Radiographic Techniques 2

lecture 10

Lumbar spine

By

Ali Hani Kareem

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1. Antero-posterior (Basic)

Position of patient and image receptor

1. The patient is positioned supine on the X-ray table, **with the median sagittal plane** perpendicular **and** coincident with the midline of the Bucky/ image receptor.
2. The anterior superior iliac spines should be equidistant from the tabletop.
3. The knees and hips are flexed and the feet are placed with their plantar aspect on the tabletop to reduce the lumbar arch to bring the vertebral column parallel to the image receptor.
4. The image receptor is centred at the level of the lower costal margin.
5. Exposure is made on arrested expiration, as expiration will cause the diaphragm to move superiorly. The air within the lungs would otherwise cause a large difference in density and poor contrast between the upper and lower lumbar vertebrae.

Direction and location of the X-ray beam

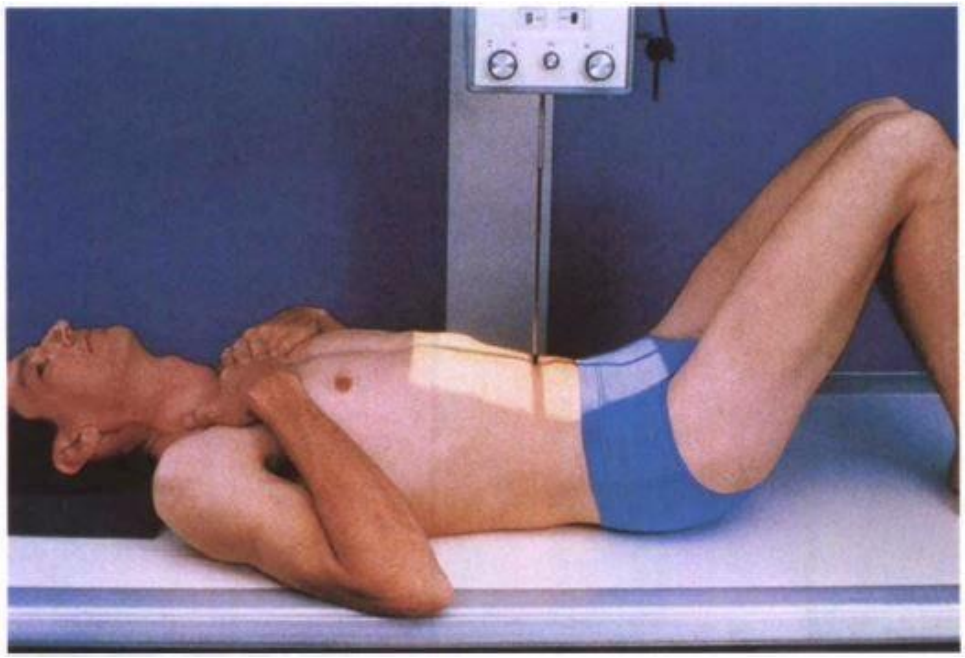
1. The collimated vertical beam
2. center over the midline at the level of the lower costal margin (L3).

