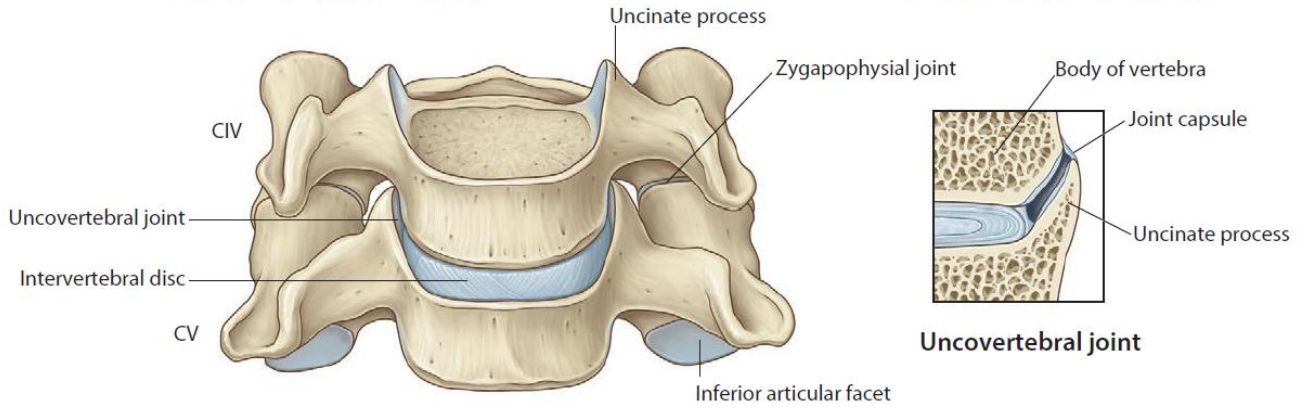


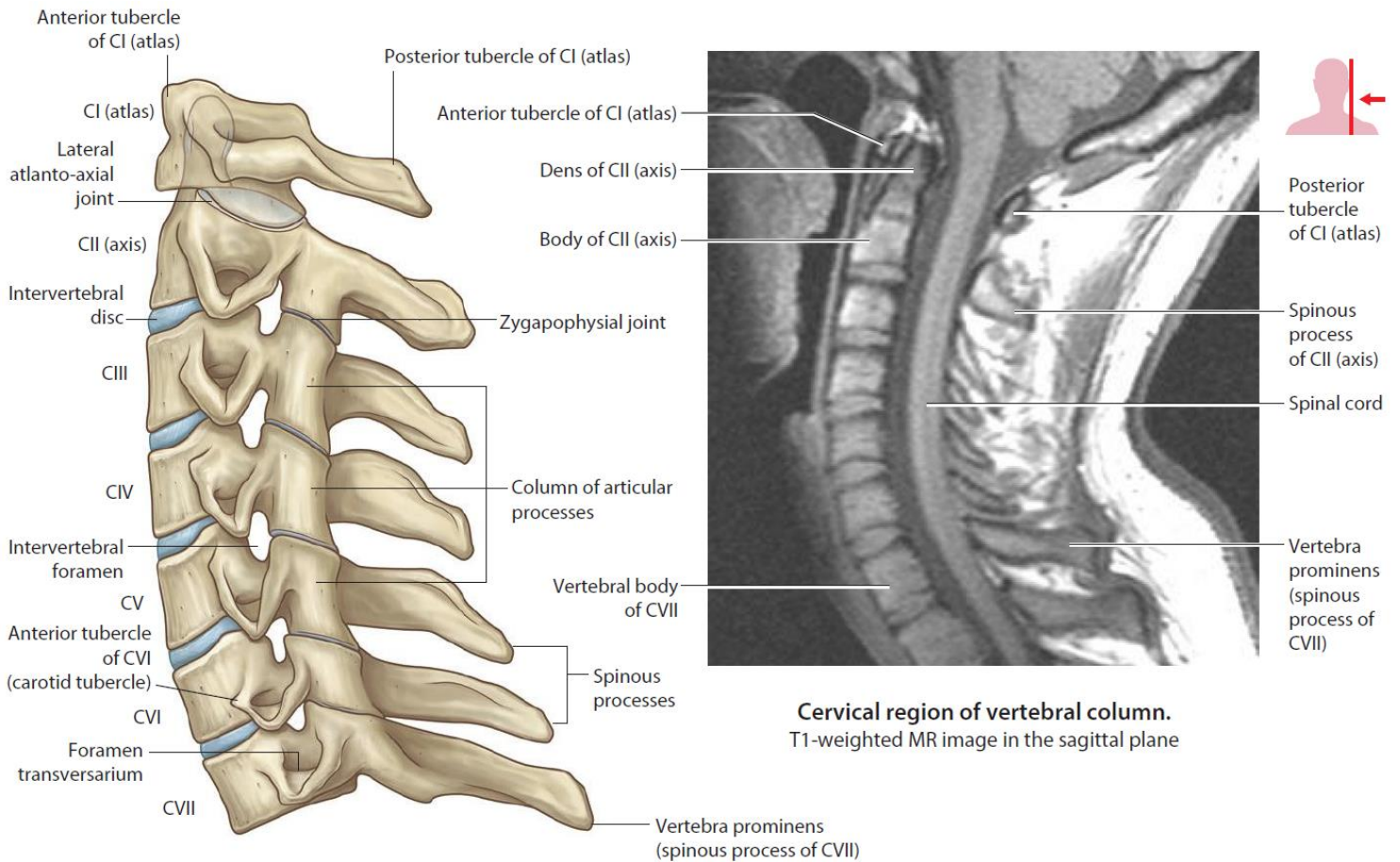
CV vertebra (superior view)

