Sri Aurobindo College of Dentistry

Indore, Madhya Pradesh

INDIA

MODULE PLAN

- TOPIC :X-RAY FILM
- SUBJECT:OMDR
- TARGET GROUP: UNDERGRADUATE DENTISTRY
- MODE: POWERPOINT – WEBINAR
- PLATFORM: INSTITUTIONAL LMS
- PRESENTER: DR.VIHANG NAPHADE

X RAY FILMS INTENSIFYING SCREENS & GRIDS

PRESENTED BY-DR. VIHANG NAPHADE

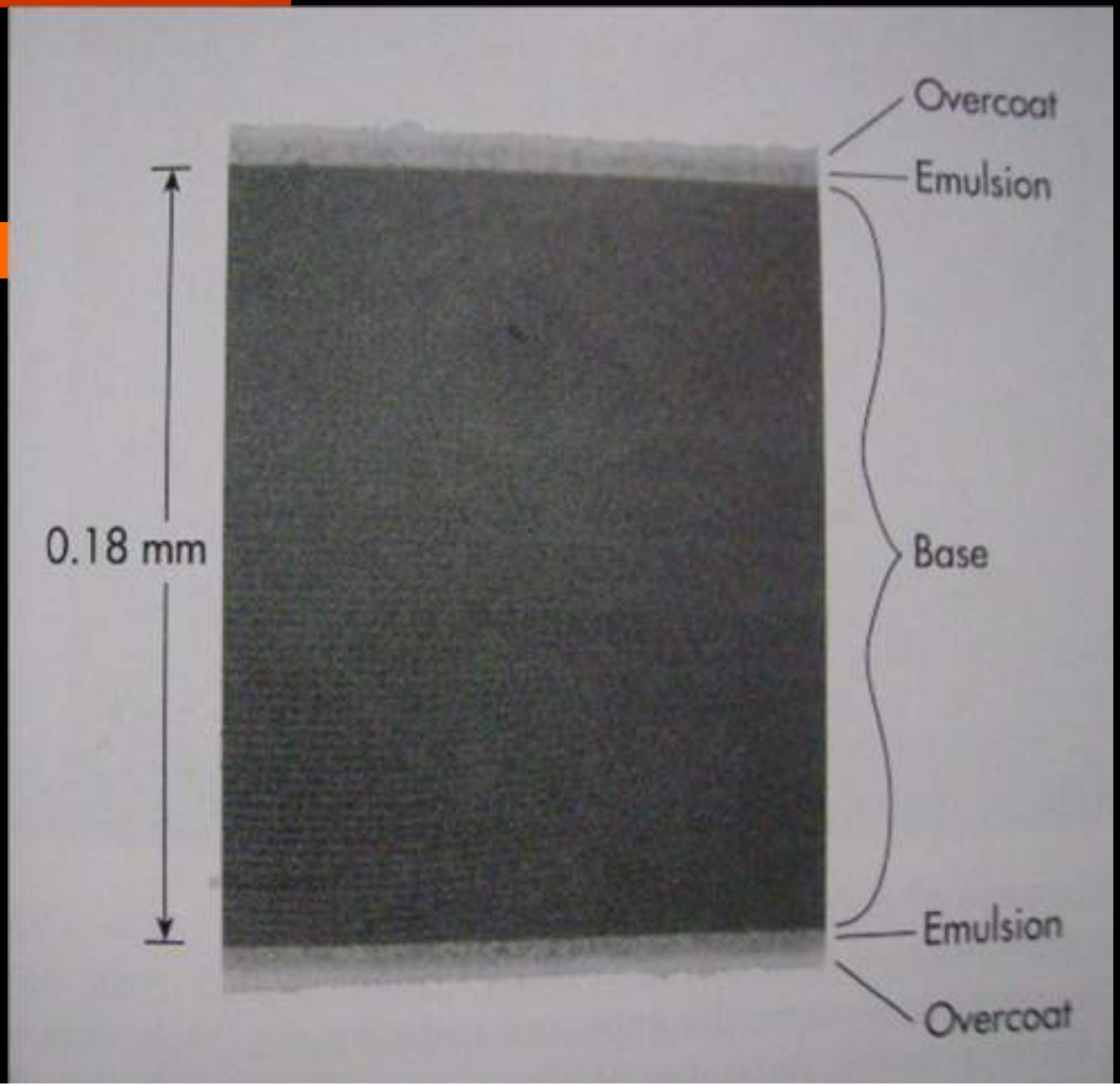
(M.D.S)

X RAY FILMS

While making a radiograph – we require, x ray source, object & image receptor. When x rays traverse the object (to be radio graphed), they may be absorbed / may not interact with the atoms of the object, depending on structure & composition of the object. So these information must be recorded on an image receptor, most commonly used image receptor are **x ray films**.