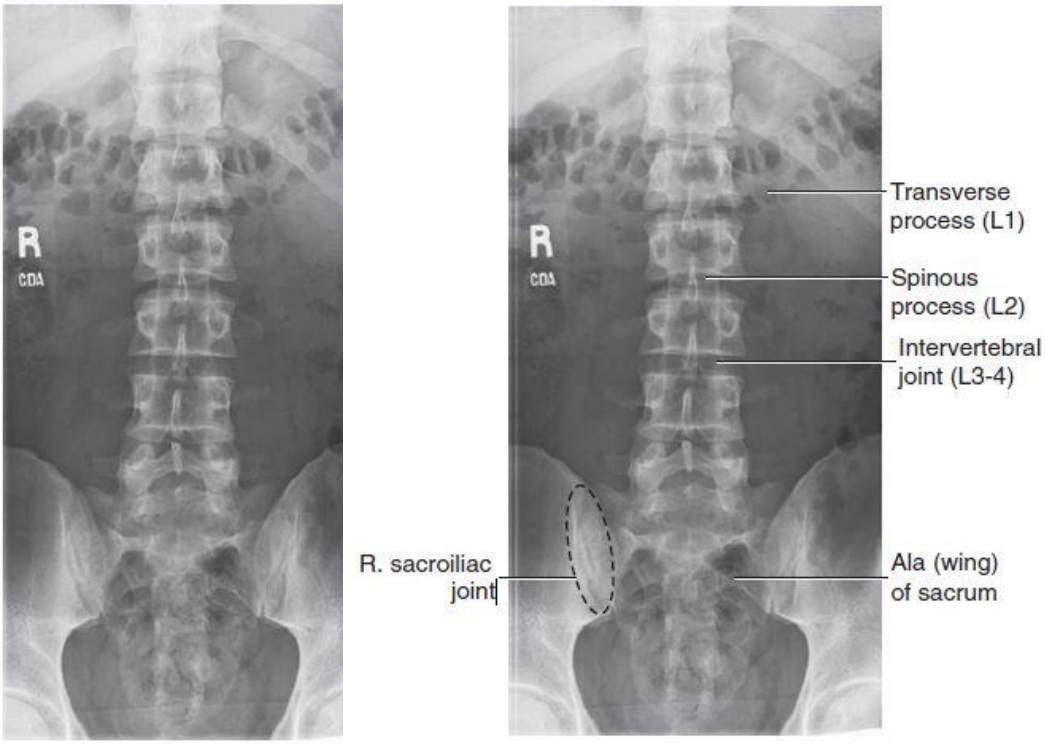
Essential image characteristics

1. The image should include from T12 to all the sacro-iliac joints.
2. Rotation can be assessed by ensuring that the sacro-iliac joints are equidistant from the spine.
3. The image should be good density to demonstrate bony detail.

Common faults and solutions

1. The most common fault is to miss some or all of the sacroiliac joint. An additional projection of the sacro-iliac joints should be performed if this is the case.





Antero-posterior of Lumbar spine

2. Lateral (Basic)

Position of patient and image receptor

1. The patient is positioned the lateral erect or lateral decubitus on the X-ray table, with the **median sagittal plane** parallel to the Bucky/ image receptor.
2. If there is any degree of scoliosis, then the most appropriate lateral position will be such that the **concavity of the curve** is towards the X-ray tube.
3. The arms should be away from the spine.
4. The knees and hips are flexed for stability and non-opaque pads may be placed under the waist and knees to bring the vertebral column parallel to the image receptor.
5. The image receptor is centred at the level of the lower costal margin.
6. The exposure should be made on arrested expiration.

Direction and location of the X-ray beam

1. The collimated vertical beam
2. center over the midline at the level of the lower costal margin (L3), and it's at right-angles to the line of spinous processes towards a point 7.5 cm anterior **to the** 3rd lumbar spinous process.