CV vertebra (anterior view)

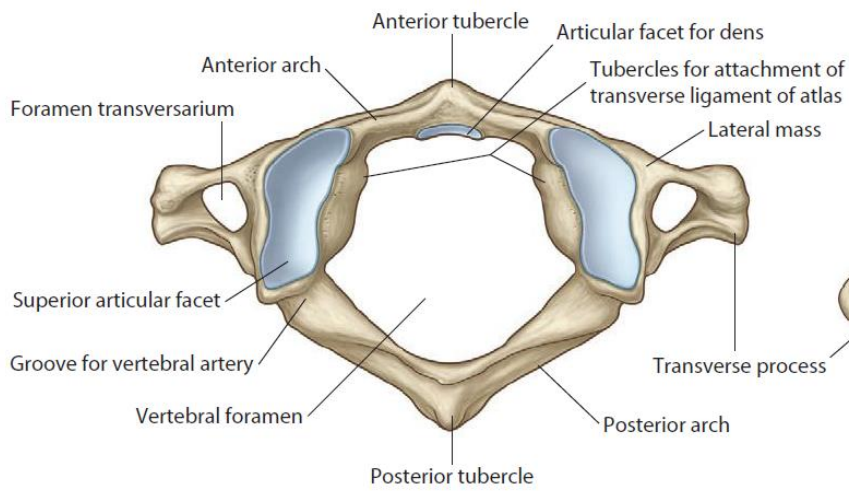


CIV/CV vertebrae (anterior view)

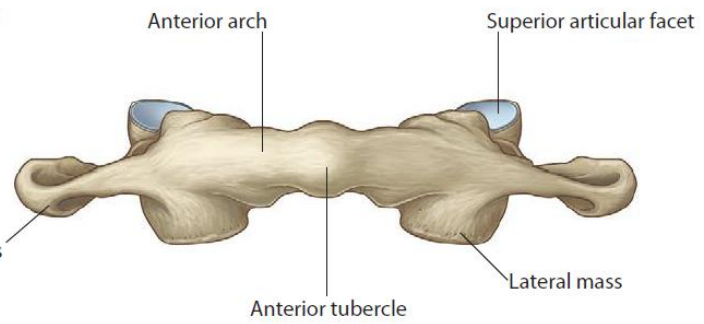
Uncovertebral joint



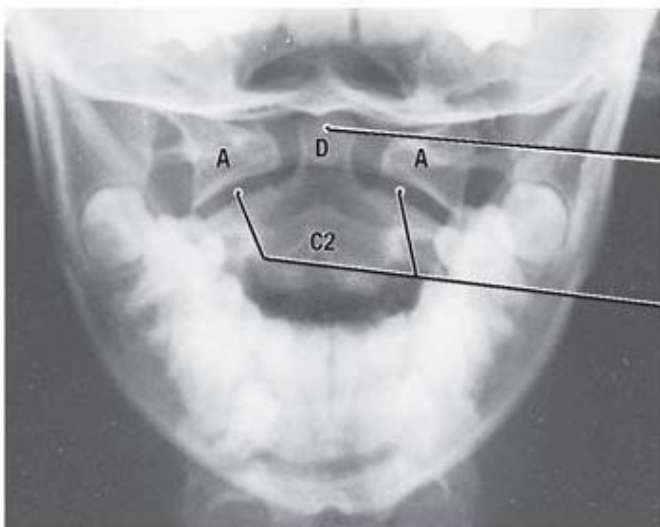
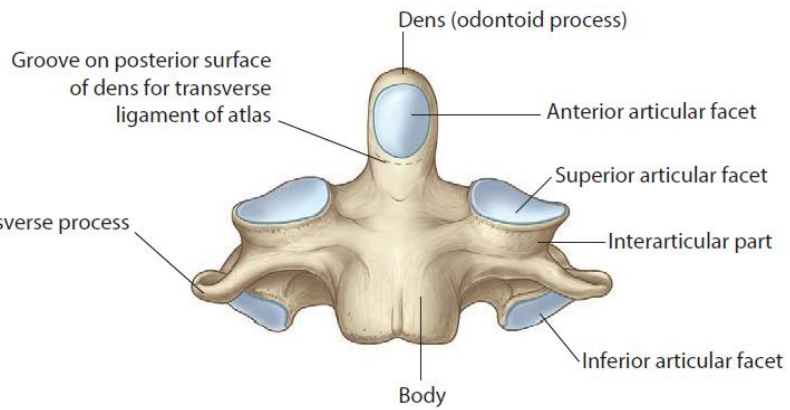
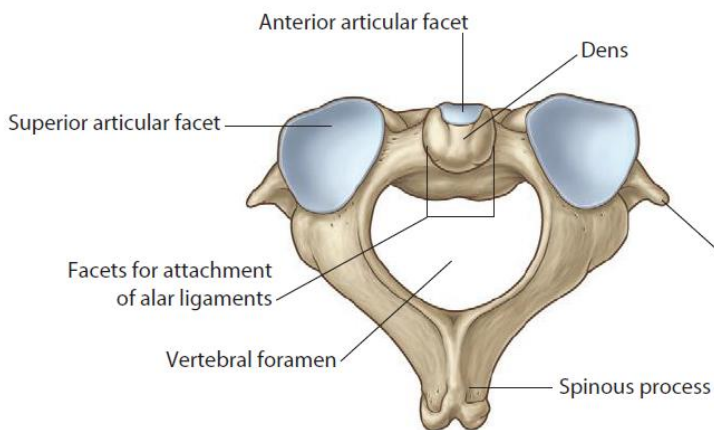
Cervical region of vertebral column.
T1-weighted MR image in the sagittal plane



