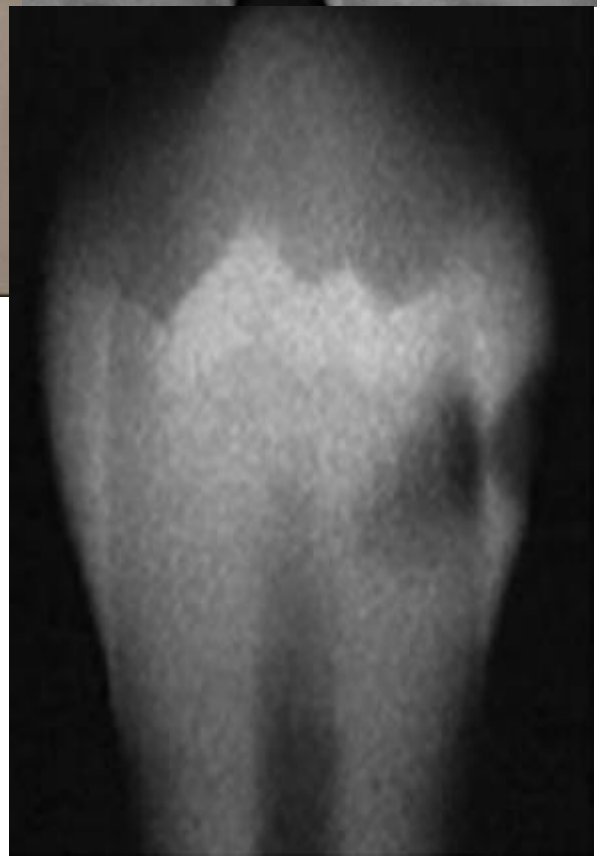


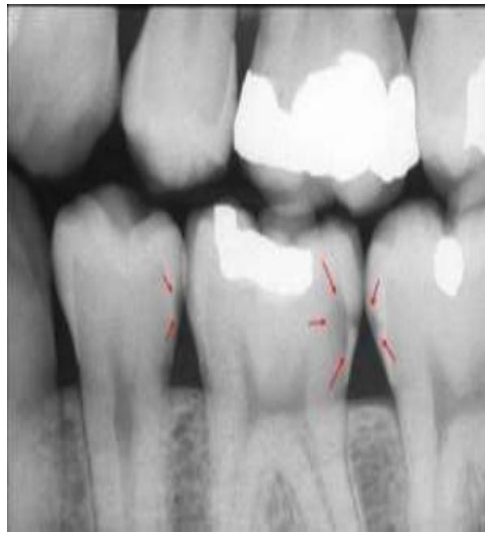
A moderate interpeoximal lesion extends greater than halfway through the thickness of enamel, but does not involve the DEJ. A moderate lesion is seen in enamel only.

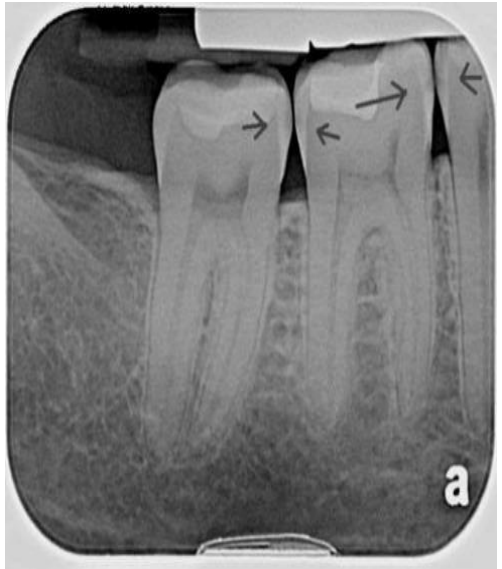


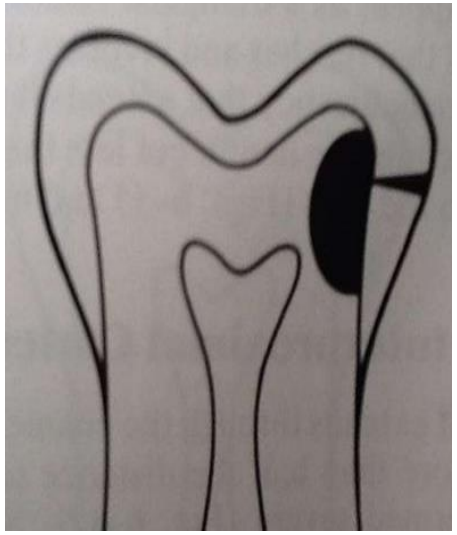
A severe interproximal lesion extends through enamel,through the dentin and greater than half the distance towards the pulp.

A severe lesion involves both the enamel and dentin and may clinically appear as cavitation(or hole) in the tooth

