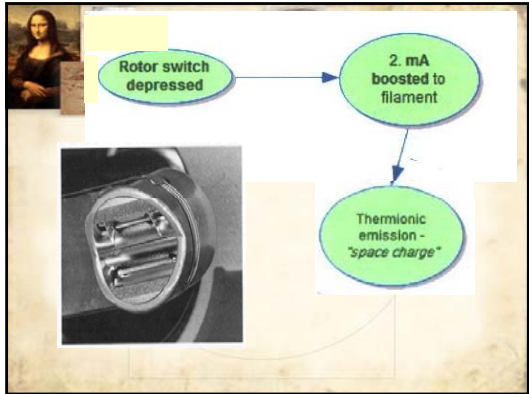
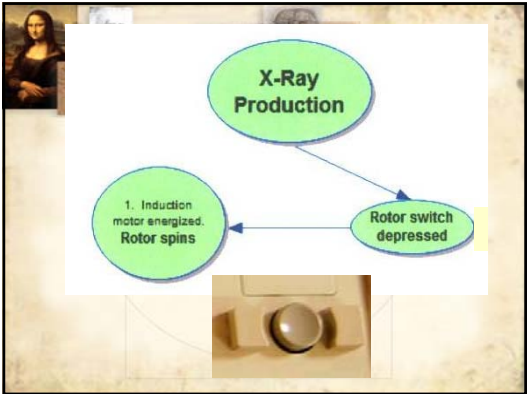
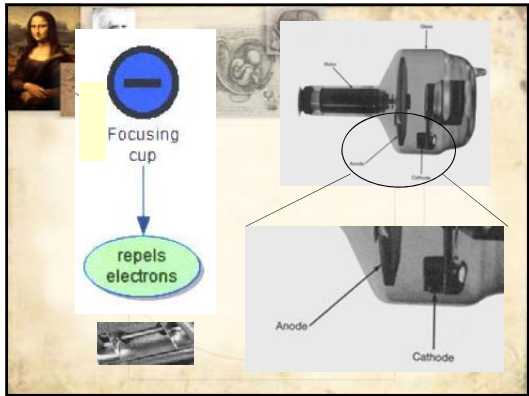
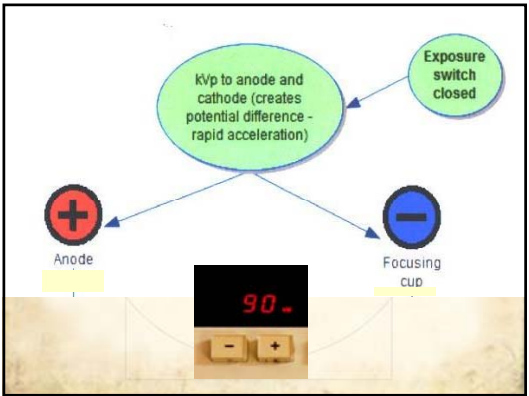


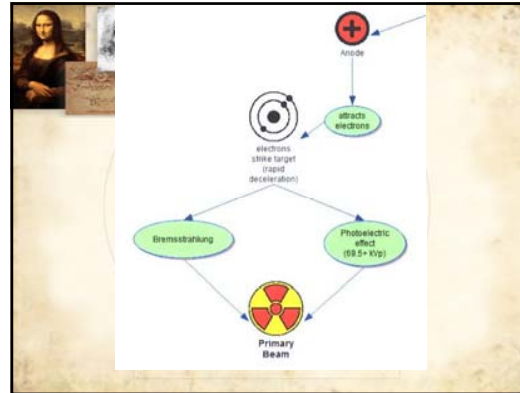
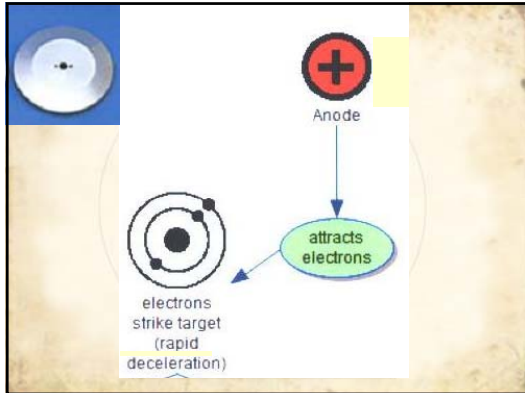
*Technique 101:  
Getting Back to Basics*

