

Beam Restricting Devices

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. Which of the following are tools that the radiographer can use to limit scatter radiation?
- Beam-restricting devices
 - Radiographic grids
 - Digital imaging plate
 - A and B
 - B and C
- ___ 2. The larger the x-ray beam field size, the _____ the amount of scatter radiation produced.
- greater
 - lesser
- ___ 3. What purpose does positive beam limitation serve?
- To prevent the technologist from placing an image receptor in the Bucky tray that is too large for the study performed
 - To allow the technologist to use an exposure field larger than the image receptor size
 - To prevent first-year students from having to repeat studies by not aligning the Bucky tray with the image receptor
 - To reduce patient exposure by limiting the exposure field to the same size as the image receptor in the Bucky tray
- ___ 4. Which of the following beam-restricting devices is best at limiting unsharpness surrounding the radiographic image?
- Collimator
 - Cylinder cone
 - Aperture diaphragm
 - Focused grid
- ___ 5. Decreasing collimation results in:
- a smaller field size.
 - a larger field size.
 - decreased patient dose.
 - less scatter production.
- ___ 6. As beam restriction increases, field size and patient dose _____.
- increases
 - decreases
 - does not change
- ___ 7. As beam restriction increases, the quantity of scatter radiation _____ and radiographic contrast _____.
- increases; increases
 - decreases; increases

- c. decreases; decreases
- d. increases; decreases

- ___ 8. Which of the following beam-restricting devices is least effective at limiting unsharpness surrounding the radiographic image?
- a. Collimator
 - b. Cylinder cone
 - c. Aperture diaphragm
 - d. Focused grid
- ___ 9. An aperture diaphragm with an attached elongated tube is a(n):
- a. collimator.
 - b. aperture diaphragm.
 - c. cone.
 - d. cylinder.
- ___ 10. A beam-restricting device that has two or three sets of lead shutters is a(n):
- a. collimator.
 - b. aperture diaphragm.
 - c. cone.
 - d. cylinder.
- ___ 11. The purpose of the mirror inside the collimator is to:
- a. allow the patient to see the radiographer.
 - b. allow the radiographer to see the patient.
 - c. project a light field onto the patient.
 - d. none of the above.
- ___ 12. The smaller the volume of tissue irradiated, the:
- a. greater the amount of scatter produced.
 - b. less the amount of scatter produced.
 - c. greater the need to use a grid.
 - d. A and C.
- ___ 13. Which kVp selection would result in the most scattered x-rays in the image-forming beam?
- a. 90 kVp
 - b. 75 kVp
 - c. 60 kVp
 - d. 50 kVp
- ___ 14. Compton scatter contributes to ____.
- a. useful information
 - b. image noise
 - c. image contrast
 - d. all of the above
- ___ 15. The three primary factors influencing the intensity of scatter in the image-forming beam are ____.
- a. mAs, kVp, and collimation
 - b. mAs, filtration, and grids

- c. kVp, field size, and patient thickness
- d. filtration, patient thickness, and mAs

- ___ 16. Decreasing the kVp will increase ____.
- a. patient dose
 - b. image noise
 - c. Compton scatter
 - d. optical density
- ___ 17. Scatter radiation increases as ____ increases.
- a. photoelectric absorption
 - b. field size
 - c. filtration
 - d. contrast
- ___ 18. The x-rays that are transmitted through the patient without interaction contribute to ____.
- a. useful information
 - b. film fog
 - c. image noise
 - d. all of the above
- ___ 19. Contrast resolution is improved by ____.
- a. tight collimation
 - b. lowering kVp
 - c. patient compression
 - d. all of the above
- ___ 20. The most commonly used beam restricting device is the ____.
- a. extension cone
 - b. variable collimator
 - c. aperture diaphragm
 - d. compression device

Beam Restricting Devices Answer Section

MULTIPLE CHOICE

1. ANS: D
Beam-restricting devices and radiographic grids are tools that the radiographer can use to limit scatter radiation.

PTS: 1 REF: p.179
2. ANS: A
The larger the x-ray beam field size, the greater the amount of scatter radiation produced.

PTS: 1 REF: p.180
3. ANS: D
Positive beam limitation (PBL), or automatic collimator, mechanically adjusts the x-ray field size to the size of the image receptor. This makes it difficult for the radiographer to open up the field beyond the image receptor, thus limiting the patient overexposure.

PTS: 1 REF: p.187
4. ANS: A
The collimator, using two or three sets of lead shutters, is best at limiting unsharpness surrounding the radiographic image.

PTS: 1 REF: p.187
5. ANS: B
Decreased collimation is the same as less beam restriction and results in a larger field size, increased patient dose, and more scatter production.

PTS: 1 REF: p.181
6. ANS: B
As beam restriction increases, field size and patient dose decreases.

PTS: 1 REF: p.181
7. ANS: B
As beam restriction increases, the quantity of scatter radiation decreases and radiographic contrast increases.

PTS: 1 REF: p.181
8. ANS: C
The aperture diaphragm is least effective at limiting unsharpness surrounding the radiographic image.

PTS: 1 REF: p.183
9. ANS: D
The cylinder is an aperture diaphragm with an attached elongated tube.

PTS: 1 REF: p.183

10. ANS: A
The collimator, or variable aperture diaphragm, includes two or three sets of lead shutters, some of which are adjustable.
- PTS: 1 REF: p.185
11. ANS: C
The mirror allows the radiographer to see a light field on the patient, representing the x-ray field that will be produced.
- PTS: 1 REF: p.186
12. ANS: B
The smaller the volume of tissue, the less scatter is produced.
- PTS: 1 REF: p.179
13. ANS: A
The percentage of Compton interaction increases as kVp increases.
- PTS: 1 DIF: Moderate REF: page 187
OBJ: List three factors that contribute to scatter.
14. ANS: B
Compton scatter contributes only to image noise.
- PTS: 1 DIF: Moderate REF: page 187
OBJ: Identify the x-rays that constitute image-forming radiation.
15. ANS: C
The three primary factors influencing the intensity of scatter in the image-forming beam are kVp, field size, and patient thickness.
- PTS: 1 DIF: Moderate REF: page 187
OBJ: List three factors that contribute to scatter radiation.
16. ANS: A
Decreasing the kVp will increase patient dose.
- PTS: 1 DIF: Moderate REF: page 187
OBJ: List three factors that contribute to scatter radiation.
17. ANS: B
Scatter radiation increases as field size increases.
- PTS: 1 DIF: Moderate REF: page 188
OBJ: List three factors that contribute to scatter radiation.
18. ANS: A
The x-rays that are transmitted through the patient without interaction contribute to useful information.
- PTS: 1 DIF: Moderate REF: page 187
OBJ: List three factors that contribute to scatter radiation.
19. ANS: D
Contrast resolution is improved by tight collimation, lowering kVp, and patient compression.

PTS: 1 DIF: Moderate REF: page 189

OBJ: Discuss three devices developed to minimize scatter radiation.

20. ANS: B

The most commonly used beam restricting device is the variable collimator.

PTS: 1 DIF: Moderate REF: page 193

OBJ: Discuss three devices developed to minimize scatter radiation.