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**Paper : radiological positioning**

**Question no : 2**

Explain the x-ray projections of chest and its radiological consideration for it ?

**Answer :**

**CHEST ( MOBILE ANTERO- POSTERIOR ) :**

Should performed only when necessary .

**Position of the patient and image receptor :**

- The patient should be examined in an erect position .
- The image receptor is supported behind the back of patient using pads as required .
- It is important to avoid any rotation of patient .

**DIRECTION AND CENTRING OF X- RAY BEAM :**

As described for the sitting antero- posterior position .

**ESSENTIAL IMAGE CHARACTERISTICS :**

Described as supine chest position

**Additional consideration :**

- Identification of the patient very carefully .
- Moving and handling issues .
- Care when handling any patient devices such as drains .
- Radiation protection
- Good communication with nursing staff .
- Include the date time exposure patient position or FRD.

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

This projection is usually utilized when patient is unable to situp on a bed

**POSITION OF PATIENT AND IMAGE RECEPTOR :**

- The image receptor is carefully positioned under the patient chest .
- The median sagittal plane is adjusted at right angle to the middle of image receptor .
- The arm rotated laterally support by trunk head is supported on pillow chin slidely raised and pelvis check for rotation .

**DIRECTION AND CENTRING OF X- RAY BEAM :**

As described for the sitting antero- posterior position .

**ESSENTIAL IMAGE CHARACTERISTICS :**

The image quality may be compromised due to the patients condition and drawbacks of this technique however the apices lateral lung margins and bases should be visualized with optimum image processing and resolution with no evidence of rotation .

**Additional consideration :**

- Maximum lung demonstration is lost because the absence of gravity affect of the abdominal organs that are present in erect position .
- A pleural position is not well demonstrated that compared that compares with erect position .
- FRD of at least 120cm essential .

**Chest lateral :**

**The position of the patient in image receptor :**

- The projection may be under taken with or without grid .
- The patient is turned in contact with image receptor for investigation .
- Median sagittal plane parallel to the image receptor.
- Arms are folded over the head .
- The mid axillary line coincident with the middle of image receptor .

**DIRECTION AND CENTRING OF THE X- RAY BEAM :**

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

**ESSENTIAL IMAGE CHARACTERISTICS :**

- The image should include the apices and costophrenic angles and lung margins anteriorly and posteriorly .
- Image processing should be optimized to visualize the heart and lung tissues ,with particular regard to any lesions if appropriate .

**Additional consideration :**

- The projection is useful to confirm position and size of lesion on the initial projection .
- Increasing the use of computed tomography to examine the thorax.

**Chest – Antero- posterior ( Erect ) :**

- This projection is used when postero interior projection cannot performed .

**Position of the patient in image receptor :**

- The patient sits with their back against the image receptor .
- Median sagittal plane adjust at right angle to the middle of the image receptor .
- Depending on the patient condition the arms are extended forwards and rotated to minimize the super imposition of the scapulae on the lungs fields .

**DIRECTION AND CENTRING OF X- RAY BEAM :**

- The horizontal ray is directed at right angle to the image receptor and sternal notch .
- The central ray is coincident with the middle of image receptor and avoid unnecessary exposure of the eyes .
- The exposure is taken on full normal inspiration .
- FRD atleast 120 cm is essentials .

**ESSENTIAL IMAGE CHARACTERISTICS :**

The image should be comparable quality that describe postero- anterior chest projection .

**Additional consideration :**

- The heart is moved further from the image receptor increasing magnification and reducing accuracy of heart size . ( cardio thoracic ratio )

**Chest-Postero-Anterior :**

**Position of the patient in image receptor :**

- The patient faces image receptor with the feet slidely apart for stability and chin extended and placed on the top of image receptor .
- The median sagittal plane is adjusted at the right angles of the image receptor .
- For patient with reduced mobility is to allow the arms to encircle in the image receptor .

**DIRECTION AND CENTRING OF X- RAY BEAM :**

- The horizontal central beam directed at right angle to the image receptor at the level of the eighth thoracic vertebra ( T7 )
- Exposure made of normal inspiration and FRD of 180cm should be minimized magnification .

**ESSENTIAL IMAGE CHARACTERISTICS :**

- Full lung field with the scapulae projected laterally away from the lung fields and clavicles symmetrical and equidistant from the spinous processes.
- Sufficient inspiration visualizing six ribs anteriorly or 10 ribs posteriorly .
- The costophrenic angles , diaphragm , mediastinum ,lung markings and heart should be defined sharply .

**Additional consideration :**

An expiration radiograph may be perform to demonstrate a small apical pneumothorax.

**Question no : 4**

Write names for basic x- ray projections for the following .

