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RADIOGRAPHY CERTIFICATION EXAM REVIEW

DEVELOPED BY:

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RT Review Workbook

A. Patient Care

I. Patient Interaction and Management

1. The best way to ensure patient understanding before a radiographic procedure:

2. What are effective methods of nonverbal communication:
    a.
    b.
    c.

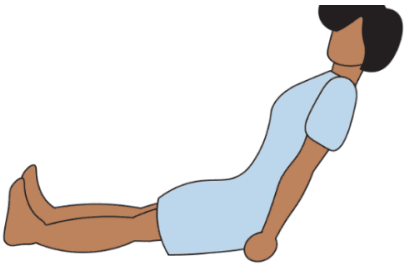
3. Define & Provide Example:

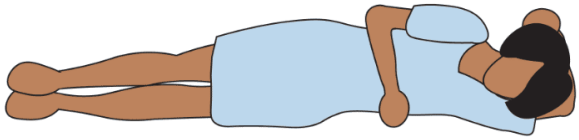
    a. Implied Consent

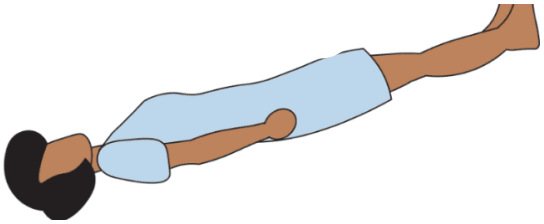
    b. Informed Consent

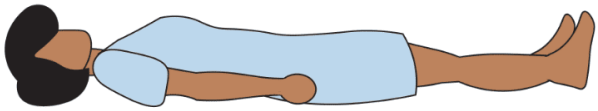
4. Name three patient identifiers:
    a.
    b.
    c.

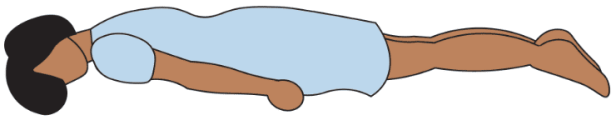
5. Identify recumbent positions:











6. What are common reactions to iodinated contrast?

7. List procedures for each contrast medium below:
    a. Barium Sulfate
    b. Iodinated Contrast
    c. Air
8. List contraindications for each contrast administration:
    a. Barium Sulfate
    b. Iodinated Contrast
9. A patient refuses and X-ray after you've explained its necessity. What steps should you take next?
10. Define and provide example:
    a. Tort
    b. Libel
    c. Negligence
    d. Battery
    e. Assault

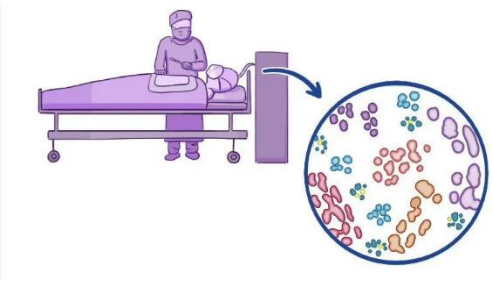
11. Define ethical patient care and provide examples:

12. HIPPA regulations are designed to protect patient _____?

H
I
P
P
A

13. What documentation/consent is needed to perform a radiographic procedure?

14. Identify medical & surgical asepsis.



15. Why is it important to disinfect radiographic equipment after each patient?

16. What technique is used to eliminate all forms of microbial life on surgical equipment?

17. What is the most effective method for preventing the spread of infection?

18. A patient becomes unresponsive during a procedure. List the steps you should take immediately.
    a.
    b.
    c.
    d.

19. What is the correct ratio of chest compressions to breaths during CPR?

20. Define the acronym “RACE” in fire safety:

21. Define the acronym “PASS” in fire safety:

22. What are the three basic principles of radiation protection?

    a.
    b.
    c.

23. The lead equivalent of protective apron must be at least _____ mm Pb?

24. What steps can be taken to minimize pediatric radiation exposure?

25. A patient has an order for a CT Abdomen/Pelvis with IV and Oral, a KUB, and an Upper GI. What is the preferred exam sequence?
    a.
    b.
    c.

26. Preparation instructions for the following procedures:

a. Chest X-ray:

b. IVU:

c. Small Bowel:

d. Upper GI:

e. Arthrogram:

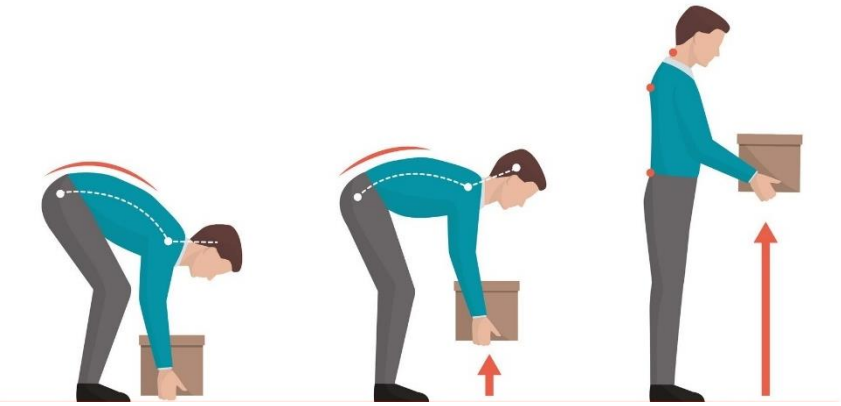
f. Myelogram:

g. Lower GI with suspected bowel perforation:

h. Hysterosalpingogram:

27. Patients undergoing MRI scans should remove all _____ to prevent safety risks.

28. List / Describe what improper body mechanics occur in the following:



29. List / Describe the proper body mechanics and patient safety transfer occurring:

30. List examples of how active listening can improve patient care in radiology. How can you build rapport with a patient who appears anxious with active listening?

31. Provide example and patient care plan for the following contrast reactions:

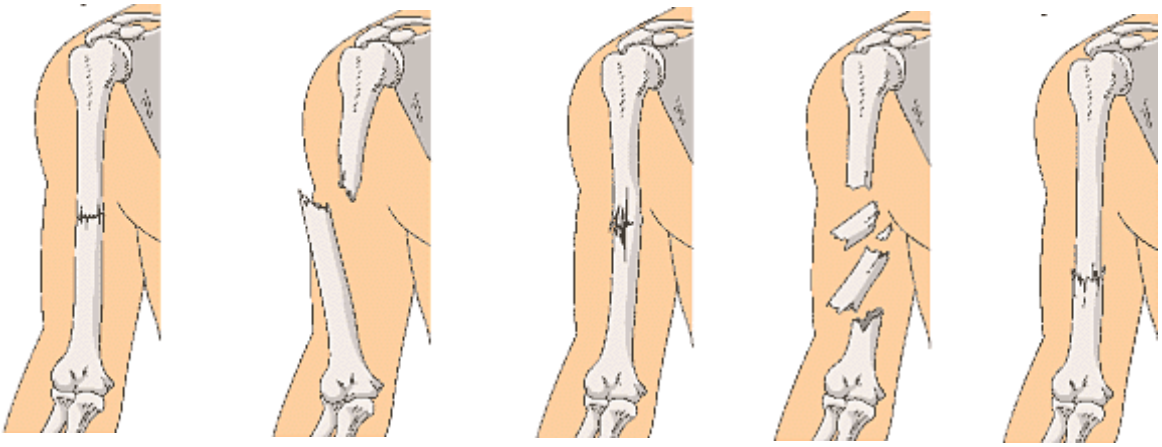
    a. Mild reaction

    b. Moderate reaction

    c. Severe reaction

32. A patient refuses an X-ray after you've explained its necessity. What steps should you take next?

33. Identify the types of fractures below:



34. A patient needs instruction for a barium swallow study. What key points must be covered?

    a.
    b.
    c.
    d.

35. During a mobile chest x-ray, other patients are nearby. What radiation protection measures are required considering the following:

    a. Distance considerations

    b. Shielding needs

    c. Communication

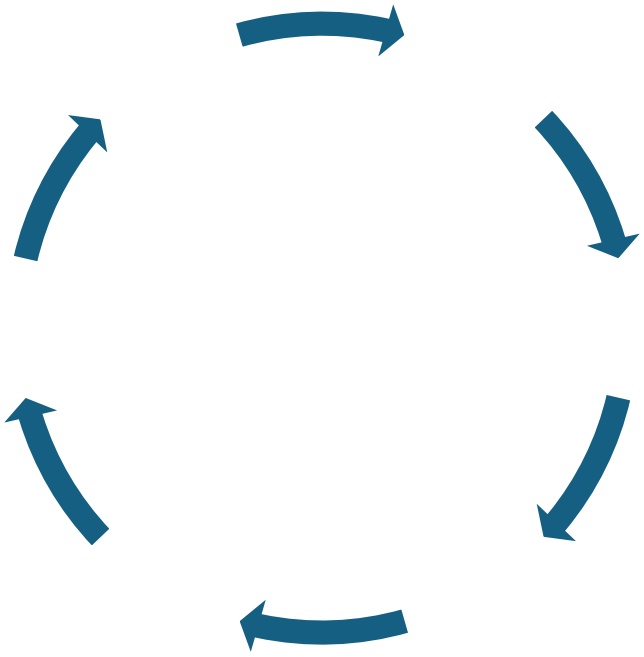
    d. Documentation

36. A patient's pulse oximeter reading drops to 88%. What immediate actions are required?

37. A patient refuses an examination after signing consent. What is your appropriate response considering patient rights, documentation, communication, and protocol review.

38. Your patient is hearing impaired. What communication methods would be most effective?

39. Fill in Chain of Infection. Define & Explain.



40. What content does the material safety data sheet provide?
    a.
    b.

41. Transmission Based Precautions

Precaution	PPE	Disease	
Contact			
Droplet			
Airborne			
Enteric			
Neutropenic			

42. List routes of contrast administration:
    a.
    b.
    c.

43. List the Six Rights of drug administration:
    a.
    b.
    c.
    d.
    e.

44. Types of Contrast Media

Type of Contrast Media	Exam Type	Radiographic Effect	
Negative			
Positive			

45. Chemical Composition

Solution	Definition	
Ionic		
Non-Ionic		
Osmolarity		
Viscosity		
Barium		
Gastrografin		

A. Patient Care Exam – Test your knowledge *(46 questions)*

1. What is the best method to communicate with a patient who is hard of hearing?

   A) Speak louder
   B) Write down instructions
   C) Use medical terminology
   D) Stand behind them

2. Which of the following promotes effective patient communication?

   A) Use of medical jargon
   B) Active listening
   C) Speaking quickly to save time
   D) Avoiding eye contact

3. When dealing with a pediatric patient, the technologist should primarily focus on:

   A) Communicating only with the parent
   B) Explaining procedures in age-appropriate terms
   C) Avoiding interaction with the child
   D) Relying on the parent for patient cooperation

4. If a patient becomes anxious during an exam, the technologist should:

   A) Proceed without explanation
   B) Explain the procedure calmly
   C) Ignore the patient's concerns
   D) Stop the procedure immediately

5. What is an effective way to gain a patient's trust?

   A) Avoiding personal interaction
   B) Providing clear and honest communication
   C) Limiting eye contact
   D) Using technical terminology

6. What is the correct way to transfer a patient from a wheelchair to the X-ray table?

   A) Lift the patient by yourself
   B) Use a transfer belt and assist
   C) Ask the patient to jump onto the table
   D) Call for help only if the patient asks

7. The most effective method for preventing the spread of infection in a radiology department is:

   A) Wearing gloves at all times
   B) Frequent hand hygiene
   C) Using disposable imaging plates
   D) Disinfecting equipment weekly

8. Which of the following is NOT a common reaction to iodinated contrast media?

   A) Itching
   B) Nausea
   C) Anaphylactic shock
   D) Hair loss

9. What is the correct ratio of chest compressions to breaths during CPR?

   A) 15:2
   B) 30:2
   C) 20:1
   D) 10:1

10. Which of the following is NOT a basic principle of radiation protection?

    A) Time
    B) Shielding
    C) Distance
    D) Comfort

11. How should you educate a patient about post-procedure care for a barium swallow?

    A) “Eat whatever you like immediately”
    B) “Increase fluid intake to prevent constipation”
    C) “Avoid physical activity for 48 hours”
    D) “Rest until you feel normal”

12. When imaging a pediatric patient, the most important factor to consider is:

    A) Speed
    B) Parental involvement
    C) Communication level
    D) All of the above

13. What is the correct order for donning personal protective equipment (PPE)?

    A) Gloves, mask, gown
    B) Gown, mask, gloves

C) Mask, gloves, gown
D) Gown, gloves, mask

14. What precaution should be taken for a patient with airborne precautions?

A) Standard surgical mask
B) N95 respirator
C) Gloves only
D) No special precautions

15. When performing a mobile exam on an isolation patient, what should the technologist do after leaving the room?

A) Dispose of PPE and wash hands
B) Call the next patient immediately
C) Reuse the PPE
D) Skip hand hygiene

16. What is the proper protocol for disposing of a sharp object?

A) Place it in a regular trash can
B) Recap and place in a sharp container
C) Place it in a sharp's container without recapping
D) Dispose of it with a biohazard waste

17. When assisting a patient with a weak side, you should:

A) Stand on the weak side
B) Stand on the strong side
C) Allow them to walk unaided
D) Push them in a wheelchair

18. Which document provides legal authorization for medical treatment?

A) Incident report
B) Informed consent
C) HIPAA form
D) Health insurance card

19. HIPAA is designed to protect:

A) Patients' medical records
B) Technologists from lawsuits
C) Hospital revenue
D) Insurance claims

20. The principle of autonomy in healthcare ethics means:

A) Patients have the right to make decisions about their care
B) Providers make all decisions
C) Care is provided without explanation
D) Patients must follow provider recommendations

PATIENT CARE

21. If a patient refuses an exam, the technologist should:

A) Perform the exam regardless
B) Notify the physician
C) Ignore the patient's wishes
D) Convince the patient to comply

22. The concept of beneficence requires a healthcare provider to:

A) Do good and act in the patient's best interest
B) Avoid contact with the patient
C) Promote only hospital policies
D) Follow orders without question

23. Which ethical principle involves treating all patients fairly?

A) Autonomy
B) Justice
C) Nonmaleficence
D) Veracity

24. Which of the following actions violates patient confidentiality?

A) Discussing a patient's case in public areas
B) Sharing information with authorized personnel
C) Documenting care in the patient's chart
D) Encrypting electronic records

25. For a patient with a nasogastric tube, the technologist should:

A) Remove the tube for better positioning
B) Avoid moving the tube and keep it secure
C) Disconnect it from the suction apparatus
D) Insert another tube for backup

26. The most effective way to prevent falls in a healthcare setting is to:

A) Always use restraints
B) Provide a call bell and ensure proper footwear
C) Allow patients to walk without assistance
D) Avoid monitoring the patient

27. If a patient experiences a sudden drop in blood pressure during an exam, the technologist should:

A) Ignore the symptoms
B) Assist the patient to a supine position
C) Administer oxygen immediately
D) Encourage the patient to stand

28. The acronym RACE is used to respond to a fire emergency. What does the "C" stand for?

A) Call for help
B) Confine the fire
C) Cover the patient
D) Contain oxygen tanks

29. In a code blue situation, the technologist's primary responsibility is to:

A) Manage patient care until the code team arrives
B) Perform surgery
C) Call for help and assist the code team as directed
D) Leave the area immediately

30. What is the first step when using an AED (Automated External Defibrillator)?

A) Turn on the device
B) Start chest compressions
C) Attach the electrodes
D) Check for a pulse

31. What is the appropriate action if you suspect child abuse?

A) Report your concerns to the appropriate authority as required by law
B) Ignore the signs
C) Confront the parent or guardian
D) Wait for confirmation from a colleague

32. What does the principle of nonmaleficence require?

A) Avoid causing harm to patients
B) Ensure all patients receive equal treatment
C) Provide complete autonomy to patients
D) Prioritize hospital profits

33. What are three patient identifiers?

A) Name, date of birth, medical record number
B) Insurance provider, room number, gender
C) Phone number, address, age

D) Hair color, height, weight

34. Which of the following is a recumbent position?

A) Supine
B) Prone
C) Lateral Decubitus
D) All of the above

35. What is a common mild reaction to iodinated contrast?

A) Hives
B) Anaphylaxis
C) Sweating and itching
D) None of the above

36. What is a contraindication for barium sulfate?

A) Suspected bowel perforation
B) Allergy to iodine
C) Dehydration
D) Gastric ulcers

37. What should you do if a patient refuses an X-ray after explaining its necessity?

A) Force the procedure
B) Notify the physician and document the refusal
C) Ignore the refusal
D) Call security

38. What is an example of battery in healthcare?

A) Performing a procedure without consent
B) Making false statements about a patient
C) Failing to properly monitor a patient
D) Accidental harm during a procedure

39. Which of the following defines medical asepsis?

A) Removing all microorganisms
B) Reducing microorganisms to prevent infection
C) Sterilizing surgical instruments
D) Using antibiotics to treat infections

40. What technique is used to eliminate all microbial life on surgical equipment?

A) Disinfection

B) Sterilization
C) Antisepsis
D) Isolation

41. The most effective method for preventing infection is:

A) Wearing gloves
B) Hand hygiene
C) Using antibiotics
D) Vaccination

42. What is the first step when a patient becomes unresponsive during a procedure?

A) Call for help
B) Check for a pulse
C) Start CPR
D) Finish the procedure

43. The lead equivalent of a protective apron must be at least:

A) 0.25 mm Pb
B) 0.50 mm Pb
C) 1.0 mm Pb
D) 2.0 mm Pb

44. To minimize pediatric radiation exposure, you should:

A) Use the lowest possible dose
B) Shield reproductive organs
C) Use appropriate positioning
D) All of the above

45. What are the three basic transmission-based precautions?

A) Contact, droplet, airborne
B) Bloodborne, droplet, airborne
C) Standard, isolation, contact
D) None of the above

46. What is a primary advantage of non-ionic contrast media?

A) Lower risk of adverse reactions
B) Higher iodine content
C) Less visibility on imaging
D) Less expensive than ionic contrast

ANSWERS

1. B
2. B
3. B
4. B
5. B
6. B
7. B
8. D
9. B
10. D
11. B
12. D
13. B
14. B
15. A
16. C
17. B
18. B
19. A
20. A
21. B
22. A
23. B
24. A
25. B
26. B
27. B
28. B
29. A
30. A
31. A
32. A
33. A
34. D
35. C
36. A
37. B
38. A
39. B
40. B
41. B
42. A
43. B
44. D
45. A
46. A

NOTES

B. Safety

I. Radiation Physics and Radiobiology

A. Principles of Radiation Physics

1. X-ray Production:

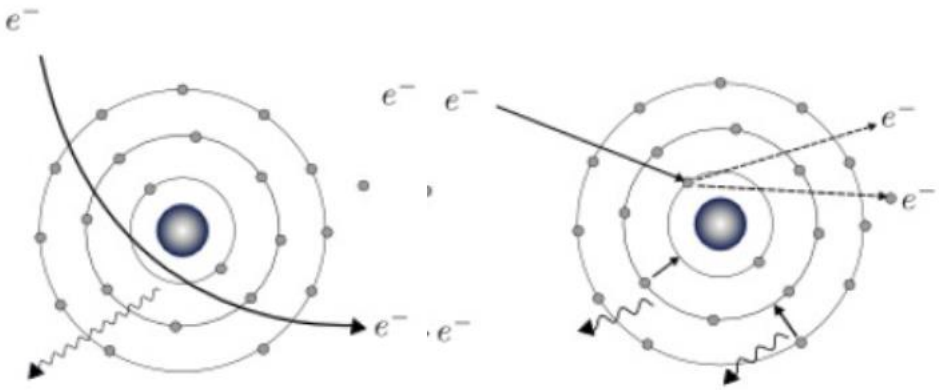
The source of free electrons is the _____

The focusing of Electrons is completed by _____

The acceleration of electrons is completed by _____

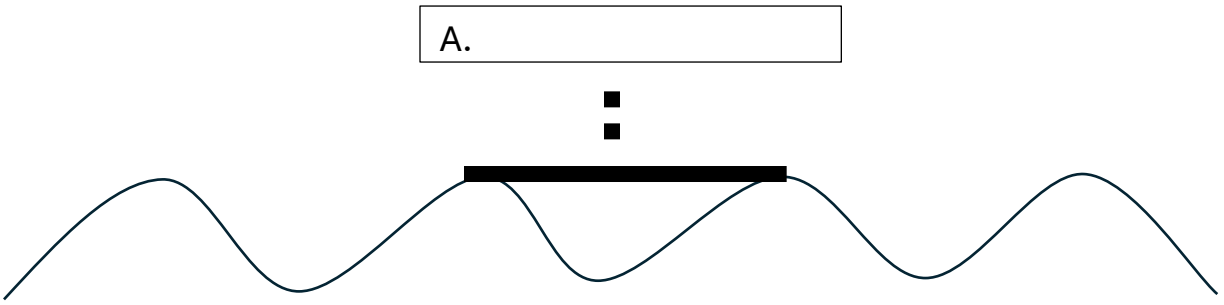
The Deceleration of electrons is found at the _____

2. Target Interactions:



A._____ B._____

3. X-ray Beam:



Frequency is the _____

Wavelength is the _____

Factors that affect the Quality of the x-ray beam (3 factors):

Factors that affect the Quantity of the beam (2 Factors):

Primary Radiation are x-rays that _____

Remnant Radiation are x-rays that _____

Inverse Square Law: Solve

$$\frac{I(1)}{I(2)} = \frac{D(2)^2}{D(1)^2}$$

A radiographer is performing a chest x-ray with an exposure rate of 8 mGy/sec at 100 cm. What would the exposure rate be at 150 cm?

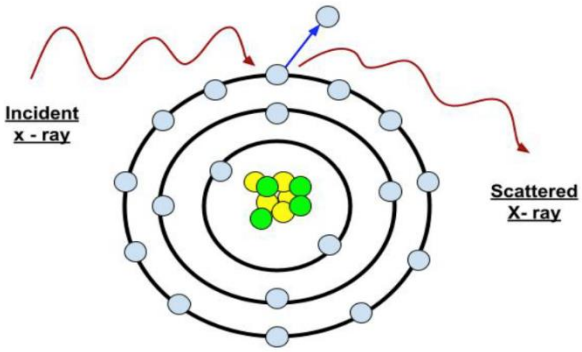
A fluoroscopy unit has an exposure rate of 5 mGy/hr, which is located 100 cm from the x-ray tube. What is the exposure rate 150 cm from the tube?

