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.

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

4- Process the film.

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

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

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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

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