- A. Hand
- B. Foot
- C. Abdomen

Answer :

**Abdomen :**

**Abdominal radiography :**

Acute abdominal series

- Ap supine view
- PA erect view
- Lateral decubitus view
- Dorsal decubitus view
- PA prone view
- Lateral view
- Oblique views

**HAND RADIOGRAPHY OR SHOULDER GIRDLE RADIOGRAPHY :**

- Scapula series
- Ap view
- Lateral view

**Foot series :**

- Ap view
- Oblique series
- Lateral view
- Weight-bearing view
- **Calcaneus series**
- Axial view
- Lateral view
- **Toes series**
- Ap view
- Oblique view

**Question no : 3**

Explain detail basic projection for neck pain patients ?

**ANSWER:**

**Servical spine x- ray :**

Is a safe and painless test that uses a small amount of radiation to take picture of the bones of neck .

**DIAGNOSIS :**

Doctor will take a medical history and do examination and check the numbness and muscle weakness and also check that how can move head forward backward and side to side .

**IMAGING TESTS :**

Imaging test can perform to get a picture of a cause of the neck pain .

**Projection are x- rays CT scan MRI .**

**OTHER TEST :**

**ELECTROMYOGRAPHY ( EMG ) :**

This can be performed when doctor think neck pain might be related to a pinched nerve.

**IMAGE TECHNICAL EVALUATION :**

- There should be a clear visualization C1 to T1 ( T1 minimum )

**PRACTICAL POINTS :**

**TRACTION :**

- This projection required inferior traction of the arms to better visualization T1

**CERVICAL SPINE LATERAL ERECT :**

**POSITION OF PATIENT AND IMAGE RECEPTOR :**

- The patient stands and sit with shoulder against the image receptor .
- The head should be flexed.
- To aid immobilization .
- Medium sagittal plane parallel to the image receptor .
- If need to identify lower cervical vertebra shoulder must be depressed .

**DIRECTION AND CENTRING X-RAY BEAM :**

- The horizontal central ray centred to appoint vertically.

- FRD of 150cm should use .

**ESSENTIAL IMAGE CHARACTERISTICS :**

- Soft tissue of the neck should be included
- The whole of the cervical spine should be included etc.

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

**POSITION OF PATIENT AND IMAGE RECEPTOR :**

- The patient lies supine on the bucky table.
- Median sagittal plane is adjusted
- The neck is extended ( in some cases )
- The image receptor coincide with the central ray.

**DIRECTION AND CENTRING OF X-RAY BEAM :**

- 5 to 15 degree cranial angulation is employed .
- The beam is centred in the mid line below the prominence of thyroid cartilage.

**ESSENTIAL IMAGE CHARACTERISTICS :**

- The chin should be super imposed .
- Lateral collimation to soft tissue margins .
- Third cervical vertebra down to cervical thoracic junction when image demonstrate .

**Question no : 1**

**Explain the x- ray projections of femur and discuss its radiological findings ?**

**Answer :**

**POSITION OF PATIENT AND IMAGE RECEPTOR :**

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

**Direction and centring of x- ray beam :**

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

**ESSENTIAL IMAGE CHARACTERISTICS :**

Both hip and knee joints should be included on the image .

**ADDITIONAL CONSIDERATIONS :**

- In fractures cases , the limb not be rotated .
- The knee and hip joints included on the image and if this is not possible then the joint near to the side of injury should be included .
- If the distal femur is a focus of attention , and the effects of scatter are not of pressing concern , the image receptor can be placed directly under the femur.

### **FEMUR- LATERAL :**

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

- antero- posterior position the patient rotates on to the affected side and knee is flexed .
- The pelvis is rotated backward to separate the thighs .
- The position of the limb adjust vertically superimpose femoral condyles .
- Pads are used to support the opposite limb
- The image receptor is positioned in bucky tray under the lateral aspect of thigh .
- The image receptor is positioned directly under the limb .

#### **DIRECTION AND CENTRING OF X- RAY LIMB :**

Centre to the middle of the image receptor with the 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 CONCENTRATION :**

In slim patients it is possible to demonstrate femoral head . A separate image of proximal region may be needed if the entire length of the femur is required .

#### **RADIOLOGICAL FINDINGS :**

### **RADIOLOGICAL FINDING OF AP PROJECTION :**

#### **Ap view :**

- Ap view of femur
- Femoral head
- Hip joint
- Leg length

#### **ESSENTIAL IMAGE CHARACTERISTICS :**

The radiograph must show the knee up to the proximal third of the femur .

#### **ADDITIONAL CONCENTRATION :**

Slim thin patient have the possibility to demonstrate up the femoral head and image of the proximal region needed when whole femur is required for seen .

#### **RADIOLOGICAL FINDING OF LATERAL VIEW :**

The lateral view , we have the following findings .

- Fracture of the neck of femur .
- Broken shenton arc .
- Femoral head
- Femoral neck etc .