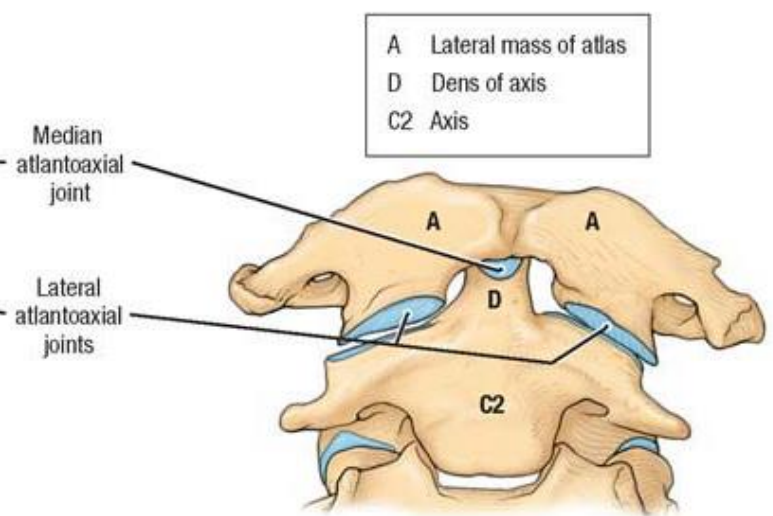
C1 vertebra (atlas; superior view)



C1 vertebra (atlas; anterior view)

