

L.8 Radiographic Errors and Artifacts on the Film

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Introduction:

Artifact defined:

- Any opacity on the radiograph that does not correspond to an actual anatomic structure.
- Any misrepresentation of an actual anatomic structure.
- Anything decreasing radiographic quality.

Films with errors should be avoided due to the following reasons: Retake will lead to:

- Expose the patient to unnecessary radiation.
- Waste film and time (money).
- Interfere with accurate interpretation and diagnosis.

Radiographic Errors and Artifacts on the Film:

1. Distorted images: from improper alignment of the tube, object or film.

Vertical elongation: vertical angulation too small.

Foreshortening: vertical angulation too great.

Horizontal overlapping: incorrect horizontal angulation.

2. Finger marks: from improper handling with hands; dark finger marks, developer on fingers fluoride particularly stannous dirt (grease) clear finger marks, fixer on fingers

3. Blurred images: from movement of the patient, film, or tube during exposure. The complete film will be blurred.

4. With a bent film: part of the film will be in focus (usually the crowns) and part will be blurred (elongated).

- 4.1. When the film is completely bent over the lead foil from the back of the film appears on the front of the film and causes white lines area, areas usually in the corner of the film closest to the roots.
5. Dark or light films where images are visible: error in any one of the factors controlling density or distance. With the three exposure or three processing errors, the whole film will be affected.
6. Completely clear film: i) machine not switched on ii) malfunction of machine iii) placing film in fixer before developer solution iv) film not taken / exposed.
7. Cone cutting: beam of radiation did not cover film, improper alignment (vertical or horizontal) / OR: long axis of rectangular cone placed horizontal for anterior film or vice versa, OR improper set-up of aligning instruments.
8. Herring bone pattern / Tire Track: film placed wrong way round in mouth. Film will have reduced density and marks / pattern on one side of film. Without the marks - see # 5 above.
9. Double exposure: same film is exposed twice. Often this results in another film not being exposed, thus another film will appear clear. The images may appear superimposed, (parallel) at ninety degree angles to each other or upside-down.
10. Static electricity: films forcibly unwrapped or excessive flexing of film. Seen more often in dry, hot environment. Black "lightning" marks.
11. Crescent shaped black lines: i) fingernail pressure on the film ii) excessive bending the film. Crescent shaped white lines - cracked intensifying screen.
12. Reticulation: the emulsion contracts with time when subjected to great changes (difference of at least 15 degrees) in temperature between the different processing solutions.
13. Undeveloped / clear area on film i) Incomplete immersion of film in developer - linear gray levels along edge - common board question. ii) Films overlapping during processing - outline of film. iii) Fixer on operator's hands - clear finger prints iv) Cone cutting sharply delineated round or straight area v) Film not exposed
14. Scratched film: Emulsion is soft during processing. Long fingernails, careless handling during manual processing, wet films touching other films while being processed or drying.

15. Black borders: i) Wet or leaking packets allow light to enter a poorly sealed edge of film packet. Dry films on removal from mouth. ii) Light due to opening day light loader too soon

16. Black spots: dirt in the duplicating machine (developer drops will be dark)

17. Streaks: i) Improper washing of film hanger ii) Dirty rollers. iii) Heating pad in automatic processor not functioning

18. Radiolucent spots: i) developer drops (dark) ii) powder from the gloves iii) developer chemicals not properly dissolved.

19. Clear spots: i) Air bubbles sticking to film during processing ii) Fixer splashed on film prior to developing iii) Dirt in the intensifying screens

20. Brown film: With time the film will go brown if not left in fixer solution or water bath (final wash) for the required amount of time with manual processing. Also with exhausted fixer solution with automatic processing. When the radiograph is initially processed it will appear "normal".

21. Small, round, irregular, dark dots similar to static electricity - marks due to powder from gloves.

22. Black film: completely exposed to light. Black on one side of the film, hands taken out of automatic processor too soon.

