

## Radiographic image characteristics

Lecture 9

Imad Brinjikji

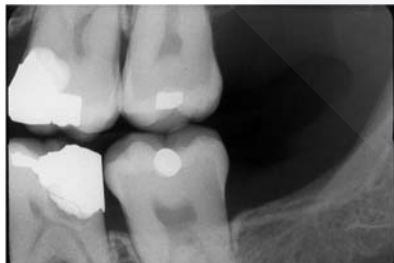
1

2

**RADIOLUCENT**

**Dark Gray to Black**

Low object density results in high film density (e.g., air, soft tissue).



3

**RADIOPAQUE**

**White to Light Gray**

High object density results in low film density (e.g., amalgam, tooth structure, bone).



4

I. Radiographic density.

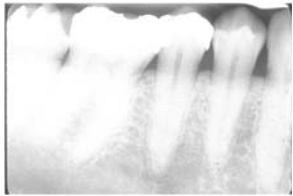
II. Radiographic contrast.

III. Radiographic speed.

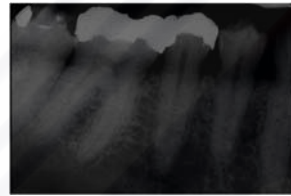
IV. Radiographic Noise

## I. Density

- The degree of darkening or opacity of an exposed film is referred to as optical density.
- In digital radiography, it may be referred to as “brightness”.

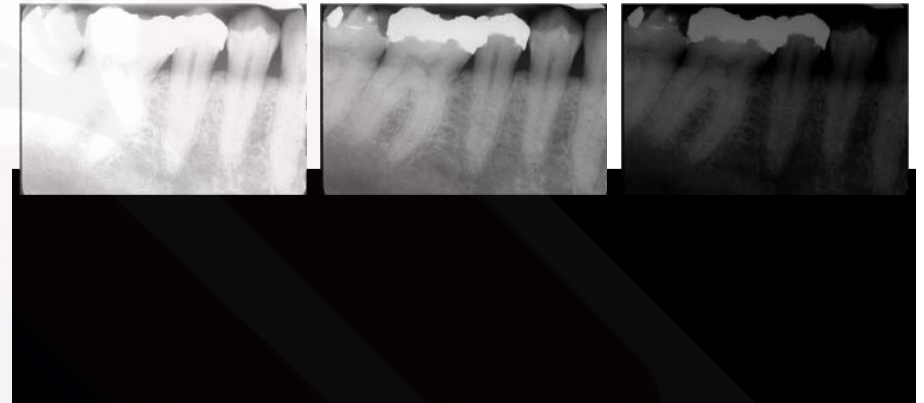


Too light



Too dark<sup>s</sup>

## I. Density



6

## I. Density

- Even the clear film (an unexposed film that was processed has a slight density).
- This is due to blue tint added to the base of the film. It is thought that this procedure enhances the diagnostic value of the film.

7

## I. Density

**Density is influenced by:**

1. Patient size.
2. Exposure factors.
3. Object density.

8

## I. Density

1- Patient size: the larger the patient's head, the more x-rays that are needed to produce an ideal film density (e.g. child vs adult).

2- Exposure factors (mA, kVp, exposure time). An unnecessary increase in any of these factors results in an increase in film density.

9



The tongue appears white although it is a soft tissue (due to its thickness)

11

## I. Density

3- Object density is determined by:

A- Type of material (metal, tooth structure, composite, etc.).

B- Amount of material

10

## II. Contrast

- The difference in densities between various regions on a radiograph.



12

## High Contrast

- Short gray scale of contrast.
- Few shades of gray.



## Low Contrast

- Long Scale.
- Many shades of gray.



## Contrast is influenced by:

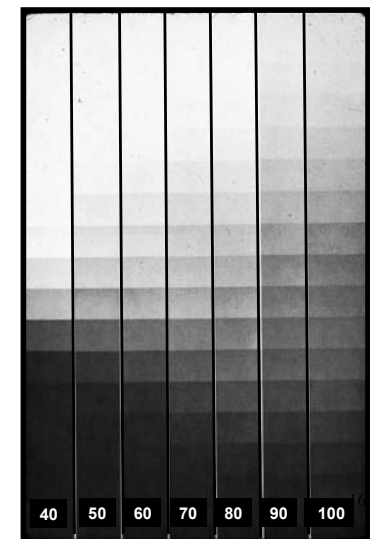
1. kVp.
2. The type of the developer.

## II. Contrast

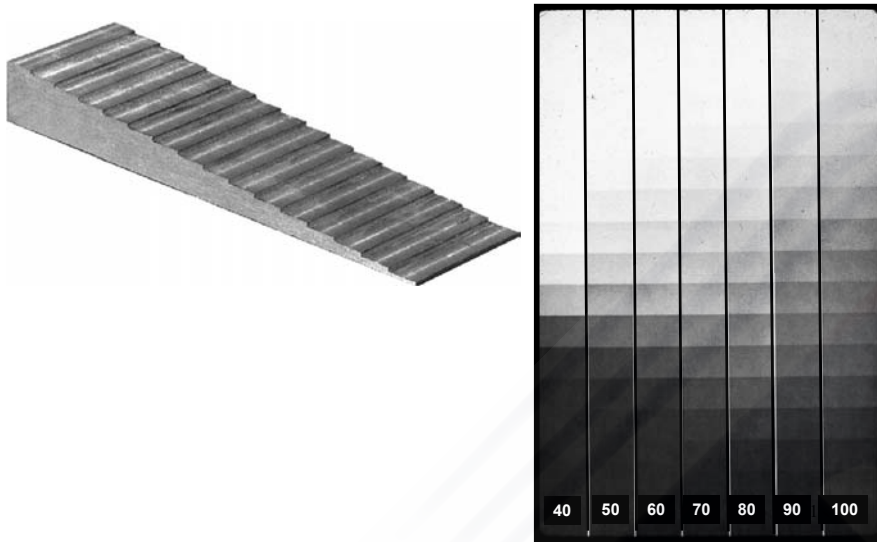
### kVp

Affects energy  
(penetrating ability)  
of x-rays.

The higher the KV,  
the less the  
contrast.



## II. Contrast



## III. Speed

- Represents the amount of radiation required to produce a radiograph of appropriate density.
- The higher the speed, the less radiation needed to properly expose the film.

(Larger crystals = increased speed)<sub>s</sub>

## III. Speed

- Represents the amount of radiation required to produce a radiograph of appropriate density.
- The higher the speed, the less radiation needed to properly expose the film.

## III. Speed

- The larger the crystal, the less the resolution and sharpness.
- The speed of dental intraoral x-ray film is indicated by a letter.
- D-, E- and F-speed films are appropriate for intraoral radiography (D is no longer available in markets).

## IV. Speed

- **F-speed films require approximately 40% of the exposure time of D-speed films and 75% of the exposure of E-speed films**
- **Sensors require about 50% of the dose of F-speed films.**

*The end*