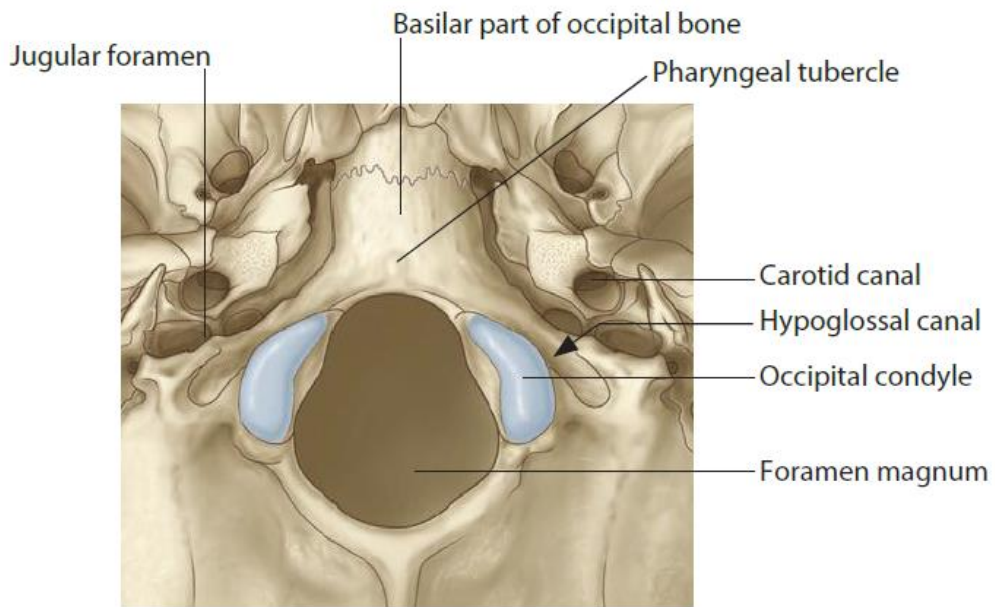


C. Anteroposterior View

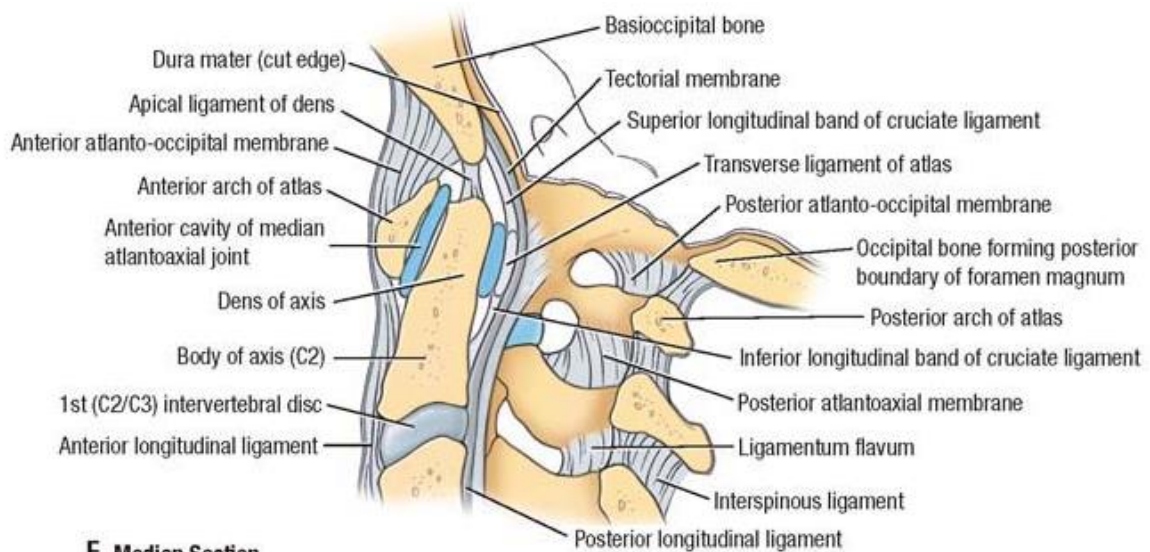
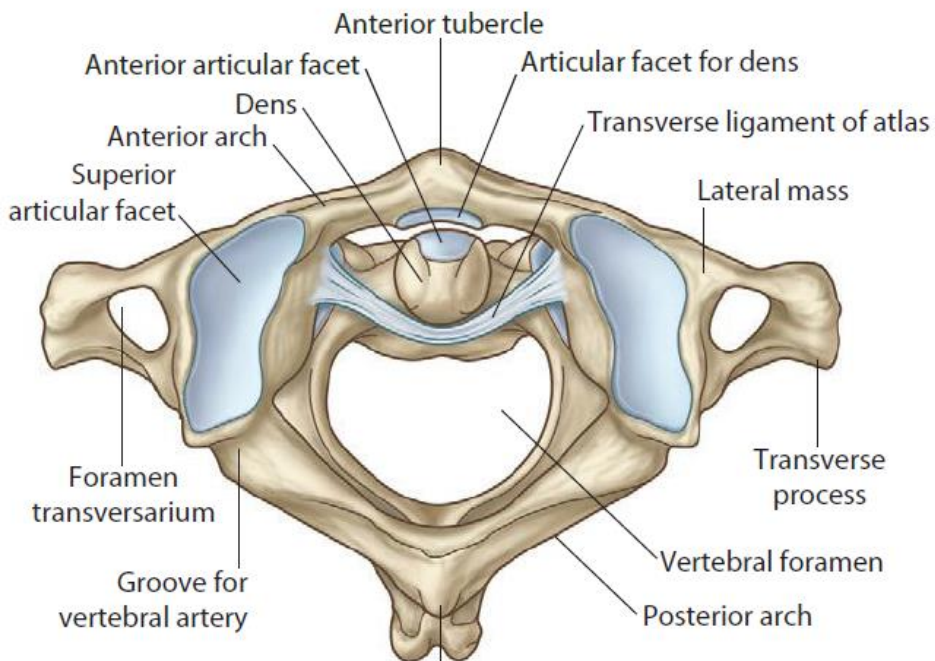