Film composition :

1. Base
2. Adhesive
3. Emulsion
4. Protective coat


Overcoat
Emulsion
0.18 mm
Base
Emulsion
Overcoat

1. Base :

The base is the supporting material on to which the emulsion is coated.

It is made up of polyethylene terephthalate (a polyester), about 0.2mm thick.

The base should have :

- proper amount of flexibility.
- it should be evenly translucent, casting no pattern on the resultant radiograph.
- should have bluish tint.
- it must be able to withstand exposure to processing solution without distorting.

Adhesive :

It sticks the emulsion on to the base.

Emulsion :

It has 2 components - silver halide crystals

- gelatin matrix.

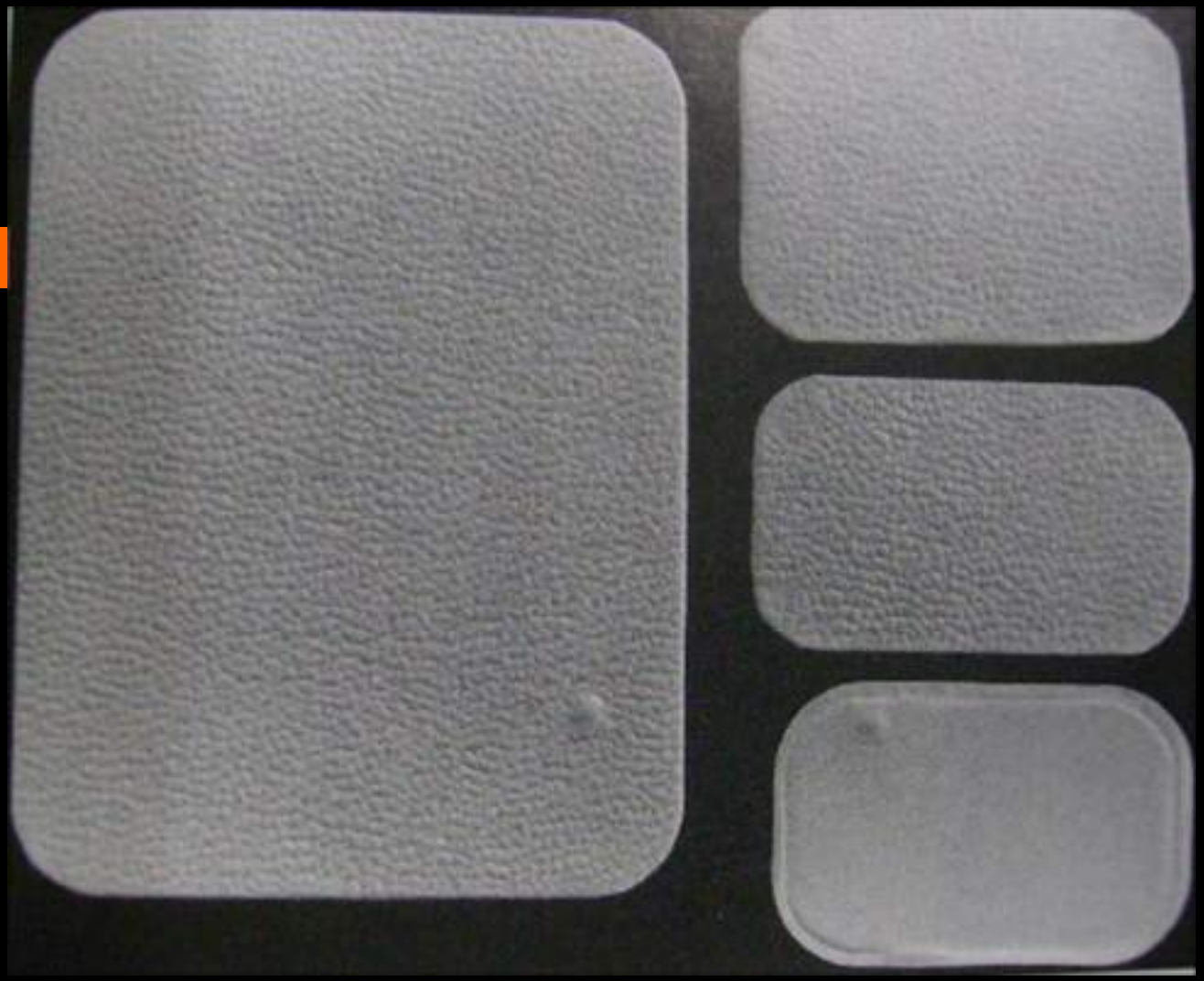
The silver halide crystals are suspended in gelatin matrix. The gelatin is made from cattle bone. During processing the gelatin absorbs the processing solution, there by allowing the chemicals to react with silver halide crystals.

