Radiographic artifacts



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Radiographic Artifacts

- Radiographic artifacts should be avoided due to:

1. Loss of diagnostic information.
2. Loss of professional and patient time.
3. Exposed the patient to unnecessary radiation.

Errors classification

1- Processing errors

2- Technical and projection errors

3- Exposure errors

1. Processing errors

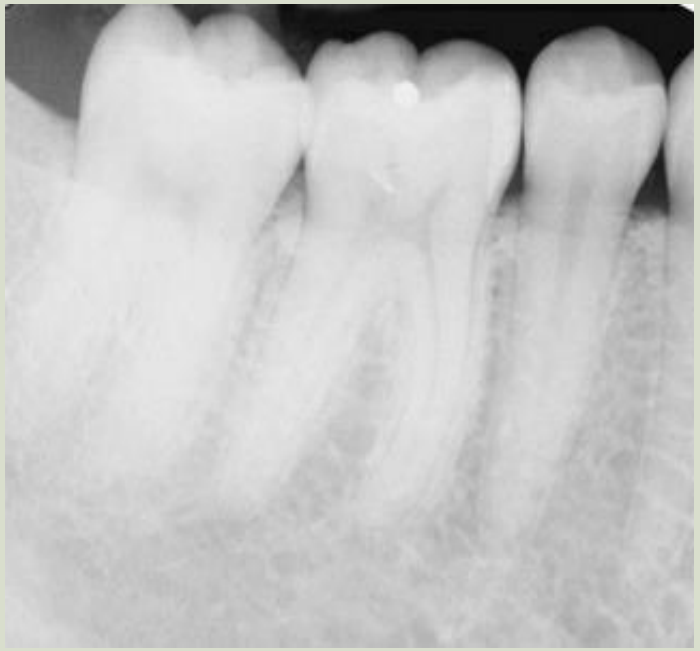
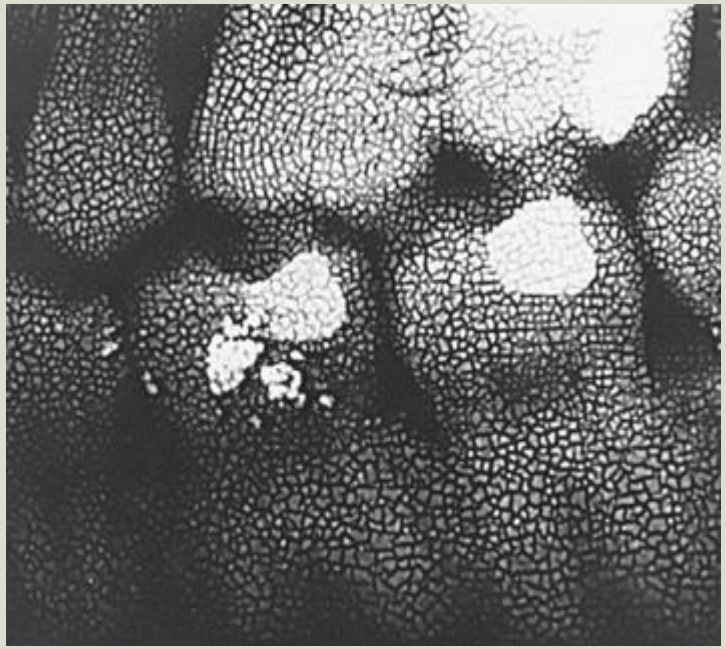
1- Time and temperature

2- Chemical contamination

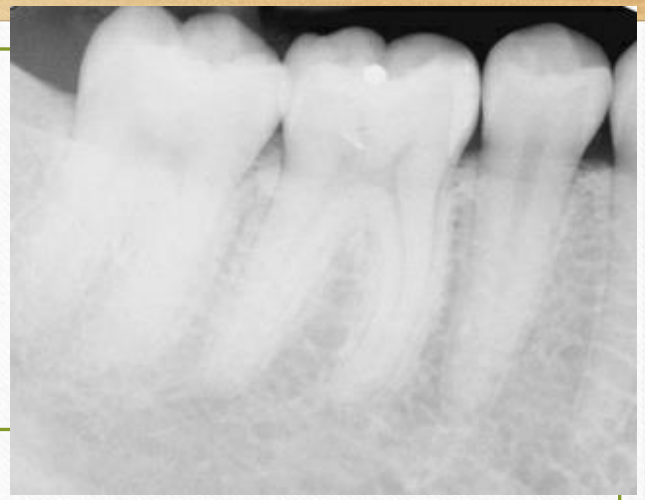
3- Film handling

4- Lightening problem

1- Time and temperature

Underdeveloped film	Overdeveloped film	Reticulation of film
		

Underdeveloped film



- **Processing Errors**
  Underdevelopment (temperature too low; time too short; thermometer inaccurate)
  Depleted developer solution
  Diluted or contaminated developer
  Excessive fixation (hours)