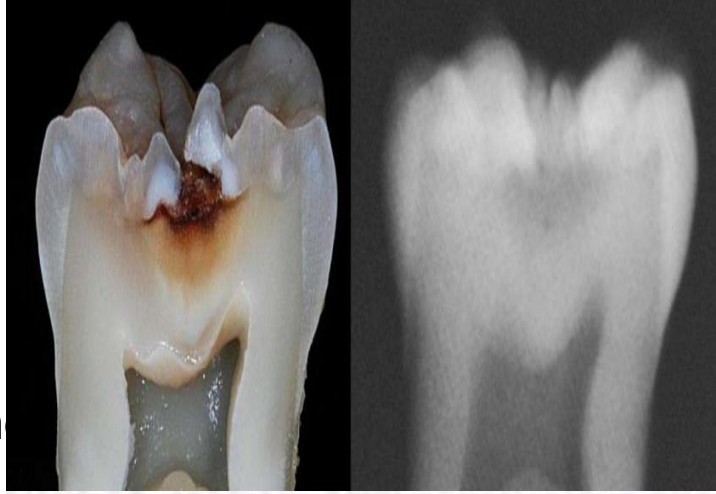






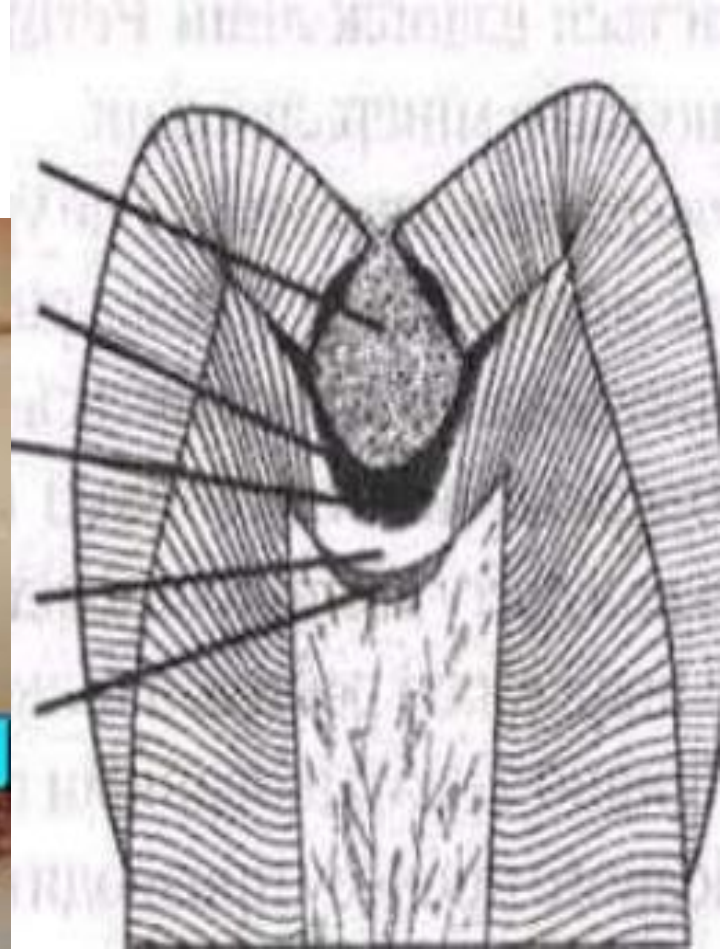


2-occlusal caries:-



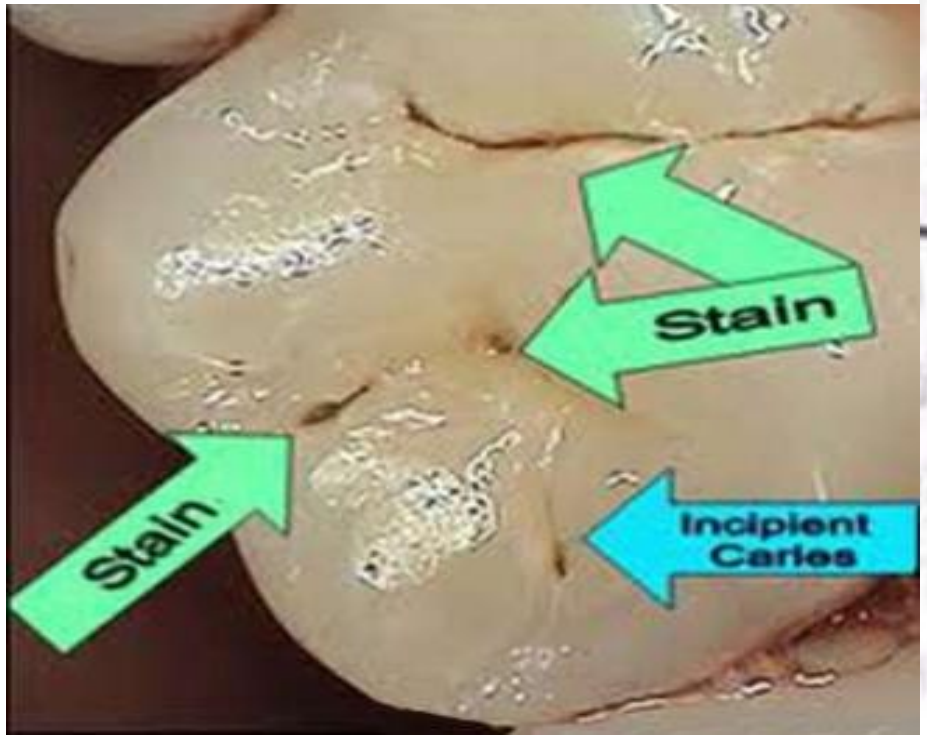
The first radiographic sign is a dark line between enamel and dentin occasionally occlusal caries is confused with buccal of lingual caries and differentiated clinically.

occlusal caries follows the enamel rods, as in interproximal caries th shape of the caries in the fissures is triangular but occlusal caries Differs from interproximal caries enamel caries is that the base is toward the dentinoenamel junction and the apex of the triangle is toward the occlusal surface of the tooth



Incipient occlusal caries

Cannot be seen on a dental radiograph and must be detected clinically with an explorer instead.



Moderate occlusal caries

extends into dentin and is seen as a very thin

- **radiolucent line.**

The radiolucency is located under the enamel of the

- **occlusal surface of the tooth, Little if any**

radiographic change is noted in the enamel.

Severe occlusal caries

extends into dentin and is seen as a large radiolucency.

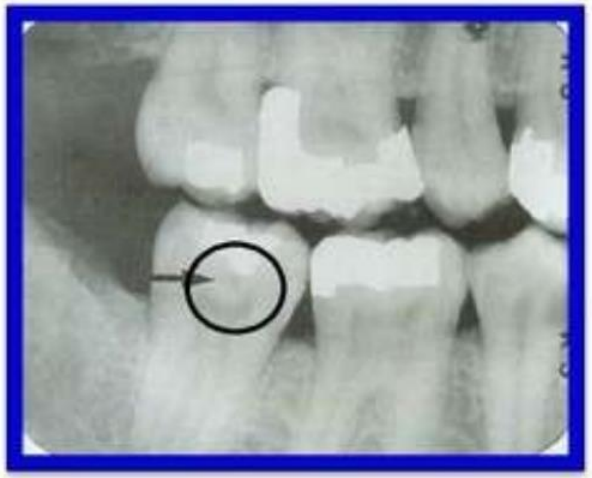
- **the radiolucency extends under the enamel of the occlusal surface of the tooth.**

Severe occlusal caries is apparent clinically and

- **appears as a cavitation(or hole) in a to**

Buccal and lingual caries:

It occur in the pits and, grooves in the region of the free margin of the gingival, the enamel caries tends to follow the lines of the enamel rods,it is elliptical and / or semi lunar, It is difficult to differential between buccal and lingual caries, also it may be confused with pulp exposure even the lesion may be relatively superficial.