4. Fundamental Properties of X-ray (fill in the blanks)

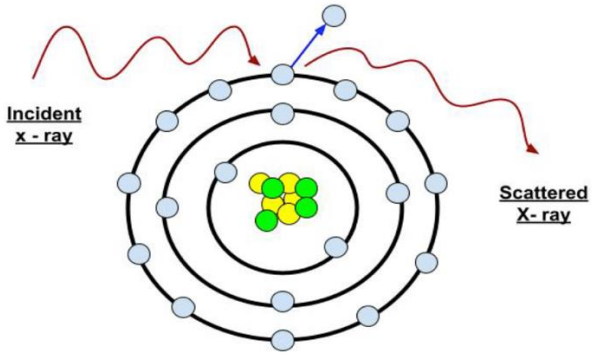
Part of the electromagnetic spectrum			
Travel in straight lines as waves	Have characteristics of waves and particles	Exist in a wide range of wavelengths and energies	
Electrically neutral	Can Scatter and produce Secondary Radiation		

5. Photon Interactions with Matter (Label and Describe)

A.



B.



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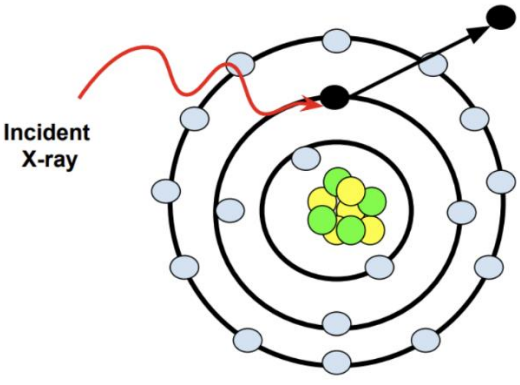


6. Attenuation by Various Tissues

Thin patients more chance for _____

Thicker patients more chance for _____

Higher Atomic Number of tissue = more likely to _____

Lower Atomic Number of tissue = more likely to _____

B. Biological Effects of Radiation

1. SI Units of Measurement

Unit of Measurement	SI Unit	What it Measures
Exposure		
Air Kerma		
Absorbed dose (D)		
Equivalent dose (EqD)		
Effective dose (EfD)		

2. Radiosensitivity

Dose Response Relationships

	One Term used		One Term used	
Term to Know:	Linear	Non-Linear	Threshold	Nonthreshold
Description:				

Radiation Safety follows the assumption that any dose can show a response.
This would be considered a _____, _____ dose-response relationship.

3. Relative Tissue Radiosensitivity

Somatic cells divide by _____

Genetic cells divide by _____

Cells are radiosensitive during which phases of cell division?

When exposed to radiation, _____ cells may result in a mutation that will be passed on to future generations.

4. Define:

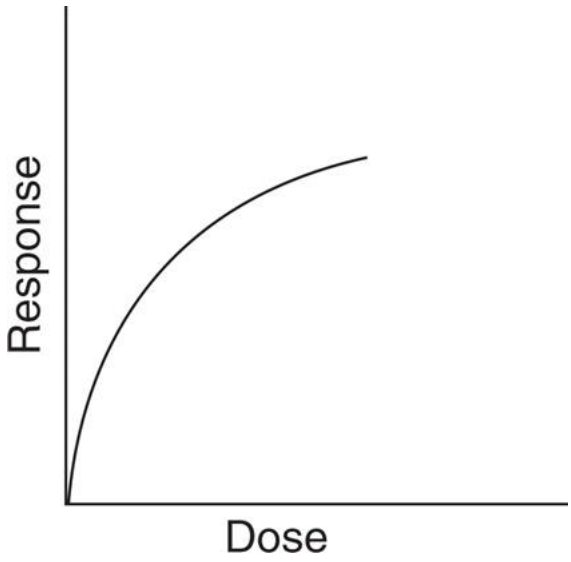
Linear Energy Transfer:

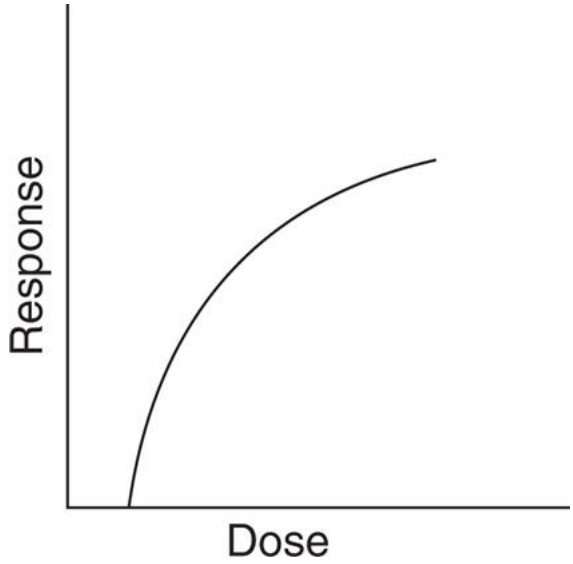
Relative Biologic Effectiveness:

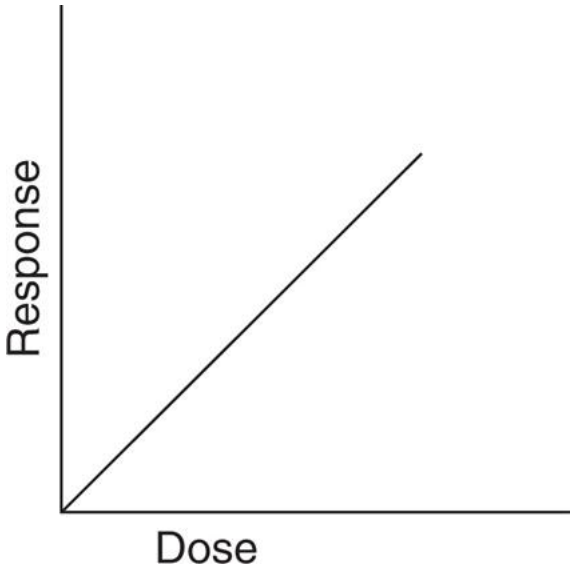
When Linear Energy Transfer Increases, Relative Biologic Effectiveness _____.

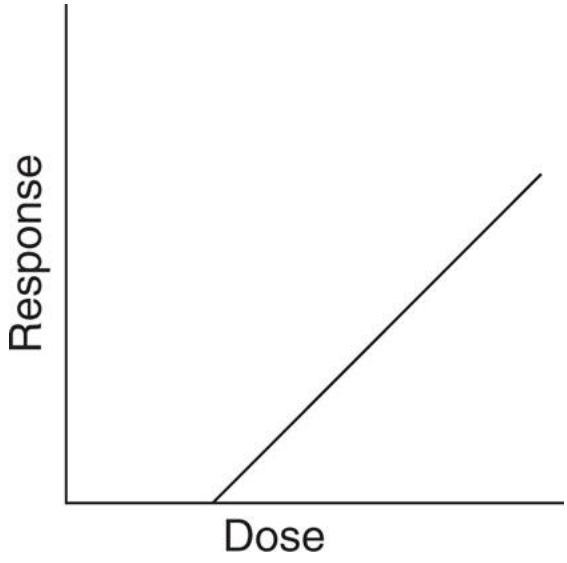
5. Label the Dose-Response Curves:

A. _____ B. _____ .









C. _____ D. _____

6. Describe the differences between Direct Effects and Indirect effects.

What is the radiolysis of water?

Which causes the most damage in the human body? (Circle the correct answer)

Direct Action or Indirect Action

7. Explain the concept of Target Theory.

Put the Law of Bergonie and Tribondeau in your own words.

Radiosensitivity of cells is directly proportional to their reproductive activity and inversely proportional to their degree of differentiation

As cells mature and become more specialized, they are _____ sensitive to radiation.

Fill out the chart:

Type of Cell	**Radiosensitive/Radioinsensitive**
	Most Radiosensitive
Muscle Tissue	
Epithelial Tissue	
Stem Cells	
	Most Radioinsensitive
Immature Sperm Cells	

8. Cell Survival and Recovery

Cells contain _____ that can repair and recover sublethal doses of radiation.

LD 50/30 means, the Lethal dose that will kill _____ of the population in _____days.

Oxygen Effects

The more oxygen found in tissue, the more _____ damage potential there is with radiation.

9. Somatic Effects

A. Cells & Tissue

Cells that are _____ and more _____, are less sensitive to radiation

Cells are _____ at higher temperatures.

Fill in the Chart:

Tissue Type	Effects seen
Breast	
Skin	
Eyes	
Thyroid	
Bone Marrow	
Gonads	

10. The embryo fetus is most sensitive during the _____ trimester; also called the _____ stage.

List some of the birth defects that can occur with the embryo fetus when exposed to radiation.

B. Carcinogenesis

Define Carcinogenesis.

Carcinogenesis is considered a late _____ effect.

Carcinogenesis is the most significant late _____ effect.

C. Early Versus Late (Acute versus Chronic)

Discuss the differences between Early/Acute and Late/Chronic effects.

D. Deterministic (tissue reactions) versus Stochastic

Discuss the differences between Deterministic (tissue reactions) and Stochastic effects.

E. Short-term versus Long-term exposure

Define Fractionation and Protraction.

Discuss the differences between short-term and long-term exposure.

F. Acute Radiation Syndrome (ARS)

Describe the 4 stages of ARS.

Manifest illnesses	**What happens & Dose it takes to happen**
Hematopoietic syndrome	
Gastrointestinal (GI) syndrome	
Central nervous system (CNS) syndrome	

II. Radiation Protection

A. Minimizing Patient Exposure

Exposure Factor	How factor affects patient's exposure
KVP	
mAs	
Automatic Exposure Control (AEC)	

1. Beam restriction

What do beam restrictors do and how does that affect patient dose?

Type of Beam Restrictor	Differences
Aperture Diaphragm	
Cone/Cylinder	
Collimator	

What is positive beam limitation and how does that affect patient dose?

2. Patient Considerations

Consideration	What to know
Positioning	
Communication	
Pediatric	
Morbid Obesity	

3. Filtration

What does filtering do? And why is this good for patients?

Types of Filtration	What it is	Examples of filtration type
Inherent		
Added		

Total filtration is a combination of added and inherent filtration. What is the recommended aluminum equivalent needed for an x-ray tube operating above 70 kVp?

4. Dose documentation

It is the responsibility of the _____ to document patient dose (especially during fluoroscopy procedures).

5. Image Receptors

Less technique is needed when using _____ speed systems. Digital systems are considered _____ (fast/slow)

6. Grids

When using grids, _____ of exposure factors occurs.

Higher Grid ratios require more _____. This results in an _____ in patient dose when using grids.

7. Fluoroscopy

Describe in your own words what is pulsed fluoroscopy?

_____ kVp, _____ mAs techniques are used in fluoroscopy.

Keeping the _____ close to the patient will result in less dose to the patient.

Fluoroscopy timer is set for _____ minutes.

What is Automatic Brightness Control/ Automatic Exposure Rate Control?

What does magnification mode do to patient dose?

Describe how the last image hold feature is used and why it will reduce patient dose.

Fill in the blanks

Type of unit	Must be at least _____ away from patient
Stationary x-ray units	
	30 cm (12 inches)
Stationary fluoroscopy units	
C-arms	30 cm (12 inches)

8. Dose Area Product (DAP) meter

What unit of measurement is used by the DAP?

B. Personnel Protection (ALARA)

9. Source of Radiation Exposure

A. Primary Beam

The radiographer should _____ be exposed to the primary beam.

List individuals who should be last resorts for immobilization during an exposure.

- _____
- _____
- _____

Give 2 examples of those who are first choices to immobilize patients:

- _____
- _____

B. Secondary Radiation

Compare and Contrast Scatter and Leakage Radiation.

Scatter	
Leakage	

C. Patient as the source

Patients become a source of _____ radiation during examinations.

If technologists are in the room, best practice is to stand _____ to the patient.

D. Basic Methods of Protection

Describe the Cardinal Rules of Radiation Protection and how they protection personnel

Time	
Distance	
Shielding	

E. Protective Devices

Type	Lead Requirement	Height Requirement
Primary Barrier		
Secondary Barrier		
Control Booth		
Leaded Glass Barrier		
Lead Aprons		
Thyroid Shield		
Lead Gloves		
Protective Curtain		
Bucky Slot Cover		

F. Special Considerations

Mobile

During mobile procedures, the radiographer should stand _____ meters away from the source of x-ray exposure.

Fluoroscopy

Describe how the following protect the fluoroscopist from radiation exposure:

- Protective Drape

- Protective Bucky Slot Cover

Distinguish how remote-controlled fluoroscopy will reduce dose to occupational workers.

Guidelines for Fluoroscopy and Mobile units

Fluoroscopy exposure rates

Type of Fluoroscopy	Exposure Rate Limit
General purpose fluoroscopy	
Non-image intensified	
High level-controlled fluoroscopy	

Exposure switch guidelines

Examine and describe the use of the dead man switch required in Mobile and Fluoroscopy units.

10. Radiation Exposure and Monitoring

Types of Dosimeters

Type	Made of	How it is Processed	Monitoring Period	Sensitivity
Film Badges		Densitometer	1 month monitoring period	0.1 mSv
Thermoluminescent Dosimeter (TLD)	Lithium Fluoride		Up to 3 months	
Optically Stimulated Luminescence (OSL)		Read using laser Light		0.01 mSv
Pocket Ionizing Chamber	Pen shaped	Using electrometer	Must be read daily	Most sensitive

Dosimeters are issued with the risk of receiving _____ 10% of the _____ exposure limit is likely.

Dosimeter	Where do you wear it
Primary Dosimeter	
Primary Dosimeter during Fluoroscopy	
Pregnant Monitor	
Pregnant Monitor during Fluoroscopy	

NCRP recommendations for personnel monitoring (NCRP #116)

Type	Dose Limit
Cumulative effective dose limit	
Annual: Occupational	
Annual: General Population	
Entire Pregnancy: Pregnant Radiation Worker	
Embryo Fetus – per month	
Annual: Education and individuals under age of 18	
Annual: Lens of eyes	
Annual: Skin, Hands, Feet	

11. Evaluation and Maintenance of Personnel Dosimetry Records

Who oversees the radiation safety programs of an institution?

Describe what an action limit or trigger level is and how it will help in personnel protection.

Describe how radioisotopes and other radioactive material is handled and dispose.

B. Safety Exam – Test your knowledge *(60 questions)*

1. What is the source of free electrons in X-ray production?

   A) Anode
   B) Cathode filament
   C) Focusing cup
   D) Target

2. What focuses the electrons in X-ray production?

   A) Target
   B) Focusing cup
   C) Cathode
   D) Rotating anode

3. What accelerates electrons in the X-ray tube?

   A) Tube housing
   B) High-voltage potential
   C) Filament current
   D) Target

4. What factors affect the quality of the X-ray beam?

   A) kVp, filtration, and tube current
   B) mAs, filtration, and exposure time
   C) kVp, mAs, and focal spot size
   D) kVp, filtration, and beam restriction

5. Primary radiation refers to:

   A) Radiation that interacts with the patient and is scattered
   B) X-rays that pass through the patient without interaction
   C) X-rays that originate directly from the target
   D) Secondary radiation from patient tissues

6. Using the inverse square law, what is the exposure rate at 150 cm if it is 8 mGy/sec at 100 cm?

   A) 4.5 mGy/sec
   B) 3.6 mGy/sec
   C) 2.8 mGy/sec
   D) 3.2 mGy/sec

7. Which X-ray interaction with matter involves the ejection of an inner-shell electron?

A) Photoelectric effect
B) Compton scatter
C) Coherent scatter
D) Pair production

8. Tissues with a higher atomic number are more likely to:

A) Absorb radiation via the photoelectric effect
B) Transmit radiation
C) Cause Compton scatter
D) Produce coherent scatter

9. What SI unit measures radiation exposure in air?

A) Gray (Gy)
B) Sievert (Sv)
C) Air Kerma (Gy_a)
D) Becquerel (Bq)

10. Radiosensitivity of cells is highest during which phase of cell division?

A) G1 phase
B) S phase
C) M phase
D) G2 phase

11) Which cells are most radiosensitive:

A) Muscle cells
B) Nerve cells
C) Stem cells
D) Mature red blood cells

12. What is the SI unit for effective dose?

A) Gray (Gy)
B) Sievert (Sv)
C) Becquerel (Bq)
D) Coulomb/kg

13. Beam restrictors reduce:

A) Patient dose and scatter radiation
B) Image resolution
C) Exposure time
D) Radiation intensity

14. What does the use of grids do to patient dose?

A) Increases dose
B) Decreases dose
C) Does not affect dose
D) Reduces scatter without affecting dose

15. What is the maximum dose rate for fluoroscopy?

A) 50 mGy/min
B) 100 mGy/min
C) 150 mGy/min
D) 200 mGy/min

16. Which type of interaction occurs when an inner-shell electron is ejected?

A) Compton scatter
B) Photoelectric effect
C) Coherent scatter
D) Pair production

17. What is the minimum total filtration required for X-ray tubes operating above 70 kVp?

A) 1.0 mm Al
B) 2.0 mm Al
C) 2.5 mm Al
D) 3.0 mm Al

18. What is the purpose of collimation?

A) Increase scatter radiation
B) Decrease patient dose by restricting the beam size
C) Decrease exposure time
D) Reduce beam energy

19. Which cardinal rule of radiation protection is most effective?

A) Time
B) Distance
C) Shielding
D) Exposure

20. During mobile radiography, radiographers should stand at least:

A) 3 feet from the source
B) 6 feet from the source
C) 9 feet from the source
D) 4 meters from the source

21. The fluoroscopy timer is designed to alert the operator after how many minutes?

A) 3 minutes
B) 5 minutes
C) 10 minutes
D) 15 minutes

22. What type of dose-response relationship assumes no safe dose of radiation?

A) Linear threshold
B) Linear nonthreshold
C) Nonlinear threshold
D) Nonlinear nonthreshold

23. What is the Law of Bergonié and Tribondeau?

A) Radiosensitivity is inversely proportional to cell specialization
B) Radiosensitivity is directly proportional to cell age
C) Radiosensitivity is unrelated to cell function
D) Radiosensitivity decreases with increased cell division

24. What is the unit of measurement for Dose Area Product (DAP)?

A) Gray (Gy)
B) Sievert (Sv)
C) $mGy \cdot cm^2$
D) Becquerel (Bq)

25. To minimize motion blur in pediatric radiography, you should:

A) Increase kVp
B) Decrease mAs
C) Use shorter exposure times
D) Use higher mAs values

26. What type of dosimeter uses lithium fluoride to measure radiation exposure?

A) Film badge
B) Thermoluminescent dosimeter (TLD)
C) Optically stimulated luminescence (OSL)
D) Pocket dosimeter

27. What is the dose limit for pregnant radiation workers over the entire gestation period?

A) 1 mSv
B) 5 mSv
C) 10 mSv
D) 50 mSv

28. What is the effective dose limit for occupational workers annually?

A) 10 mSv
B) 20 mSv
C) 50 mSv
D) 100 mSv

29. What does Automatic Exposure Control (AEC) adjust?

A) kVp
B) mAs
C) Filtration
D) Collimation

30. What is the purpose of the last image hold feature in fluoroscopy?

A) Increase brightness
B) Decrease scatter
C) Reduce patient dose
D) Improve image quality

31. Positive Beam Limitation (PBL) ensures:

A) Reduced scatter radiation
B) Automatic collimation to the image receptor size
C) Increased patient dose
D) Improved contrast

32. What material is commonly used for added filtration in X-ray tubes?

A) Lead
B) Aluminum
C) Copper
D) Tungsten

33. What happens to patient dose when using magnification mode in fluoroscopy?

A) Increases
B) Decreases
C) Remains constant
D) Is eliminated

34. What is the recommended minimum lead equivalent for thyroid shields?

A) 0.25 mm Pb
B) 0.5 mm Pb
C) 1.0 mm Pb
D) 1.5 mm Pb

35. What is the occupational dose limit for the lens of the eye annually?

A) 20 mSv
B) 50 mSv
C) 150 mSv
D) 500 mSv

36. Which type of radiation interaction produces characteristic X-rays?

A) Photoelectric effect
B) Compton scatter
C) Pair production
D) Bremsstrahlung radiation

37. During mobile radiography, what is the safest location for the radiographer?

A) Behind the portable machine
B) 90 degrees to the primary beam and patient
C) 180 degrees from the patient
D) Close to the x-ray tube

38. Which of the following is an example of a stochastic effect?

A) Skin erythema
B) Cataracts
C) Radiation-induced cancer
D) Hair loss

39. Cells with high reproductive rates are:

A) More radiosensitive
B) Less radiosensitive
C) Unaffected by radiation
D) Equally sensitive as all other cells

40. What is the sensitivity threshold for optically stimulated luminescence (OSL) dosimeters?

A) 0.1 mSv
B) 0.01 mSv
C) 1.0 mSv
D) 0.5 mSv

41. What is the purpose of the dead man switch in fluoroscopy?

A) Reduce scatter radiation
B) Prevent accidental prolonged exposure
C) Increase patient dose control
D) Maintain image sharpness

42. Natural background radiation represents what percentage of human's radiation exposure?

A) 21%
B) 50%
C) 82%
D) 5%

43. Which of the following is responsible for producing contrast on the radiograph?

A) Photoelectric interaction
B) Compton Scatter
C) Coherent Scatter
D) Pair Production

44. What is the traditional unit of measurement derived from multiplying Rad by a radiation weighting factor?

A) Roentgen
B) Gray
C) Rem
D) Curie

45. The agency that enforces radiation protection standards relating to radioactive material at the federal level is the:

A) Nuclear Regulatory Commission (NRC)
B) International Commission on Radiation Protection (ICRP)
C) National Council on Radiation Protection and Measurements (NCRP)
D) Bureau of Radiological Health (BRH)

46. ALARA is an acronym for:

A) As long as reasonably achievable
B) As little as reasonably achievable
C) As long as radiologist allows
D) A radiation protection concept that encourages radiation users to keep the dose to the patient as low as reasonably achievable

47. What are graphs called showing the relationship between dose of radiation received and incidence of effects?

A) Nonlinear-nonthreshold effect
B) Linear-nonthreshold effect
C) H & D curves
D) Dose-response curves

48. Which of the following means there is a safe level of radiation for certain effects and those effects are not directly proportional to the dose received when the safe level is exceeded?