D. Anterior View

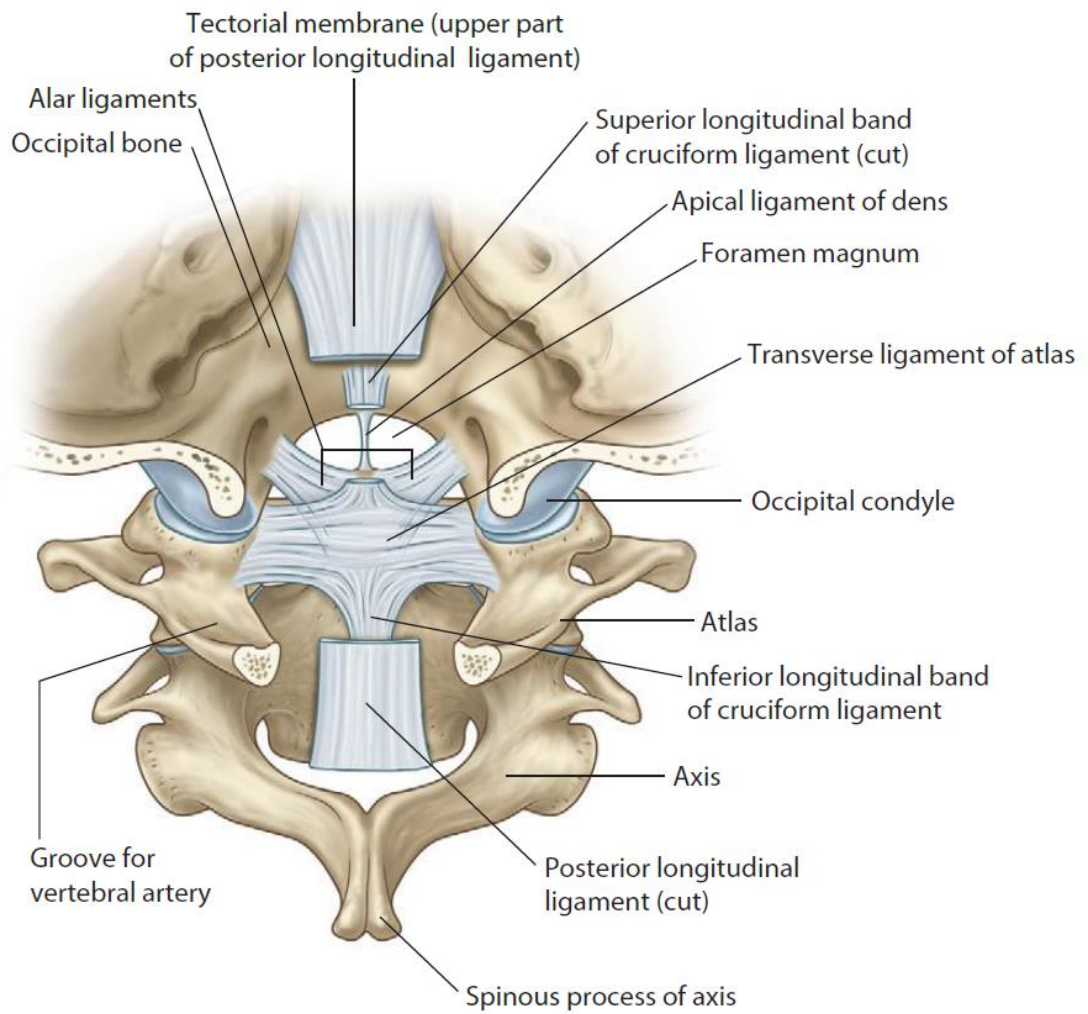
A	Lateral mass of atlas
D	Dens of axis
C2	Axis



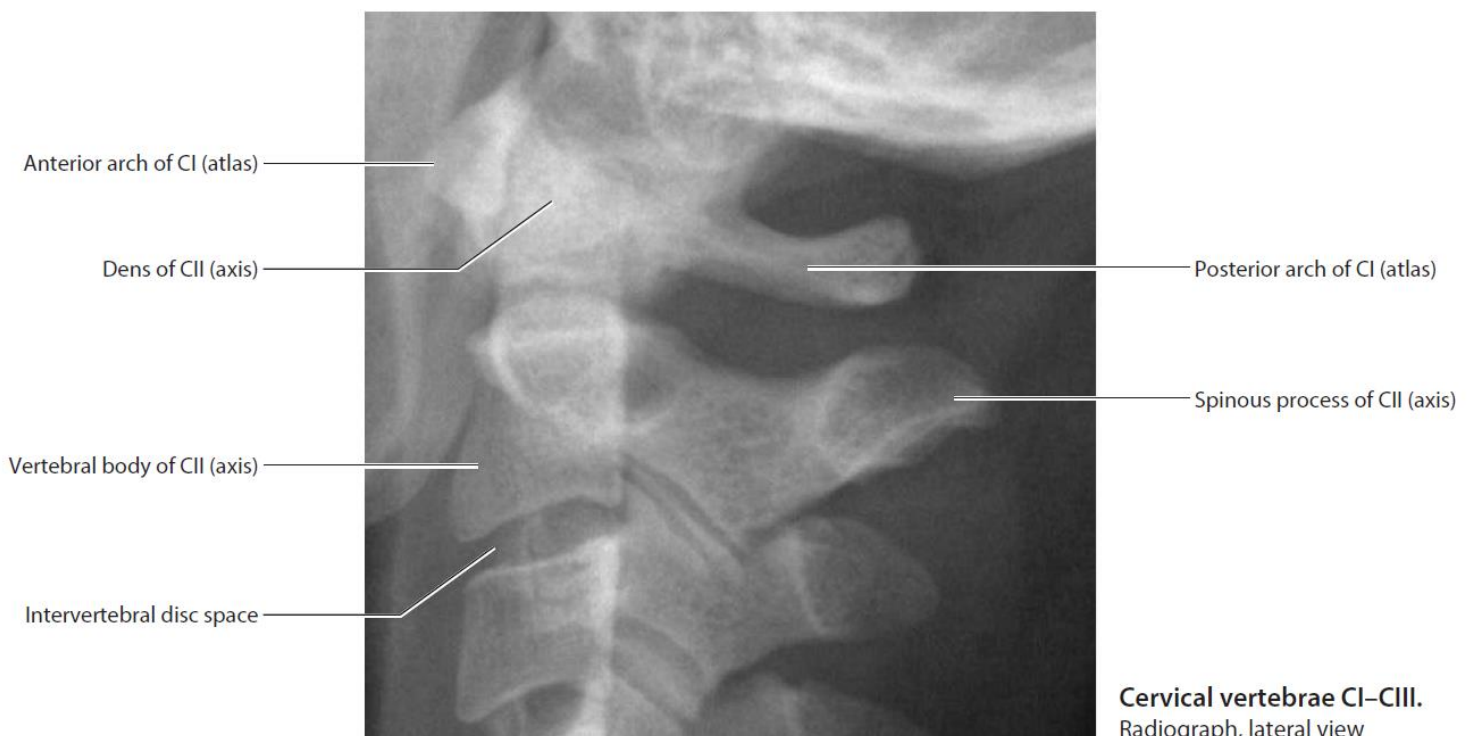
Occipital condyles of skull (inferior view)