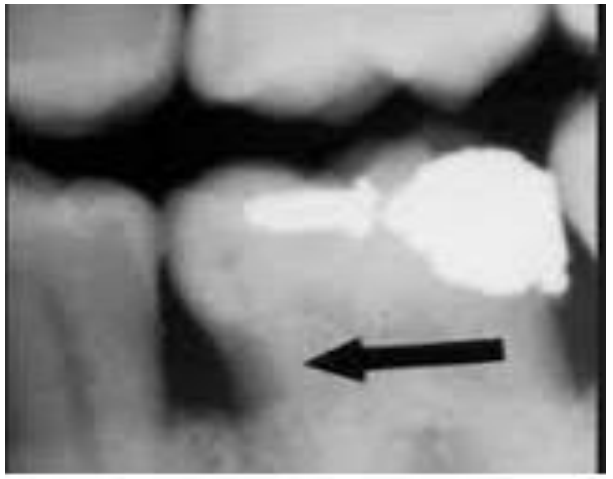


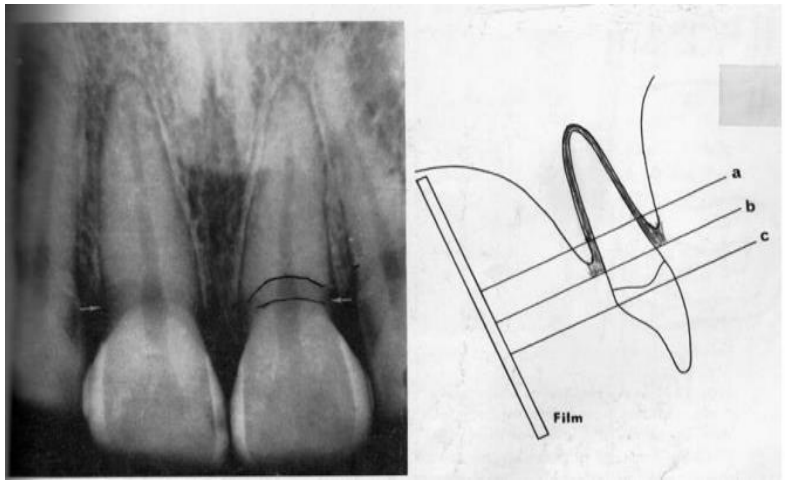
Cemental caries:-

On a dental radiograph, root surface casries appears as a cupped-out or crater-shaped of varying depth radiolucency just below the cemento-enamel junction . Early lesions may be difficult to detect on dental radiograph It doesn't occur in areas covered by a well attached gingival, it may be confused with cervical burnout

Cervical burnout:

radiolucent band running across the tooth in area not cover by enamel or alveolar bone(neck of the tooth) because it absorbs less x-ray than areas below and above





cervical burnout (CB) and its differentiation from root surface caries (RSC)

-CB appears on the mesial and distal surfaces of teeth in the cervical region

- It is a diffuse (ill defined) radiolucent (blacker) area and is bounded by the CEJ and the alveolar ridge

-It may be due to overexposure of the film which can "burnout" the thinner sections of teeth. i.e there is lower absorption of the x-rays by this anatomical area so if the exposure is high enough, the film in this area will totally "blacken".

-It is optically more prominent due to the contrast with the adjacent radio opaque bone and enamel.

-RSC has a similar radiolucent bowl shaped area on the radiograph. However, It will generally have a loss of tooth structure i.e in CB there is an intact tooth surface radiographically whereas this is not intact in RSC. Also, CB will sit exactly between the bone and CEJ in most cases.

In the end, it is always prudent to check for lesions clinically and only use radiographs as a guide for a physical oral examination

Rampant caries

The term rampant means growing or spreading unchecked.Rampant caries is advanced and severe caries which affects numerous teeth in the dentition.

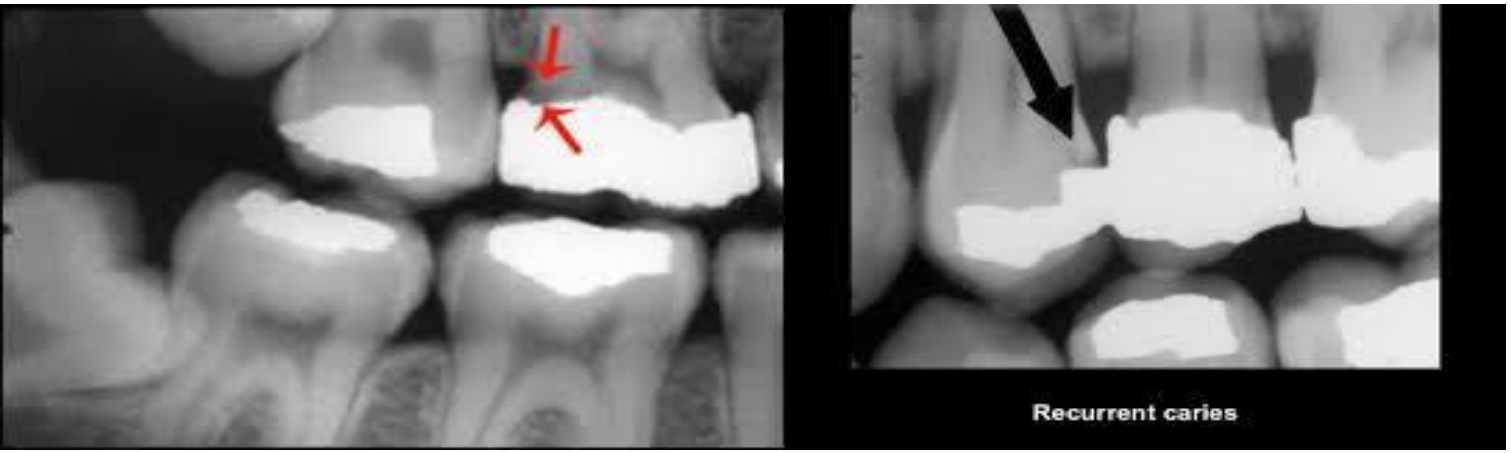
Rampant caries is typically seen in children with poor dietary habits or in adults with a **decreased salivary flow**

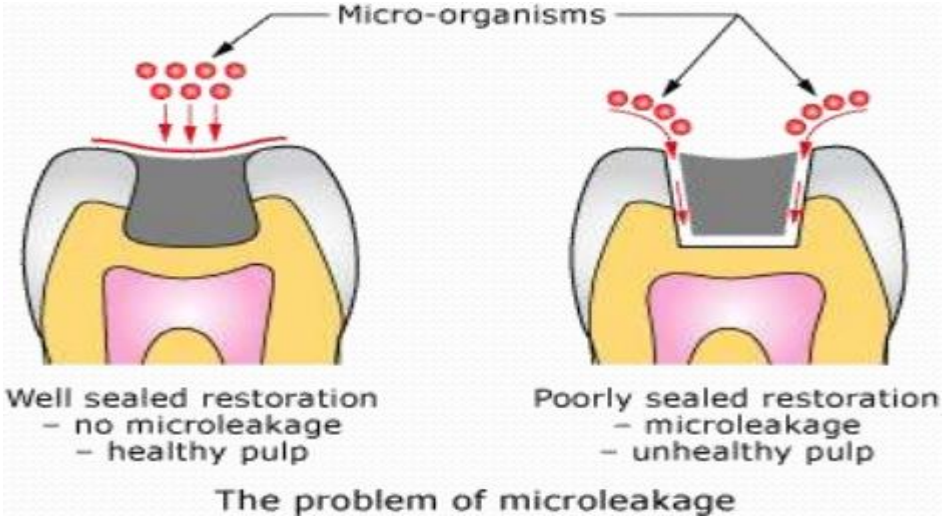
Radiation caries

Resulting from xerostomia caused by seria head and neck radiation therapy

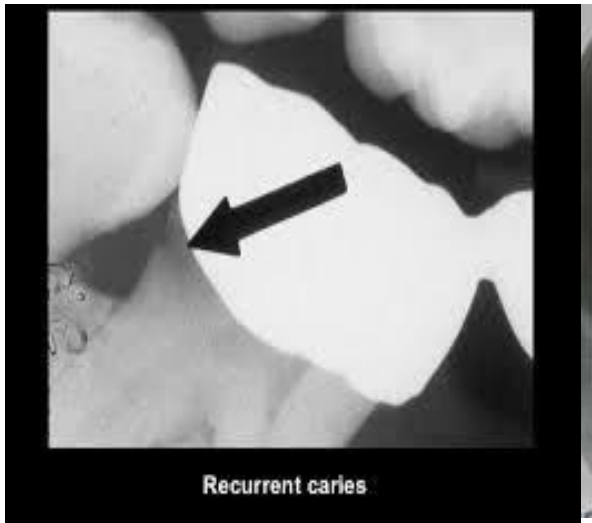
Secondary or recurrent caries:

occurs adjacent to a pre-existing restoration.Caries occurs in this region because of inadequate cavity preparation, defective margins or incomplete removal of caries prior to the placement of the restoration High caries incidence and poor oral hygiene also play a part.