A) Nonlinear-nonthreshold effect
B) Linear-nonthreshold effect
C) Linear-threshold effect
D) Nonlinear-threshold effect

49. Effects of radiation that become more severe at higher levels of exposure once the threshold dose is exceeded are called:

A) Dose-response curves
B) Deterministic effects
C) Genetic effects
D) Somatic effects

50. What is the embryo or fetus equivalent dose limit per month?

A) 50 mSv
B) 1 mSv
C) 5 mSv
D) 0.5 mSv

51. Which of the following occurs when radiation transfers its energy to DNA?

A) Indirect effect
B) Target theory
C) Direct effect
D) Mutations

52. Cells are more radiosensitive when:

A) Fully oxygenated
B) Deoxygenated
C) Slowly dividing
D) Near the skin

53. Attenuation:

A) Is radiation emerging from the patient
B) Describes changes in the x-ray beam as it travels through the patient
C) Produces only scatter radiation
D) Occurs only at doses used in radiation therapy

54. Medical x-rays are an example of:

A) Natural background radiation
B) Artificially produced radiation
C) Nonionizing radiation
D) Ionizing, natural background radiation

55. If the radiation dose 6 feet from the x-ray table is 5 R, what is the dose at a distance of 3 feet?

A) 20 R
B) 10 R
C) 1.25 R
D) 2.5 R

56. A damaged cell is otherwise known as?

A) Molecular
B) Exposed
C) Genetic
D) Somatic

57. Effects of ionizing radiation appearing months or years after exposure to ionizing radiation.

A) Radiation weighting factor
B) Short-term somatic effects
C) Long-term somatic effects
D) Linear energy transfer

58. Random, or probability:

A) Long-term damage
B) Stochastic damage
C) Somatic damage
D) Short-term damage

59. Which of the following instruments is called a *cutie pie*?

A) Geiger-Muller detector
B) OSL dosimeter
C) Proportional counter
D) Ionization chamber-type survey meter

60. Which of the following items is *not* a basic component of the film badge dosimeter?

A) Charged electrodes
B) Radiographic film packet
C) Assortment of metal filters
D) Durable plastic film holder

ANSWERS

1. B
2. B
3. B
4. A
5. C
6. C
7. A
8. A
9. C
10. C
11. C
12. B
13. A
14. A
15. B
16. B
17. C
18. B
19. B
20. B
21. B
22. A
23. A
24. C
25. C
26. B
27. B
28. C
29. B
30. C
31. B
32. B
33. A
34. B
35. C
36. D
37. B
38. C
39. A
40. B
41. B
42. B
43. A
44. C
45. A
46. D
47. D
48. D
49. B
50. D
51. C
52. A
53. B
54. B
55. A
56. D
57. C
58. B
59. D
60. A

NOTES

C. Image Production

I. Image Acquisition and Evaluation

1. Match the following equipment components with their function:

   X-ray tube x-ray detection & image formation

   Collimator improves image contrast

   Grid generates x-ray

   Image receptor beam restriction

2. _____ is commonly used for the anode in the X-ray tube.

3. _____ controls the filament current in the X-ray tube and determines the quantity of electrons produced.

4. Explain why the rotating anode is preferred over a stationary anode in diagnostic radiography.

5. Arrange the following in order from least to most radiopaque:

   air, muscle, bone, fat

   Least Most
   < ---------- >

6. A radiograph has excessive noise. What could be the cause, and how would you correct it?

7. Which combination of mAs and kVp is likely to produce the best image quality while minimizing patient dose?

8. Define the term “reciprocity law” and provide an example of its application.

9. Doubling the mAs will _____ the radiographic density.

10. A portable chest X-ray is underexposed. How would you adjust the technical factors to improve the image?

11. You need to maintain the same radiographic density, and the desired exposure is 10 mAs.
    - $mA_1 = 100$
    - $t_1 = 0.1$ seconds

    what mA_2 is required if the new exposure time $t_2 = 0.2$ seconds?

12. Describe one method to reduce scatter radiation without using a grid.

13. List types of gride errors:

14. Define and provide example:

    - Pixel
    - Matrix
    - Dynamic Range
    - Bit depth

15. Explain the relationship between matrix size, pixel size, and spatial resolution:

16. Without changing the field of view (FOV), how can spatial resolution be improved?

17. List advantages of digital imaging:

18. A CR image appears excessively dark. What could be the cause, and how would you correct it?

19. List examples of DR processing artifacts:

20. What steps can you take to minimize motion artifacts during an exposure?

21. You notice a radiograph has a blurred appearance. What might be the cause, and how would you address it?

22. Why is it important to perform regular maintenance and calibration of radiographic equipment?

23. During a quality control test, the HVL is found to be below the recommended level. What action should be taken to correct this issue?

II. Equipment Operation and Quality Assurance

24. Describe primary function of the cathode and anode:

    - Cathode:

    - Anode:

25. Describe the Anode Heel Effect:

26. The _____ is the area of the anode where electrons collide, and X-rays are produced.

27. Tube Housing components and material: complete table.

Component	Material	Key Properties
Cathode Filament		High melting point, low vaporization
	Tungsten, Rhenium Tungsten, Molybdenum, Graphite	High atomic number, thermal resistance
Tube Housing		
	Borosilicate glass, metal-ceramic	Maintains vacuum, thermal resistance

28. During an X-ray, you hear a loud noise coming from the tube. What might be the cause, and what steps should you take?

29. What type of generator provides the most consistent and efficient X-ray output?

30. Explain how mAs and kVp settings are controlled in the X-ray generator.

31. Match the following components to their roles in the X-ray generator:

Transformer	Provides control & adjustment to kVp setting
Rectifier	Increases voltage
Autotransformer	Converts AC to DC

32. Which device is used to restrict the size of the X-ray beam?

33. Adding filtration effects?

34. During an inspection, it is found that the beam size does not match the collimator light field. What could cause this discrepancy, and how can it be corrected?

35. Describe the role of inherent and added filtration in improving image quality.

36. Match the following image receptor types to their characteristics:

Film-screen	reusable phosphor plates
CR	widest dynamic range
DR	chemically processed

37. During indirect digital radiography, what converts X-ray photons into light photons?

38. A digital image appears excessively bright despite appropriate exposure settings. What might be causing this artifact?

39. The Nine-penny test evaluates the alignment of?

40. Explain why repeat analysis is an essential part of quality assurance?

41. During quality control, the measured exposure output is inconsistent when the same settings are used. What could be the cause, and what steps would you take to address it?

42. The _____ protects operators from scatter radiation during fluoroscopic procedures.

43. Describe the purpose and function of a dosimeter in radiation safety.

44. You notice that a lead apron has visible cracks. What steps should you take to ensure patient and operator safety?

45. List causes of X-ray tube failure:

46. The _____ chart is used to prevent overheating and damage to the X-ray tube.

47. Noise is coming from the rotating anode. What could be the problem, and what steps should you take?

48. Why is it important to document equipment maintenance and service records in radiology?

C. Image Production Exam – Test your knowledge *(60 questions)*

1. What is the primary controlling factor of X-ray beam quality?

   A) mAs
   B) kVp
   C) Focal spot size
   D) SID

2. The primary controlling factor of X-ray beam quantity is:

   A) kVp
   B) mAs
   C) Filtration
   D) OID

3. What is the function of the focusing cup in the X-ray tube?

   A) Accelerates electrons
   B) Focuses electrons on the anode
   C) Produces free electrons
   D) Absorbs scatter radiation

4. Bremsstrahlung radiation occurs when:

   A) An inner-shell electron is ejected
   B) An electron interacts with the nucleus of an atom
   C) An electron is absorbed by the nucleus
   D) An outer-shell electron fills an inner-shell vacancy

5. Characteristic radiation occurs when:

   A) An electron is decelerated
   B) An inner-shell electron is ejected, and an outer-shell electron fills the vacancy
   C) A photon is absorbed by the nucleus
   D) Electrons are repelled from the anode

6. What percentage of the energy in the X-ray tube is converted into X-rays?

   A) 1%
   B) 50%
   C) 75%
   D) 99%

7. What is the primary purpose of filtration in the X-ray tube?

   A) Reduce scatter radiation
   B) Improve image resolution
   C) Increases patient dose
   D) Remove low-energy photons from the beam

8. Which interaction contributes most to patient dose?

   A) Compton Scatter
   B) Photelectric effect
   C) Coherent scatter
   D) Pair production

9. Which interaction contributes most to radiographer dose?

   A) Compton scatter
   B) Photoelectric effect
   C) Coherent scatter
   D) Pair production

10. The focal spot is located on which part of the x-ray tube?

   A) Cathode
   B) Glass envelope
   C) Anode
   D) Filtration

11. Which factor determines the penetration of X-rays?

   A) mAs
   B) kVp
   C) SID
   D) Focal spot size

12. Increasing kVp will:

   A) Decrease beam intensity
   B) Decrease beam quality
   C) Increase the number of photons in the beam
   D) Increase photon energy

13. Increasing mAs will:

A) Increase photon energy
B) Increase the number of photons in the beam
C) Increase contrast
D) Decrease image brightness

14. What effect does increasing SID have on image sharpness?

A) Increases sharpness
B) Decreases sharpness
C) No effect
D) Reduces magnification

15. What material is commonly used for the anode target in diagnostic x-ray tubes?

A) Lead
B) Tungsten
C) Aluminum
D) Copper

16. The anode heel effect is more pronounced with:

A) Larger focal spot sizes
B) Smaller anode angles
C) Increased SID
D) Increased filtration

17. What is the relationship between kVp and patient dose?

A) Higher kVp increase dose
B) Higher kVp decreases dose
C) No relationship
D) Dose is only affected by mAs

18. What happens to contrast when scatter radiation increases?

A) Contrast increases
B) Contrast decreases
C) Contrast remains unchanged
D) Contrast becomes sharper

19. What is the purpose of a rotating anode?

A) Improve heat dissipation
B) Increase patient dose
C) Focus the electron beam
D) Reduce x-ray production

20. Which of the following factors has the greatest impact on scatter radiation production?

A) mAs
B) kVp
C) Filtration
D) Focal spot size

21. What is the active layer of a digital detector?

A) Photoconductor
B) Scintillator
C) Phosphor layer
D) Protective layer

22. What does DQE (Detective Quantum Efficiency) measure?

A) Noise level in the image
B) The efficiency of the detector in converting x-rays to a signal
C) Image resolution
D) Speed of the image receptor

23. Which term describes the ability to distinguish small objects with high contrast?

A) Spatial resolution
B) Contrast resolution
C) Brightness
D) Linearity

24. In digital imaging, pixel size affects:

A) Image contrast
B) Spatial resolution
C) Image brightness
D) Noise

25. Increasing the matrix size in digital imaging will:

A) Decrease spatial resolution
B) Increase spatial resolution
C) Increase pixel size
D) Decrease image brightness

26. What is the purpose of a histogram in digital imaging?

A) Reduce noise
B) Enhance contrast
C) Plot pixel intensity values
D) Improve sharpness

27. Which post-processing tool adjusts image brightness?

A) Window level
B) Window width
C) Edge enhancement
D) Equalization

28. What artifact occurs when the grid is misaligned with the X-ray beam?

A) Grid cutoff
B) Motion artifact
C) Quantum mottle
D) Moire effect

29. What is the effect of increased OID on image magnification?

A) Increases magnification
B) Decreases magnification
C) No effect
D) Improves image resolution

30. What is the result of excessive kVp?

A) Increased contrast
B) Increased scatter
C) Decreased spatial resolution
D) Reduced brightness

31. Quantum mottle is primarily caused by:

A) Low mAs
B) High kVp
C) High SID
D) Low OID

32. What is the purpose of window width in digital imaging?

A) Adjust contrast
B) Adjust brightness
C) Sharpen edges
D) Reduce noise

33. The 15% rule states that increasing kVp by 15% will:

A) Double the exposure
B) Halve the exposure
C) Improve contrast
D) Reduce scatter radiation

34. Which factor reduces shape distortion?

A) Aligning the x-ray tube, part, and image receptor
B) Increasing OID
C) Using a small focal spot size
D) Decreasing SID

35. Increasing collimation:

A) Increase scatter radiation
B) Reduce scatter radiation
C) Increase patient dose
D) Decrease image contrast

36. What is the primary purpose of a grid?

A) Reduce patient dose
B) Absorb scatter radiation
C) Increase beam intensity
D) Improve spatial resolution

37. Which of the following reduces motion blur?

A) Shorter exposure times
B) Increased mAs
C) Higher kVp
D) Increased SID

38. A wide dynamic range in digital imaging means:

A) Higher image resolution
B) Ability to display more shades of gray
C) Reduced exposure latitude
D) Improved spatial resolution

39. What is the effect of increasing the grid ratio?

A) Decreases patient dose
B) Increases patient dose
C) Decreases image contrast
D) Increases OID

40. The focal spot size primarily affects:

A) Image contrast
B) Image resolution
C) Patient dose
D) Beam intensity

41. The relationship between SID and image sharpness is:

A) Inverse
B) Direct
C) Exponential
D) Unrelated

42. What does Automatic Exposure Control (AEC) regulate?

A) kVp
B) mAs
C) OID
D) Collimation

43. What effect does increasing tube filtration have on the X-ray beam?

A) Increases quantity
B) Increases quality
C) Decreases penetration
D) Reduces photon energy

44. What is the effect of increasing matrix size in digital imaging?

A) Increases pixel size
B) Increases spatial resolution
C) Reduces image contrast
D) Reduces brightness

45. What is the most effective way to reduce patient dose in fluoroscopy?

A) Increase SID
B) Use pulsed fluoroscopy
C) Increase mA
D) Reduce collimation

46. What type of artifact occurs due to improper detector calibration?

A) Grid cutoff
B) Flat-field artifact
C) Quantum mottle
D) Aliasing artifact

47. Which factor is primarily responsible for brightness in digital imaging?

A) mAs
B) processing algorithm
C) kVp
D) SID

48. What does window level control in digital imaging?

A) Contrast
B) Brightness
C) Resolution
D) Noise

49. Which type of detector has the highest spatial resolution?

A) CR cassette
B) DR flat-panel detector
C) Film-screen system
D) Photostimulable phosphor plate

50. How does increasing kVp affect the histogram in digital imaging?

A) Shifts the histogram to the left
B) Shifts the histogram to the right
C) Narrows the histogram
D) Widens the histogram

51. What is the main purpose of LUT (Look-Up Table) in digital imaging?

A) Enhance spatial resolution
B) Adjust brightness and contrast
C) Reduce patient dose
D) Correct motion artifacts

52. What is the effect of decreasing pixel size in digital imaging?

A) Decreases spatial resolution
B) Increases spatial resolution
C) Increases image noise
D) Reduces brightness

53. What is the primary cause of aliasing artifacts in digital imaging?

A) Misaligned grid
B) Inadequate sampling frequency
C) Excessive kVp
D) Overexposure

54. What post-processing technique is used to suppress high-frequency noise?

A) Edge enhancement
B) Smoothing
C) Equalization
D) Windowing

55. Which of the following affects contrast resolution in digital imaging?

A) Bit depth
B) Pixel size
C) Matrix size
D) Focal spot size

56. What happens to the exposure index when a detector is underexposed?

A) It increases
B) It decreases
C) Remains unchanged
D) Becomes invalid

57. What is the primary advantage of using DR (Digital Radiography) systems?

A) Increased spatial resolution
B) Reduced processing time
C) Reduced patient dose
D) Greater portability

58. In digital imaging, what does the term "dynamic range" refer to?

A) The range of pixel sizes
B) The range of exposures the detector can accurately capture
C) The time it takes to process an image
D) The detectors ability to handle motion

59. What is the purpose of edge enhancement in digital imaging?

A) Increase image sharpness
B) Reduce noise
C) Decrease contrast
D) Suppress low-frequency signals

60. What factor primarily affects image contrast?

A) mAs
B) kVp
C) SID
D) kVp

ANSWERS

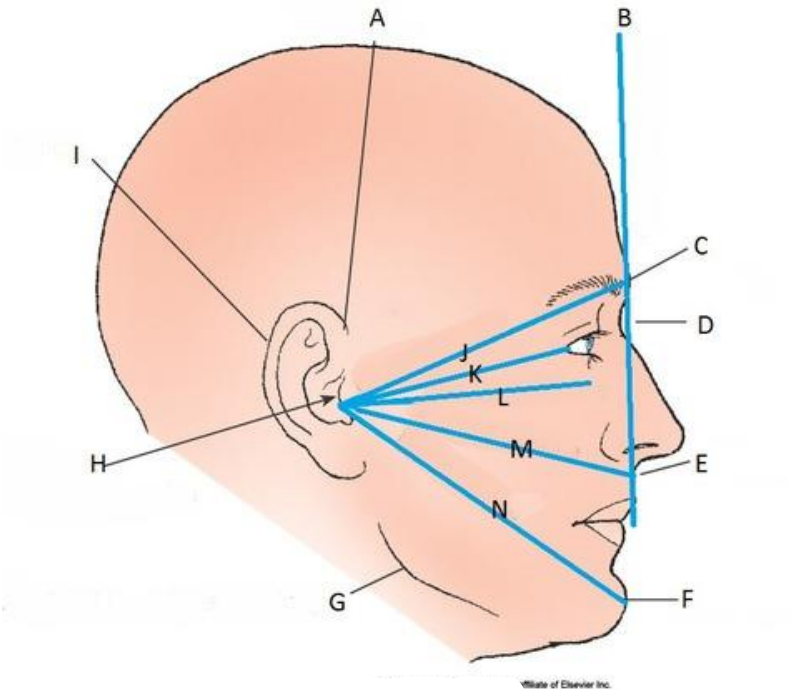
1. B
2. B
3. B
4. B
5. B
6. B
7. A
8. B
9. A
10. C
11. B
12. D
13. B
14. A
15. B
16. B
17. B
18. B
19. A
20. B
21. C
22. B
23. A
24. B
25. B
26. C
27. A
28. A
29. A
30. B
31. A
32. A
33. A
34. A
35. B
36. B
37. A
38. B
39. B
40. B
41. B
42. B
43. B
44. B
45. B
46. B
47. B
48. B
49. C
50. B
51. B
52. B
53. B
54. B
55. A
56. B
57. B
58. B
59. D
60. B