Supper coat :

The emulsion is covered by a protective layer of gelatin, that protects it from – scratching & pressure during use & processing.

Types of x ray films :

1. Based on area of application –
   - Extra oral films (screen films)
   - Intra oral films (non screen films)
     - I.O films are further divided into 3 categories on their clinical application
       - periapical film – 0, 1& 2.
       - bitewing film
       - occlusal film.
2. Based on speed –
   - A B C D E F .




Kodak
Dental Intraoral E-Speed Film
Dental Film • Film Dentaire • Película Dental
Filme Dental • Рентгеновская пленка для стоматологии

Contents of I.O film packet :

- Film
- Black paper
- Lead foil
- Plastic wrapper.

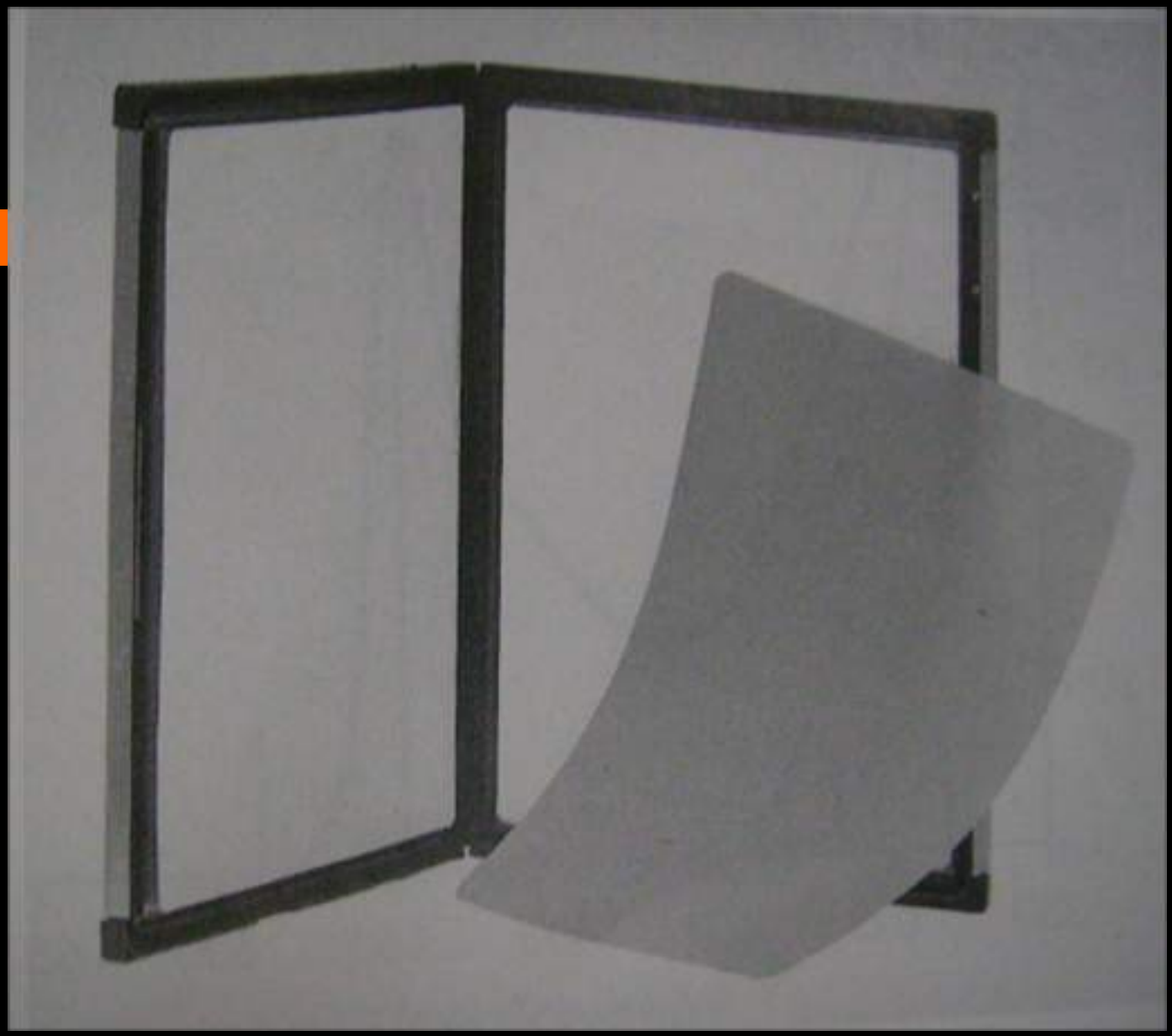
On one corner of the packet- there is a raised dot which should be placed towards the x ray tube. After the film is processed it helps in identifying whether the radiograph is of right side or left side.

