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★ Attempt All Questions:-

Q1 What is OPG? Describe the positioning and patient positioning technique in detail.

Ans

OPG:-

OPG stands for orthopantomography. An OPG is a panaramic X-ray of the upper and Lower jaws, including the teeth. The OPG unit is specifically designed to rotate around the patients head during the scan. An OPG will take approximately 20 seconds.

An OPG can be used to look for,

- Fractures
- Dislocated jaw
- Infection
- Dentition teeth

It can also be used for surgical planing.

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Patient positioning in Opg:

- Removal of all metallic objects
- Demonstrate the machine.
- Draped with leaded apron
- Dental arches located in focal trough
- Midline stand positioning.

Position of patient and image receptor:-

- The patient walks into the machine, holding the handles and adopting a 'sking' position.
- The equipment is brought to start position and careful explanation is given to the patient.
- A 15 x 30cm image receptor is used on many machine however direct Radiography (DR) technology may be utilize in newer equipment.

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- Any bulky clothing and radio-opaque objects such as jewellery, dentures or hearing aids should be removed from the image area.
- The exposure is taken. Observe the patient carefully.

Direction and Centering of X-ray Beam:-

The anteroposterior light should be centred distally to the upper lateral incisor. This allows optimal positioning of the focal trough, the zone of focus outside of which the anatomical detail becomes blurred.

Essential image characteristics:

- Correct anatomical coverage, which should include the entire mandible and temporomandibular joints.
- Edge to edge incisors.

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Additional Considerations:-

- Problems can occur with producing an optimal range image with this technique due a number of factors including patient movement and positioning errors.

Machine preparation and exposure:

(1) Set the exposure parameters. Select the patient size and adjust the kvp and mA.

(2) Exit the operatory and activate the exposure button. Some machines require the operator to hold the exposure button for the entire duration of the exposure.

(3) The film / sensor has now been exposed and is ready for processing.

Qe How will you scan a patient with lower back pain - Write a basic view for lumbar x-rays ?

Ans: For the patient which have the lower back pain, it can help your doctor to understand the cause of chronic back pain or view the effects of injuries, disease or infection - Your doctor may order a lumbar spine x-ray to diagnose:

- Low back pain that persists or lasts for more than four to eight weeks.
- Osteoarthritis, which is another affecting the joints
- Osteoporosis, which is a condition that causes your bones to thin.

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Basic view of Lumbar X-rays:-

We have made lumbar spine x ray at two view, which is basic views for the lumbar x-ray:

(1) Lumbar spine AP
(2) lumbar spine Lateral

(1) Lumbar spine AP view:-

The Lumbar spine AP view images the lumbar spine which consists of five vertebrae. It is utilized in many imaging contexts including trauma, postoperatively, and for chronic conditions.

Patient Position:-

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Patient Position:-

- The patient is erect or supine, depending on clinical history.
- All imaging of patients with suspected spinal injury must occur in the supine position without moving the patient.
- In the supine projection, hands are placed by the patients side.

Technical Factors:-

- Anteroposterior projection
- Suspended expiration (for a uniform density)
- Centering point:

- The level of the iliac crests at the MSP.
- The central ray is perpendicular to the image receptor.

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- Collimation:-
- Superiorly to include the T12/L1 junction.
- Inferiorly to include the sacral region.
- Orientation:-
- Portrait
- Detector size:-

35 cm X 43 cm

Direction to centering of x-ray:-

Direct the central ray towards the midline.

Essential image Characteristics:-

- Rotation can be assessed by ensuring that the sacro-iliac joints are equidistant from the spine.

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Lumbar spine (Lateral view):

The Lumbar spine lateral view images the lumbar spine which consists of five vertebrae- SL is utilized in many imaging contexts including trauma, postoperatively, and for chronic conditions.