NOTES

Procedures

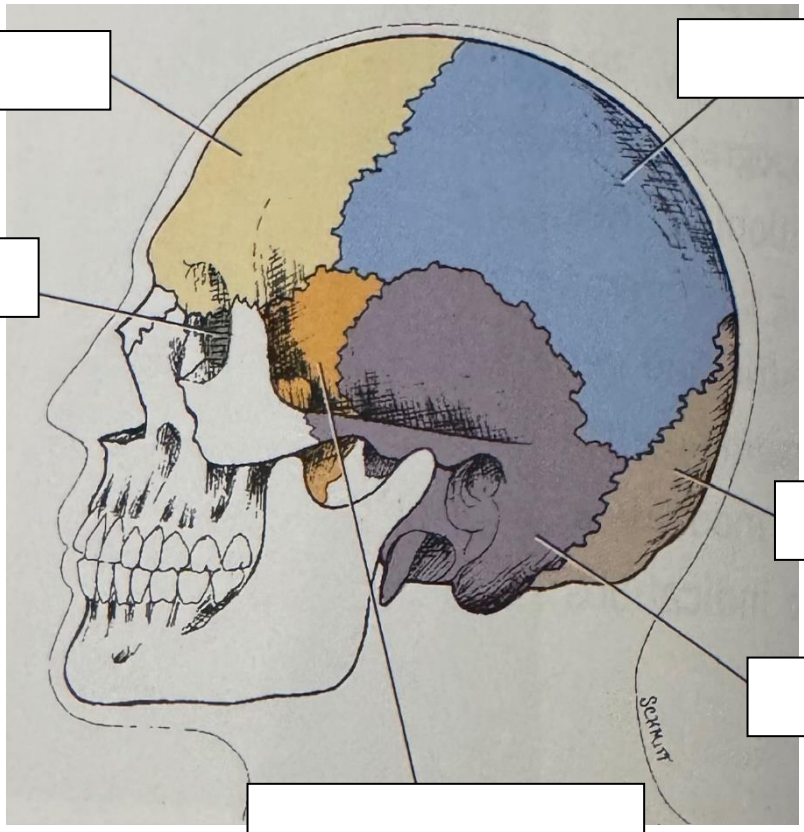
I. Head, Spine, and Pelvis

1. Label head / facial centering points:

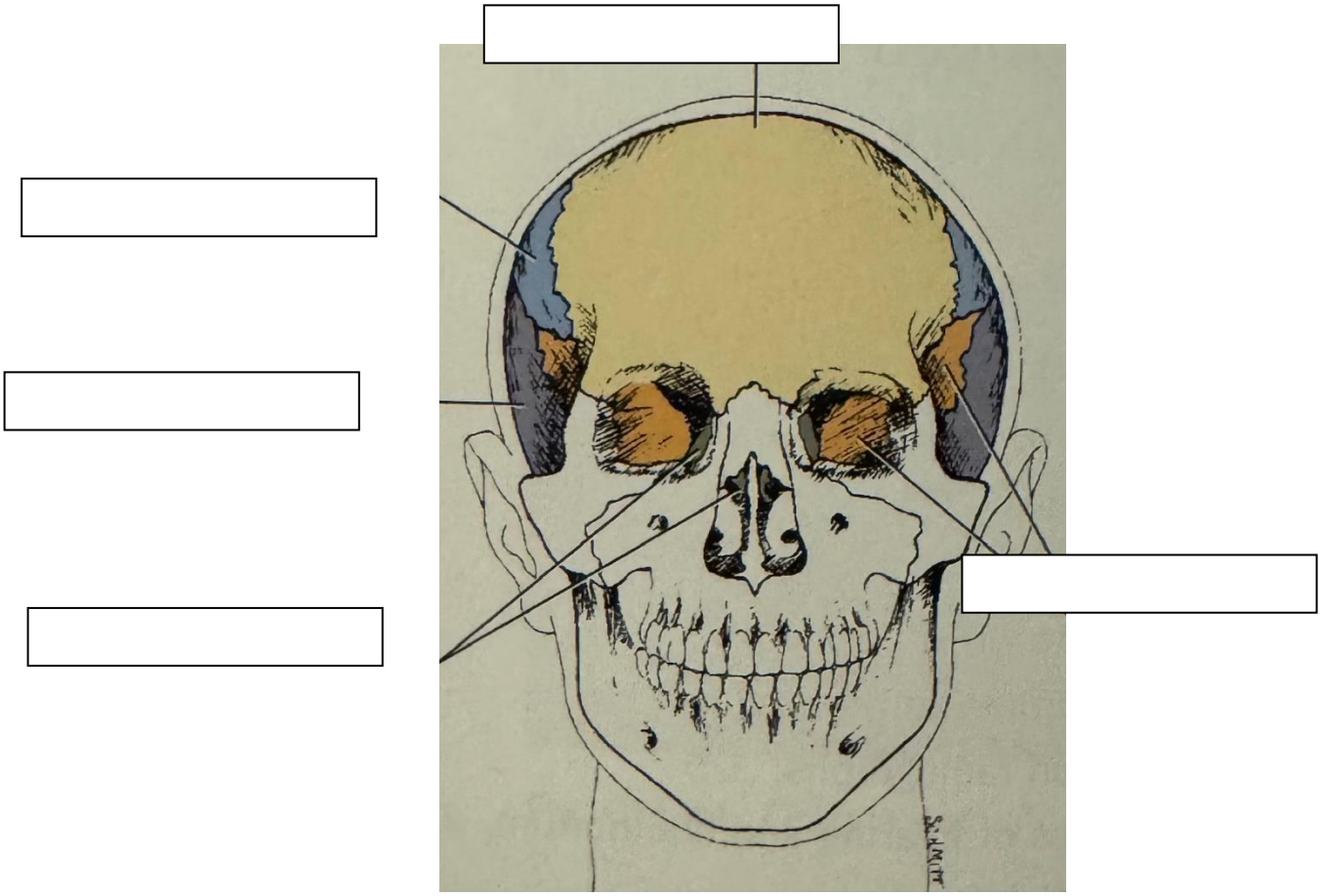


2. In a lateral skull projection, the CR is directed 2 inches superior to the:

3. Label Lateral Skull:



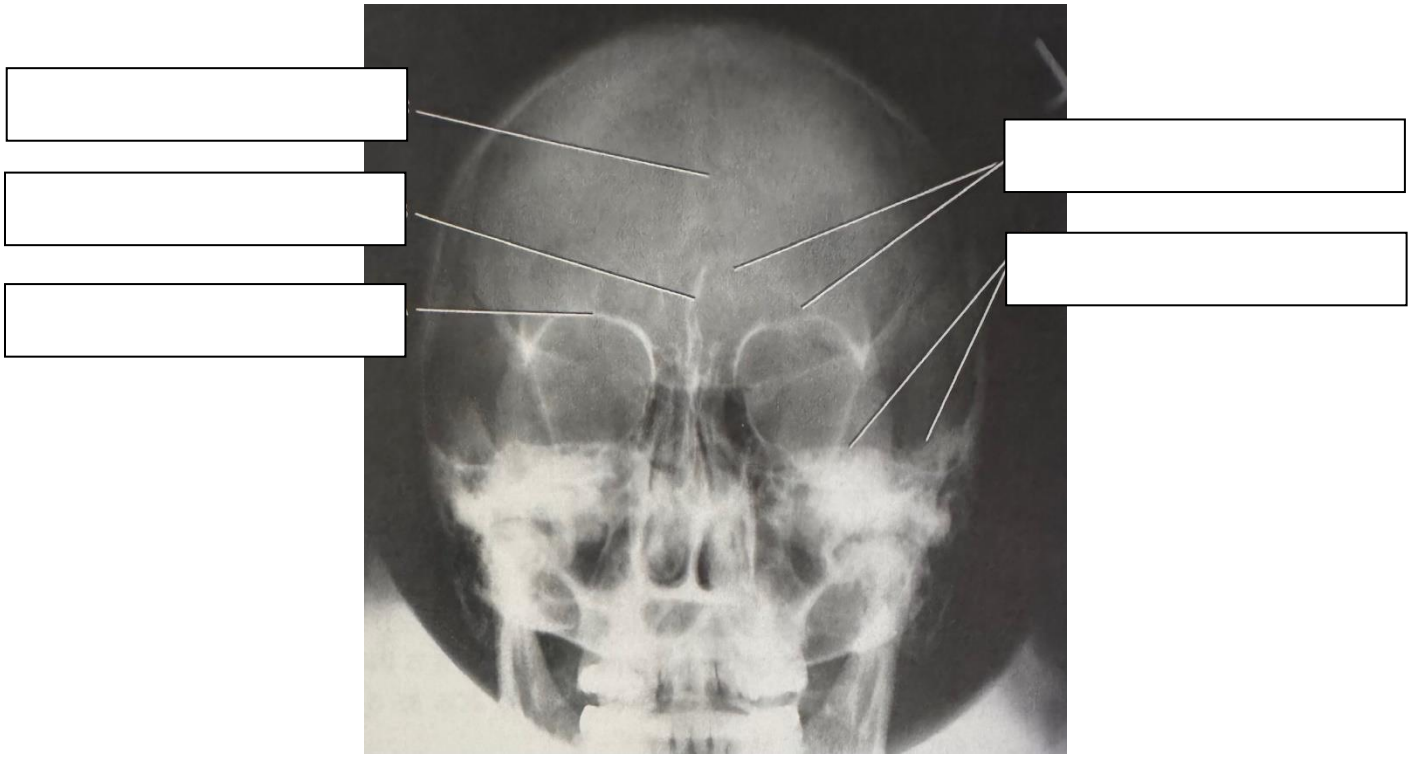
4. Label frontal view skull/facial:



5. Match the following skull/facial bone projections with the correct anatomical area they best demonstrate:

Waters (parietocanthial)	demonstrates the base of the skull and zygomatic arches
Modified Waters	demonstrates maxillary sinuses free of superimposition
Submentovertex (SMV)	Demonstrates the frontal sinuses and best overall view of the skull vault
PA Caldwell	Demonstrates the floor of the orbits and blowout fractures

6. Label **PA Caldwell:**



7. A patient arrives with trauma to the zygomatic arch. The physician suspects a possible tripod fracture. What routine radiographic projections of the facial bones would you include, and why?

8. When positioning for the **Modified Waters** projection, the OML is adjusted to form approximately a _____ angle with the image receptor.

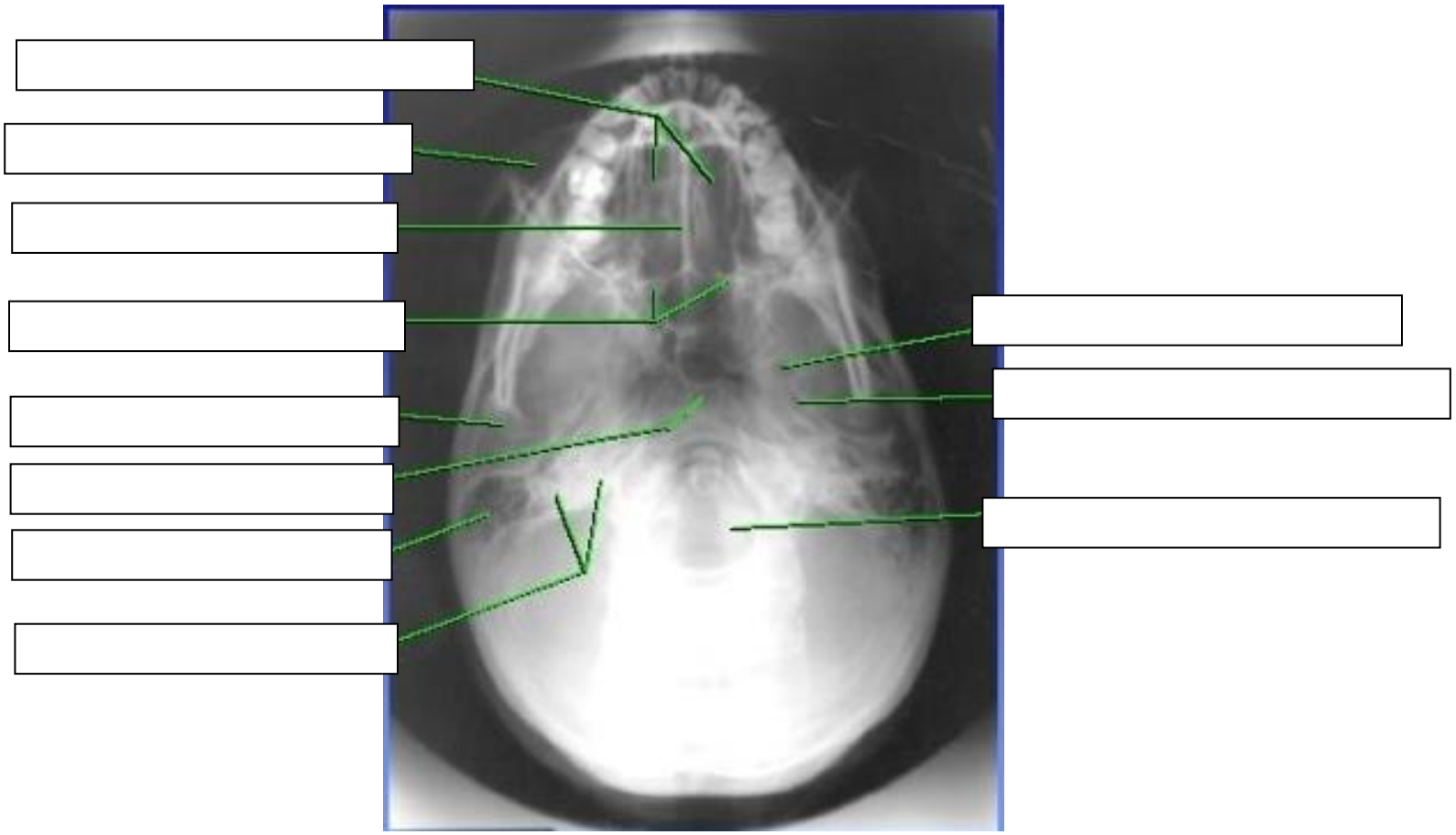
9. Arrange these steps in the correct order for performing an **SMV** projection of the skull:

   _____ Center the CR perpendicular to the IOML at the level of the sella turcica

   _____ Check for patient comfort and stability
   _____ Place the vertex of the head against the IR

   _____ Hyperextend the patient's neck so the IOML is parallel to the IR

10. Label Facial Bones, **SMV Projection:**



11. Explain why it is important to visualize the dorsum sellae within the foramen magnum in an **AP axial (Towne)** projection of the skull.

12. A properly positioned **Caldwell** view of the sinuses should project the petrous ridges into the lower _____ of the orbits.

13. You are asked to perform a **paranasal sinus series** on a patient who is unable to stand. Which positioning modifications can be made to obtain adequate diagnostic images?

14. Label **Lateral Facial / Sinus Projection**:

E.

F.

G.

H.

J.

K.

L.

M.

O.

P.

Q.

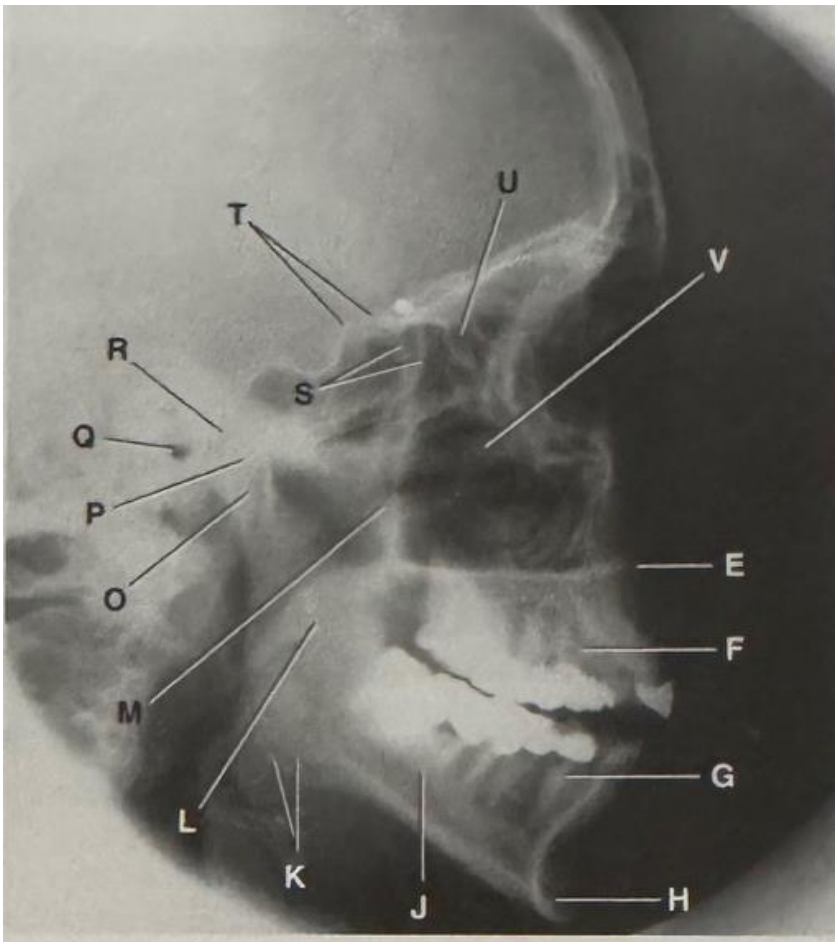
R.

S.

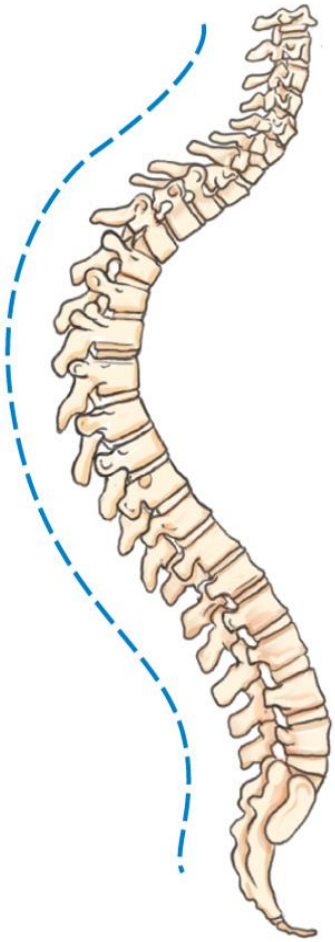
T.

U.

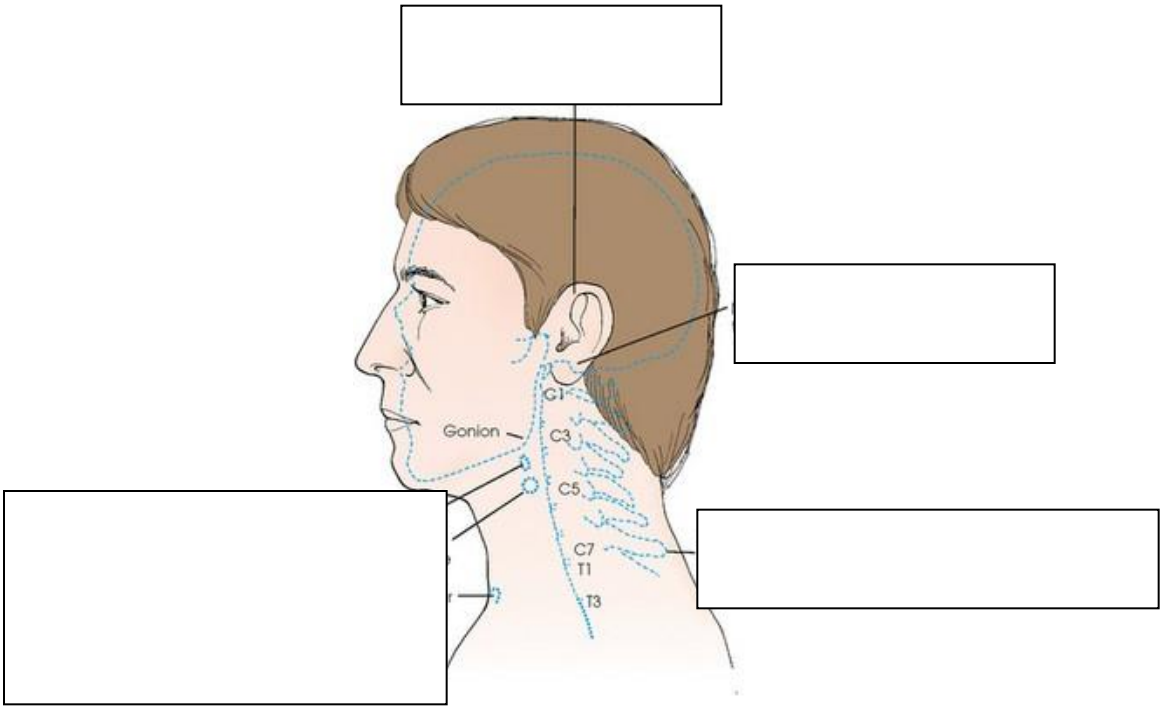
V.



15. What type of abnormal spine curvature are demonstrated?

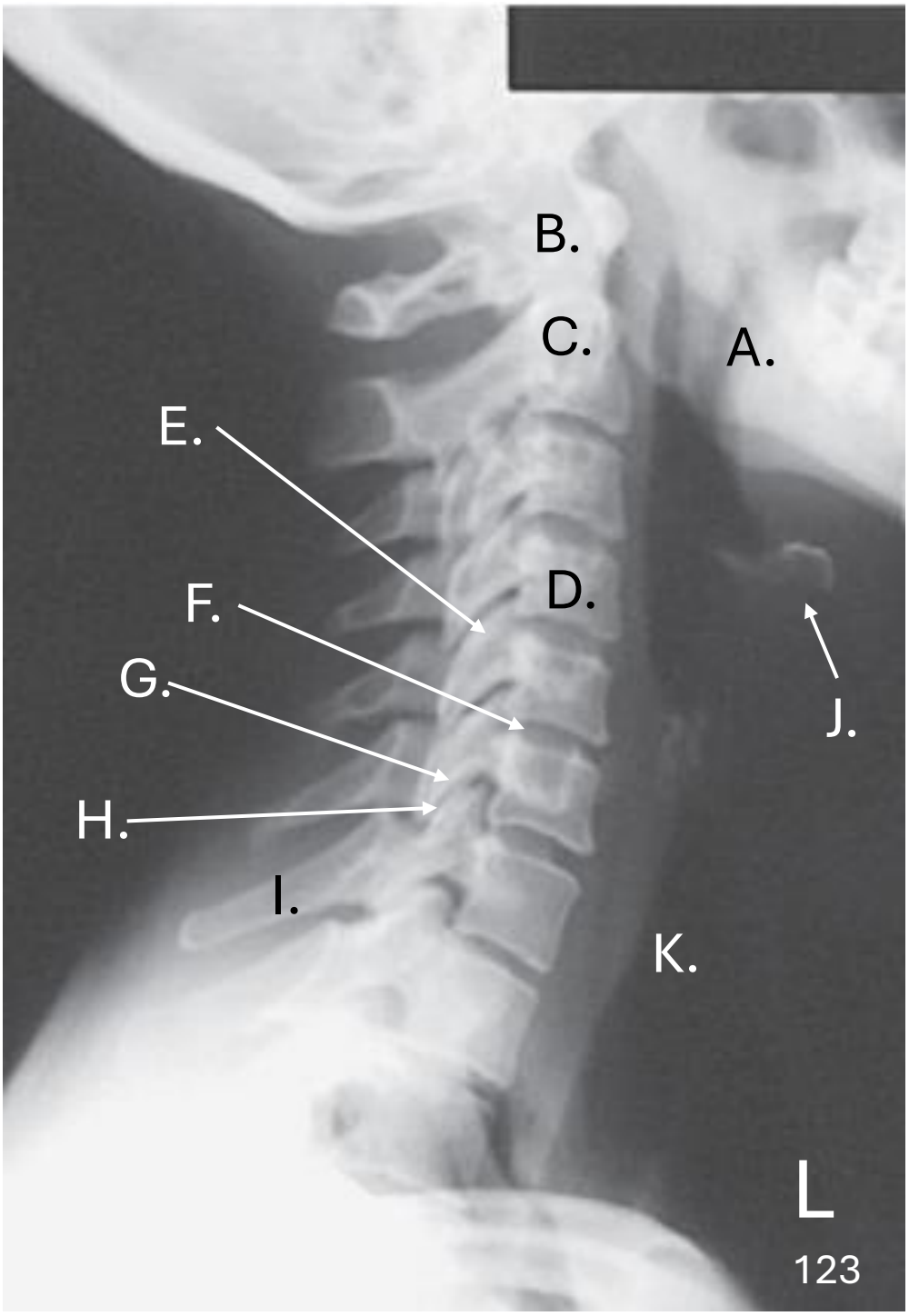


16. Label surface landmarks:



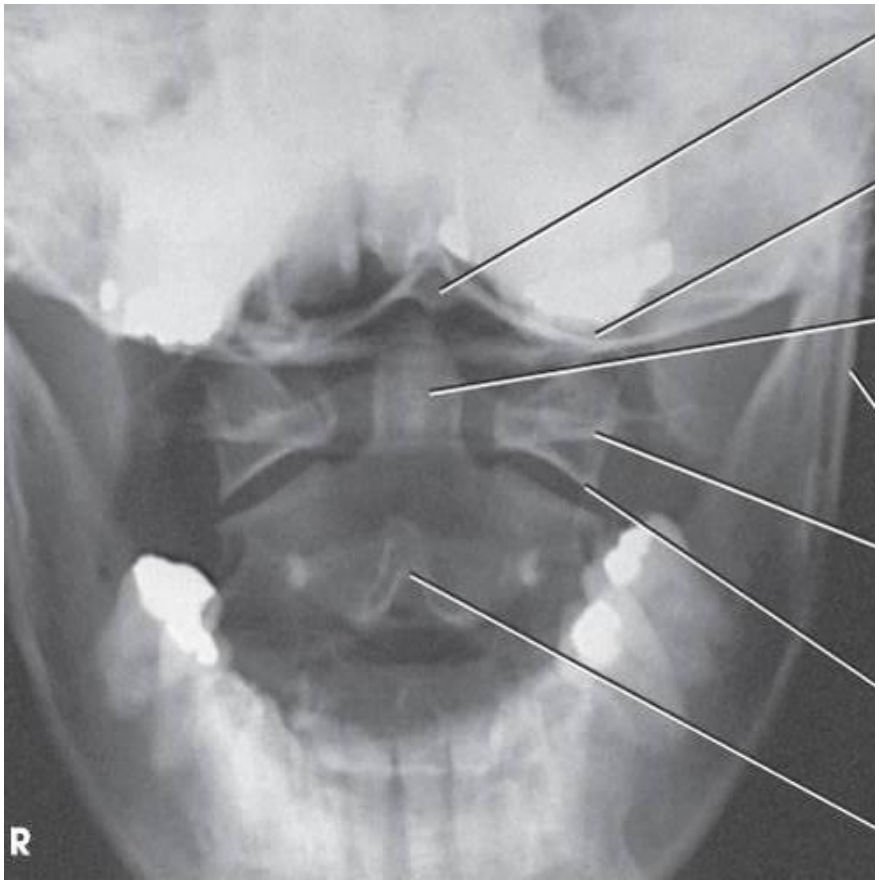
17. What projection is this? What angle is used?