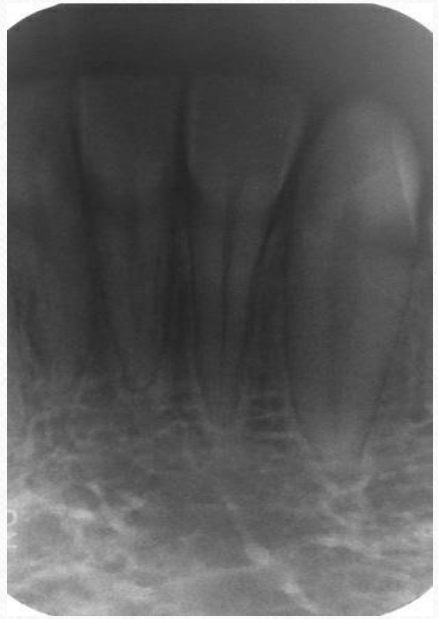
- **Underexposure**
  Insufficient mA
  Insufficient kVp
  Insufficient exposure time
  Film-source distance too long

Overdeveloped film



Processing Errors

Overdevelopment (temperature too high; time too long)
Developer concentration too high
Inadequate time in fixer

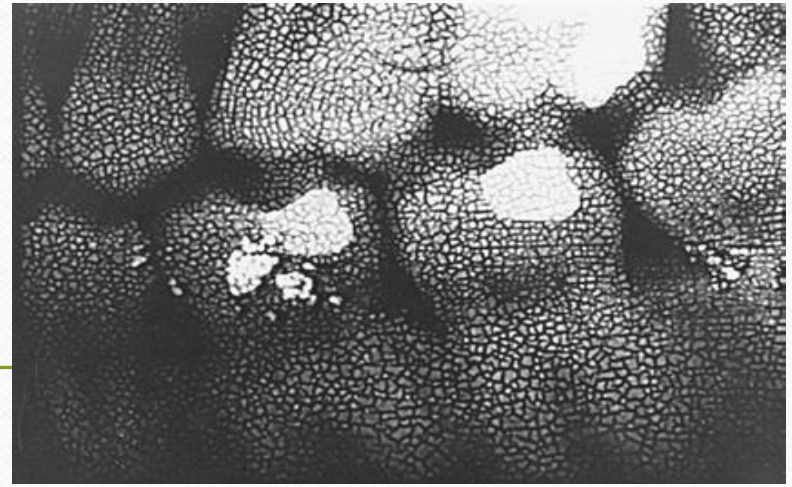


Overexposure

Excessive mA
Excessive kVp
Excessive exposure time
Film-source distance too short

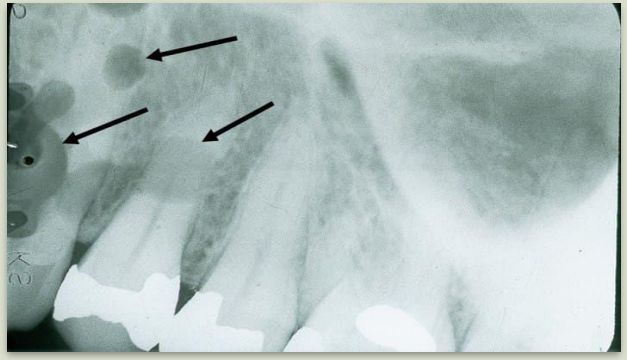
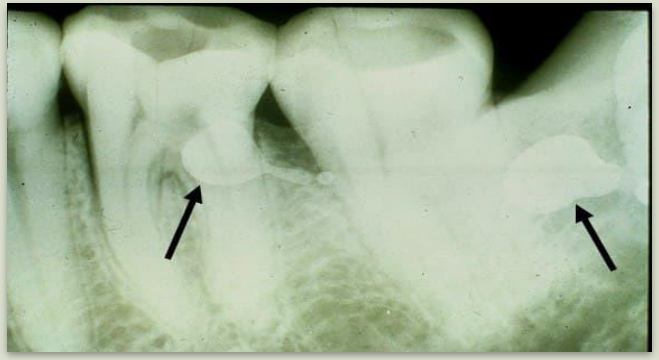
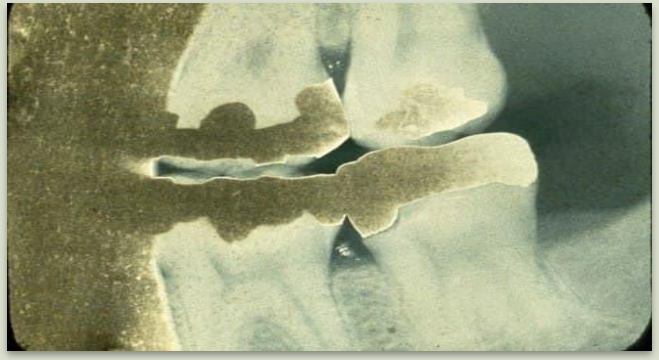
Reticulation of film

- If film is developed at an elevated temperature and then placed in a cold water bath (or vice versa), the sudden change in temperature causes the swollen emulsion to shrink rapidly and give the image a wrinkled appearance called **reticulation**.
- ***Correction:*** Sharp contrasts in temperatures between processing and the water bath should be avoided.





