**MIDTERM**

**SUBJECT: RADIOLOGICAL POSITIONING**

**CLASS: 4rth SEMESTER**

**DEPARTMENT: RADIOLOGY (AHS)**

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**Q NO1: Explain basic X-ray projections of Femur and discuss its radiological findings?**

**Answer:** Basic X-ray projection of Femur

* Femur – ANTERO- POSTERIOR
* Femur – LATERAL

**Femur – ANTERO-POSTERIOR**: **Position of patient and image receptor:**

1. The patient lies supine on the X-ray table with both legs extended.
2. Affected limb is rotated to centralize the patella over the Femur.
3. Sand bags are placed below the knee to help maintain the position.
4. The image receptor is positioned in the Bucky tray, adjacent to the posterior aspect of the thigh to both the hip and the knee joint.
5. The image receptor is position directly under the limb against the posterior aspect of the thigh include the joint.

**Direction and centering**:

* Centre to the middle of image receptor, vertical central Ray at ninety degrees to imaginary line joining both Femoral condyles.

**Image characteristics:**

* The hip and jointsshould both be included on the image

**Considerations:**

* In suspected fractures, the limb must be rotated.
* The knee and hip joint must be included in image receptor if it is not possible then include nearest side of the injury.
* If the distal Femur is the focus of attention, effect of scatter are not getting the actual result then the image receptor can be placed directly under the Femur.

 **Femur – LATERAL** : **Positioning of patient** **and image receptor**:

* From the Antero posterior position, the patient rotates on to the effected side, knee slightly flexed.
* Pelvis is rotated backwards to separate the thigh.
* Position of the limb is vertically super impose the Femoral condoyles.
* Pads are used to support the position of limb.
* Image receptor is positioned in the Bucky tray under the lateral aspect of thigh.
* The image receptor is positioned directly under the limb, against the lateral aspect of the thigh, include the knee joint.

**Direction and centering**:

* Center to the middle of the image receptor, with vertical central ray parallel to imaginary line which joins the Femoral condoyle.

**Image characteristics**

* The image should show from the knee up to the proximal third of Femur.

**Considerations:**

* In slim patients, as possible to examined the femoral head, separate image of this proximal region may be needed if the whole length of the femur is required to be seen.

**QNO2: Explain the X-ray projection of Chest and its radiological consideration for it?**

**Answer:**

 **X-ray projection of chest :**

* Postero-anterior
* Antero-posterior
* Lateral
* Supine
* Mobile /Trolley

**POSTERO-ANTERIOR : Position of patient and Image receptor**

* Patient faces the image receptor , feet slightly apart and chin extended and placed on the top of the image receptor .
* Median sagittal plane is placed at right angle , Dorsal aspects of the hands are placed behind and below the hips , elbows forward , shoulders rotated anteriorly and pressed downwards in contact with image receptor .
* Patients with reduced mobility an alternative to allow the arms to encircle the image receptor.

**Direction and Centering ;**

* Central beam is directed at right-angles to the image receptor at the level of the eighth thoracic vertebrae .
* Exposure is made in full normal , arrested inspiration .
* FRD of 180cm should be used to minimize magnification .

**Image characteristics :**

* Full lung fields with the scapulae projected laterally away from lung fields and clavicle symmetrical and equidistant from the spinous process
* Sufficient inspiration .
* Costophrenic angles , diaphragm , mediastinum , lung markings and heart should be defined sharply.

**Considerations :**

* **E**xpiration radiograph may be obtained to demonstrate a small apical pneumothorax .

**ANTERO-POSTERIOR : (ERECT)**

This projection is used as alternative when the postero-anterior projection cannot be performed due to the patient’s condition . patient is supported sitting erect on a chair .

**POSITION OF THE PATIENT :**

* Patient sits with their back against the image receptor
* Median sagittal plane is placed at right angles to the middle of the image receptor .
* Dependent on the patients condition , the arms are extended forwards into the anatomical position and internally rotated to minimize the superimposition of the scapulae on the lung.

**DIRECTION AND CENTRING :**

* Horizontal ray is directed first at right – angle and towards the sternal notch .
* Avoiding unnecessary exposure of the eye .
* Exposure is taken in full inspiration .
* FRD of atleast 120cm is essential to reduce unequal magnification of intrathoracic structures .

**CONSIDERATION :**

* The heart is moved further from the image receptor , increasing magnification and reducing accuracy of assessment of heart size .

**CHEST – LATERAL : POSITION OF PATIENT :**

* This projection is undertaken with or without grid ,depending on the size of the patient .
* Median sagittal plane is placed parallel to the image receptor .
* Arms are folded over the head .
* Mid-axillary line is coincident with the middle of the image receptor , lower lobes to the level of the first lumbar vertebra .