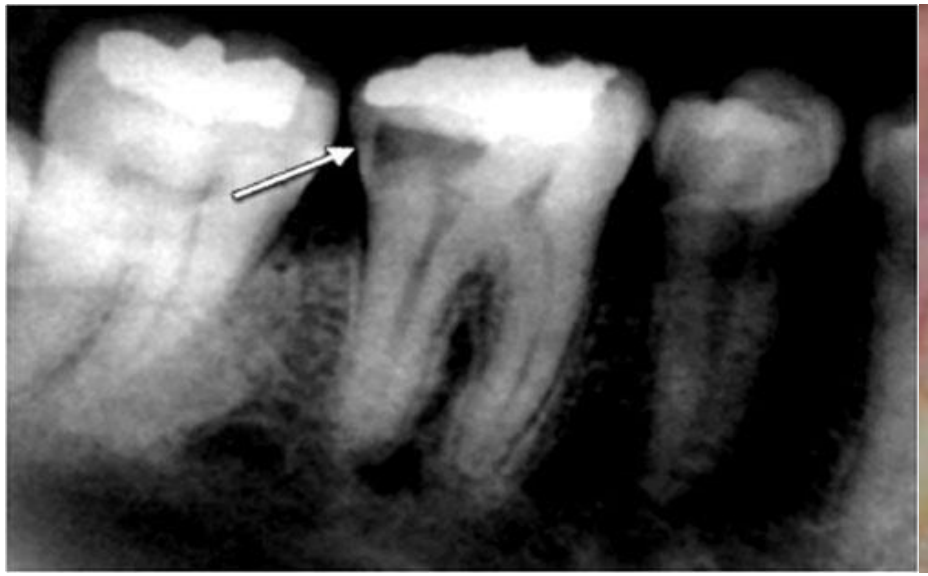


On a dental radiograph, recurrent caries appears as a radiolucent area just beneath a restoration.Recurrent caries is most often seen beneath the interproximal margins of a restoration



pulp exposure:

Radiographic evidence suggesting pulp exposure should not be used as the only definitive criterion for either tooth removal or endodontic therapy. It is possible through angulations changes to create on appearance radiographically that simulate pulpal exposure.

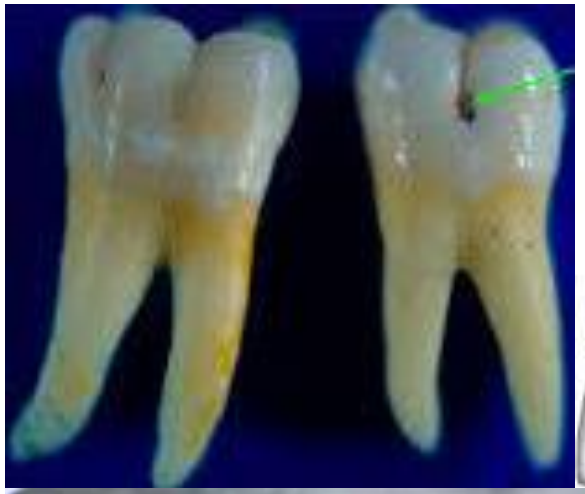


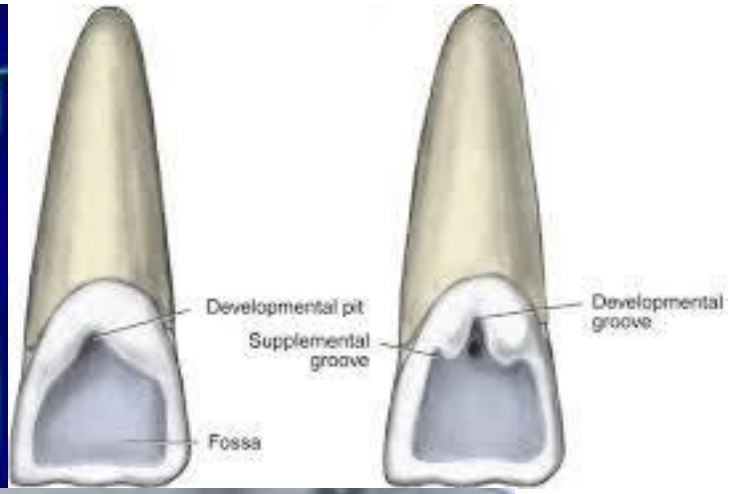
Periapical radiolucencies

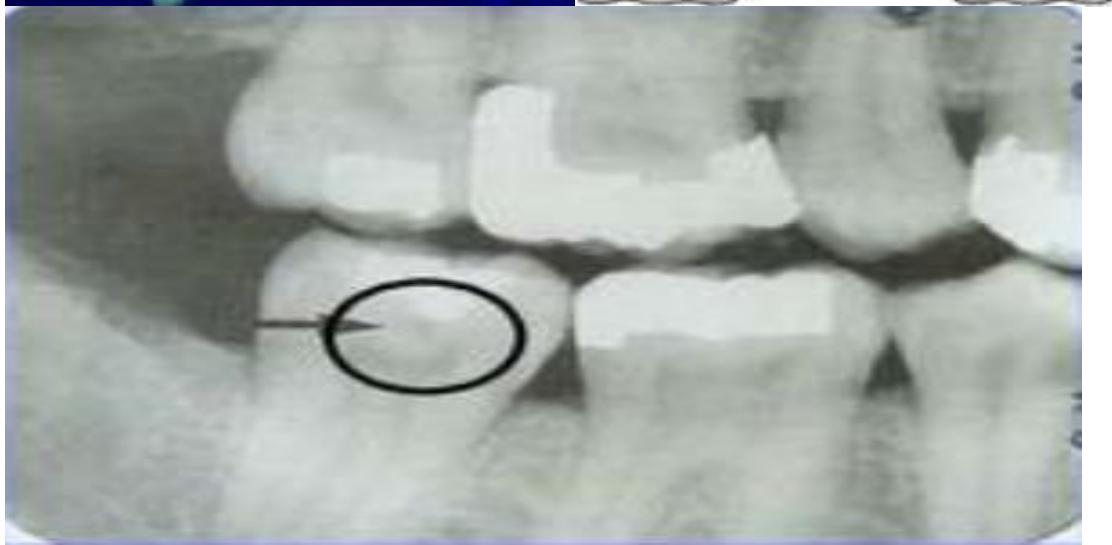
Common pathologic conditions granuloma, cyst, abscess, 1st stage of cementoblastoma you must remembered that anatomic entities such as the mental and incisive foramina may superimposed on the tooth apex which may simulate apical pathology

Developmental pits:

Developmental pits particularly isolated hypoplastic areas, can simulate caries radiographically. In the case of a hypoplastic pit the simulate caries enamel surface tends to curve inward into the defect.







