Experiment number (3):

***Compensating filters and density***

**Objective:**

To demonstrate the influence of compensating filter on radiographic density.

**The use of filters produce a cleaner image by absorbing the lower energy x-ray photons that tend to scatter more Film one.**

**Procedure:**

We will use: 24x30 cm cassette, foot phantom and a filter.

1- Place the foot phantom on the cassette and angle the X-ray tube 15 degrees towards the foot. (note that the FFD must be reduced by 2.5 cm for each 5 degrees angulation , so the FFD used is 100 – 7.5 = 92.5 cm).

2- Center the X-ray beam towards the foot phantom and collimate it to cover the area of interest.

Expose the foot phantom using the following factors: KV=45, mAs=4 3-

Process the film. 4-

**Film two:**

1- Place the foot phantom on the cassette and angle the X-ray tube 15 degrees towards the foot. (note that the FFD must be reduced by 2.5 cm for each 5 degrees angulation , so the FFD used is 100 – 7.5 = 92.5 cm).

2- Center the X-ray beam towards the foot phantom and collimate it to cover the area of interest.

3- Attach the filter to the X-ray tube, be sure that the thinner part of the filter is towards the body of the foot, while the thicker part is towards the toes

Expose the foot phantom using the following factors: KV=45, mAs=4 4-

5- Process the film.

**Film three:**

1- Place the foot phantom on the cassette and angle the X-ray tube 15 degrees towards the foot (note that the FFD must be reduced by 2.5 cm for each 5 degrees angulation , so the FFD used is 100 – 7.5 = 92.5 cm).

2- Center the X-ray beam towards the foot phantom and collimate it to cover the area of interest.

3- Attach the filter to the X-ray tube, be sure that the thinner part of the filter is towards the body of the foot, while the thicker part is towards the toes.

4- Expose the foot phantom using the following factors: KV=**55**, mAs=4

(note that the Kv was increased by **10**)

5- Process the film.

***Conclusion:***

***Film one:***

Since we did not use the compensating filter, the density across the image is ***not uniform***.

The density seen in the toes area is ***high ( dark)*** because the toes are ***thin*** so the X-ray beam is not attenuated as much as the X-ray beam that passed through the body of the foot.

The density seen in the body of the foot is ***low (bright)*** because the body of the foot is ***thick*** so the X-ray beam is attenuated more than the X-ray beam that passed through the toes.

***Bad image quality because the density is not uniform.***

***Film two:***

Since we used the compensating filter, the density across the image is **uniform**.

***good image quality***

***Film three:***

we used the compensating filter, so the density across the image is ***uniform***.

But since we increased the ***Kv*** the density is ***uniformly high (dark).***

***Bad image quality due to high density***

**filtration is not a useful technique and is seldom used.**