INTENSIFYING SCREENS :

It is a device that transfers x ray energy into visible light, the visible light in turn, exposes the screen film. As the word intensifying suggests, these screens intensify the effect of x ray on the film. So less radiation is required to expose the film & so less radiation to the patient.

So such a combination of x ray film with an I.S results in an image receptor system 10 – 60 times more sensitive to x rays than film alone.

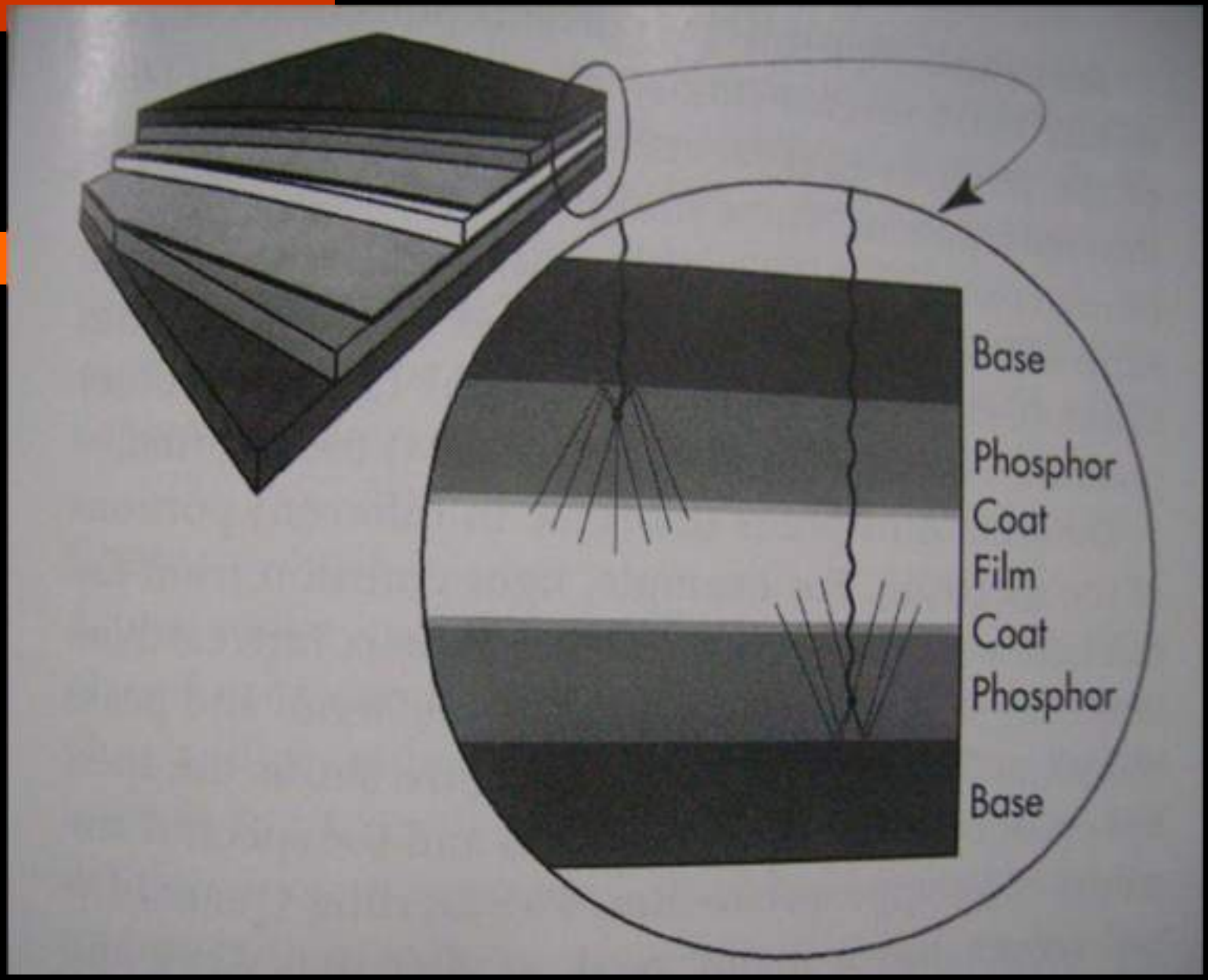
I.S are virtually used for all extra oral radiography. The film is sandwiched between 2 I.S in the cassette.