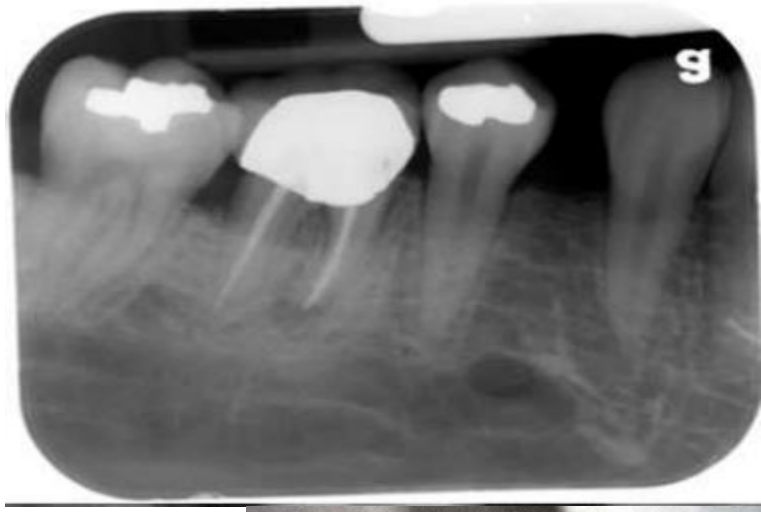
Less common pathologic conditions

fibro-osseous lesions,neoplasic changes, and **various infections**.

Radiographic signs: the apical lesion will show an interrupted **lamina dura**. The periphery blend into surrounding bone definite demarcation may exist between the **lesion and bone** or the lesion may exhibit a distinct bone lamina encircling the radiolucency shape is **basically spherical** with irregular or smooth outline periphery.

Interpretation of periapical radiolucency

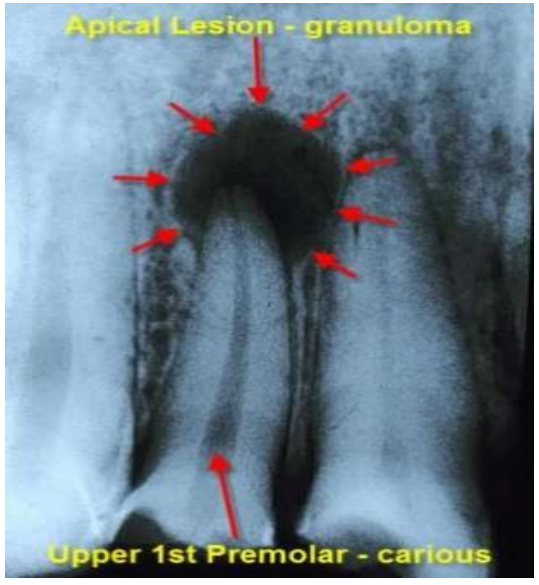
1. Superimposition of radiolucent normal anatomical structure like mental foramen & maxillary sinus, & inferior dental canal.



2. Incomplete root formation (with children)

3. Periapical cyst

granuloma,



abscess.

4. First stage of cementoblastoma

Periodontal space thickening

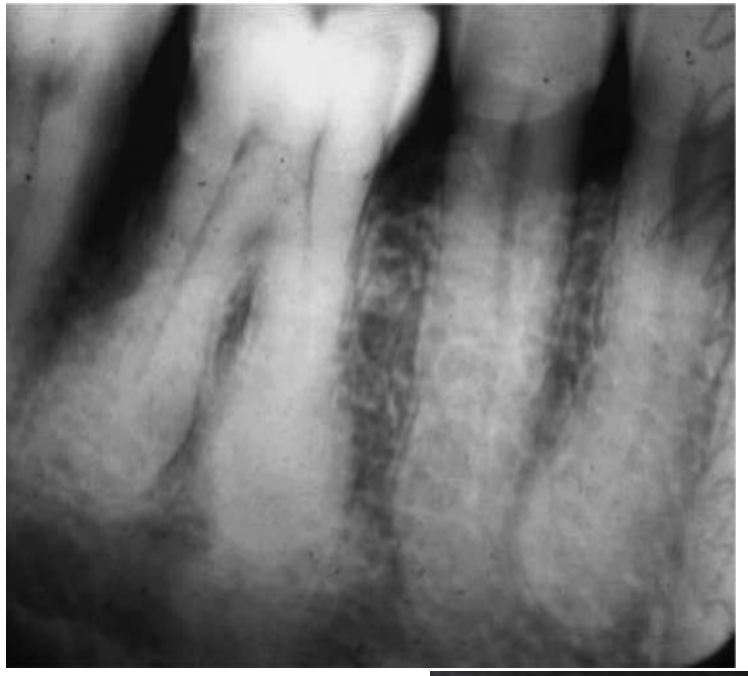
1. **Pathologic:** as in tooth extrusion, root resorption, resorption of lamina dura or initial symptoms of osteomylitis or with trauma.

2. Non pathologic:
as in terminal stage of root formation

Root end changes :

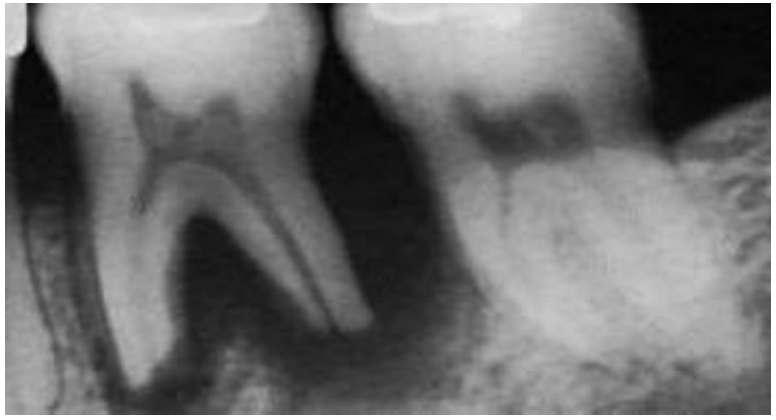
1-Hypercementosis:

clubbing of root (radiopacity related to the root suface)



2-Root resorption

-A. smooth root resorption(smooth root periphery).



-B. Rough root resorption (roughened root periphery).

Bone changes associated with apical alteration

1. **Condensing osteitis:** bone sclerosis as a result of **stress**, **trauma** or **infection**, it characterized by reduction of size of **trabecular spaces**.

2-Ankylosis: bone and tooth roots occasionally become **fused**.

