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Ideal radiographic projection:-
Ideal radiographic demonstrates certain image qualities includes:-
A – Radiographic image that is sharp.
B – Radiographic image that is shaped like the object.
C – Radiographic image that is the same size as the object.
Also there are 5 principles of shadow casting must observed during film exposure these principles are as follow:-

1. Source of radiation should as small as possible.
2. Tube – object distance should be as great as possible.
3. Object – film distance should be as small as possible.
4. Film should be parallel to an easily identifiable plane of the object.
5. Central ray of the beam should be perpendicular to the film.
Now first 3 principles deal with the image sharpness while the last 2 principles required during exposure as a technique.

**Penumbra:** - is the amount of unsharpness of the image so penumbra is the area of partial shadow.

**Umbra:** - is the area of total shadow and its exist only when the object absorb all of x-rays.

Now penumbra is created by the size of focal spot (source of radiation), the larger the spot size the greater is the penumbra (the amount of unsharpness).

Also penumbra affect not only by focal spot size but tube – object distance and object – film distance so the closer tube – object distance the greater is the penumbra while the closer object– film distance the lesser is the size of penumbra.
**Distortion:**
Is the change in the shape of the image as compared to the object due to improper alignment of the tube film or the object.

**Artifacts:**
1. **Cone cut:** is clear unexposed area result from positioning fault when the x-ray beam not completely cover the film during exposure.
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1. Cone cut: is clear unexposed area result from positioning fault when the X-ray beam not completely cover the film during exposure.
2. Back side exposure: when the film placed in wrong position making the non exposure side facing the beam, the result is the image with the pattern of the lead foil is evident.

E. Pattern from the lead foil is evident — the film packet was placed back to front in the mouth.
3. Double exposure: - here the same x-ray film expose twice to X-ray this result in excessive dense and blurred image.

F. Double exposure — the same film packet was used for two different projections.
4. Elongated image:- vertical angulation of x-ray tube was too shallow.
5. Shortened image: vertical angulation was too steep.

B. Foreshortened image — the vertical angulation of the X-ray tube head was too steep.
6. Overlapping of adjacent structures: when horizontal angulation was incorrect.

C. Superimposition/overlapping of adjacent structures — the horizontal angulation of the X-ray tubehead was incorrect.
7. Discharge of static electricity:- see as multiple black linear streaks produced or when it flexed to make it less stiff.

D. Discharge of static electricity (arrowed)
8. **Blurred film:** due to excessive bending of the film during exposure.

B. As a result of excessive bending of the film packet during the exposure.
9. Fingernail marks:- resulting black lines when pressure by fingernail as an example put on the film or sometime we have (finger print impression) in the emulsion.

B. Finger nail marks (arrowed)
10. Reticulation: - it mean creak of emulsion when subjected to great change in temperature between different processing solution. Note: temperature must go from warm to cold.

11. Undeveloped area: - this appear as clear area caused by incomplete immersion of the film in developer or sticking the film in the developer to the side of the tank.

12. Wet and leaking packets: - when we have black borders due to light entering a poorly sealed film wrapper.

14. to Pale X-ray film: This due either under exposure, or under developing.

Example of a periapical that is too pale with poor contrast.
15. Dark X-ray film: this is due to either over exposure or overdevelopment.

Example of a periapical that is too dark with poor contrast.