18. Label **Lateral Cervical Spine Projection:**



19. In the **AP open-mouth** projection of the cervical spine, the CR is directed through the:

20. Label **AP open-mouth projection:**

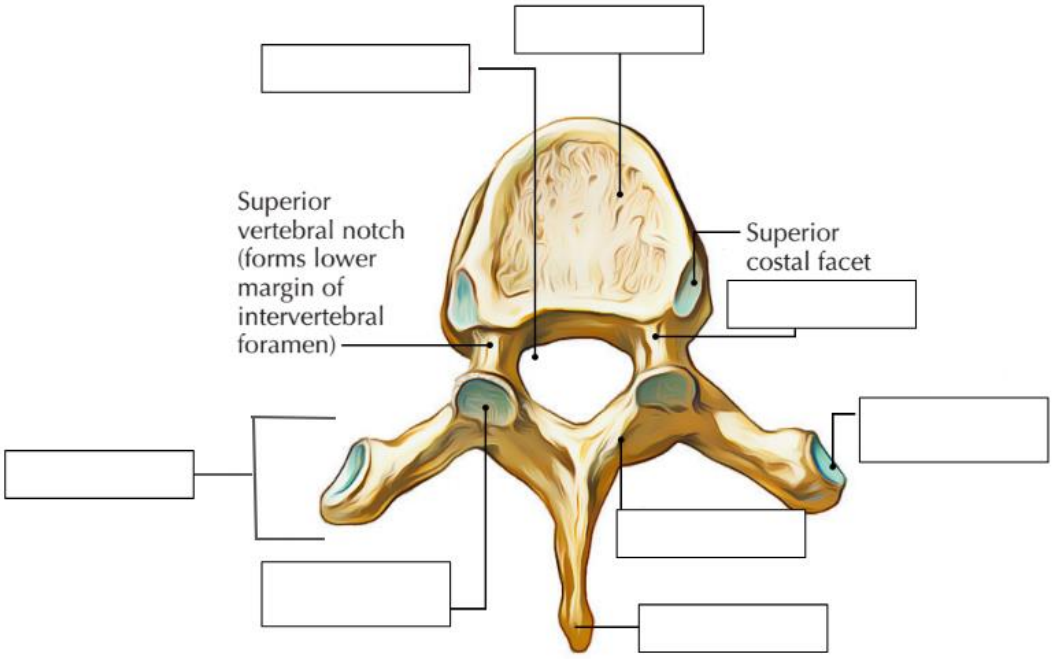


21. What projections are shown in radiographs one and two?

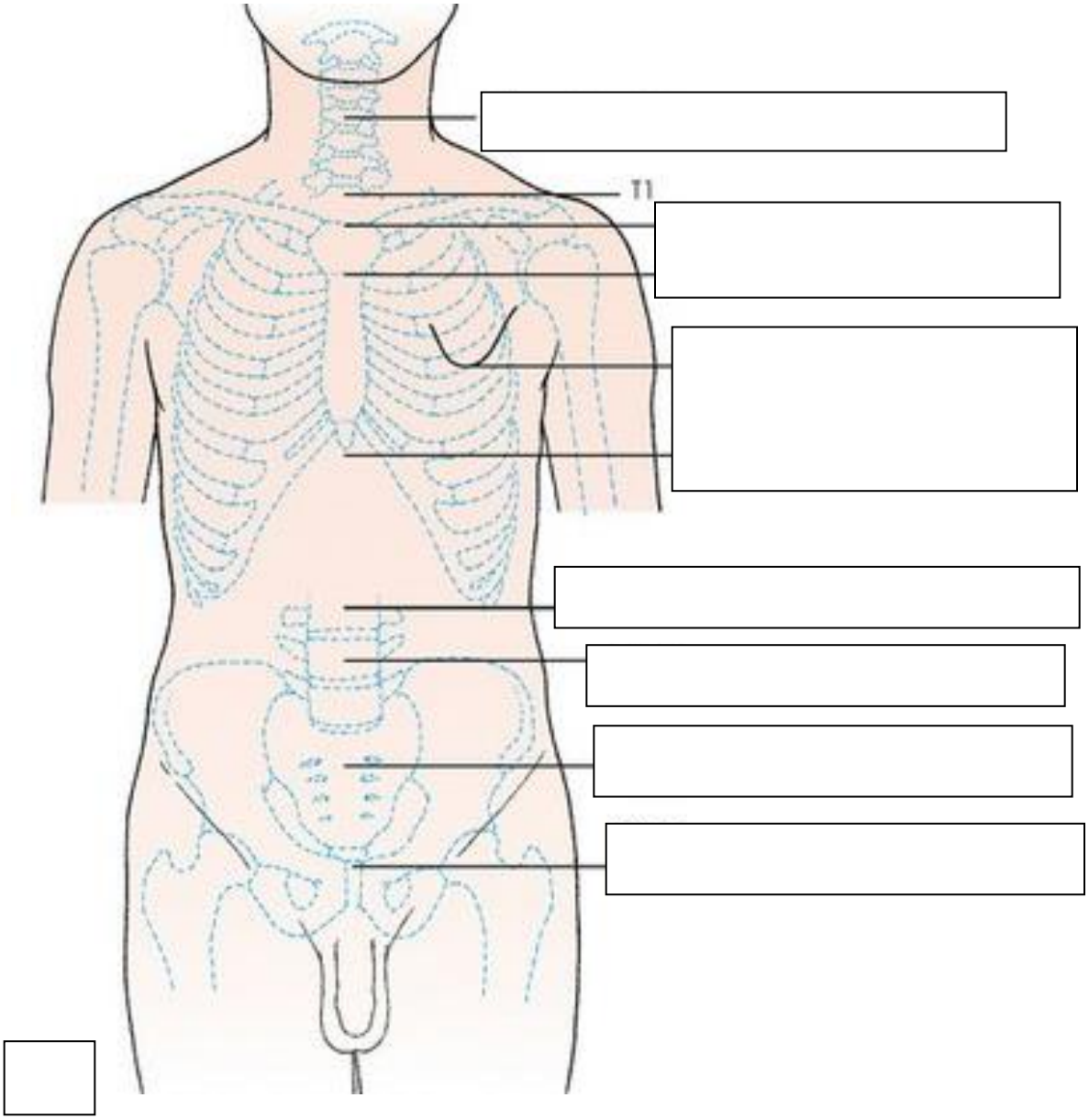
1

2

22. Label thoracic vertebrae:



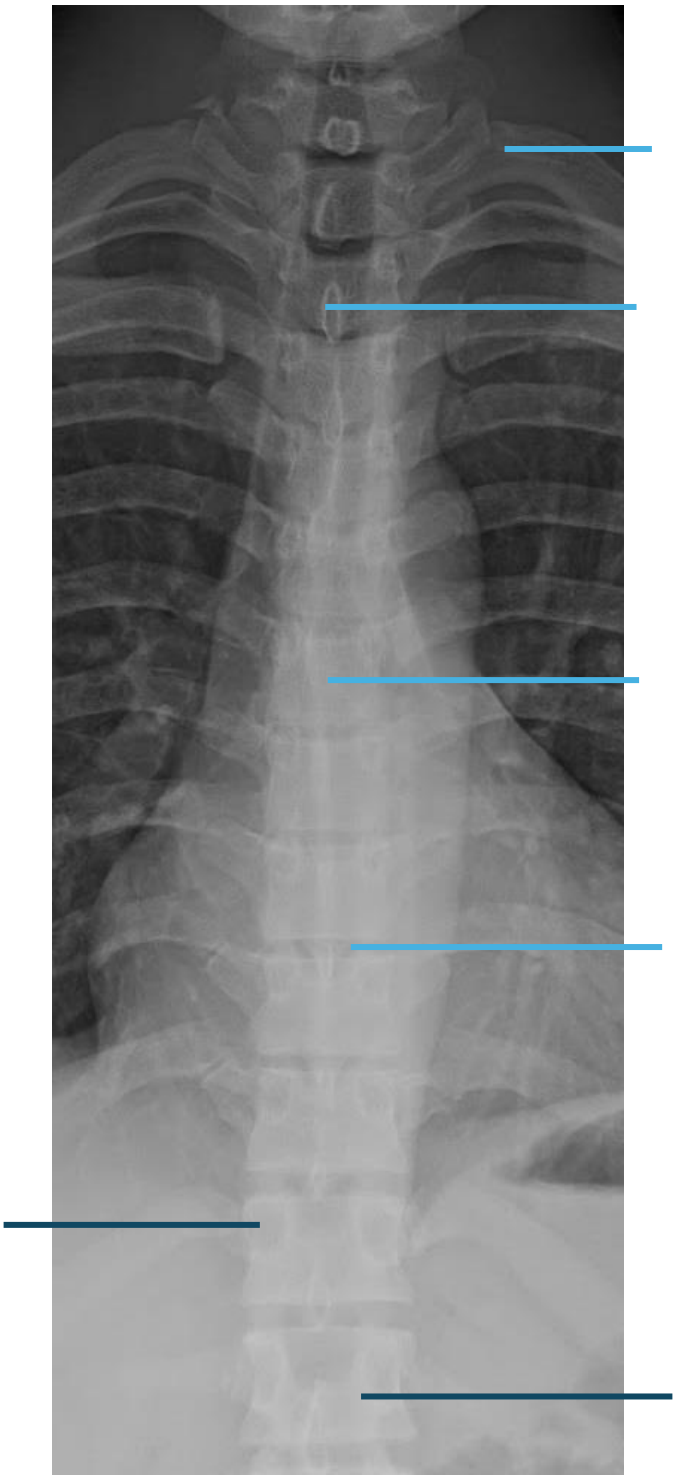
23. Label surface landmarks:



24. Which vertebrae have demifacets for the articulation or ribs?

25. In the **AP T-spine** projection, the patient's knees should be flexed to reduce the normal _____ curvature and improve patient comfort.

26. Label **AP T-Spine Projection:**

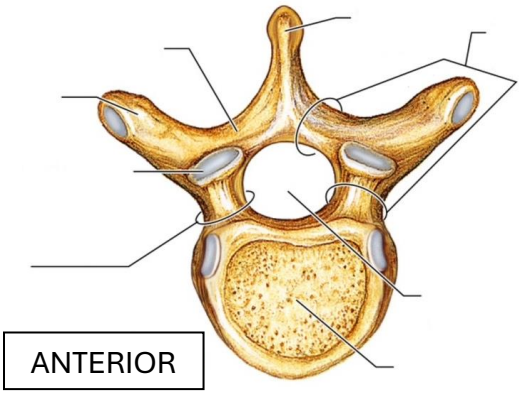


27. What type of abnormal thoracic spine condition is demonstrated?

28. A patient has suspected **spondylolysis** at the L4–L5 level. Which specific position/projection would best demonstrate the **pars interarticularis**?

29. Which cervical spine projection best visualizes the **intervertebral foramina** on the side closest to the IR?

30. Label lumbar vertebrae:

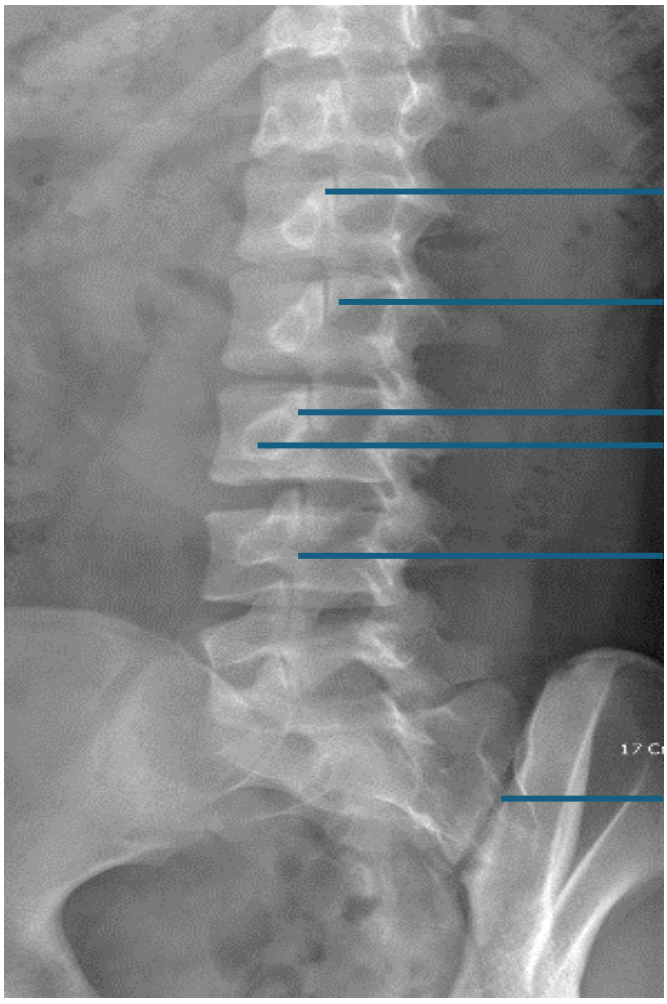


31. Match each lumbar spine projection with its primary purpose:

AP Lumbar	Focuses on lumbosacral joint
Lateral Lumbar	Demonstrates pars interarticularis and zygapophyseal joints
L5-S1 Spot	Provides a front-to-back view of lumbar vertebrae and spinous Process
Oblique Lumbar	Assesses overall alignment and intervertebral disc spaces

32. During a **flexion-extension lateral** lumbar spine series for instability, the patient cannot flex or extend fully due to pain. How can you modify your approach to obtain diagnostic images?

33. Label **Lumbar Oblique Projection:**



34. Why is it crucial to have the patient empty their bladder before performing an **AP projection of the sacrum**?

35. During a **flexion-extension lateral** lumbar spine series for instability, the patient cannot flex or extend fully due to pain. How can you modify your approach to obtain diagnostic images?

36. For an AP pelvis, the top of the IR should be placed approximately 1–1½ inches above the _____.

37. Which pelvis belongs to male and female?

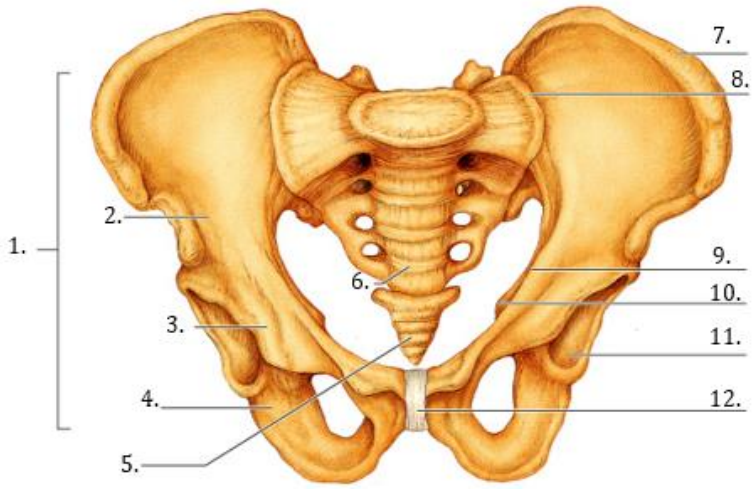
38. List the three bones that form the acetabulum:

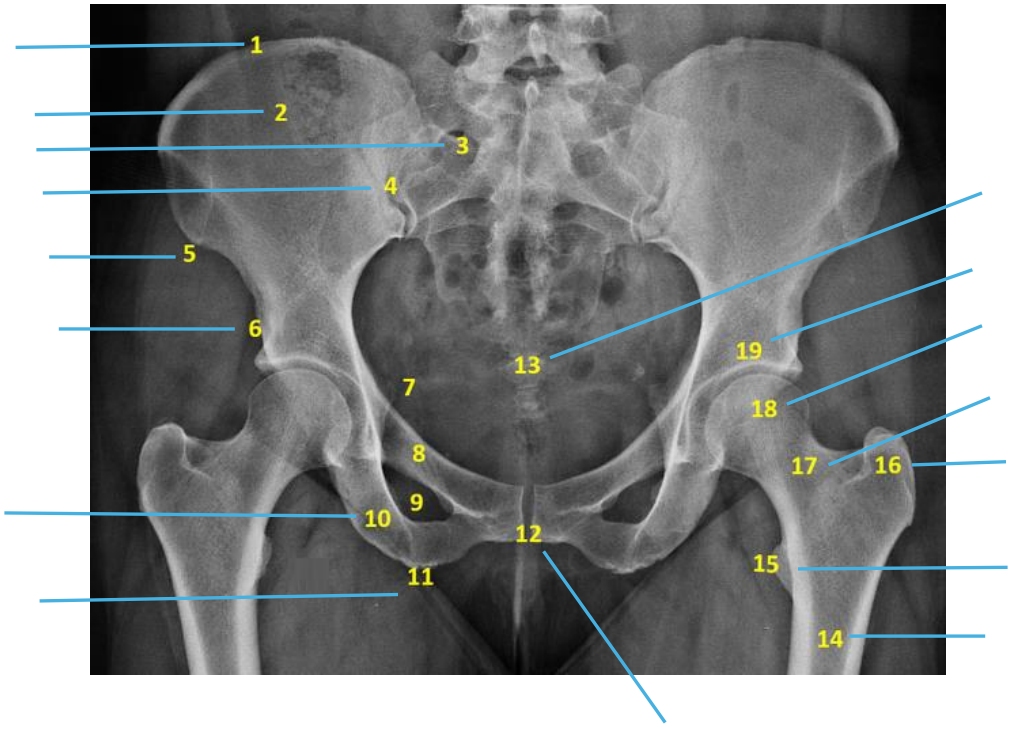
-
-
-

39. List the bones that form the pelvis:

-
-
-

40. Label **AP Pelvis:**





41. Why must patients with possible pelvic fractures be handled carefully when positioning for an **AP pelvis** radiograph?

42. A trauma patient with a suspected **proximal femur fracture** arrives in the emergency department. The patient cannot move their affected leg. Which projection(s) can you perform to best demonstrate the hip without rotating the leg?

43. A patient has chronic sacroiliac joint pain. The physician requests **Sacroiliac** (**SI) joint projections**. List the routine projections for SI joints and explain how the CR is oriented for each.

-
-

44. Identify projections:

II. Thorax and Abdomen Procedures

1. When performing a **PA chest** projection, which of the following is the primary reason for a 72-inch (180 cm) SID? Include additional reasons.

2. List the four body types:

   -
   -
   -
   -

3. The number of ribs that should be demonstrated above the diaphragm on a chest radiograph with proper inspiration:

4. Complete table:

	SIDE OF INTEREST
RAO	
LPO	
LAO	
RPO	

A – away** **PO – put on

5. Why is a PA projection generally preferred over an AP projection for a routine chest exam?

6. An AP supine abdomen (KUB) is often performed to visualize:

7. Arrange the following steps for an AP supine abdomen in the correct order:

   _____ Expose on expiration

   _____ Ensure no rotation of the pelvis or shoulders

   _____ Align the mid-sagittal plane to the midline of the table

   _____ Center the CR to the level of the iliac crests

   _____ Place the patient supine with arms by the side

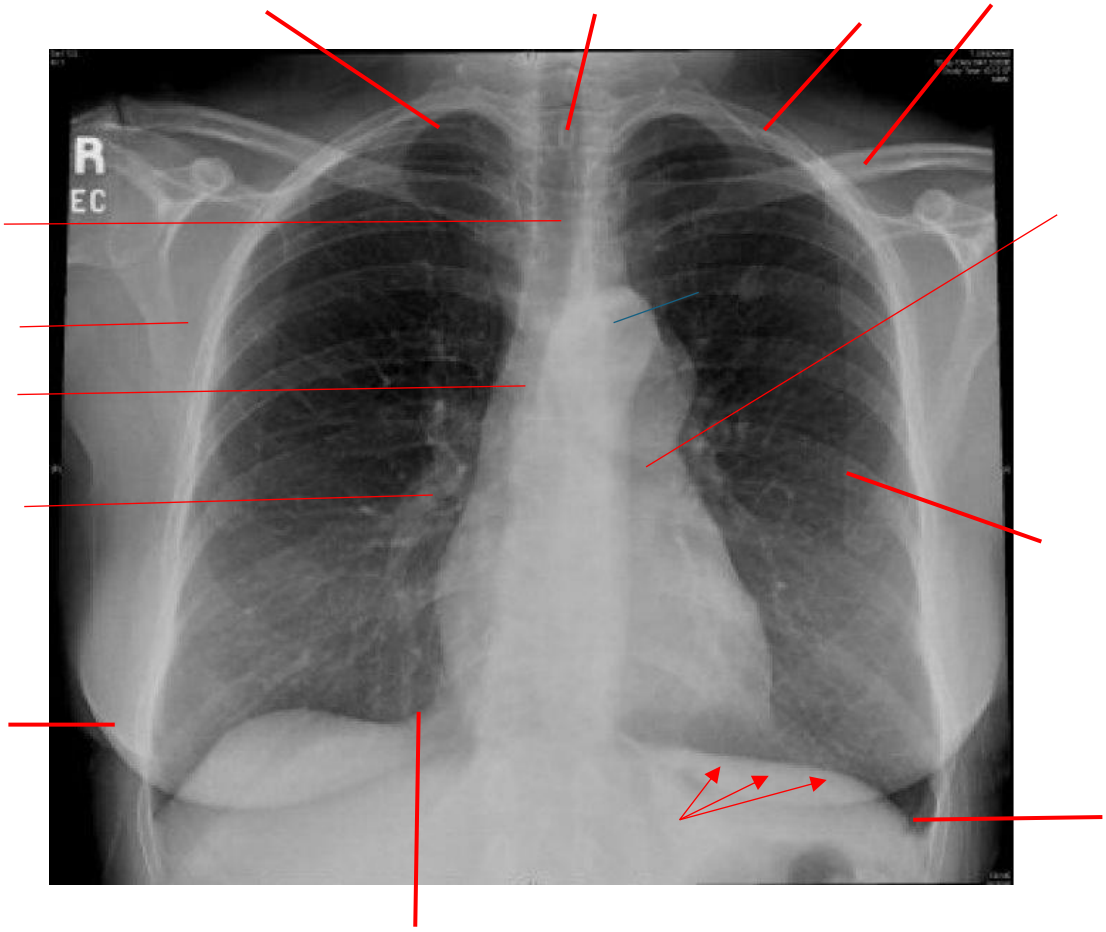
8. You notice on a PA chest that the diaphragm appears elevated on the right side. Which pathology might this indicate?