Prepared and presented by:  
**Thomas G. Sandridge, M.S., R.T.(R)**  
Director, School of Radiography  
Northwestern Memorial Hospital  
Chicago, IL



1. If the mAs is 30, and the time is 0.1 sec., the mA setting must be what?
2. If the mA is set at 400, and the mAs obtained is 80, what must the time be set at?





1. If 10 mAs with 75 kVp produces an acceptable density at 100-cm SID, what should be used at 180-cm?
2. An acceptable density is obtained at an unknown SID using 25 mAs at 90 kVp. If a similar density is obtained using 50 mAs at 60", what was the original SID?

### Technical Factors Summary

Factor	In tube	Primary beam	In Patient	Image
mA		<i>mAs</i>	<i>mAs</i>	<i>mAs</i>
time		<i>mAs</i>	<i>mAs</i>	<i>mAs</i>
mAs				
kVp				

1. A radiographic image is obtained using 80 kVp @ 3.2 mAs. Although the image exhibits acceptable density, the radiologist requests that the film be repeated because there is "too much contrast". What new factors would be required if a minimum of 100 kVp is to be used?

2. A shoulder series is obtained using 15 mAs @ 77 kVp. The supervising technologist states that the density is acceptable, but the images do not demonstrate enough contrast. What new factors should be used?

1. The intensity of a beam is 100 mR at a distance of 1 meter. What is the intensity at 3 meters?
2. For a given technique, the x-ray intensity at 1 meter is 450 mR. What is the intensity at 2.5 meters?

3. A beam results in an intensity of 25 mR at 100cm. How far away would the intensity measure 1 mR?

1. What is the grid ratio if the height of the lead strips is 1.2 mm and the distance between them is 0.1 mm?
2. What is the ratio of a grid if the height of the lead strips is 0.8 mm and the distance between them is 0.1 mm?

### How much more (mAs)???

#### Grid Conversion Factors\*

GR	GCF
T.T.	1
5:1	2
6:1	3
8:1	4
12:1	5
16:1	6

*\* The ARRT does not recognize an "official" set of GCFs, so . . . make your life a little easier*

1. An 8:1 grid is used with 10 mAs and produces sufficient density. If the exposure is to be repeated using a 12:1, what mAs is required?

2. A non-grid exposure is made using 70 kVp, 25 mAs, and 40" SID. If the exposure were to be repeated with a 16:1 grid, what technique would be required?

3. A knee is obtained using a 16:1 ratio grid at 65 kVp and 12 mAs. What mAs would be used with a table-top exposure?

### Calculating I.F. / Speed

Exp. Without screens  
(mAs or mR)

I.F. / speed

exp. with screens  
(mAs or mR)

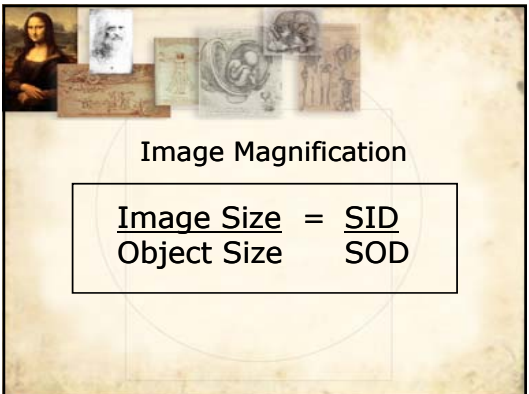
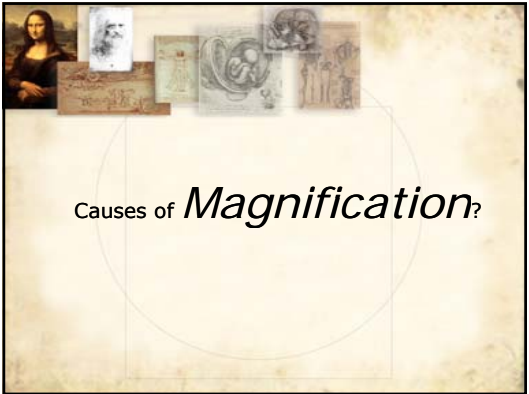
- A screen with a speed of 100 provides a patient radiation dose of 40 mR with a given technique. What would the patient dose be with a direct exposure cassette?