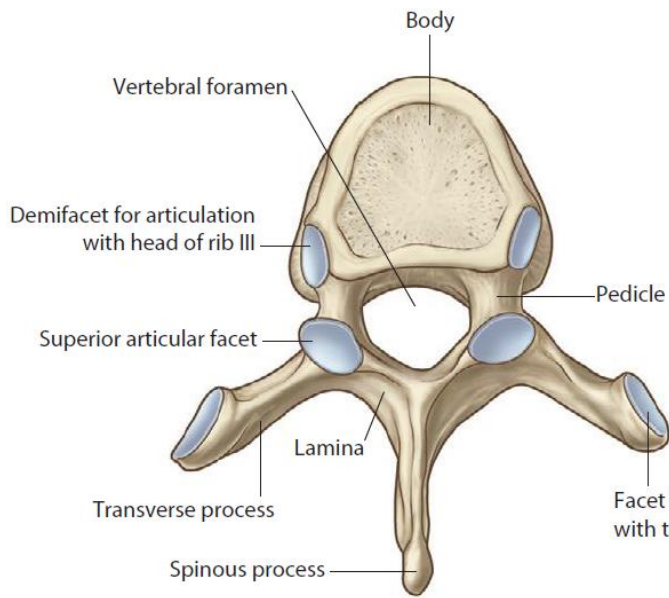
E. Median Section



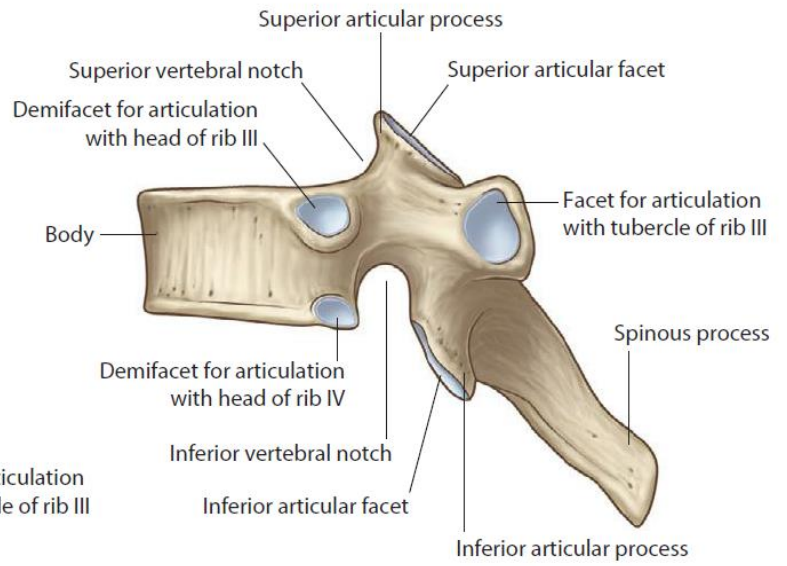
Atlanto-occipital joint (posterior view)



