

X - RAY FILM

FILM – COMPOSITION

1. Emulsion
2. Base

1. EMULSION

- Silver halide grains
- Vehicle matrix

Silver halide

- silver bromide and silver iodide
- Iodide is added because its large diameter crystals
- thereby increasing its sensitivity to x radiation
- disrupt the regularity of the silver bromide crystal structure

Vehicle matrix

- - gelatinous and non gelatinous materials
- keeps the silver halide grains evenly dispersed

During processing the vehicle absorbs the processing solutions allowing the chemicals to reach and react with silver halide grains.

OTHER ADDED COMPONENTS (added to improve the sensitivity)

1. Gold
2. Sulphur

2. BASE

- It is made up of Polyester polyethylene terephthalate.
- It is about 0.2 mm thick
- It must have a proper degree of flexibility to allow easy handling of the film.

- But it must be able to withstand exposure to processing solutions without becoming distorted.
 - It must be uniformly translucent so that it does not cast any pattern on the radiograph.
 - However a base with a slight blue tint improves diagnostic detail.
3. **ADHESIVE LAYER** - thin layer of adhesive material is added to the base before emulsion is applied
 4. **OVERCOAT** - protects the film from damage

SIZE OF X-RAY FILMS

PERIAPICAL VIEW

BITEWING VIEW

OCCLUSAL VIEW

Periapical view

They are used to record the crowns, roots and surrounding bone...

For recording this, film packs come in 3 sizes

22x35 mm – Size 0 - for small children

24x40 mm – Size 1 – relatively narrow used for anterior teeth.

31x41 mm – Size 2 – standard film size used for adults

Bitewing view (Inter proximal view)

- They are used to record the coronal portions of the maxillary and mandibular teeth in one image.
- They are used for detecting the inter proximal caries and evaluating the height of the alveolar bone
- Size 2 film is used in adults; size 1 for children; size 0 for smaller children; Occasionally size 3 may be used.
- Bitewing films have a film tab projecting from middle of the film on which the patient bites to support the film.

Occlusal view

- It is more than 3 times larger than size 2 film – 57x76mm
- It is used to show larger areas of maxilla or mandible than that may be seen on a peri apical view.
- They also may be used to obtain right angle views to the usual peri apical view.
- The name derives from the fact that the film usually is held in position by having the patient bite lightly on it to support it between the occlusal surfaces of the teeth.

TYPES OF X - RAY FILMS

DIRECT FILMS

INDIRECT FILMS

DIRECT FILMS

Films exposed by x- rays are Direct exposure films

- Eg. All intra oral films

INDIRECT FILMS

Indirect exposure films - Films sensitive to visible light. It is used with intensifying screens that emit visible light.

- Eg. All Extra oral films

INTENSIFYING SCREEN

An intensifying screen is a device used to intensify the photographic effect of X-rays

- The intensification is brought about by the property called Fluorescence
- wherein certain chemicals such as Phosphors have the property of absorbing roentgen rays & emit visible light.
- The sum of the effects of the x-rays and the visible light creates an image receptor system that is 10-60 times more sensitive to x-rays than the film alone and thereby reduces the patient dose by nearly 85-90%.
- Substantial reduction in dose of X-radiation to which the patient is exposed.
- They are used in combination with films in extra oral radiography.
- Not used with intraoral films - because of loss of resolution.

COMPOSITION

Base

- polyester plastic
- (0.25 mm thick)
- mechanical support for the phosphor layer

Phosphor layer plastic

- consists of light sensitive phosphor crystals which exhibit the property of fluorescence

Protective plastic coat

- 8 micron meters thick.
- - protects the phosphor layer and keeps the surface clean of any debris or scratches

Phosphor layer

Earlier Phosphors

- Barium platinocyanide,
- Cadmium tungstate
- Zinc sulphide.

Recent Phosphors

- Terbium activated gadolinium oxysulphide
- Thulium activated lanthanum oxybromide

A layer of titanium dioxide known as reflecting layer between phosphor layer & base for increasing the sensitivity of intensifying screen but is associated with image unsharpness.

GRIDS

A Grid is a device that is used in extra oral radiography.

It is placed between the subject and the film.

- Reduce the amount of scattered radiation exiting a subject that reaches the film
- reduces film fog and improves image quality
- but results in increased exposure

COMPOSITION

- alternating strips of a radio opaque material(lead)
- strips of radiolucent material(plastic)
- When secondary photons generated in the subject are scattered towards the film,
- they are usually absorbed by the radio opaque material in the Grid

Grids are manufactured with varying number of **line pairs** of absorbers and radiolucent spaces per inch

Grids with 80 or more line pairs per inch do not show objectionable grid lines on the image

Grid ratio (Grids with a ratio of 8 or 10 is preferred)

The ratio of grid thickness to the width of the radiolucent spacer is known as Grid ratio.

The higher the grid ratio, more effectively the scattered radiation is removed from the x ray beam.

Types of grids

- Linear Grid
- Focused Grid
- Pseudo focused Grid

- Crossed Grid
- Moving Grid (Bucky)

Advantage of Grid

Since its function is to remove Scattered radiation it minimizes film fog and improves image quality.

Disadvantage of Grid

To compensate for the absorbing materials in the Grid , the exposure required when a Grid is used is approximately double than that needed without a Grid.