- An acceptable radiographic density is obtained using a 400-speed screen system, 70 kVp, 20 mAs, 180cm SID. What mAs would be required if a similar density is to be obtained using a direct exposure system?

- If 80 mAs is needed for a particular radiograph using a 100-speed system, what mAs would be needed with a 400-speed system?

- If 70 mAs is the technique used with a 400-speed system, and a 100-speed system is to be used, what mAs would be required?

- If an exposure is made using 1.5 mAs with a 200-speed system, what mAs would be needed if the radiographer were asked to repeat using a direct exposure system?



1. An SID of 100 cm is used to radiograph a particular portion of anatomy. If the object of interest is positioned 20cm above the image receptor, and measures 15cm on the finished radiograph, what is the actual size of the object?
 
$$\frac{15 \text{ cm}}{X} = \frac{100 \text{ SID}}{80 \text{ SOD}}$$

$$100X = 1200$$

$$X = 12 \text{ cm}$$

2. An object measures 2.5" wide and casts a shadow 3.5" wide when radiographed at an SID of 72". What is the SOD?

$$\frac{3.5''}{2.5''} = \frac{72''}{X}$$

$$3.5X = 180$$

$$X \approx 51.4''$$

Magnification Factor

$$\frac{\text{Image Size}}{\text{Object Size}} = \frac{\text{SID}}{\text{SOD}}$$

MF =  $\frac{\text{image size}}{\text{object size}}$

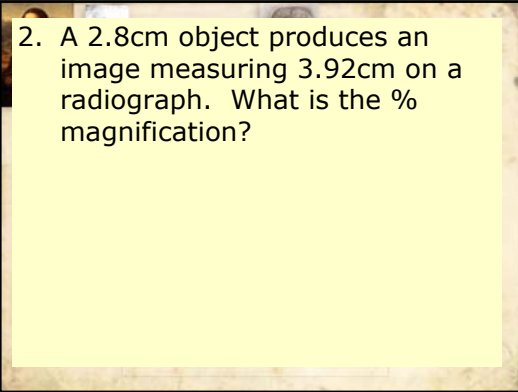
MF =  $\frac{\text{SID}}{\text{SOD}}$

1. An object measures 2.5" wide and casts a shadow 3.5" wide when radiographed at an SID of 72". What is the magnification factor?

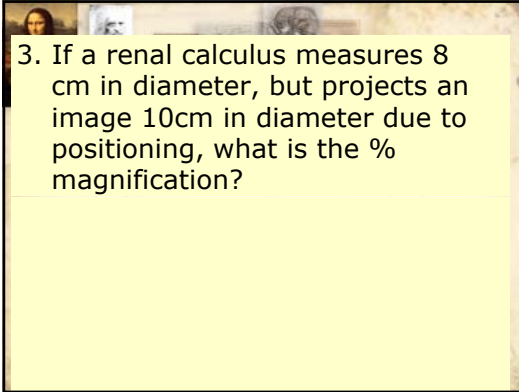
2. An object is radiographed at an SID of 60", while being positioned 20" above the image receptor. What is the MF?

3. Calculate the magnification factor of an object that measures 1.5 inches in diameter and casts a shadow of 2.0 inches.

1. An object that measures 1.5 inches in diameter and casts a shadow of 2.0 inches. What is the % magnification?



2. A 2.8cm object produces an image measuring 3.92cm on a radiograph. What is the % magnification?



3. If a renal calculus measures 8 cm in diameter, but projects an image 10cm in diameter due to positioning, what is the % magnification?



*Questions ???*