

## **RADIOLOGICAL POSITIONING**

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### **QUESTION 1:**

**Xray projection of Femur :**

**Femur :**

- Lateral
- Antero-posterior

**Lateral :**

**Position of patient and image receptor :**

- The knee is flexed when the patient rotates onto the affected side.
- To separate thighs the pelvis rotates backward.
- Limb is adjust vertically to super impose the femoral condyles.
- Pads are used to support the opposite limb.
- The image receptor is positioned in the buckey tray under the lateral aspect of the thigh to include knee joint and Femur as possible.

**Direction and centering of Xray beam:**

- Center to the middle of the image receptor vertical central ray parallel to the imaginary line joining the femoral condyles.

**Essential image characteristics:**

- The image should show from the “knee up” to the proximal third of the Femur.

**Additional Considerations:**

- In some slim patients, it is possible to demonstrate up to the femoral head
- however, a separate image of this proximal region may be needed if the entire length of the femur is required to be seen.

**FEMUR antero-posterio:**

Position of patient and image receptor

- The patient lies supine on the x-ray table with both legs extended.
- The affected limb is rotated to centralize the patella over the femur.
- The image receptor is positioned in the bucky tray immediately under the limb, adjacent to the posterior aspect of the thigh to include both the hip and the knee joints.
- Alternatively, the image receptor is positioned directly under the limb, against the posterior aspect of the thigh to include the knee joint.

**Direction and centering of x-ray Beam**

- Center to the middle of the image receptor, with the vertical central ray at
- 90 degrees to an imaginary line joining both femoral condyles.

**Essential image characteristics**

- The hip and knee joints should both be including on the image where possible.

**Additional Consideration**

- In suspected fractures, the limb must not be rotated.
- The knee and hip joints should be included on the image if this is impossible to achieve, then the joint nearest site of injury should be included.

- If the distal femur is the focus of attention, and the effects of the scatter
- are not of pressing concern, the image receptor can be placed directly under the femur.

### **Radiological Findings**

Antero-Posterior hip radiograph

- 1) Leg Length.
- 2) Neck-shaft angle.
- 3) Acetabular coverage: The lateral center-edge angle and femoral head extrusion index.
- 4) Acetabular depth.
- 5) Acetabular inclination.
- 6) Acetabular version.
- 7) Head sphericity.
- 8) Joint space width.

### **Lateral hip radiographs**

The head-neck offset ratio can be assessed using three lines

- 1) A horizontal line
- 2) A line parallel to line1 through the anterior most aspect of the femoral neck.
- 3) A line parallel to line1 through the anterior most aspect of the femoral head.

Alpha angle can be measured more accurately using an “Axial computed tomography” or “magnetic resonance imaging” A cam deformity is diagnosed if the alpha angle exceeds 50-50 degrees.

### **QUESTION 2:**

#### **X-ray Projection of chest**

##### **Chest - Postero - Anterior**

##### **Position of patient and image receptor**

- The patient faces the image receptor, with the feet slightly apart for
- stability and chin extended and placed on the top of the of the image receptor
- The median sagittal plane is adjusted at right angle to the middle of the
- image receptor. The dorsal aspects of the hands are placed behind and
- below the hips, with the elbow brought forward and the shoulders rotated
- anteriorly and pressed downward in contact with the image receptor.
- For patients with reduced mobility an alternative is to allow the arms to
- mobility an alternative is to allow the arms to encircle the image receptor

##### **Direction and Centering of x-ray Beam**

- The horizontal central beam is directed at right angles to the image
- receptor at the level of the eight thoracic vertebrae (i-e, spinous process of
- T7 found by using the inferior angle of the scapula)
- Exposure is made in full normal arrested inspiration.
- An FRD of 180 cm should be used to minimize magnification.

##### **Additional Consideration**

An expiration radiograph maybe obtained to demonstrate a small apical

pneumothorax

## **Chest-Lateral**

### **Position of Patient and image receptor**

- This projection maybe undertaken with or without a grid, depending on patient size and local protocols.
- The patient is turned to bring the side under investigation in contact with the image receptor.
- The median sagittal plane is adjusted parallel to the image receptor.
- The mid-axillary line is coincident with the middle of the image receptor,
- which is then is adjusted to include the apices and the lower lobes to the level of the first lumbar vertebra

### **Direction and centering of x-ray Beam**

- Direct the horizontal central ray at right-angles to the middle of the image receptor at the mid-axillary line.

### **Additional Consideration**

- The projection is useful to confirm position and size of a lesion suspected on the initial projection of the position of the leads post pacemaker insertion.
- However, it is not a routine examination because of the additional patient dose and the increasing use of computed tomography to examine the thorax.

## **Question No 3**

### **Cervical Spine**

#### **Antero-Posterior C3-C7**

##### **Position of patient and image receptor**

- The patient lies supine on the Bucky table or if erect positioning is preferred, sits or stand with the posterior aspect of the head and shoulders against the vertical Bucky.
- Median sagittal plane is adjusted to be at right-angle.
- The neck is extended (if the patient conditions allow) so that the lower part of the jaw is cleared from the upper cervical vertebra.

##### **Direction and centering of x-ray Beam**

- A 5-15 degree cranial angulation is employed, such that the inferior border of the symphysis menti is superimposed over the occipital bone.
- The beam is centered in the midline towards a point just below the prominence of the thyroid cartilage through the fifth cervical vertebra.

##### **Essential image characteristic**

- The image must demonstrate the third cervical vertebra down to the cervical-thoracic junction.
- Lateral collimation to soft tissue margins.
- The chin should be superimposed over the occipital bone.

### **Cervical Spine-Lateral Erect**

#### **Position of patient and image Receptor**

- The patient stands or sit with either shoulder against the image receptor.
- The median sagittal plane should be adjusted such that it is parallel with the image receptor.

### **Direction and centering of x-ray Beam**

- The horizontal central ray is centered to a point vertically below the mastoid process at the level of the prominence of the thyroid cartilage.
- An FRD of 150 cm should be used to reduce magnification.

### **Essential Image Characteristic**

- The whole of the cervical spine and upper part of TV1 should be included.
- The mandible or occipital bone should not obscure any part of the upper vertebra.
- Soft tissues of the neck should be included.

### **QUESTION 4:**

#### **(A) Hand**

##### **X-ray Projections**

- (1) Hand-Dorsi-Palmer.
- (2) Hand-Dorsi-Palmar Oblique.
- (3) Hand-Lateral.

#### **(B) Foot**

##### **X-ray Projections**

- (1) Foot-Dorsi-Plantar.
- (2) Foot-Dorsi-Plantar Oblique.
- (3) Foot-Lateral Erect.

#### **(C) Abdomen**

##### **X-ray Projection**

- (1) Abdomen-Antero-Posterior Supine.
- (2) Abdomen-Prone.
- (3) Abdomen-Left Lateral Decubitus.