9. A postoperative abdominal X-ray shows free air under the diaphragm. What condition is likely, and how would you confirm it radiographically if the patient could not stand?

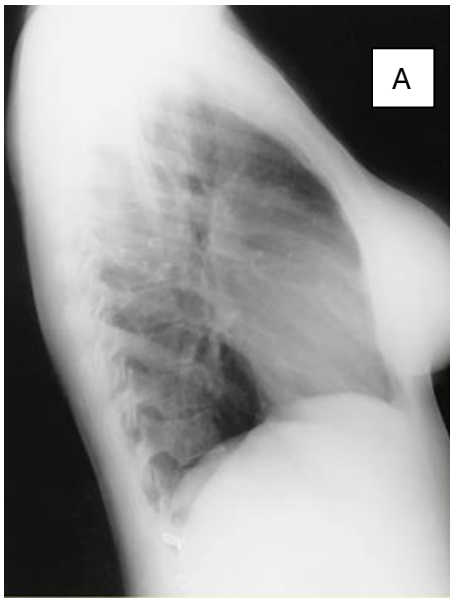
10. Which projection is most helpful in evaluating the lung apices for pathology such as tuberculosis?

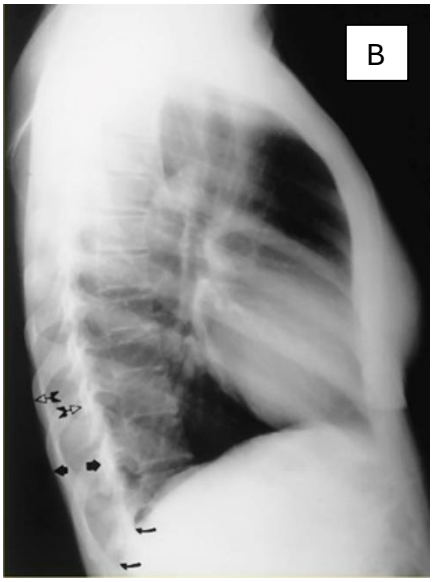
11. The patient leans backward (or the tube is angled) to project the clavicles above the lung apices. What projection is this?

12. Label **PA chest projection:**

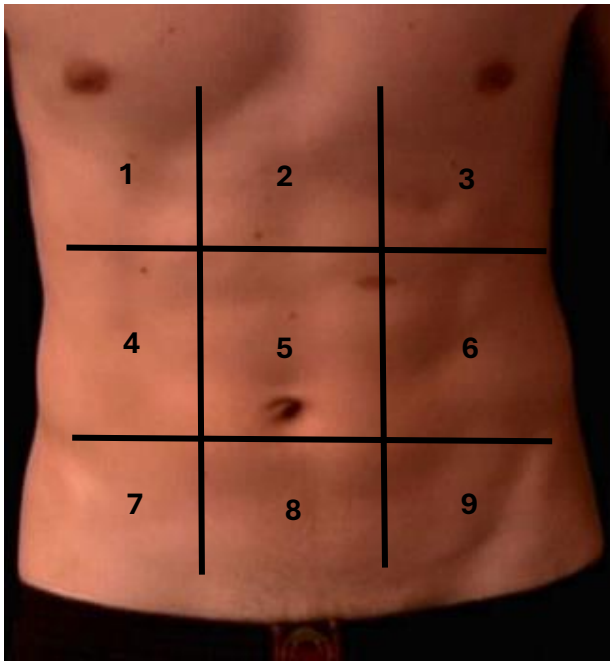


13. Which radiograph is most optimal, and why?

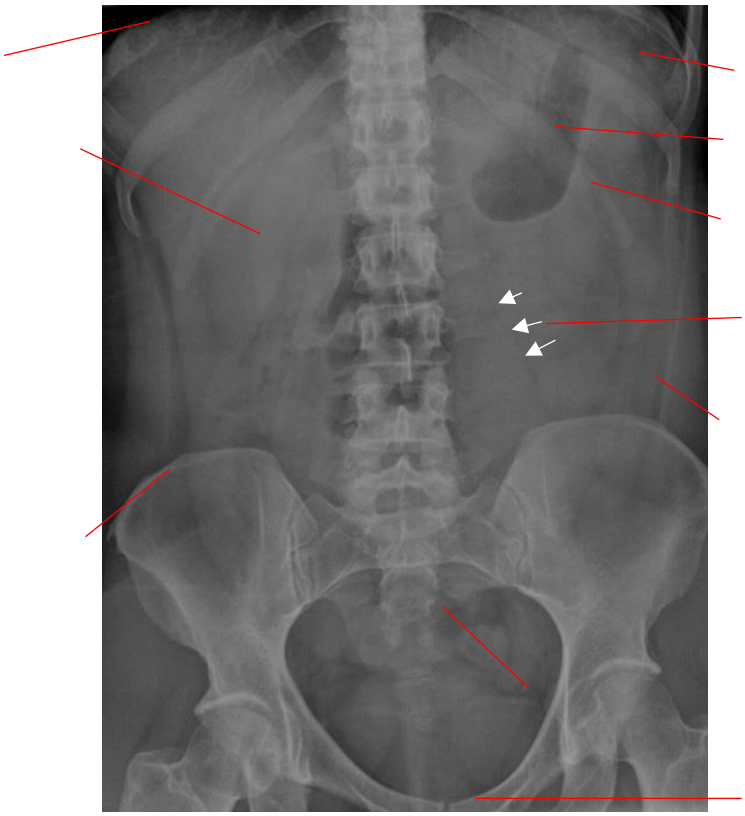




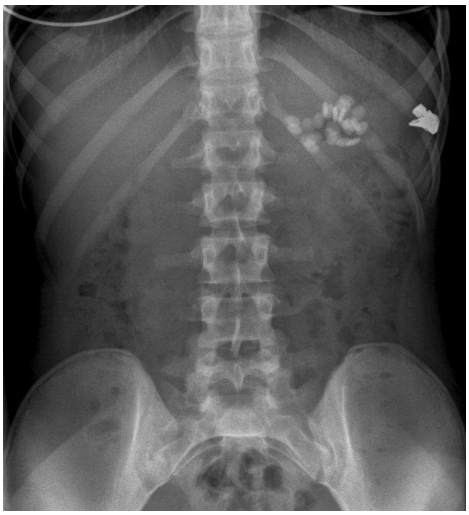
14. Label abdominal regions:



15. Label AP abdomen projection:



16. What pathology is demonstrated in this abdominal radiograph? What errors if any?



17. A left lateral decubitus abdomen is preferred over a right lateral decubitus for what reason?

18. Identify the abdominal pathology and describe the indication:

19. The largest gland in the body is:

20. The largest segment of the small bowel is the:

21. Patient enters with severe abdominal pain. What pathology does the AP abdomen image present?

22. For a patient who is unable to stand for a chest radiography, what position would best demonstrate air-fluid levels?

23. List relationship between technical factors and radiolucent pathology. List examples.

24. List relationship between technical factors and radiopaque pathology. List examples.

25. How many posterior ribs should appear above the diaphragm on a proper inspiration?

26. An elevated diaphragm appears elevated on the right side on a PA chest, which pathology might this include?

27. A patient has a suspected perforated viscus but cannot stand for an upright abdomen. Which alternative projection should be performed, and how is it positioned?

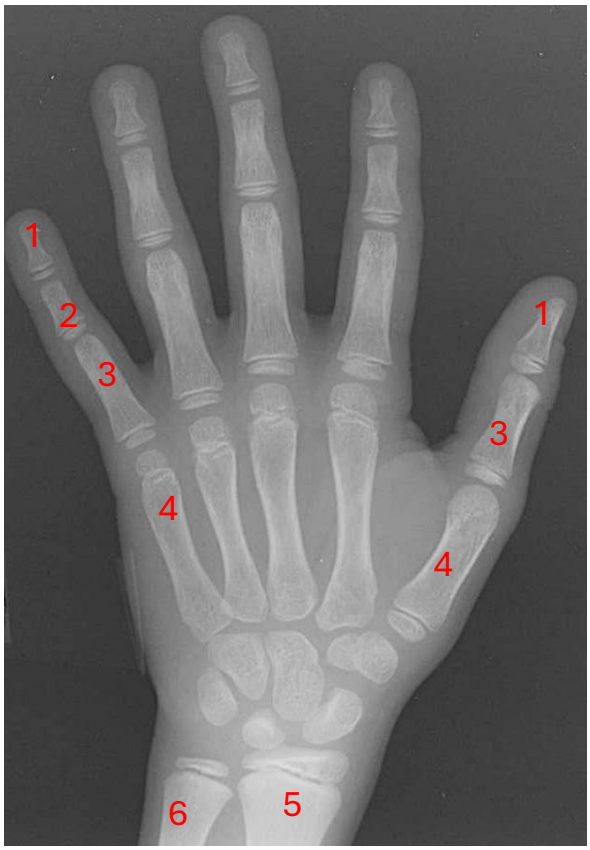
III. Extremity Procedures

1. List routine hand projections:
    -
    -
    -

2. Why is it important to have the fingers extended and separated for a **PA hand** radiograph, especially in cases of suspected fracture or infection?

3. When performing a **PA projection of the hand**, where should the central ray (CR) be directed?

4. Label **PA hand** projection:

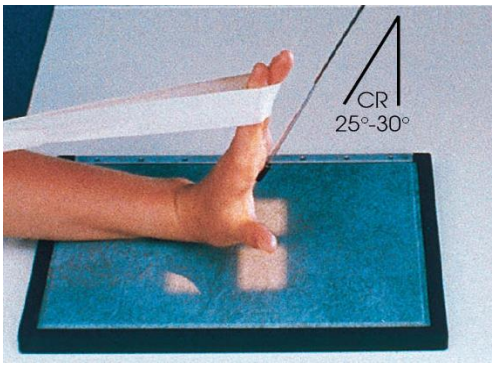


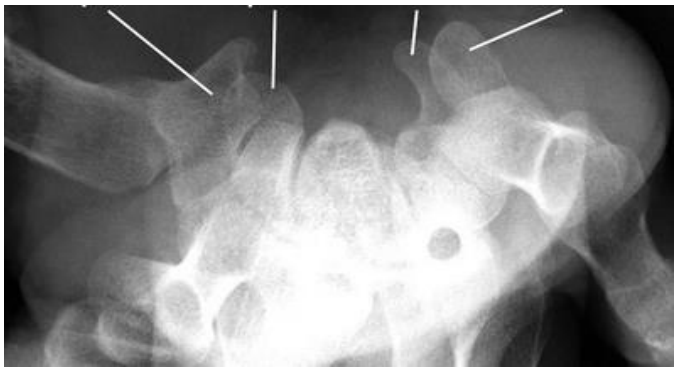
5. For a **lateral projection of the 2nd digit**, the hand is rotated so that the digit is resting on its _____ side to reduce magnification.

6. A patient arrives with a suspected **Boxer's fracture** of the 5th metacarpal. Which routine hand projections would you perform, and how might you modify your technique to clearly evaluate the metacarpal region?

7. Label **PA wrist** projection:

8. Identify projection, and label carpal bones:



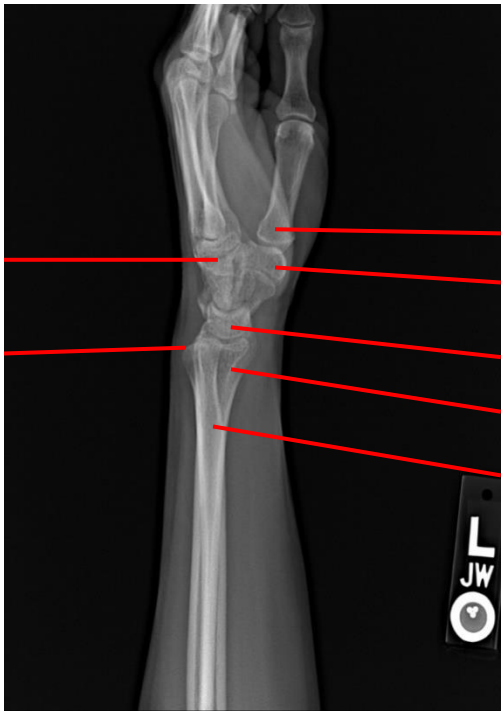


9. Largest of all eight carpal bones, articulates with base of third metacarpal:

10. Largest carpal bone in proximal row is the:

11. Crescent moon shaped carpal is the:

12. Label lateral wrist projection:

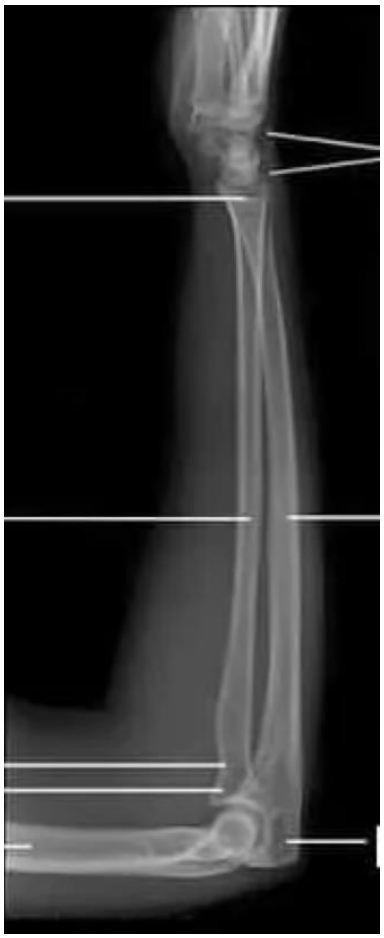


13. When critiquing an **AP wrist** radiograph, list criteria indicates correct positioning?

14. Supinating the hand to ensure the epicondyles are parallel to the IR describes what projection:

15. What is the purpose of the **partial flexion** AP elbow projections, and in which clinical scenario might they be used?

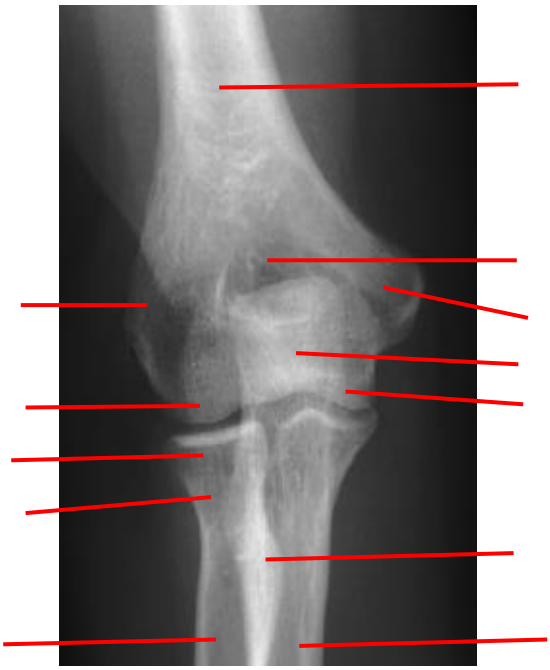
16. Label AP and lateral forearm:

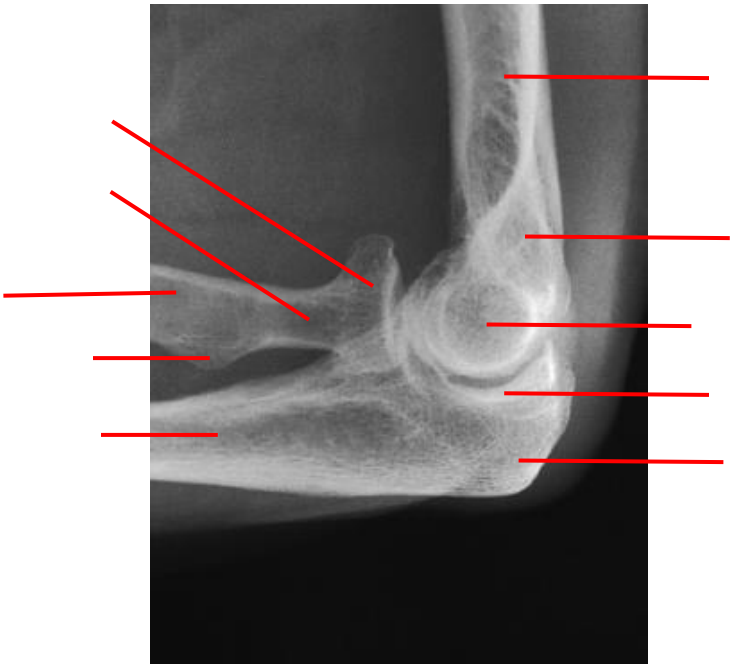


17. Name the projection / position that would best demonstrate the coronoid process of the ulna?

18. A lateral elbow can be determined by the superimposition of which of the following?

19. Label AP and lateral elbow:





20. The Coyle method is performed to better visualize? Identify degrees of flexion for each:

-
-

21. A patient can't fully extend their elbow due to an injury. You suspect a radial head fracture. Which projection(s) would you choose, and how would you position the patient to best visualize the radial head?

22. Match each special shoulder projection with its primary purpose:

    A. Grashey (AP oblique) provides a lateral view of proximal humerus in trauma cases

    B. Neer method demonstrates the glenohumeral joint space without overlap

    C. Lawrence (transthoracic lateral) evaluates the coracoacromial arch for impingement

    D. Axillary (inferosuperior axial) shows the relationship of the humeral head and glenoid in an axial projection

23. List the projections for a routine shoulder x-ray:

    -
    -
    -

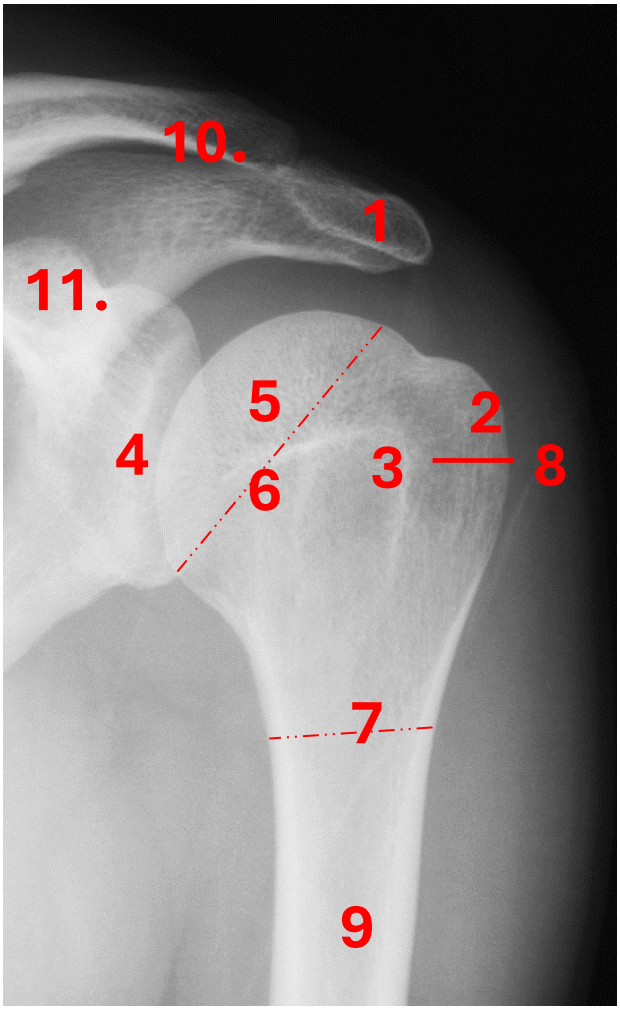
24. Match shoulder girdle joints with appropriate movement type:

    Scapulohumeral Plane or gliding

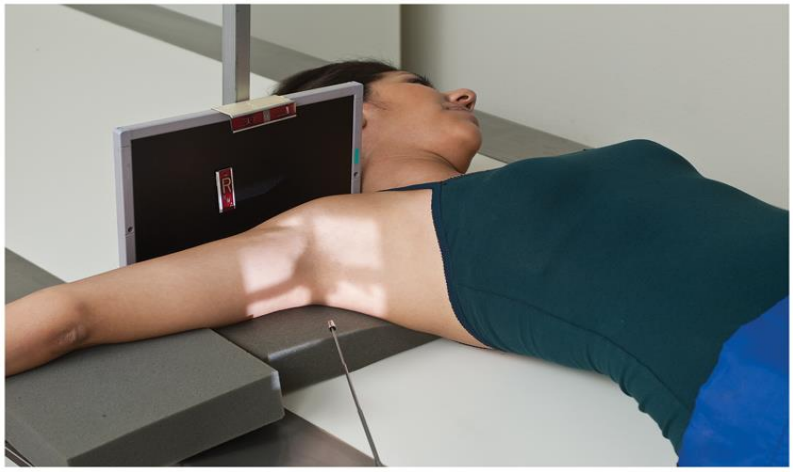
    Sternoclavicular Spheroidal or ball and socket