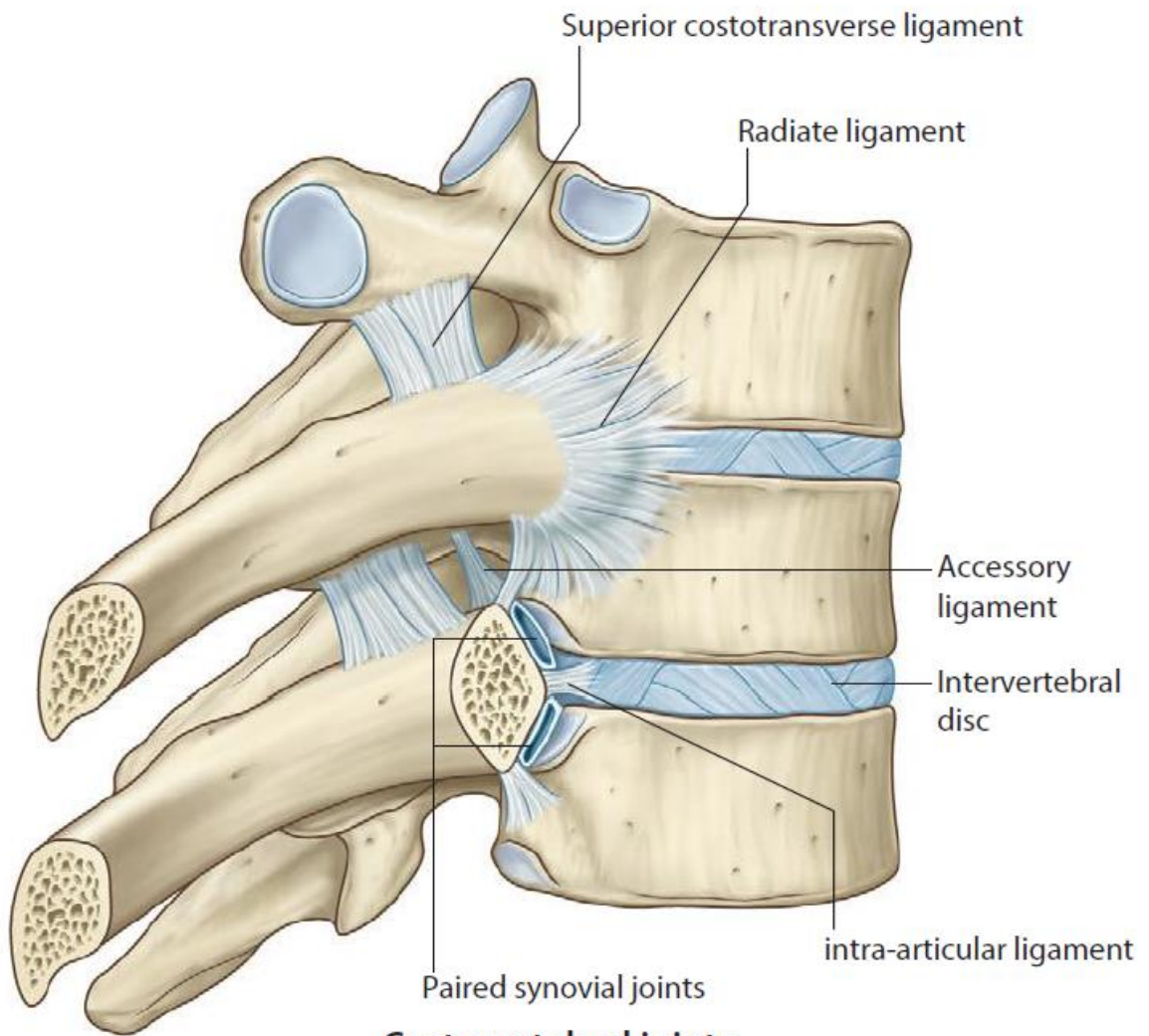
Cervical vertebrae C1–C3.
Radiograph, lateral view



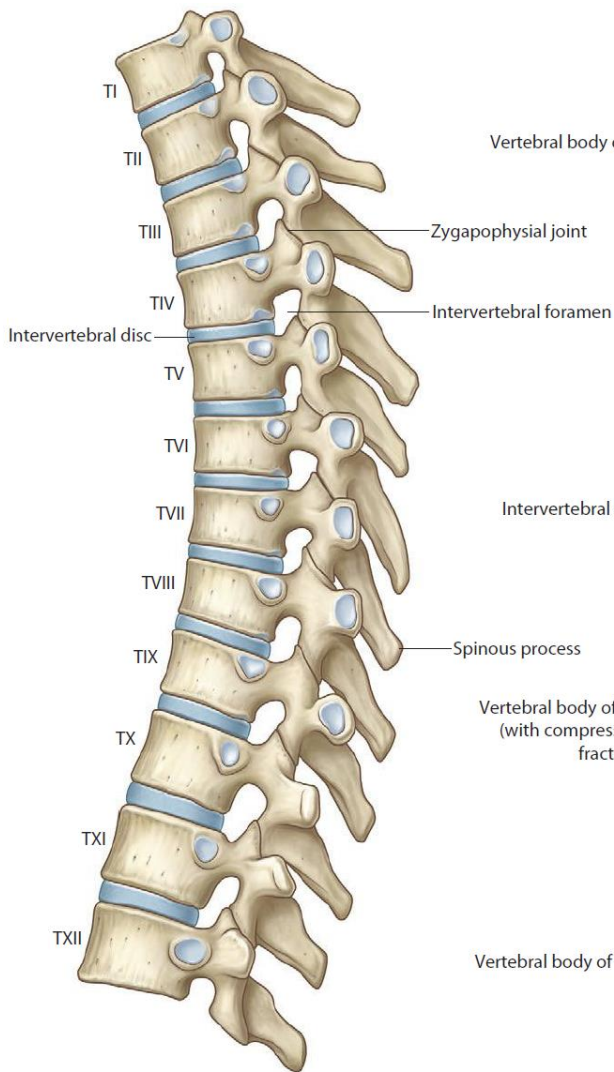
T111 vertebra (superior view)