Periodontal disease :

1.Incipient periodontal disease

a.Triangulation: widening of periodontal space at the crest of interproximal bone

b. Crestal irregularities: slightly more opaque alveolar crest with itched appearance (irregular)

c. Alveolar bone changes,bone selerosis between the lamina dura of two adjacent teeth.

2.Advanced periodontal disease: it includes all stages that follow incipient periodontal changes in addition to periodontal pocket exists between soft tissue and tooth structure.

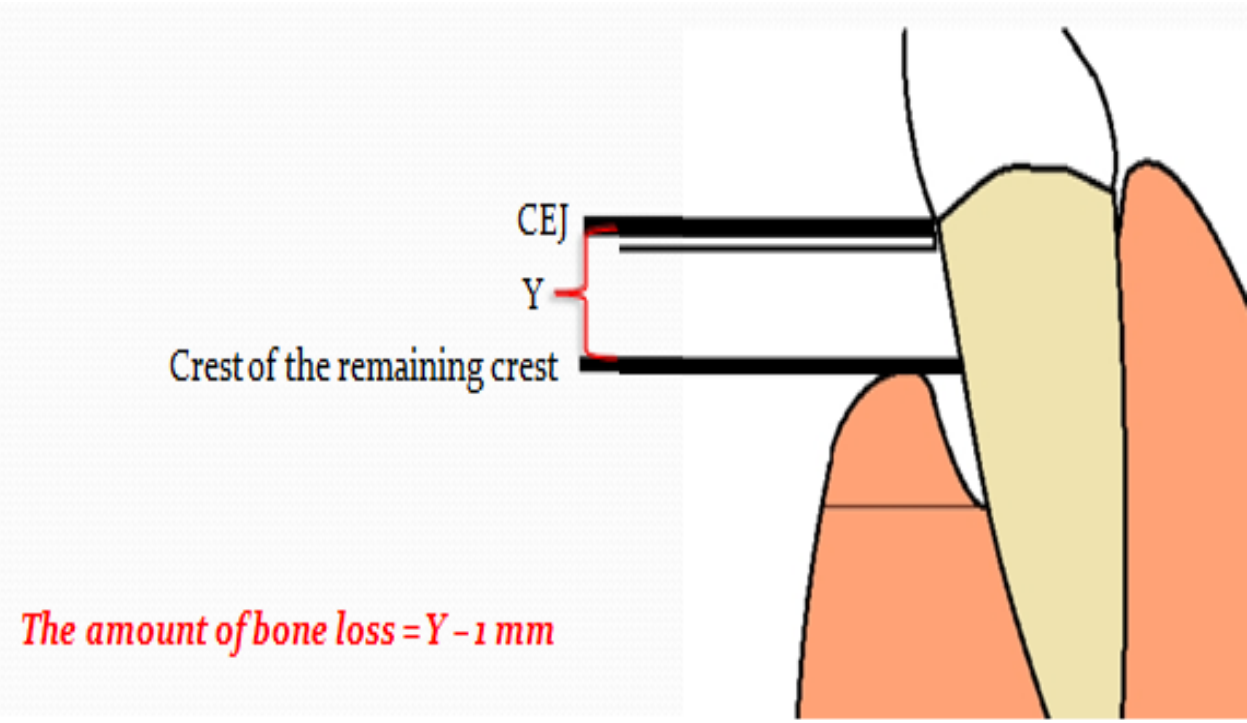
location of bone loss:

Periodomtal bone loss may be restricted to one or a few areas.
Generalized periodontitis: when periodontal bone loss is evenly distributed throughout the mouth.

Direction of bone loss

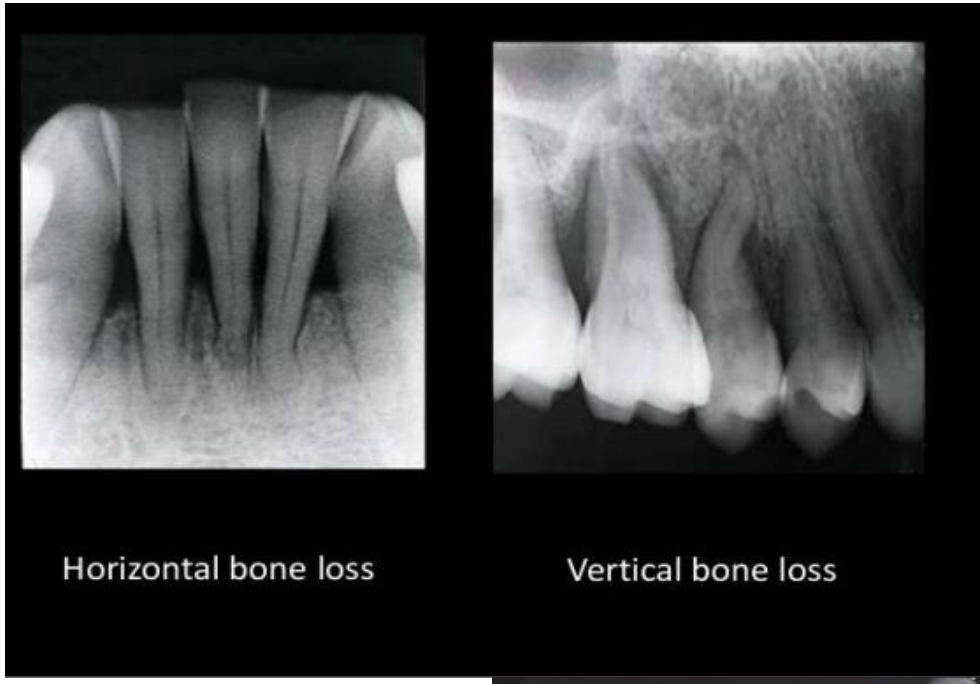
Intercrestal bone should be parallel with line dawn from the CEJ of one tooth to that of the contacting tooth.

1. Horizontal bone loss:-when loss occurs on a plane that is parallel with a line drown.



2.Vertical bone loss:-

when there is greater bone lossin one tooth than on the adjacent tooth, so the bone level is not parallel with a line joining the cementoenamel junctions

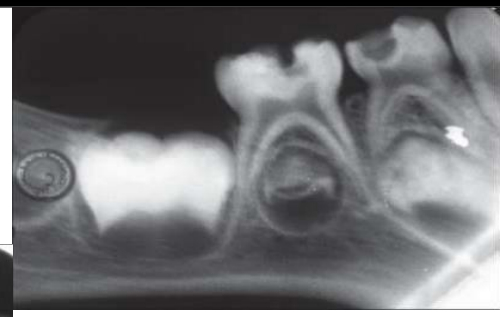


Detection of local irritating factors:

These include calculus deposits over hanging restorations, faulty restorative margins and carious lesions.