Composition of I.S :

- Base
- Reflecting layer
- Phosphor layer
- Protective plastic coat.

BASE : base material is made up of polyester plastic, 0.25mm(1×10 -2inches) in thickness. It provides mechanical support for the screen.


Base
Phosphor
Coat
Film
Coat
Phosphor
Base

REFLECTING LAYER : it is a white layer of titanium dioxide coated on the base material. It is 1×10 -3inches in thickness. Its purpose is to reflect any light emitted from phosphor layer back to the x ray film. So it increases the sensitivity of I.S, but does result in production of some unsharpness of the image.

PHOSPHOR LAYER : consists of phosphor crystals suspended in a plastic material. When exposed to x rays, the phosphors fluoresce & emit visible light in the blue/ green spectrum.

The most common phosphor used was calcium tungstate which emits blue light. Presently a number of new phosphors are used, most notably rare earth phosphors- like lanthanum, gadolinium, ytrium etc. which emit green light. Rare earth phosphors are about 4 times more efficient than ca tungstate, in converting x ray photons into visible light.

COAT : a protective coat of plastic (8 m) is placed over phosphor layer, to provide protection & surface that can be cleaned.

GRIDS

A grid is a device used to reduce the amount of scattered radiation that reaches an extra oral film during exposure. There by decreasing film fog & increasing the contrast of the image.

Grid is placed between the object & the film. It is composed of alternate strips of lead & strips of radiolucent material(plastic).

When x rays interact with the patients tissue, scattered radiation is produced, which is directed at the grid at an angle. As a result scattered radiation is absorbed by lead strips.

In practice, focused grids are used more frequently. Here the lead strips are all directed toward a common point, the focal spot. So their direction coincides with the direction of the path of diverging photons in the primary x ray beam.