2-Chemical contamination

Developer spot	Fixer spot	Yellow brown stains
		

Developer spot

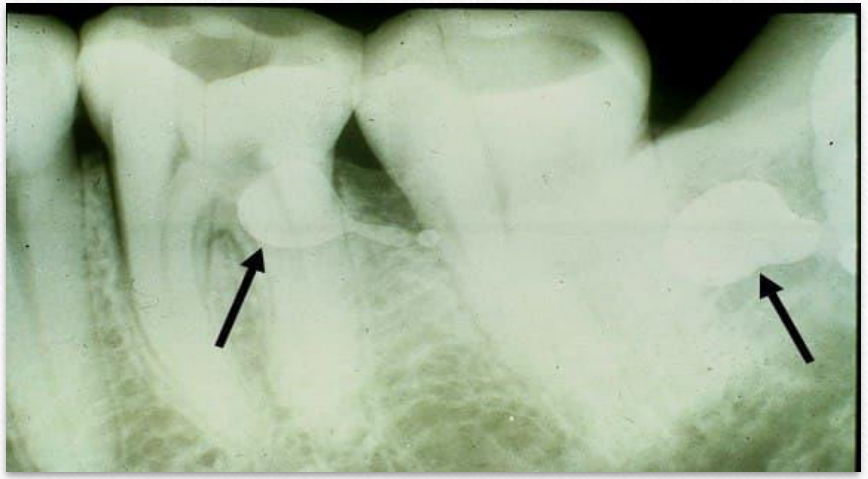
- Film contaminated with developer before processing.
- Black dots or dark spots on film result from drops of developer solution that was accidentally spilled on the film before it was developed.



Fixer spot

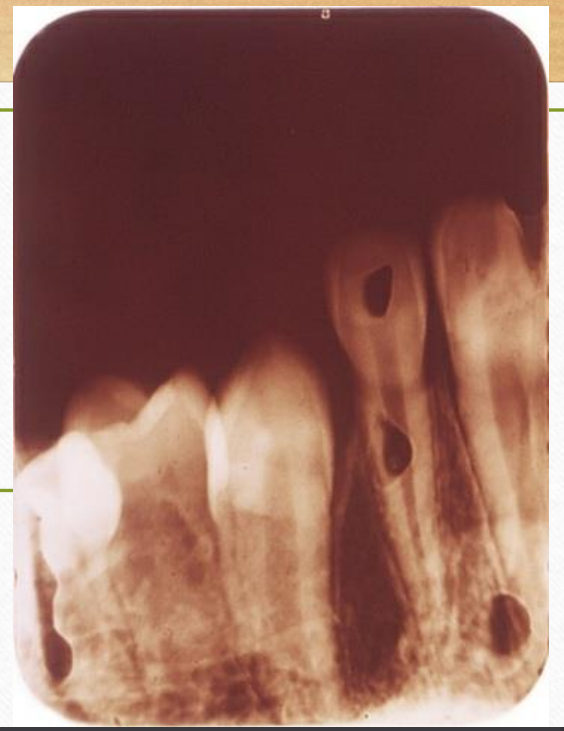
- Film contaminated with fixer before processing.
- white dots or light spots on film result from drops of fixer solution that was accidentally spilled on the film before it was developed.





Yellow brown stains

- stain or discoloration of film due to:
- Depleted developer
- Depleted fixer
- Insufficient washing
- Contaminated solutions





3-Film handling

- Developer cutoff
- Fixer cutoff
- Overlapped film
- Air bubbles
- Finger nail
- Finger print
- Static electricity
- Scratched film

Developer cutoff

- **Undeveloped area** appear as clear area due to incomplete immersion of film in developer solution.