Tooth resorption:

1-Physiologic root resorption: resorption of the deciduous teeth normally precedes their exfoliation



2-Idiopathic tooth resorption: resorption of tooth surfaces, either internal or external can occur from unknown cause

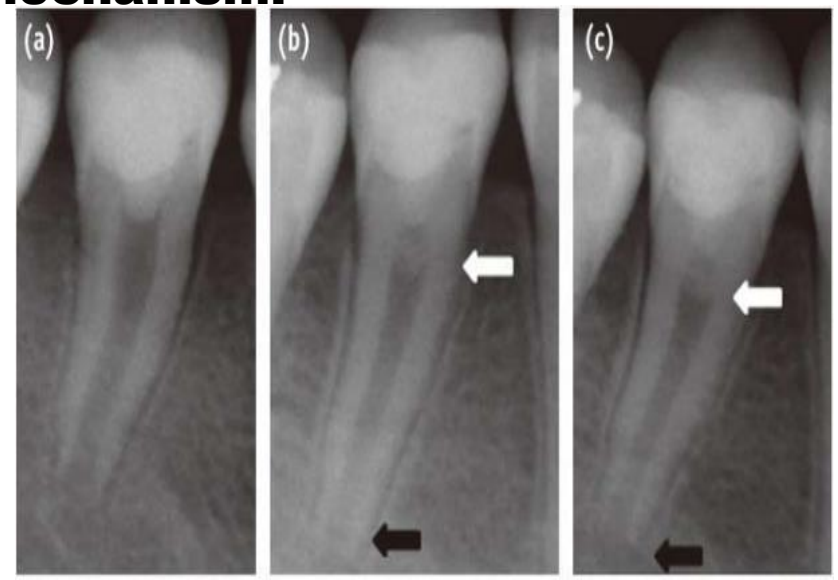
3-Pathologic tooth resorption: -it usually caused by pressure, infection , neoplasm or trauma

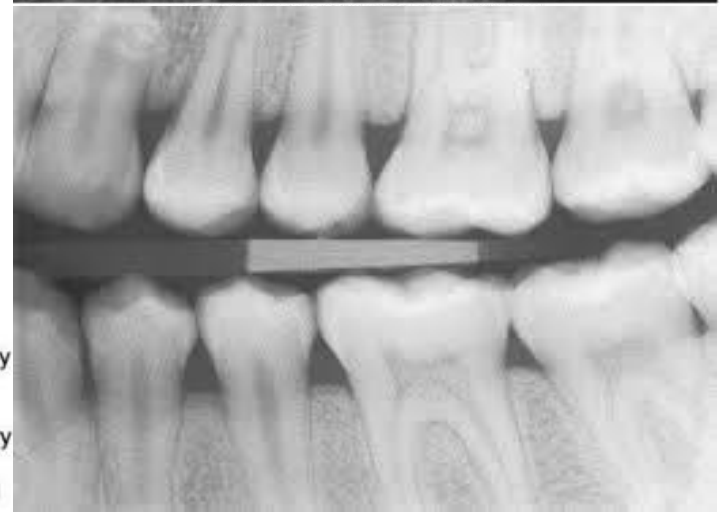
Pulp calcifications:

It include pulp stones secondary dentin dentinal bridges and pulpal obliteration

1-Pulp stone:- round or oval opacities within the pulp

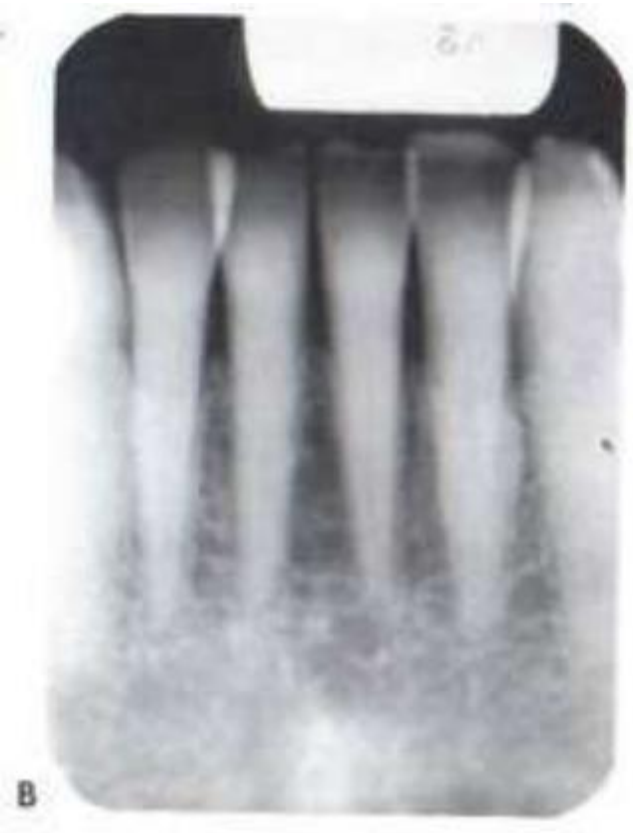
2-Secondary dentin:- reduces the size of the chamber. It appears to be a normal aging phenomenon as well as a defense mechanism.