23. Ear rings, nose rings, (metal) dentures, eye glasses etc. will all create radiographic artifacts (double or ghost images) and must be removed before radiographs are taken.

24. Gray film with loss of detail: film fogged, exhausted fixer, insufficient time in fixer solution.

Processing Errors:

Time and temperature problems and solutions:

Error	Appearance	Problem	Solution
Underdeveloped film.	Light	Inadequate development time. Developer solution too cool. Inaccurate timer or thermometer. Depleted developer solution.	Check development time. Check developer temperature. Replace faulty timer or thermometer. Replenish developer with fresh solutions as needed.
Overdeveloped	Dark	Excessive developing time.	Check development time.

film.		Developer solution too hot. Inaccurate timer or thermometer. Concentrated developer solution.	Check development temperature. Replace faulty timer or thermometer. Replenish developer with fresh solutions as needed.
Emulsion Reticulation.	Cracked	Sudden temperature change between developer and water bath.	Check temperature of processing solutions and water bath. Avoid drastic temperature changes.

Chemical contamination problems and solutions:

Error	Appearance	Problem	Solution
Developer spots.	Dark spots.	Developer comes in contact with film before processing.	Use a clean work area in the dark room.
Fixer spots.	White spots.	Fixer comes in contact with film before processing.	Use a clean work area in the dark room.
Yellow brown stains.	Yellow brown color.	Exhausted developer or fixer. Insufficient fixation time. Insufficient washing.	Replenish chemicals with fresh solutions as needed. Use adequate fixation time. Wash for a minimum of 20 minutes.

Film handling problems and solutions:

Error	Appearance	Problem	Solution
Developer cut off.	Straight white border.	Undeveloped portion of film due to low level of developer.	Check developer level before processing.
Fixer cut off.	Straight black border.	Unfixed portion of film due to low level of fixer.	Check fixer level before processing.
Overlapped films.	White or dark areas appear on film where overlapped.	Two films contacting each other during processing.	Separate films so that no contact takes place during processing.
Air bubbles.	White spots.	Air trapped on film surface after being placed in the processing solutions.	Gently agitate film racks after placing in processing solutions.
Fingernail artifact.	Black crescent shaped marks.	Film emulsion damaged by operator's fingernail during rough handling.	Gently handle films by the edges only.

Fingerprint artifact.	Black fingerprint.	Film touched by fingers that are contaminated with fluoride or developer.	Wash and dry hands thoroughly before processing.
Static electricity.	Thin black branching lines.	Occurs when a film packet is opened quickly. Occurs when a film packet is opened before the radiographer touches a conductive object.	Open film packets slowly. Touch a conductive object before unwrapping film.
Scratched film.	White lines.	Soft emulsion removed from film by a sharp object	Use care when handling films and film racks.
Developer spots.	Dark spots.	Developer comes in contact with film before processing.	Use a clean work area in the dark room.
Fixer spots.	White spots.	Fixer comes in contact with film before processing.	Use a clean work area in the dark room.
Yellow brown stains.	Yellow brown color.	Exhausted developer or fixer. Insufficient fixation time. Insufficient washing.	Replenish chemicals with fresh solutions as needed. Use adequate fixation time. Wash for a minimum of 20 minutes.

Lighting problems and solutions:

Error	Appearance	Problem	Solution
Light leak.	Exposed area appears black.	Accidental exposure of the film to white light.	Examine film packets for defects before using. Never unwrap films in the presence of white light.
Fogged film.	Gray; lack of detail and contrast.	Improper safe lighting. Light leaks in dark room. Outdated films. Improper film storage. Contaminated solutions. Developer solution too hot.	Check the filter and bulb wattage of the safe light. Check the dark room for light leaks. Check the expiration date on film packages. Store films in a cool dry protected area. Avoid contaminated solutions by covering tanks after each use. Check temperature of developer.

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