Patient Position:-

- The patient is positioned erect, supine, or lateral recumbent, depending on clinical history.
- Ideally, spinal imaging should be taken erect in the setting of non-trauma to give a functional overview of the Lumbar spine.
- In the lateral decubitus position, the hamesi are extended 90 degrees to the thorax, with the elbows flexed so that the forearms are parallel to the thorax.

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Technical Factors:-

- Lateral projection
- Expiration (to minimize superimposition of the diaphragm over the upper lumbar spine.

- Centering point:

- The level of the iliac crest.
- Coronal centering point is directly over the lumbar vertebrae, which corresponds to the posterior third of the abdomen.
- The central ray is perpendicular to the image receptor

Collimation:-

- Superiorly to include the T12/L1.
- Inferior to include the sacrum.
- Anterior to include the anterior borders of the lumbar vertebral bodies.

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Q3: Patient of old age came in the department with a complaint of knee pain, what view should be done?

Ans When a patient came in the department with a complaint of knee pain, so we should be done Antero-posterior view of knee joint.

Knee - Antero - Posterior:~

Position of Patient and Image Receptor:~

- For computed radiography (CR), an 18 x 24-cm image receptor is generally used.
- The affected limb is rotated to centralize the patella b/w the femoral condyles, and sand bags are placed against the ankle to help maintain this position.

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- The patient is either supine or seated on the x ray table, with both legs extended.

Direction and Centering of X-ray Beam:-

- Centre 2.5 cm below the apex of the patella through the joint space, with the central ray at 90 degrees to the long axis of the tibia.

Essential image Characteristics:-

- The patella must be centralize over the femur.
- The distal third of femur and proximal third of tibia are included.

Additional Considerations:-

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Q4: A patient fell from the bike after being hit by a car, has now complained of headache, what are the x-rays prescribed for a skull.

Ans The x-rays prescribed for a skull are:

Trauma protocol:-

- Skull - AP
- Skull - Horizontal ray lateral

Supplementary views:-

- Skull - Submentovertex
- Skull - Townes

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Q5: A) How you see the importance of kvp and mAs settings in your x-ray machine.

Ans We see a lot of importance of kvp and mAs by increasing the kvp increases the beam intensity (like increasing mAs), but increasing the kvp also increases the beam energy - In other words, kvp affects both the beam quantity (intensity / number of photons) and the beam quality (energy).
When the kilovoltage is too high, contrast will be reduced, because the shoulder wavelength. The kvp affects the contrast in a digital image, however, image brightness and contrast are primarily controlled during computer processing - Assuming that the anatomic parts is adequately penetrated,

changing the kvp does not affect the digital image the same as a film-screen image. However, mAs is a measure of radiation produced over a set amount of time (seconds) via an x-ray tube. An increase in current (mA) results in a higher production of electrons that are inside the x-ray tube which will therefore, increases the quantity of radiation. The mAs controls the density produced in the image. There is a direct relationship b/w the amount of mAs and the amount of density produced when using film-screen IRs. For example, when the mAs is increased, density is increased, when the mAs is decreased, density is decreased.

(8) Write about the positions and technique of pelvic x-ray.

Ans Pelvis (AP view):-

The AP pelvis view is part of a pelvis series examining the iliac crest, sacrum, proximal femur, pubis, ischium and the great pelvic girdle. It is of considerable importance in the management of severely injured patients present to emergency departments.

Patient Position:-

- Patient is in supine position.
- Lower limbs are internally rotated 15-25° from the hip.
- The midline of the patient must coincide with the central primary beam and table index mechanism.

The limbs are slightly abducted and internally rotated to bring the femoral necks parallel to the image receptor

Technical Factors:-

Centering point:-
The mid point of the anterior superior iliac spine and the pubic symphysis.

Essential image characteristics:

- Iliac crests and proximal femoral, including the lesser trochanters should be visible on the image.

Additional Considerations:

- At first visit and trauma cases, good protection is usually emitted. however Local protocols can vary. It is used on follow-up images.

(The End)