Fixer cutoff

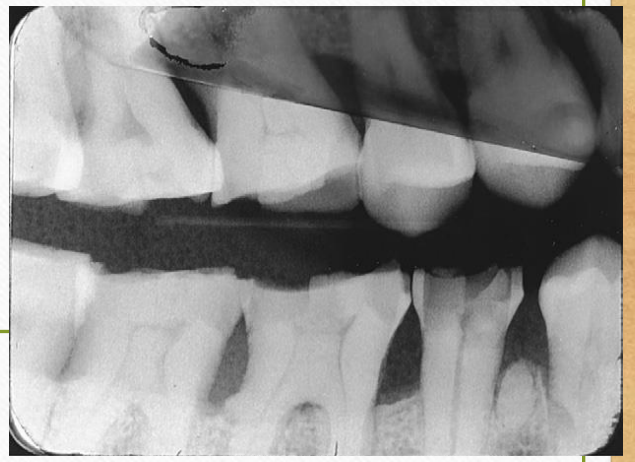
Unfixed area appear as dark area due to incomplete immersion of film in fixer solution.

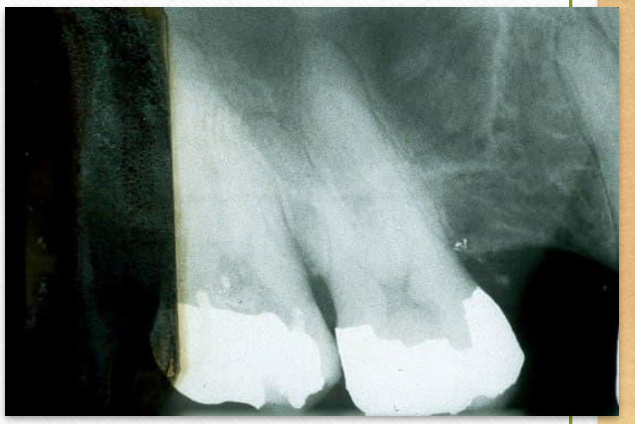


Overlapped film

If films are fed into the automatic processor too quickly, the films may overlap each other, preventing the processing chemicals from acting on emulsions. This results in a dark area on each film.

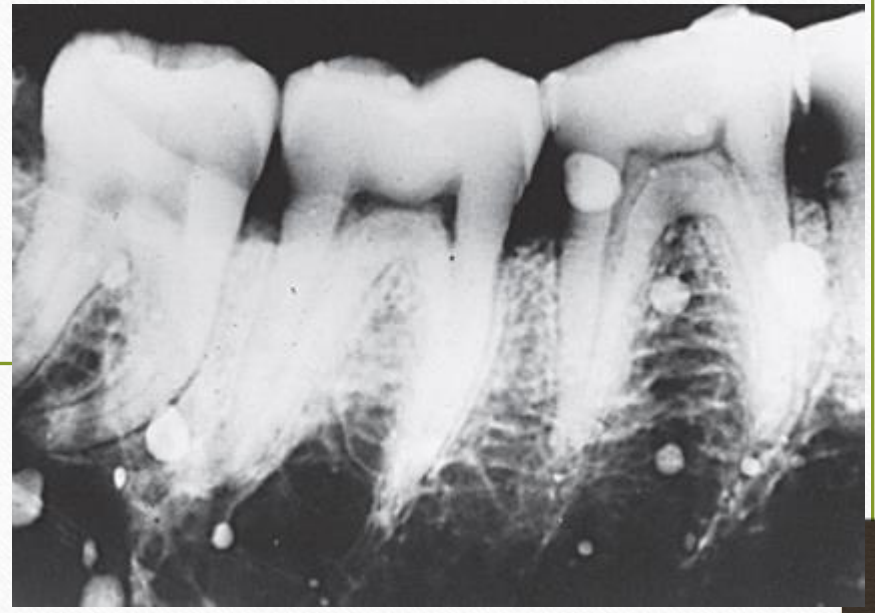


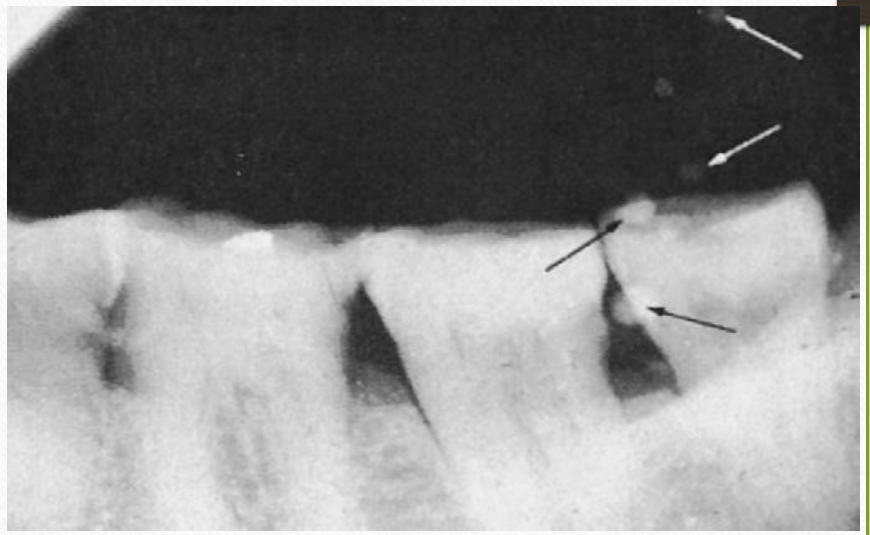




Air bubbles

- If air bubbles are trapped on the film as it is placed in the processing solutions, the chemicals cannot affect the emulsion in that area.
- The film hangers always should be gently raised and lowered when they are placed in the processing solutions to coat the films with solution.
- Aggressive agitation can cause air bubbles to stick to the films.