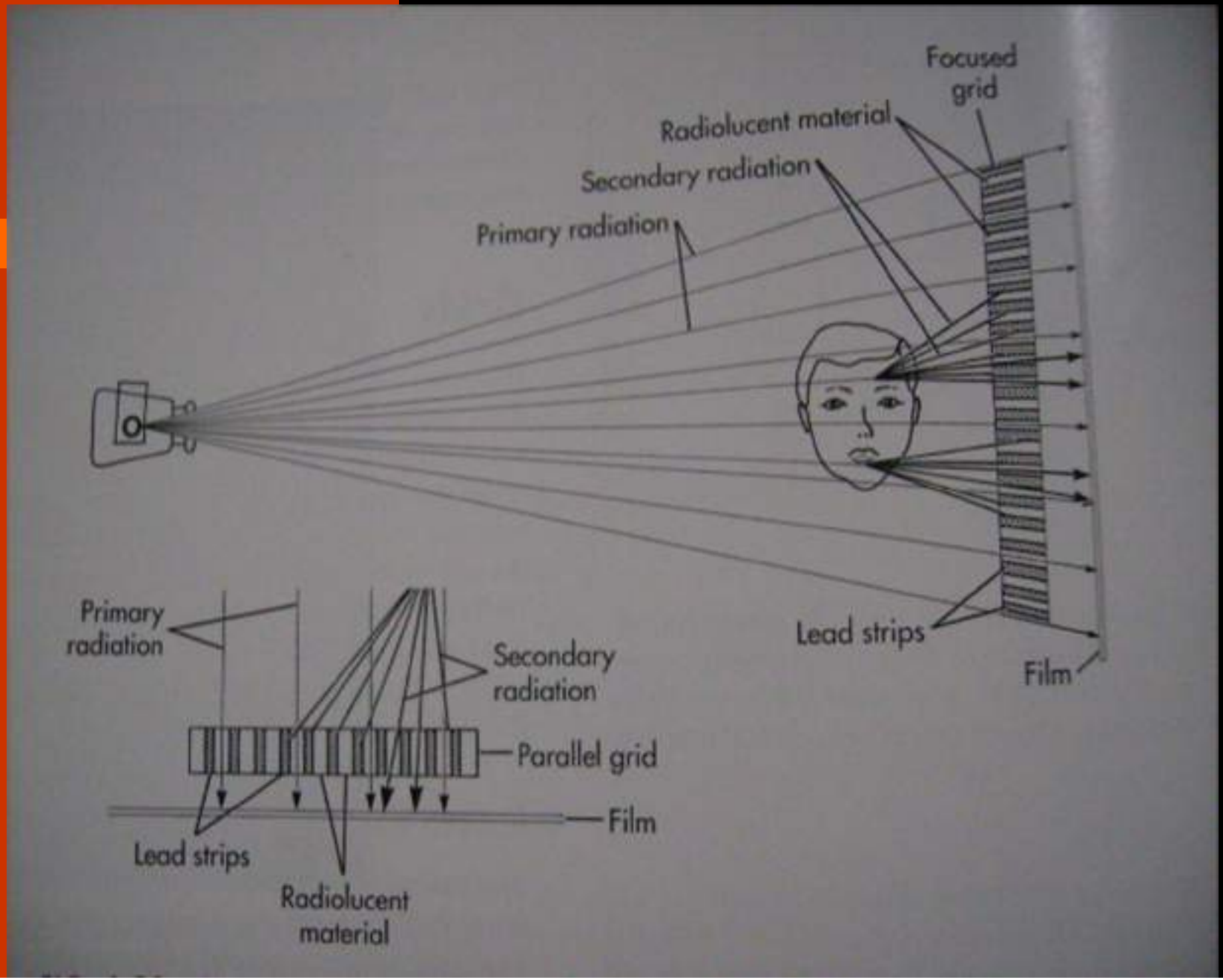
The presence of grid between object & film will result in the images of lead being projected onto the film. So closer the grid lines on the film, less objectionable they will be.

In general grids with 80 or more line pairs/ inch do not show objectionable grid lines. The ratio of the thickness of the grid to the width of radiolucent spacer is known as grid ratio. Higher the ratio, more effectively the scattered radiation will be removed.

In general grids with a grid ratio of 8 or 10 are preferred.

The grid lines may be removed by mechanically moving the grid in a direction 90 to the grid lines during exposure. So a moving grid is called a BUCKY GRID.

To compensate for the presence of lead strips, the exposure time is increased, so increased patient exposure. Therefore grids should be used only when improved image quality & high contrast are required.


Focused grid
Radiolucent material
Secondary radiation
Primary radiation
Lead strips
Film
Primary radiation
Secondary radiation
Parallel grid
Film
Lead strips
Radiolucent material