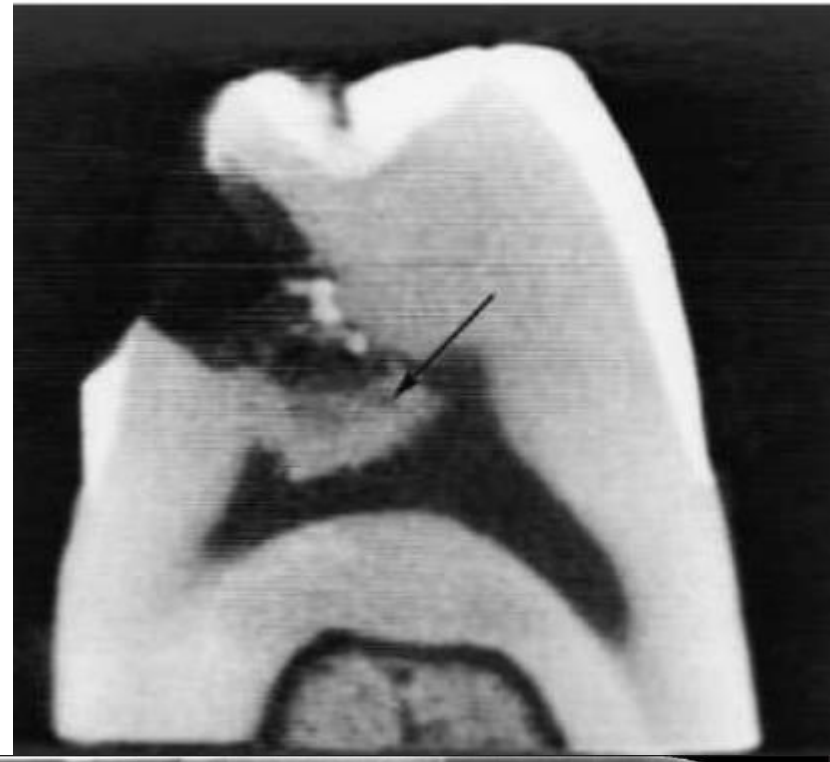




3-Dentinal bridges:- develop between Normal pulp tissue and large carious lesion

4-Pulpal obliteration: is associated with aging and degenerative pulp changes





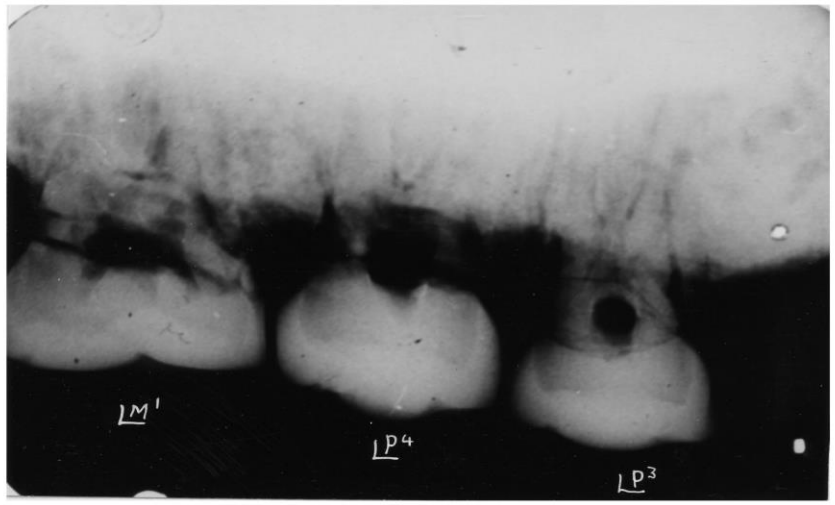
Tooth fractures:

Fracture-line and discontinuity in the outline of the tooth are the most usually observed signs of fracture.

It must be remembered that the radiogram can have an appearance that simulates a fracture and fractured segments can be superimposed in a manner that hides the fracture multiple views of the questionable area ordinarily resolve such difficulties.

Erosion, abrasion and attrition

Loss of tooth structure can be observed radio graphically



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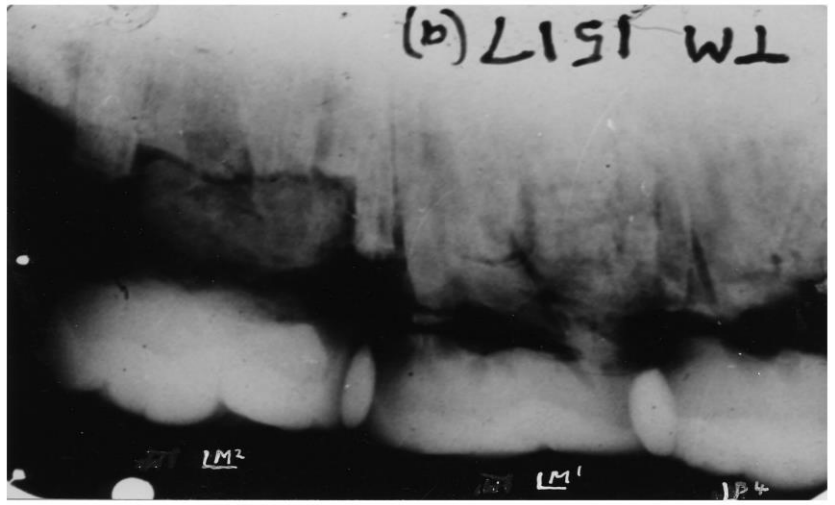


(b)

Attrition

Abfraction

Erosion

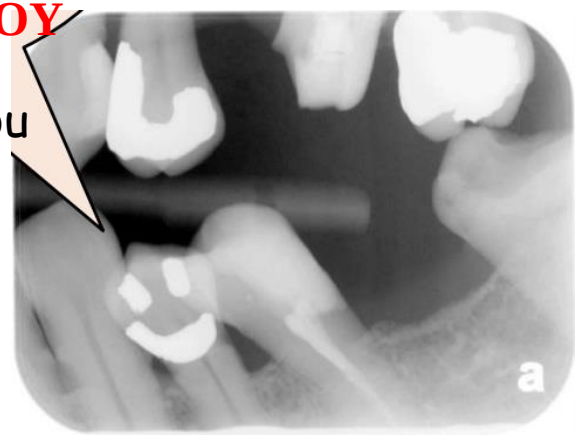
Abrasion

Erosion SMILE

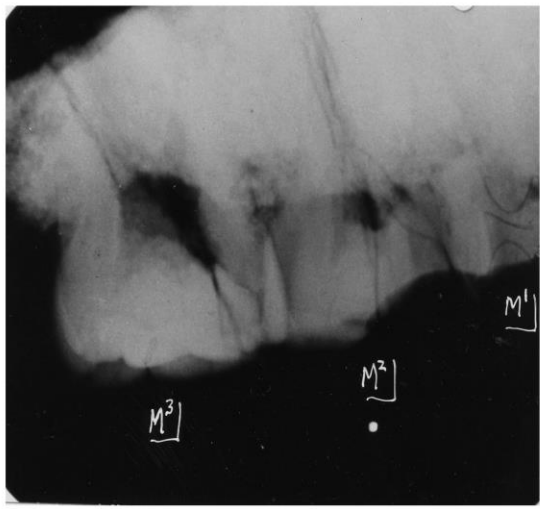
It irritatesthose who wish

to DESTROY

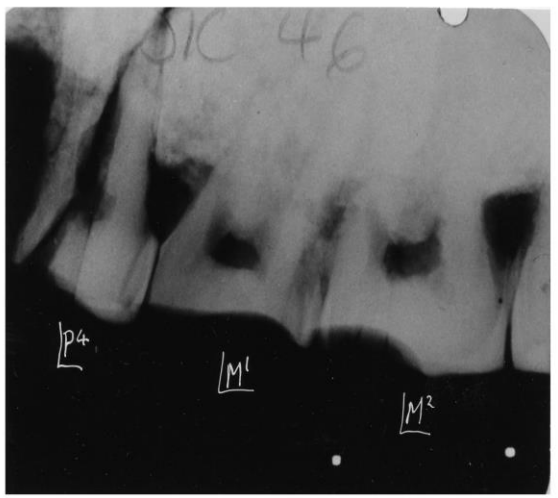
you



attrition



(a)



(b)

Impacted tooth

Impacted tooth is one that fails to erupt into the dental arch within the expected developmental window. Because impacted teeth do not erupt, they are retained throughout the individual's lifetime unless extracted or exposed surgically. Mandibular third molars are more commonly impacted than their maxillary counterparts. As a general rule, all impacted teeth must be removed, except canine teeth; canines do not need surgery and may just remain buried and give no further problems.

Accurate diagnostic imaging is an essential requirement to derive the correct diagnosis and optimal treatment plan, as well as monitor and document the treatment progress and final outcome. Intra oral periapical and occlusal films can provide this.

X-ray skull lateral view showing Wide diploic spaces and thin outer table of skull (hair on end appearance)

Diagnosis :

Chronic haemolytic anemia most probably beta thalassemia major

THANK YOU