Finger nail

Resulting in black lines when pressured by finger nail in the emulsion.

(Appear as a crescent shaped radiolucent finger nail marks)





Finger print

- Operator’s fingertip touched film during stripping and placing of film on hanger.





Static electricity

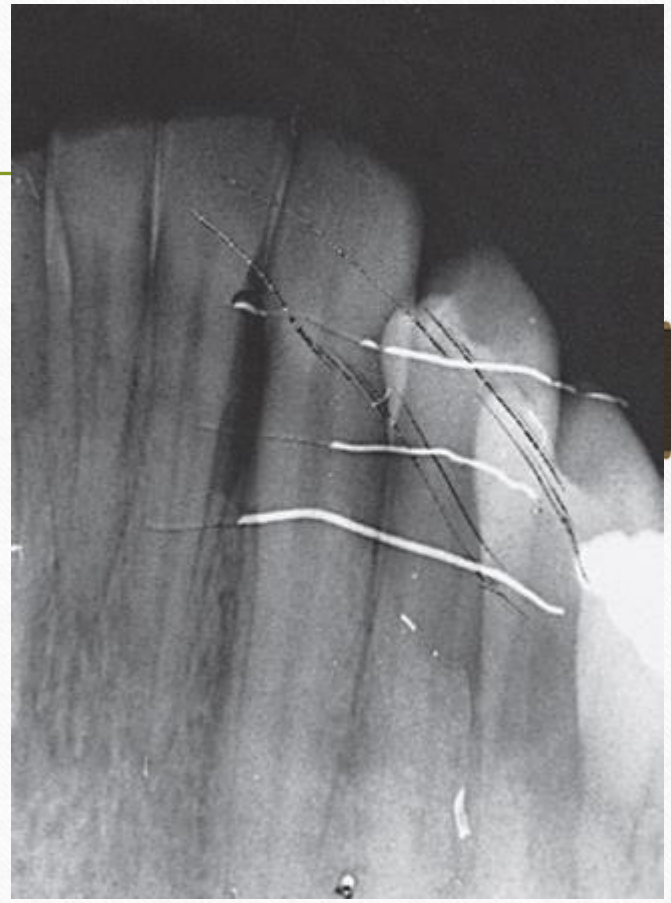
If the film is removed too quickly from the packet (intraoral) or from the film box or cassette (extraoral), contact with overlying materials may create friction, resulting in a static discharge. This may create black dots, lines, “lightning bolts”, or tree-branch patterns.





Scratched film

- when film processed in **manual processer**, the soft emulsion is scratched by holder, tank or nail.



4- Lightening problem

Light leak	Fogged film
	

Light leak

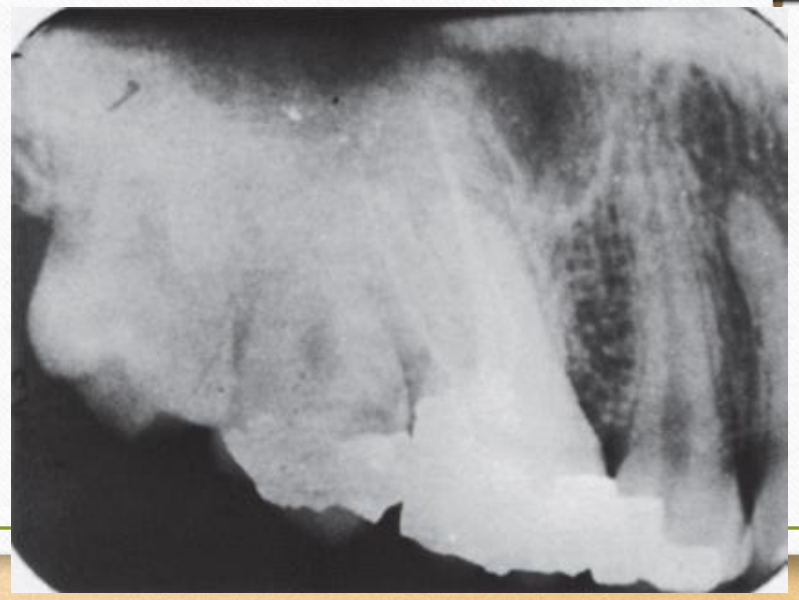
- Light leaks (cracked safelight filter; light leaks from doors, vents, or other sources)



Fogged film

- A fogged film has an overall gray appearance. This can be caused by light leaks in the darkroom, improper safe lighting, or improper film storage, as well as exposure to scatter (secondary) radiation.