**Direction and centring :**

* Direct the central ray at right-angles to the middle of image receptor .

**CONSIDERATION :**

* Projection is useful to confirm position , size of lesion suspected on the initial projection .
* It is not a routine examination because of the additional patient dose and the increasing use of computed tomography to examine the thorax .

**CHEST – SUPINE (ANTERO-POSTERIOR) :**

This projection is only utilized when the patient is unable to sit up on a bed or trolley .

**POSITION OF PATIENT :**

* Image receptor is carefully positioned under the patient chest with the upper edge of the image receptor .
* Median sagittal plane is placed at right-angles to the middle of the image receptor .
* Arms are rotated laterally and supported by the side of the trunk
* Head is supported on a pillow , with chin slightly raised .
* Pelvis is checked for rotation .

**IMAGE CHARACTERISTICS :**

* **I**mage quality maybe compromised due to patient condition

**CONSIDERATIONS :**

* Maximum lung demonstration is lost due to the absence of the gravity effect of the abdominal organs .
* A pneumothorax is not as well demonstrated compared with the erect projections.
* FRD of at least 120cm .

**CHEST – MOBILE / TROLLEY (ANTERO – POSTERIOR) :**

Ward radiography should only be performed when necessary .

**POSITION OF PATIENT :**

* Patient should be examined in an erect position , this may not be achievable due to patient condition .
* Image receptor is supported behind the back of the patient .
* It is very important to avoid/minimize any rotation .

**CONSIDERATIONS :**

Radiographer needs to consider issues such as ;

* Careful identification of patient .
* Moving and handling issues .
* Care when handling any patient devices
* Infection control
* Radiation protection
* Good communication with staff
* It is a good practice to annotate the image with information to assist with consistency of results . this may include date ,time ,exposure ,patient position and FRD .

**QNO3 : Explain in detail basic projections for neck pain patients ?**

**Answer : CERVICAL SPINE – ANTERO-POSTERIOR C3 – C7**

 **POSITION OF PATIENTS**

* Patient lies supine on the Bucky table .
* Median sagittal plane is placed to be at right – angle to the image receptor .
* Neck is extended so that the lower part of the jaw is cleared from the upper cervical vertebra .
* Image receptor / bucky is positioned to coincide with the central ray .

**DIRECTION AND CENTRING :**

* A 5 to 15 degree cranial angulation is employed .
* The beam is centred in the midline towards a point just below the prominence of the thyroid cartilage through the fifth cervical vertebra .

**IMAGE CHARACTERISTICS :**

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

**CERVICAL SPINE – LATERAL ERECT :**

**POSITION OF PATIENT :**

* Patient stands or sits with either shoulder against image receptor .
* Median sagittal plane is placed parallel with the image receptor .
* Head should be flexed or extended
* Partient should stand with the feet slightly apart and with shoulder resting against the image receptor stand .
* Shoulders should be depressed . This can be achieved by asking the patient to relax their shoulders downwards .
* Making the exposure on arrested expiration .

**DIRECTION AND CENTRING :**

* Central ray is centered to a point vertically below the mastoid process .
* FRD pf 150cm should be used to reduce magnification .

**IMAGE CHARACTERISTICS :**

* The whole of the cervical spine and upper part of TV1 should be included .
* Mandible bone should not obscure any part of the upper vertebra .
* Angles of the mandible and the lateral portions of the floor of posterior cranial fossa should be superimposed .
* Soft tissue of the neck should be included .

**QNO4 : write names for basic X-ray projections for the following**

1. **Hand**
2. **Foot**
3. **Abdomen**

**ANSWER : a) HAND**

* **PA view**
* **DP oblique view**
* **Lateral view**
* **Ball- catcher view (norgaard view)**

 **THUMB SERIES**

* **AP/PA view**
* **Lateral view**
* **Oblique view**

 **FINGERS SERIES**

* **PA view**
* **Lateral view**
* **Oblique view**

**b) Foot**

* **AP view**
* **Oblique view**
* **Lateral view**
* **Weight – bearing view**

 **CALCANEUS SERIES**

* **Axial view**
* **Lateral view**

 **TOES SERIES**

* **AP view**
* **Oblique view**
* **Lateral view**
* **Sesamoid view**

**C) Abdominal**

* **Acute abdominal series**
* **AP supine view**
* **PA erect view**
* **Lateral decubitus view**
* **Dorsal decubitus view**
* **PA prone view**
* **Lateral view**
* **Oblique views**