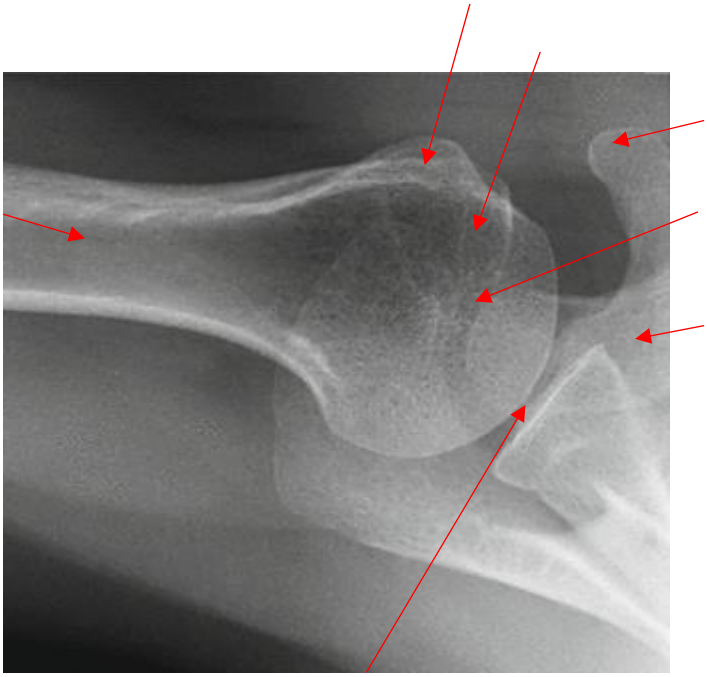
    Acromioclavicular

25. Label shoulder image:



26. Identify projection and label anatomy:





27. AP shoulder internal rotation of humerus:

28. AP shoulder external rotation of humerus:

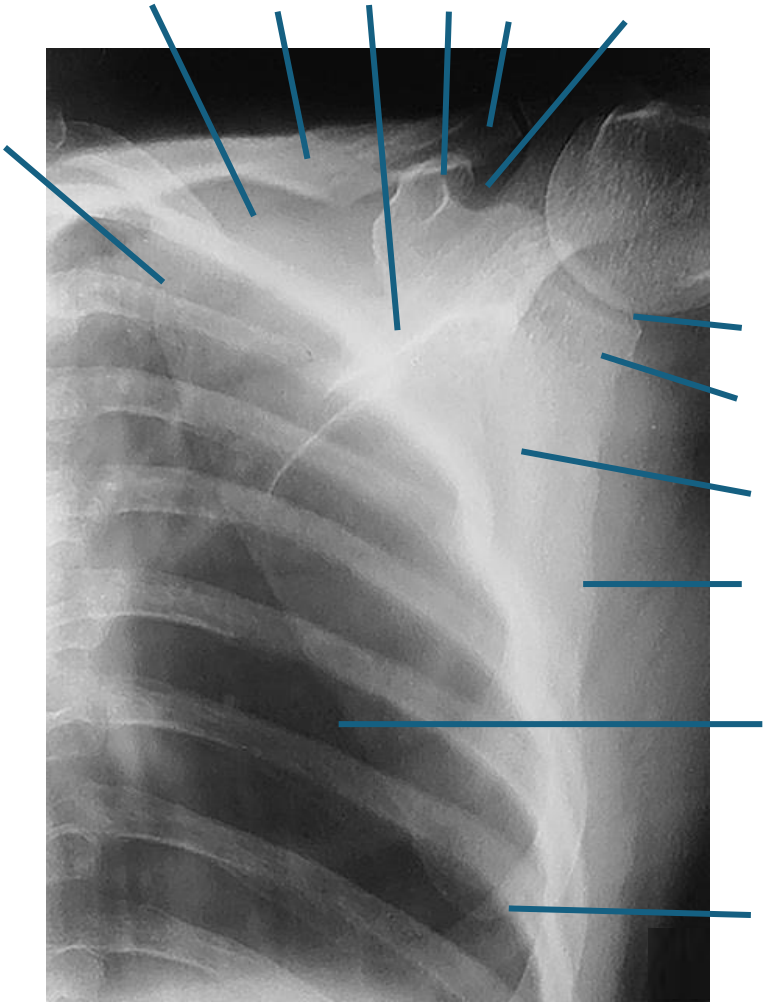
29. What classification of bone is the scapula?

30. List the borders of the scapula:

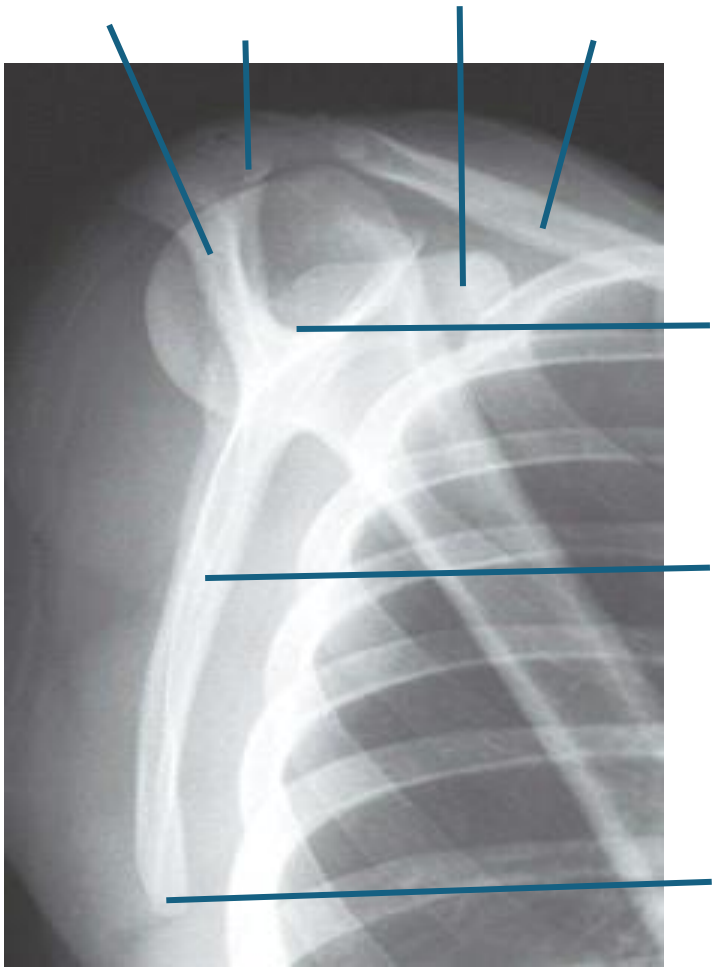
31. Identify the pathology:

32. How must a patient's arm be positioned for a good AP projection of the scapula?

33. Label AP scapula anatomy:

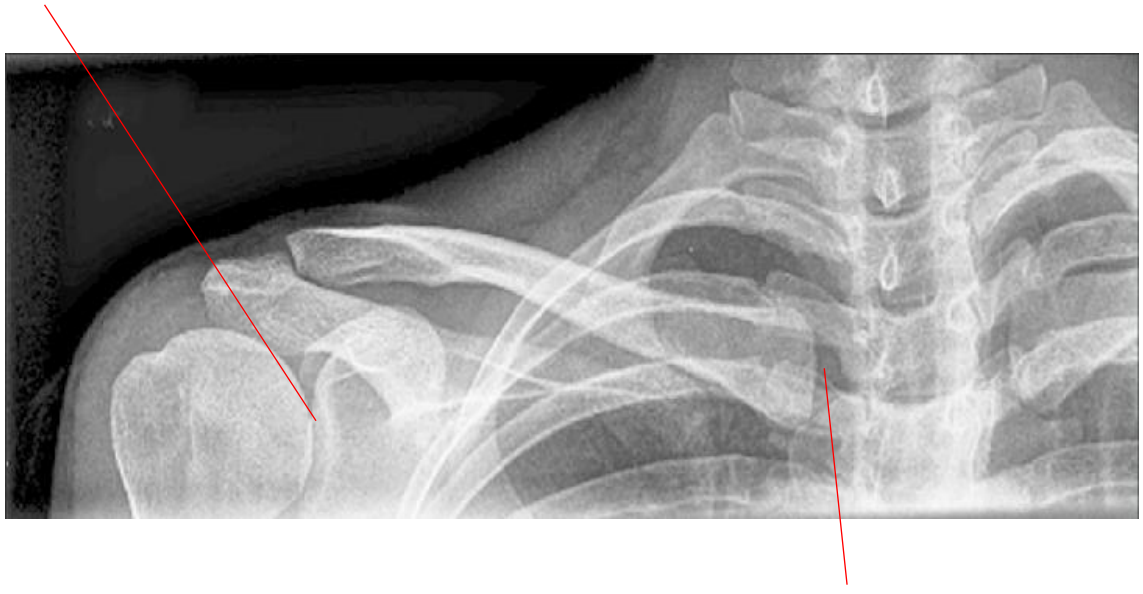


34. Label Lateral Scapular Y:

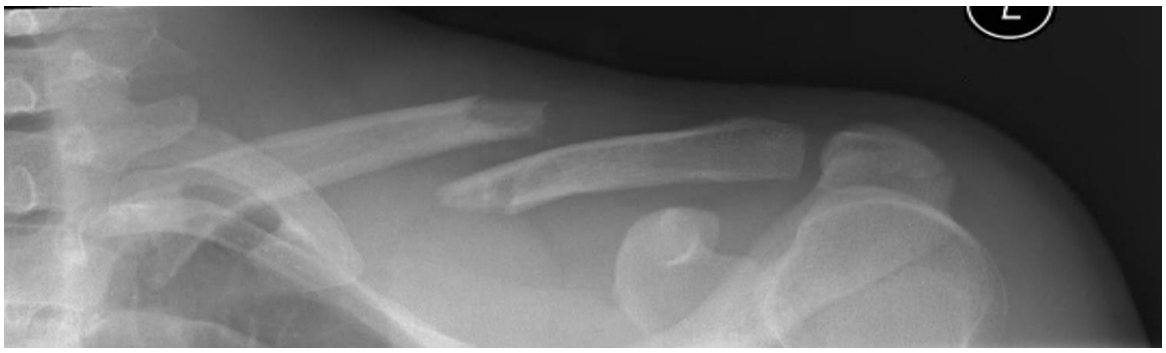


35. What classification of bone is the clavicle?

36. Label clavicle anatomy:



37. Identify between displaced and non-displaced fracture:



38. Compare an **AP mortise view** of the ankle with the routine **AP oblique**. How is the rotation different, and what specific anatomy does the mortise view demonstrate?

39. Match each projection with the structure best visualized:

AP axial toes	demonstrates the distal fibula superimposed by the posterior tibia
Medial oblique foot	visualizes the cuboid and sinus tarsi clearly
AP Mortise ankle	opens the joint space between talus and malleoli
Lateral ankle	ensures open IP and MTP joints of the toes

40. Label ankle anatomy:

41. What is the positioning error and how would it be corrected?

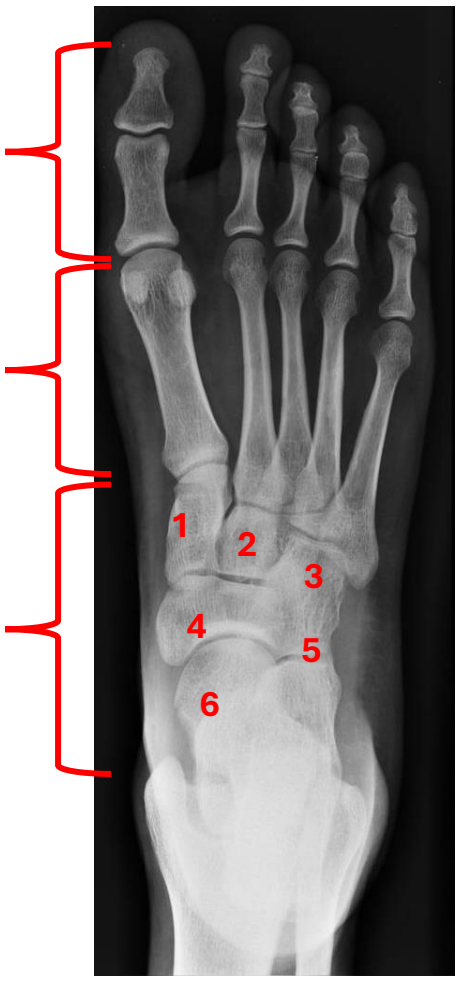
42. In a **lateral foot** projection, the CR is directed to the level of the _____metatarsal base (approx. midfoot).

43. What position would best demonstrate the cuboid free of superimposition?

44. During a portable exam for a severely injured ankle, the patient cannot rotate or dorsiflex the foot. What positioning strategies could you use to still demonstrate the joint space and any fracture lines?

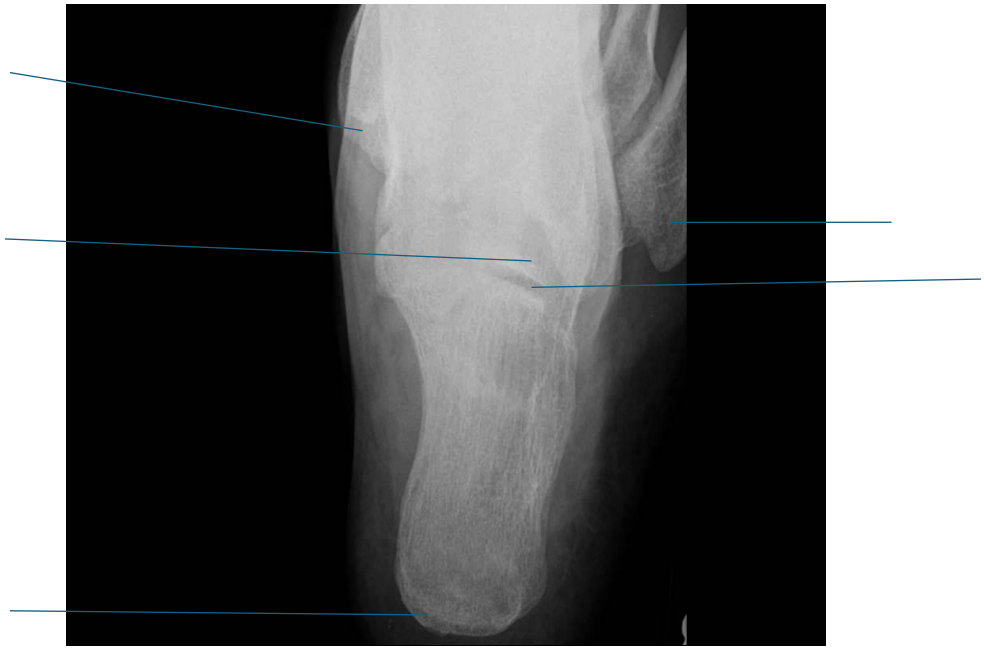
45. What pathological condition is demonstrated?

46. Label AP and Lateral foot anatomy:



47. An axial projection of the calcaneus requires the CR to be:

48. Label axial calcaneus projection:



49. Identify the ankle fracture, and describe criteria:

50. Lateral knee:

CR angle:

CR directed:

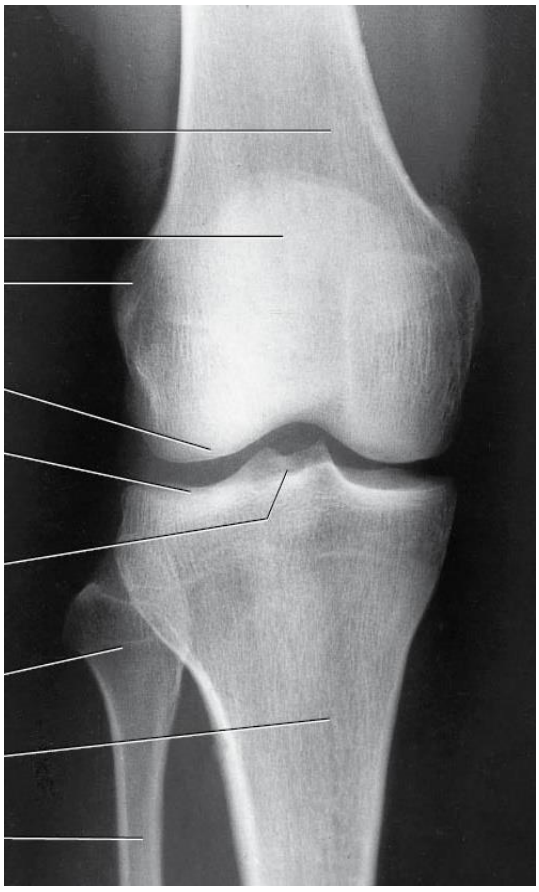
Flex knee:

Epicondyles are _____ to IR

51. A patient with suspected **tibial plateau fracture** cannot fully extend or flex their knee. What alternative projections or modifications can you use to still visualize the fracture site adequately?

52. For an AP knee projection, the CR is directed:

53. Label AP knee anatomy:



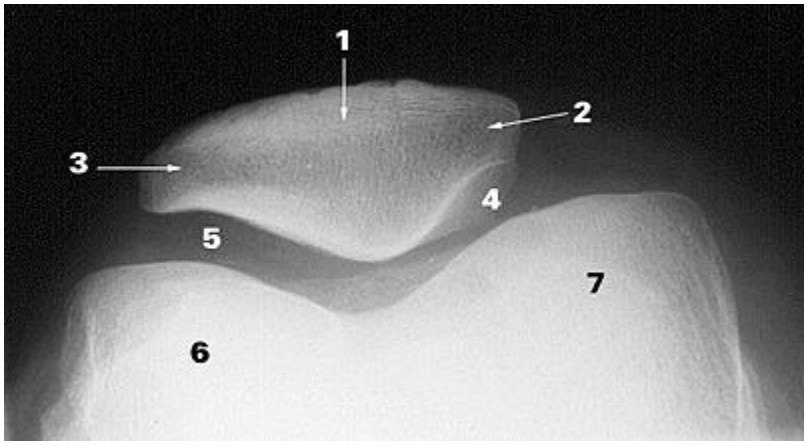
54. The ‘sunrise’ tangential projection demonstrates:

-
-
-

55. What are the three common method variations for the patella? Describe each:

-
-
-

56. Label sunrise tangential projection:



57. What is the routine exam for a Tibia/Fibula?

-
-

58. In a routine **AP tibia/fibula** radiograph, _____ & _____ joints should be included on a single 14x17-inch IR (if the patient's leg length allows).

59. Identify / describe the type of fracture:

60. For an **AP proximal femur**, the patient's leg is internally rotated about 15–20° to place the femoral neck in a _____ position relative to the IR.

61. Why is a **frog-leg lateral** hip position contraindicated in cases of suspected femoral neck fracture?

62. Match each special hip/femur projection to its typical clinical indication:

    Danelius-Miller (cross-table lateral) evaluates fractures of anterior or posterior acetabular rim

    Lauenstein/Hickey lateral projection for the femoral neck in non-trauma situations

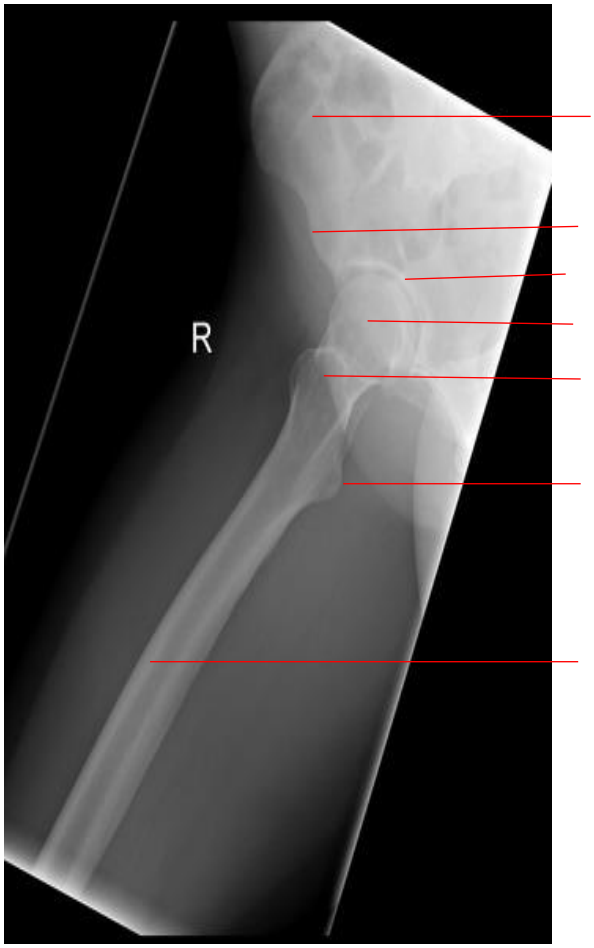
    AP Axial "outlet" pelvis trauma projection when the patient cannot abduct the leg

    Judet Views (oblique acetabulum) assesses pubic/ischial rami in pelvic trauma cases

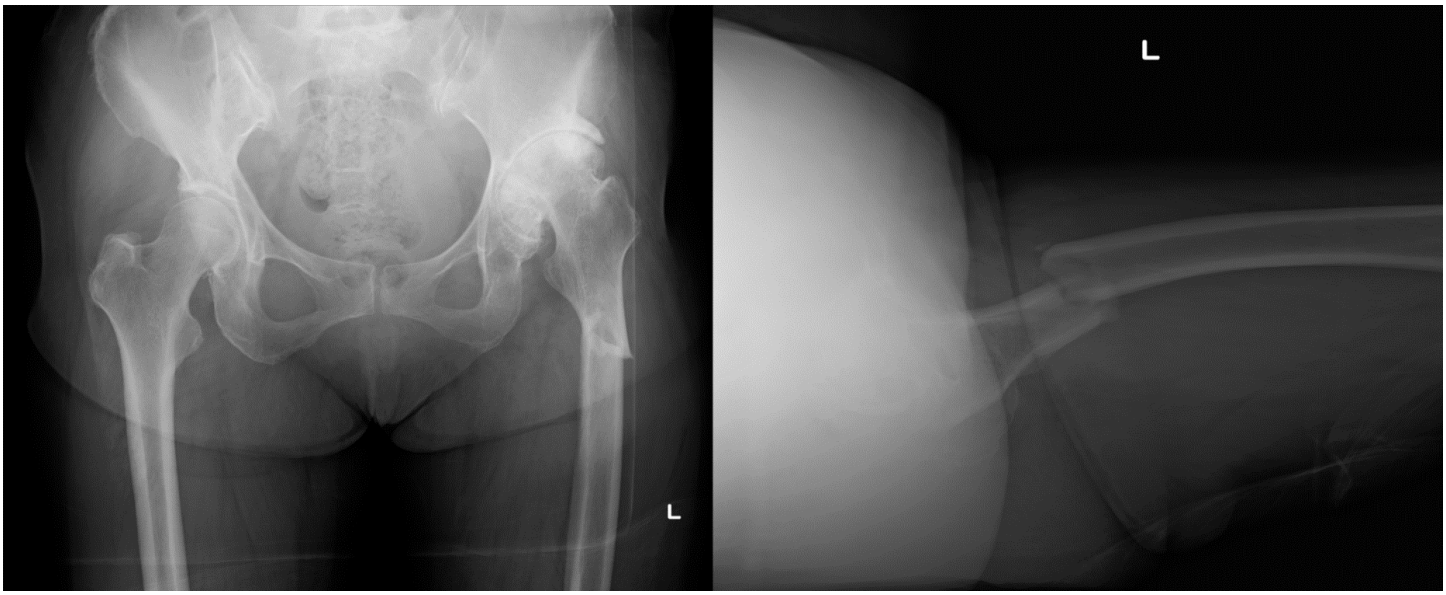
63. A patient presents with severe hip pain and limited mobility after a fall. The physician suspects a femoral neck fracture. How would you modify positioning or select specific projections to safely obtain diagnostic images?