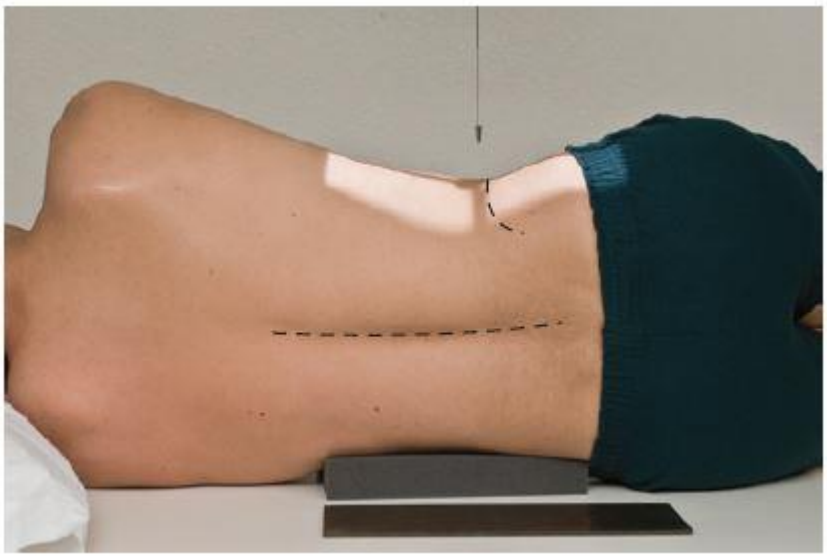
Essential image characteristics

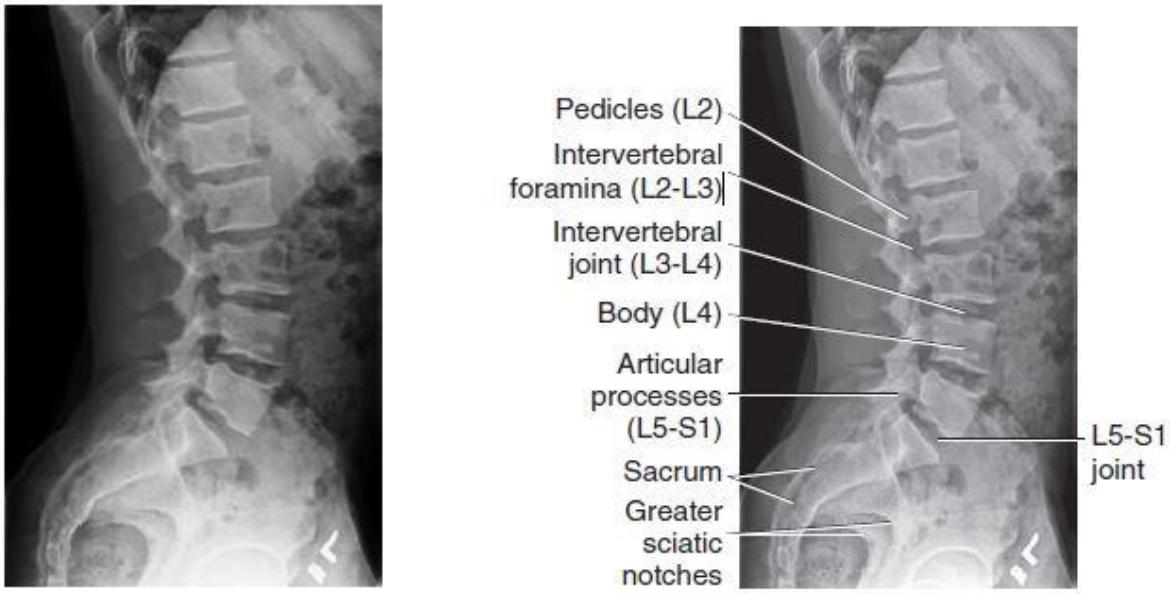
1. The image should include T12, to the lumbar sacral junction.
2. The image should be good density to demonstrate bony detail and intervertebral disc space.

3. The vertebral endplates and the cortices at the posterior and anterior margins of the vertebral body should be superimposed.

Common faults and solutions

1. High-contrast images will result in an insufficient or high image density over areas of high or low patient density, i.e. the spinous processes and L5/S1. A high kV or the use of other wide-latitude techniques and/or software application is recommended.
2. The spinous processes can easily be excluded from the image as a result of overzealous collimation.
3. Poor superimposition of the anterior and posterior margins of the vertebral bodies is an indication that the patient was rolled too far forward or backward during the initial positioning (i.e. mean sagittal plane not parallel to receptor).
4. Failure to demonstrate a clear intervertebral disc space usually results as a consequence of the spine not being perfectly parallel with the receptor or is due to scoliosis or other patient pathology.





Lateral of Lumbar spine

3. Right or left posterior oblique

These projections demonstrate the pars interarticularis and the facet joints on the side nearest the image receptor. Both sides are taken for comparison.