2. Technical and projection errors

A. Film placement artifact

B. Patient preparation artifact

C. Projection artifact

A. Film placement artifact

1. Absence of Apical Structures



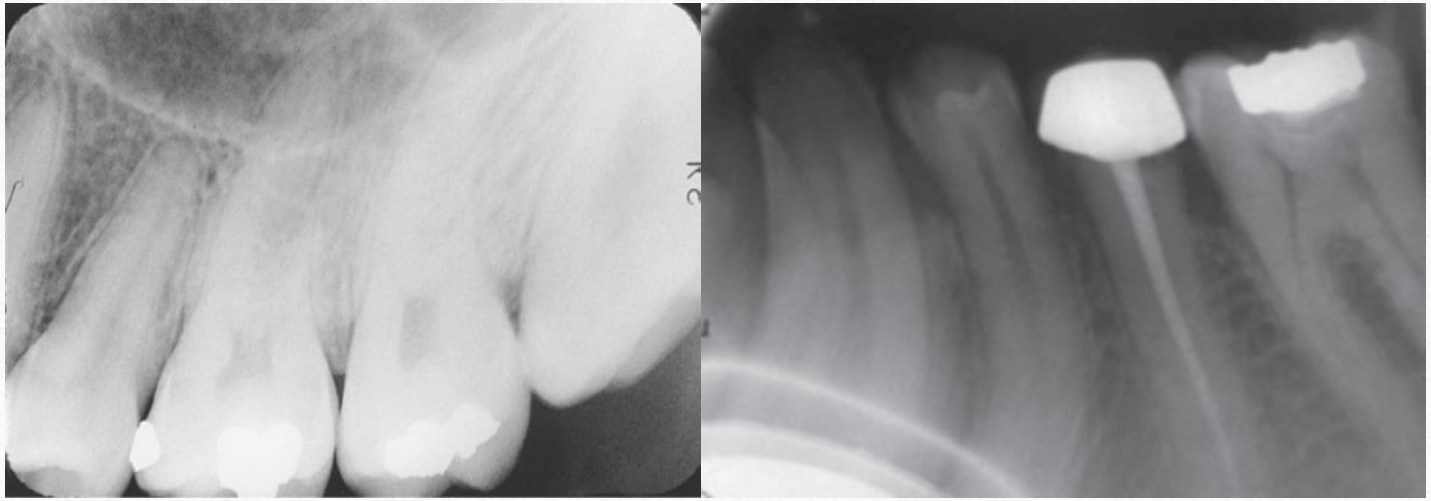
A. Film placement artifact

2. Dropped Receptor Corner



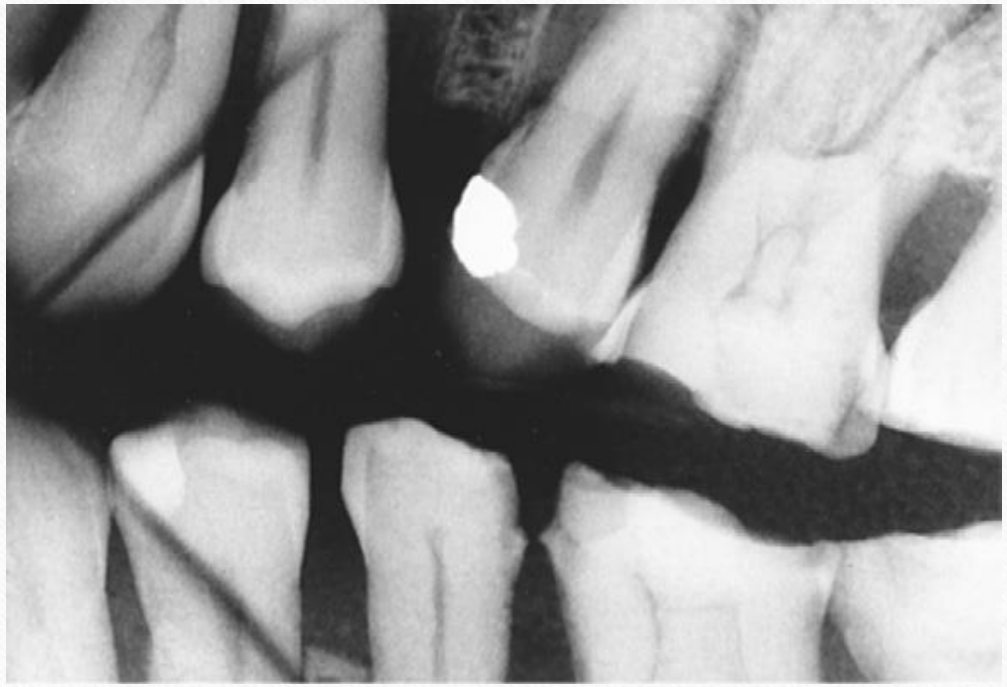
A. Film placement artifact

