

## spine\_quiz\_1a: Explanations

Q1) The height of the vertebral bodies generally increases on descending the spine. However there are two exceptions:

i. The height of the vertebral body of C6 is less than that of C4 and C6.

ii. The dorsal-height of the lower lumbar vertebral bodies are less than that of L2 (though the ventral vertebral height increases as you descend the lumbar spine).

Q2) Because the dorsal surface of the vertebral body is concave, the lateral dorsal aspect of the vertebral body is more dorsal than the mid-dorsal aspect of vertebral body. This can cause confusion when interpreting lateral spinal X-ray when choosing the length of a vertebral-body screw. It should be borne in mind that the mid-sagittal depth of a vertebral body is less than the apparent depth of the vertebral body on a lateral-spine X-ray.

Q3) Because of the predominantly coronal orientation of cervical facet joints, they are poor at resisting flexion/extension, rotation and lateral flexion. Because of the predominantly sagittal orientation of the lumbar spine, it is resistant to rotation.

Q4) The orientation of the facet joints of the lumbar spine are predominantly sagittal. However, as you descend the lumbar spine the facet joints become more coronal. The L5/S1 is less prone than L4/5 for spondylolisthesis (despite the L5/S1 disc being almost vertical). This is because the L5/S1 facet joint is more coronal at L4/5 level.

Q5) The tracts within the spinal cord and the lumbar-sacral nerve roots within the cauda equina are arranged somatotopically.

This is why hand function which is found medially within the corticospinal tract is more affected in central cord syndrome. In spinal cord injury the reason for the sacral sparing is because the sacral sensation is located dorsally and laterally in the spinothalamic tract and can be less prone to injury.

Q6) The width of the lumbar canal increases as one descends the lumbar spine. Depth generally does not change as one descends the lumbar spine.

Q7) For pedicle screw insertion, the width of the pedicle is of more importance than the height; this is because medial break-out of the screw has greater risk of injuring the nerves and the dura.

Q8. The transverse pedicle angle decreases from cervical to thoracolumbar region. This increases down the lumbar spine. Because the transverse pedicle angle increases down the lumbar spine, when inserting pedicle screws wide angle of approach is required down the lumbar spine.

Q9) The transverse process is (in the rostro-caudal plane) rostral to the midpoint of the pedicle at T1 and caudal to it at T12 with the transition consistently seen at T6-7 region. The relationship between the transverse process and the mid-point of the pedicle can be expressed mathematically:

$$D = 7.9 - (1.2 \times TL)$$

Where,

D, rostro-caudal distance between the transverse process and the midpoint of the thoracic spine

TL, thoracic level.

McCormick B, Benzel E, Adams M, Bladwin N, Rupp F, Maher D.  
Anatomy of the thoracic pedicle. *Neurosurgery* 1995; 37(2): 303-308

Q10) The head of the first rib articulates only with the body of T1.  
The head of typical ribs (T2-T10) articulate with their own vertebra  
and the vertebra above.