Position of patient and image receptor

1. The patient is positioned supine on the Bucky table and is then rotated 45° to the right and left sides in turn.
2. The arms should be away from the spine
3. The hips and knees are flexed and the patient is supported with a 45° foam pad placed under the trunk on the raised side.
4. The image receptor is centred at the lower costal margin.

Direction and location of the X-ray beam

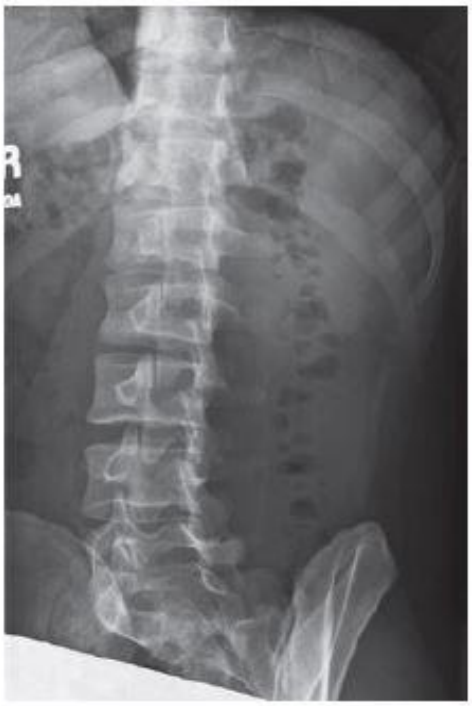
1. The collimated vertical beam
2. Center towards the mid-clavicular line on the raised side at the level of the lower costal margin.

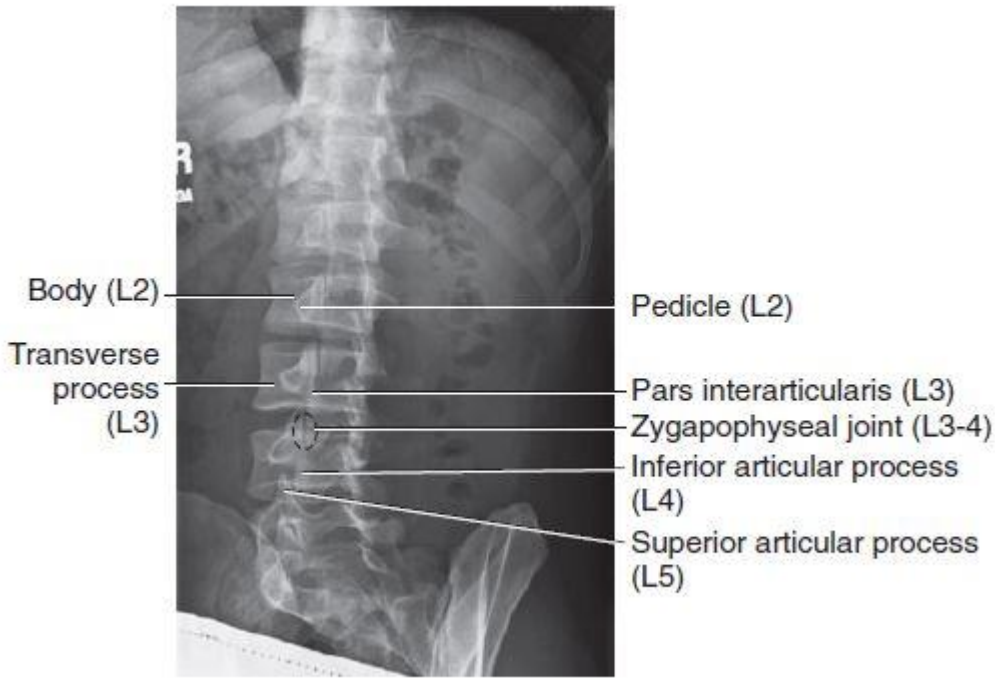
Essential image characteristics

1. The degree of obliquity should be such that the posterior elements of the vertebra are aligned in such as way as to show the classic ‘Scottie dog’ appearance.

Common faults and solutions

1. A common error is to centre too medially, thus excluding the posterior elements of the vertebrae from the image.





oblique of Lumbar spine