3. Film bending



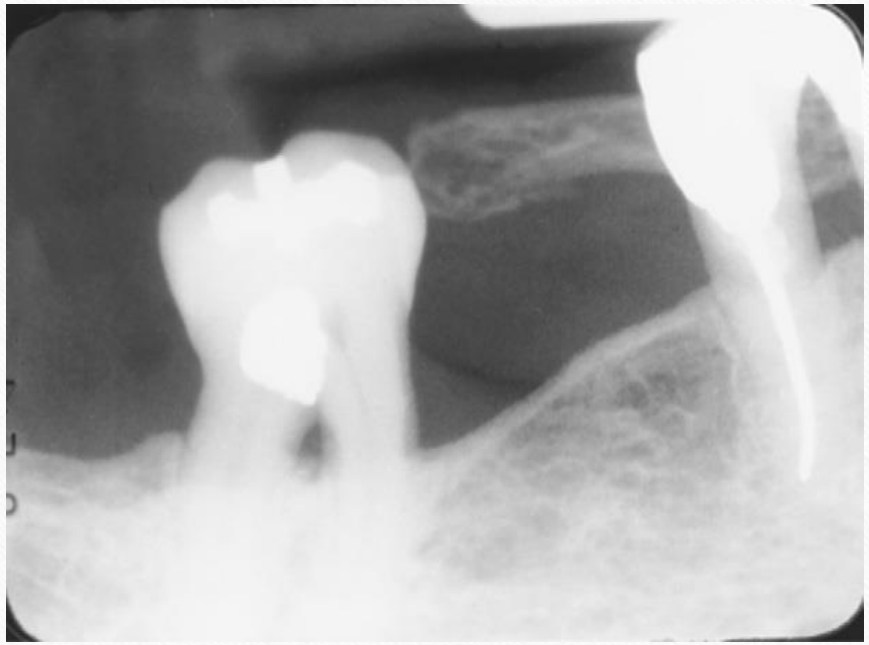
A. Film placement artifact

4. Film Creasing:



A. Film placement artifact

5. Phalangioma



A. Film placement artifact

6. Double Exposure



A. Film placement artifact

7. Reversed Film:

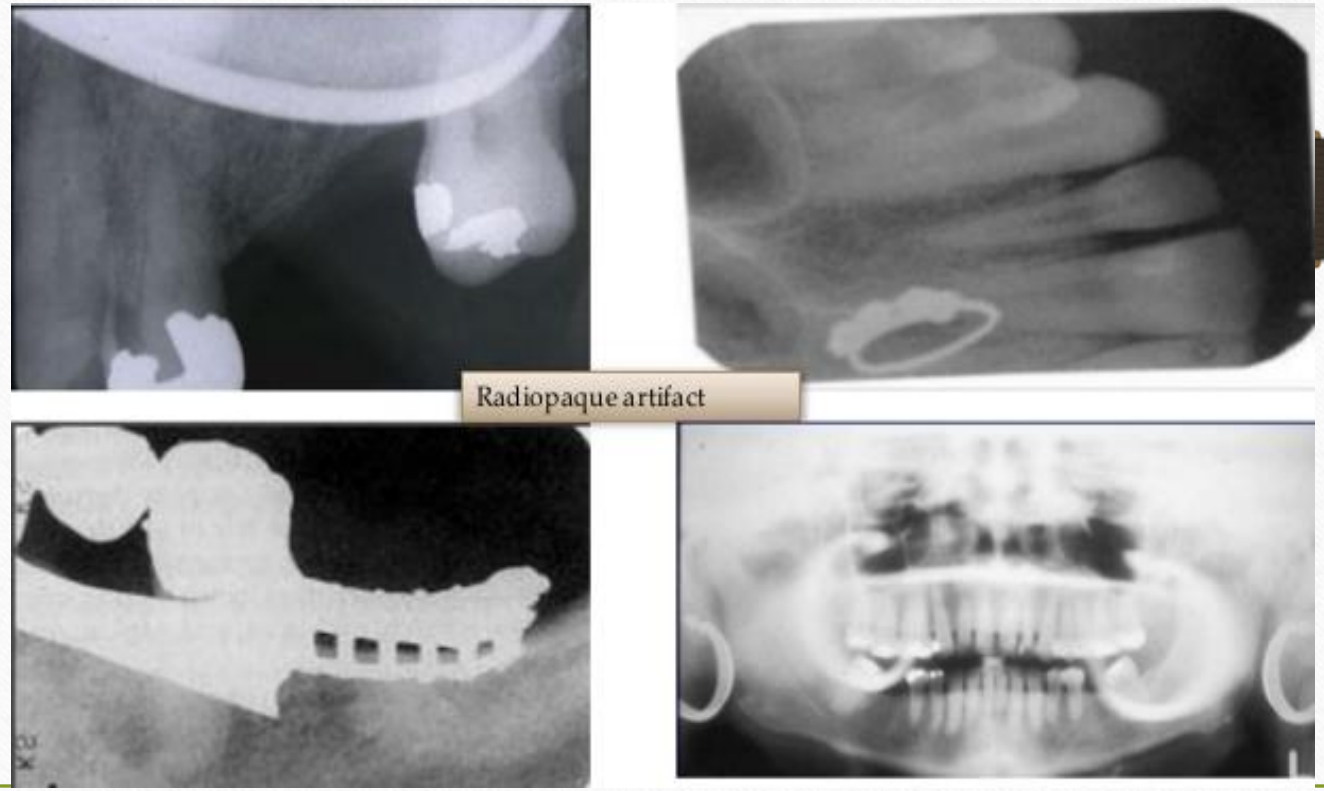
Wrong side (opposite side) of the film exposed to radiation.