64. Explain the role of **orthopedic hardware** in extremity imaging. How might it alter exposure factors or positioning strategies?

65. Label AP and Lateral hip anatomy:



66. Identify projection, CR direction, and method name. Identify/describe pathology:



67. List the general steps for **evaluating a finished extremity radiograph** for quality:

-
-
-
-
-

D. Procedures Exam – Test your knowledge *(66 questions)*

1. What is the ideal SID for a PA chest projection?

   A) 40 inches
   B) 48 inches
   C) 72 inches
   D) 96 inches

2. Which projection best demonstrates a pneumothorax?

   A) PA chest on expiration
   B) AP supine chest
   C) Lateral chest
   D) Decubitus chest

3. For a lateral decubitus abdomen, the side of interest for free air is:

   A) Up
   B) Down
   C) Either side
   D) Centered at umbilicus

4. Which condition is characterized by dilated loops of bowel with air-fluid levels?

   A) Ileus
   B) Ascites
   C) Pneumoperitoneum
   D) Crohn’s disease

5. For an AP lordotic chest, the CR is directed to:

   A) T7, angled 15–20° cephalad
   B) T10, angled 10° caudad
   C) T7, perpendicular to the IR
   D) T10, perpendicular to the IR

6. Which pathology presents radiographically with "honeycomb" lung texture?

   A) Pulmonary fibrosis
   B) Tuberculosis
   C) Emphysema
   D) Pneumothorax

7. Which projection is used to assess the mobility of the diaphragm?

A) PA chest on inspiration and expiration
B) AP supine abdomen
C) Lateral chest
D) Oblique chest

8. What is the CR (central ray) angulation for an AP axial (Towne) skull projection?

A) 15° caudad
B) 30° caudad
C) 15° cephalad
D) 30° cephalad

9. What pathology is characterized by increased density and irregularity in the mastoid air cells?

A) Mastoiditis
B) Cholesteatoma
C) Otosclerosis
D) Meningitis

10. The CR for a lateral nasal bone projection is directed:

A) At the glabella
B) 1/2 inch inferior to the nasion
C) 1/2 inch posterior to the nasion
D) Perpendicular to the acanthion

11. What pathology involves the overproduction of cerebrospinal fluid (CSF) in the brain?

A) Hydrocephalus
B) Meningitis
C) Encephalitis
D) Glioblastoma

12. Which projection best demonstrates the intervertebral foramina of the cervical spine?

A) AP axial
B) Oblique
C) Lateral
D) PA axial

13. What projection best demonstrates the zygapophyseal joints of the lumbar spine?

A) Lateral
B) AP
C) Oblique
D) PA axial

14. The Ferguson method is used to evaluate:

A) Spondylolisthesis
B) Sacroiliac joint fusion
C) Scoliosis
D) Herniated discs

15. Where is the CR directed for an AP pelvis projection?

A) 1 inch above the iliac crest
B) At the pubic symphysis
C) 2 inches superior to the pubic symphysis
D) Midway between the ASIS and pubic symphysis

16. Which projection best demonstrates the femoral necks in profile?

A) AP pelvis
B) AP hip
C) Modified Cleaves (frog-leg)
D) Lateral hip

17. What position best demonstrates the acetabulum?

A) AP pelvis
B) Judet method
C) Frog-leg lateral
D) Danelius-Miller method

18. What is the key radiographic sign of ascites?

A) Free air under the diaphragm
B) Diffuse haziness in the abdominal cavity
C) Dilated loops of bowel
D) Fluid levels in the bowel

19. Which pathology is commonly associated with avascular necrosis of the femoral head?

    A) Legg-Calvé-Perthes disease
    B) Slipped capital femoral epiphysis
    C) Osteopetrosis
    D) Paget's disease

20. For an AP knee, the CR is directed to:

    A) 1/2 inch below the patellar apex
    B) The tibial tuberosity
    C) The femoral condyles
    D) The fibular head

21. What is the most common fracture of the wrist?

    A) Colles fracture
    B) Smith fracture
    C) Barton fracture
    D) Scaphoid fracture

22. Which projection best demonstrates the radial head?

    A) AP forearm
    B) Lateral elbow
    C) AP oblique elbow with lateral rotation
    D) PA oblique elbow with medial rotation

23. Which projection best demonstrates a Hill-Sachs defect?

    A) AP shoulder
    B) Inferosuperior axial shoulder
    C) AP oblique shoulder (Grashey)
    D) Transaxillary shoulder

24. A Jone’s fracture involves which part of the foot?

    A) Base of the fifth metatarsal
    B) Calcaneus
    C) Talus
    D) First metatarsophalangeal joint

25. Which pathology involves a tear of the ulnar collateral ligament of the thumb?

A) Skier's thumb
B) Mallet finger
C) Boutonnière deformity
D) Gamekeeper's thumb

26. What is the key radiographic sign of osteomyelitis?

A) Periosteal reaction
B) Increased joint space
C) Bone sclerosis
D) Cortical thinning

27. For a lateral ankle projection, the CR is directed to:

A) 1 inch superior to the lateral malleolus
B) The medial malleolus
C) The talus
D) The tibial tuberosity

28. Which pathology involves inflammation of the bursa in the shoulder?

A) Bursitis
B) Tendonitis
C) Rotator cuff tear
D) Adhesive capsulitis

29. The manubrium articulates with which of the following?

A) Ribs 3-5
B) Clavicles and first two ribs
C) Xiphoid process and rib 7
D) Sternoclavicular joints only

30. What breathing instructions are given for a PA chest to visualize ribs above the diaphragm?

A) Full expiration
B) Shallow breathing
C) Suspend breathing
D) Full inspiration

31. For a PA projection of the upper ribs, the CR is directed to:

A) The level of T7
B) The xiphoid process
C) The level of C7
D) The iliac crest

32. Which ribs are considered "floating ribs"?

A) Ribs 1-2
B) Ribs 8-10
C) Ribs 11-12
D) Ribs 3-7

33. For an RAO sternum projection, the degree of obliquity is typically:

A) 10°-15°
B) 20°-30°
C) 5°-10°
D) 25°-35°

34. Which pathology is associated with outpouching of the intestinal wall?

A) Diverticulosis
B) Crohn’s disease
C) Volvulus
D) Intussusception

35. What is the appropriate CR angle for an AP axial inlet projection of the pelvis?

A) 15° caudad
B) 25° cephalad
C) 40° caudad
D) 30° caudad

36. The CR for an AP unilateral hip is directed:

A) 1 inch superior to the greater trochanter
B) Midway between the ASIS and pubic symphysis
C) 2 inches inferior to the ASIS
D) At the iliac crest

37. What is the proper CR angle for an AP axial "outlet" pelvis projection?

A) 10–15° cephalad
B) 20–35° cephalad
C) 30–45° cephalad
D) 40–50° caudad

38. What pathology is characterized by a loss of joint space and subchondral sclerosis in the hip?

A) Osteoarthritis
B) Rheumatoid arthritis
C) Osteoporosis
D) Ankylosing spondylitis

39. For an AP sacrum, the CR is angled:

A) 15° cephalad
B) 15° caudad
C) 25° cephalad
D) 30° cephalad

40. Which pathology is associated with a defect in the pars interarticularis?

A) Spondylolysis
B) Osteoporosis
C) Compression fracture
D) Spina bifida

41. In the lateral thoracic spine projection, what is demonstrated?

A) Zygapophyseal joints
B) Spinous processes
C) Intervertebral foramina
D) Sacroiliac joints

42. Which pathology is characterized by a forward slipping of one vertebra over another

A) Spondylolisthesis
B) Spina bifida
C) Kyphosis
D) Scoliosis

43. For an AP lumbar spine, the CR is directed to:

A) L3
B) L4-L5
C) T12
D) L1-L2

44. The CR for an AP axial cervical spine is directed at:

A) C4, angled 15–20° cephalad
B) C7, angled 15–20° caudad
C) C2, angled 10° cephalad
D) T1, angled 10° caudad

45. For a lateral facial bone projection, the CR enters:

A) At the glabella
B) Perpendicular to the zygoma
C) At the nasion
D) Inferior to the mandible

46. Which sinus is best demonstrated in the open-mouth Waters projection?

A) Frontal sinus
B) Maxillary sinus
C) Ethmoid sinus
D) Sphenoid sinus

47. The CR for an AP axial (Towne) mandible projection is angled:

A) 25° caudad
B) 30° caudad
C) 35° caudad
D) 40° caudad

48. Which pathology is characterized by a fracture of the zygomatic arch, orbital floor, and maxillary process?

A) Tripod fracture
B) Le Fort fracture
C) Blowout fracture
D) Linear skull fracture

49. Which projection best demonstrates the sella turcica?

A) AP axial (Towne)
B) Lateral skull
C) SMV projection
D) PA axial (Caldwell)

50. Which projection best demonstrates a blowout fracture of the orbit?

A) AP axial (Towne)
B) Waters (parietoacanthial)
C) PA axial (Caldwell)
D) SMV

51. Which structure is best demonstrated in the SMV (submentovertical) projection of the skull?

A) Petrous ridges
B) Occipital bone
C) Sella turcica
D) Cranial base

52. Which condition is associated with multiple rib fractures and a paradoxical chest movement?

A) Flail chest
B) Pneumothorax
C) Hemothorax
D) Costochondritis

53. What condition involves the anterior protrusion of the sternum?

A) Pectus excavatum
B) Pectus carinatum
C) Flail chest
D) Costochondritis

54. What is the appropriate SID for a lateral sternum projection?

A) 40 inches
B) 48 inches
C) 60 inches
D) 72 inches

55. Which projection best demonstrates fractures of the ribs below the diaphragm?

A) AP ribs with expiration
B) PA ribs with inspiration
C) AP ribs with inspiration
D) Lateral chest

56. Which projection best demonstrates the sternum without superimposition of the spine?

A) AP projection
B) RAO projection
C) Lateral projection
D) PA projection

57. Which projection best demonstrates the intercondylar fossa?

A) AP knee
B) Lateral knee
C) PA axial (Camp Coventry)
D) AP oblique knee

58. The CR for an AP supine abdomen is directed to:

A) T10
B) L3
C) The iliac crest
D) 2 inches above the iliac crest

59. Which pelvic fracture involves a fracture of the iliopubic and ilioischial columns?

A) Acetabular fracture
B) Malgaigne fracture
C) Duverney fracture
D) Pelvic ring fracture

60. For a suspected hip fracture, which projection should be avoided?

A) AP hip
B) Cross-table lateral hip
C) Modified Cleaves
D) Axiolateral (Danelius-Miller)

61. What pathology is characterized by narrowing of the intervertebral disc space?

A) Herniated nucleus pulposus (HNP)
B) Spondylolisthesis
C) Scoliosis
D) Osteophytes

62. For a PA axial (Caldwell) projection of the skull, the CR is angled:

A) 10° caudad
B) 15° caudad
C) 20° cephalad
D) 25° cephalad

63. Paget's disease of the skull typically presents radiographically as:

A) Bone erosion and sclerosis
B) Increased lucency
C) Uniform bone density
D) Focal calcification

64. Which line is perpendicular to the IR in a PA skull projection?

A) Orbitomeatal line (OML)
B) Infraorbitomeatal line (IOML)
C) Acanthiomeatal line (AML)
D) Glabellomeatal line (GML)

65. For the lateral skull projection, the CR enters:

A) 1 inch superior to the external auditory meatus (EAM)
B) At the nasion
C) At the glabella
D) 1 inch inferior to the EAM

66. Which pathology is characterized by a forward slipping of one vertebra over another?

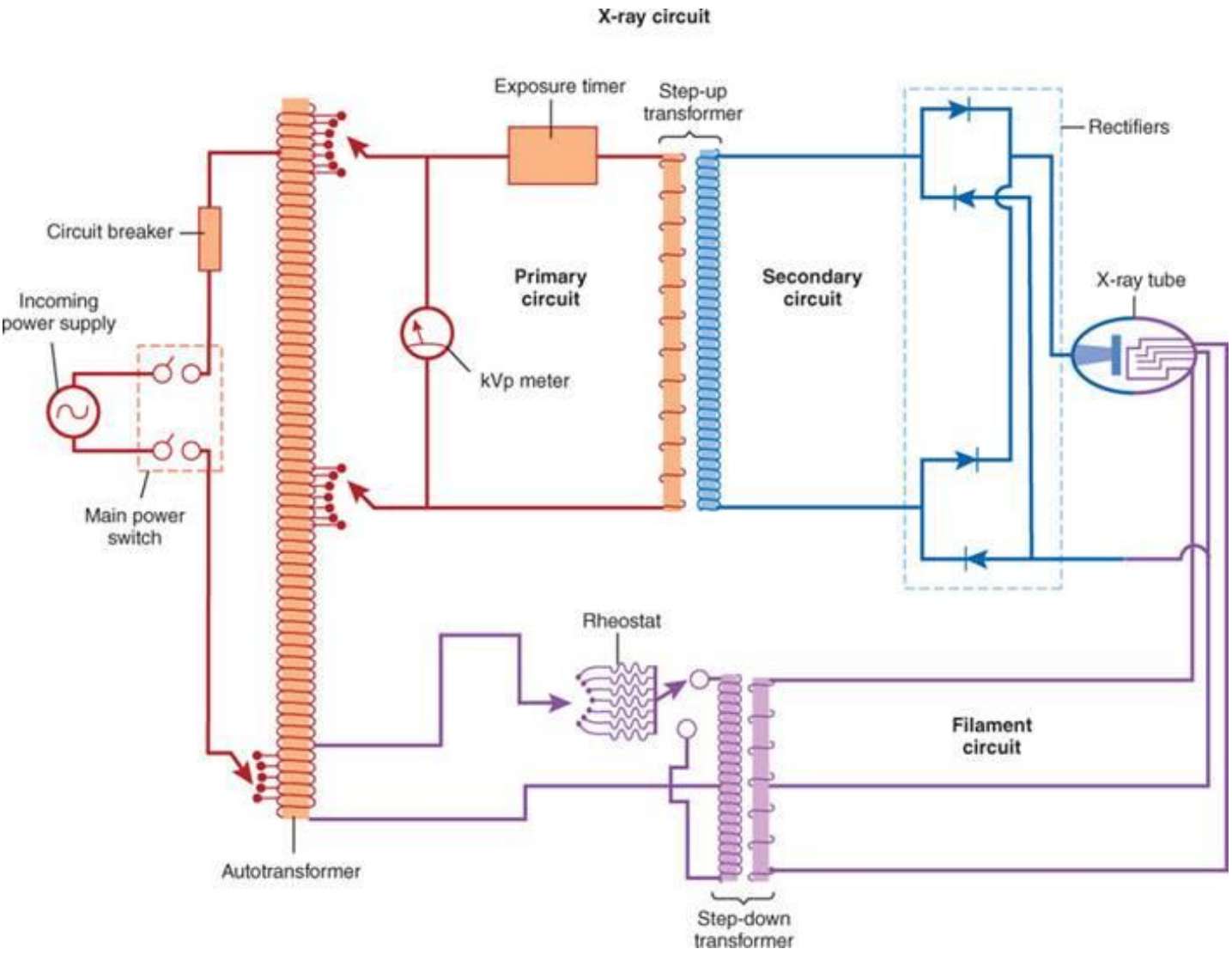
A) Spondylolisthesis
B) Spina bifida
C) Kyphosis
D) Scoliosis

ANSWERS

1. C
2. A
3. A
4. A
5. A
6. A
7. A
8. B
9. A
10. B
11. A
12. B
13. C
14. C
15. D
16. C
17. B
18. B
19. A
20. A
21. D
22. C
23. B
24. A
25. D
26. A
27. B
28. A
29. B
30. D
31. A
32. C
33. A
34. A
35. C
36. C
37. B
38. A
39. A
40. A
41. C
42. A
43. B
44. A
45. B
46. D
47. B
48. A
49. B
50. B
51. D
52. A
53. B
54. D
55. A
56. B
57. C
58. C
59. A
60. C
61. A
62. B
63. A
64. A
65. A
66. A

NOTES

X-RAY CIRCUIT REVIEW



Label X-Ray tube:

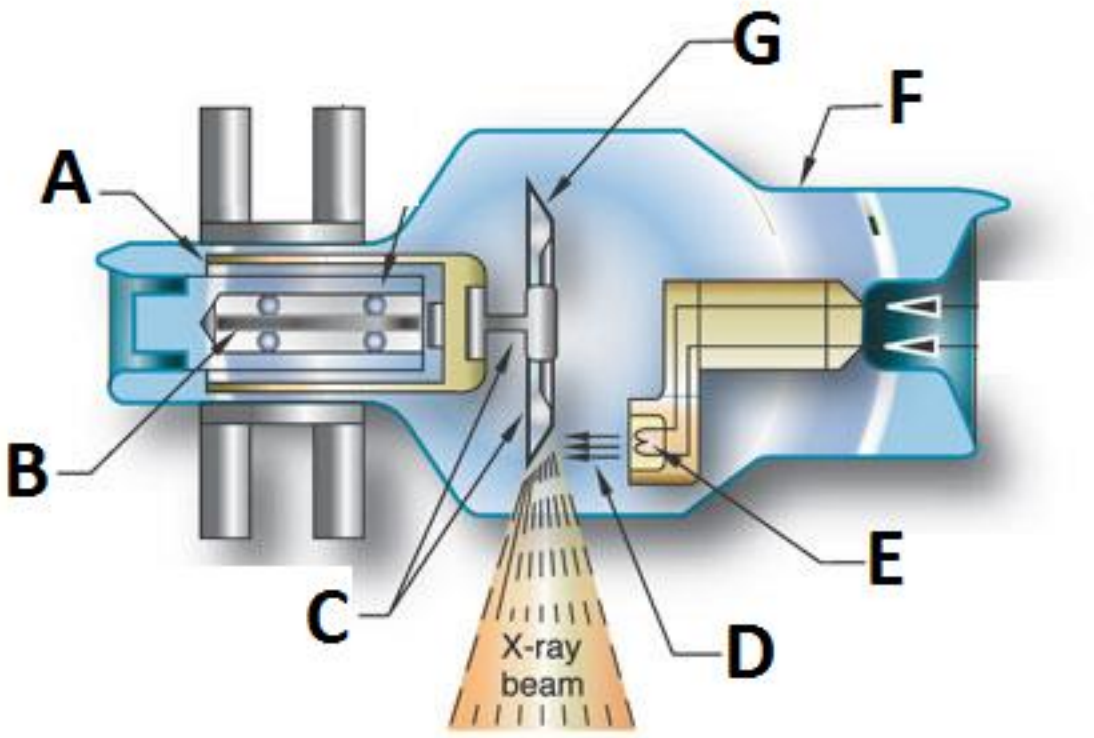


IMAGE CRITERIA

Head

Position/Projection	Position	Central Ray	Technical Factor	Criteria
PA				
Lateral				
AP Axial				
PA-Caldwell				
Submentovortex (SMV)				
PA Haas				
Trauma AP				

Facial Bones

Position/Projection	Position	Central Ray	Technical Factor	Criteria
PA Axial-Caldwell				
Lateral				
Parietocanthial-Waters				
Modified Parietocanthial-Waters				

Sinuses

Position/Projection	Position	Central Ray	Technical Factor	Criteria
PA Axial-Caldwell				
Lateral				
Parietocanthial-Waters				
Open Mouth Parietocanthial-Waters				
Submentovertical				

Cervical Spine

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP Axial				
Lateral				
AP Dens Open Mouth				
AP Dens-Fuchs				
AP Oblique				
PA Oblique				
Lateral Swimmers				
Flexion/Extension				

Thoracic Spine

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP				
Lateral				

Lumbar Spine

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP				
Oblique/s				
Lateral				
Lateral Spot				
AP Bending				
Lateral Flexion/Extension				

Pelvis

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP				
AP Axial-inlet/outlet				
Anterior Oblique-Judet				

Sacrum / Coccyx

Position/Projection	Position	Central Ray	Technical Factor	Criteria
Sacrum-AP Axial				
Sacrum-Lateral				
Coccyx-AP Axial				
Coccyx-Lateral				

SI Joints

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP/PA Axial-Ferguson Method				
Posterior Oblique				
Anterior Oblique				

Hip

Position/Projection	Position	Central Ray	Technical Factor	Criteria
AP				
Unilateral frog-leg (non-trauma)				
Axiolateral-Dan Miller (trauma)				
Axiolateral-Clements Nakayama (trauma)				

Thorax

Position/Projection	Position	Central Ray	Technical Factor	Criteria
PA/AP Upright				
Lateral				
AP Lordotic				
Oblique/s				
Lateral Decubitus				
AP Supine				

Ribs

Position/Projection	Position	Central Ray	Technical Factor	Criteria
Anterior/Posterior Above				
Anterior/Posterior Below				
Anterior Oblique/s				
Posterior Oblique/s				

SC Joints

Position/Projection	Position	Central Ray	Technical Factor	Criteria
PA				
Anterior Oblique/s				

Sternum

Position/Projection	Position	Central Ray	Technical Factor	Criteria
Lateral				
RAO				

Abdomen

Position/Projection	Position	Central Ray	Technical Factor	Criteria
KUB				
AP Upright				
AP Supine				
Lateral Decubitus				
Dorsal Decubitus				

Fluoroscopy – Esophagus / Upper GI

Position/Projection	Position	Criteria
AP		
PA		
RAO		
LAO		
RPO		
LPO		
Left Lateral		
Right Lateral		

Fluoroscopy – Lower GI / SBFT

Position/Projection	Position	Criteria
AP		
PA		
RAO		
LAO		
RPO		
LPO		
Left Lateral Decubitus		
Right Lateral Decubitus		
Left Lateral Rectum		

ADDITIONAL NOTES