B. Patient preparation artifact

- **Blurred image due to :**

1. Radiopaque Artifact



B. Patient preparation artifact

- **Blurred image due to :**

2. Movement

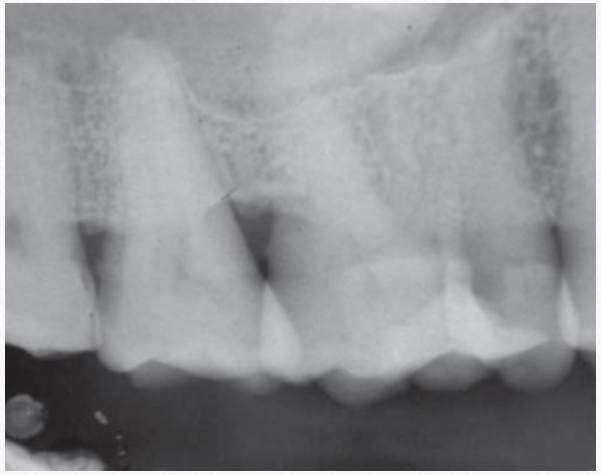


C. Projection errors

1. Incorrect Horizontal Angulation:

Overlapping of adjacent structures





C. Projection errors

2. Incorrect Vertical Angulation:

A. Foreshortened Images:

Causes

- Increased vertical angulation (bisecting angle technique)
- Film not placed parallel to the long axis of the tooth (paralleling technique).





C. Projection errors

2. Incorrect Vertical Angulation:

B. Elongated Images

Causes

- Decreased vertical angulation (bisecting angle technique)
- Film not placed parallel to the long axis of the tooth (paralleling technique).



C. Projection errors

3. Cone cut:

is clear unexposed area result from positioning fault when the X-ray beam not completely cover the film during exposure.

Causes

- Improper placement of film
- Improper placement of the PID



3. Exposure errors

A. Unexposed Film and appear Clear:



Causes:

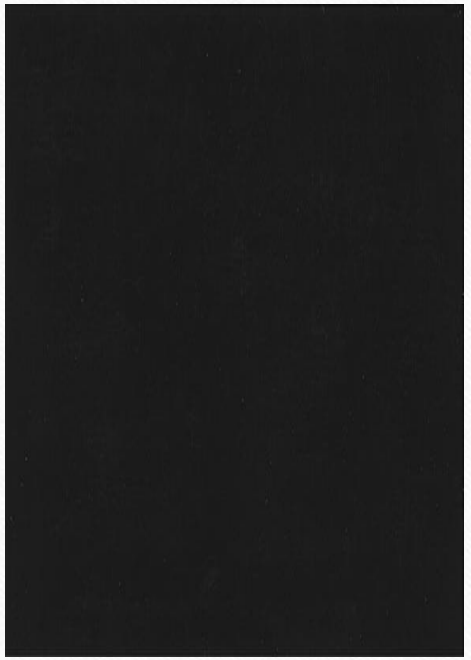
1. Failure to turn on X-ray machine.
2. Electrical Failure.
3. Malfunction of the X-ray machine.

Correction:

Make certain the X-ray machine is turn-on and listen for audible exposure signal.

3. Exposure errors

B. Film exposed to light and appear Black:



Causes:

The film was exposed to white light

Correction:

Check the safety of the dark room for light leakage and the filters used with safe light.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