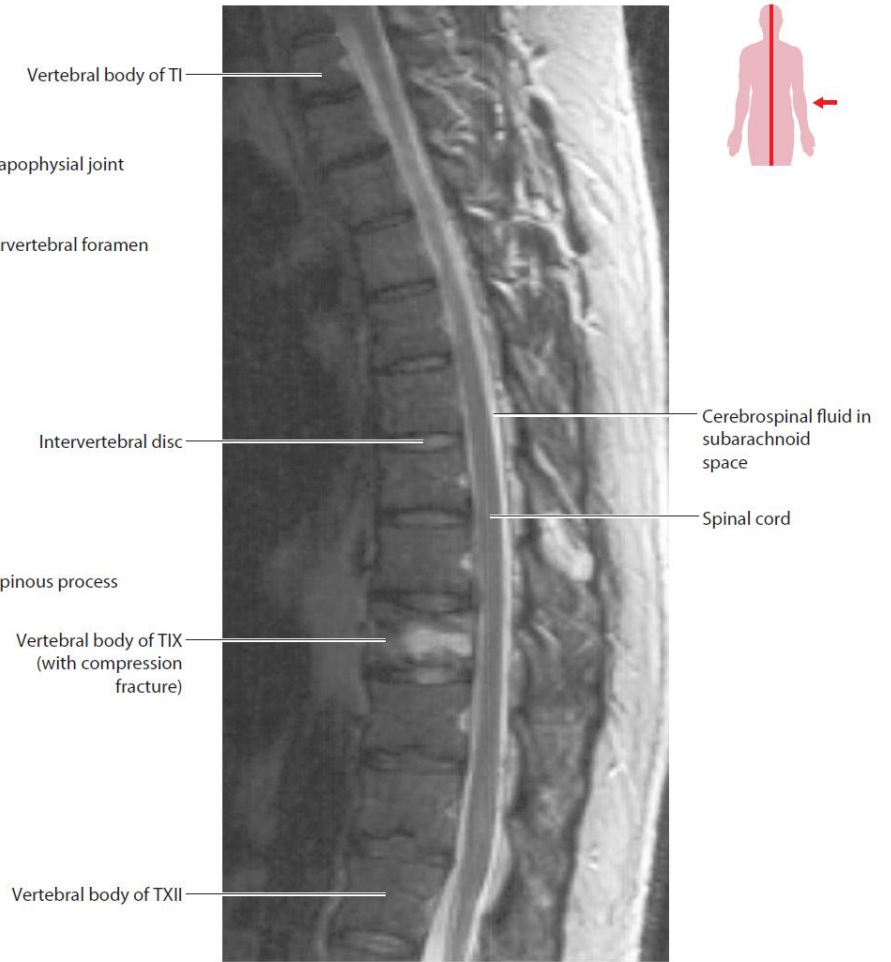
T111 vertebra (lateral view)



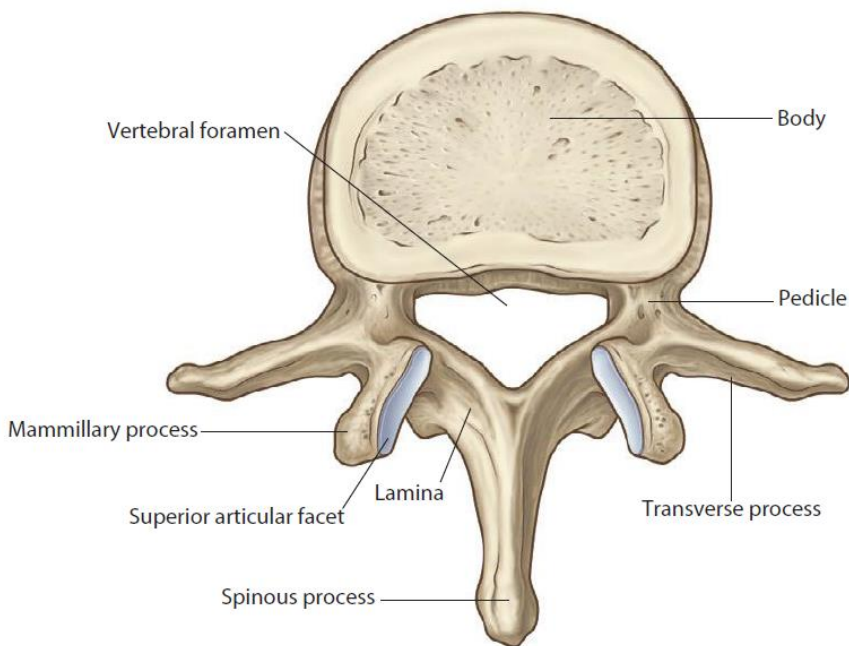
Costovertebral joints (lateral view)



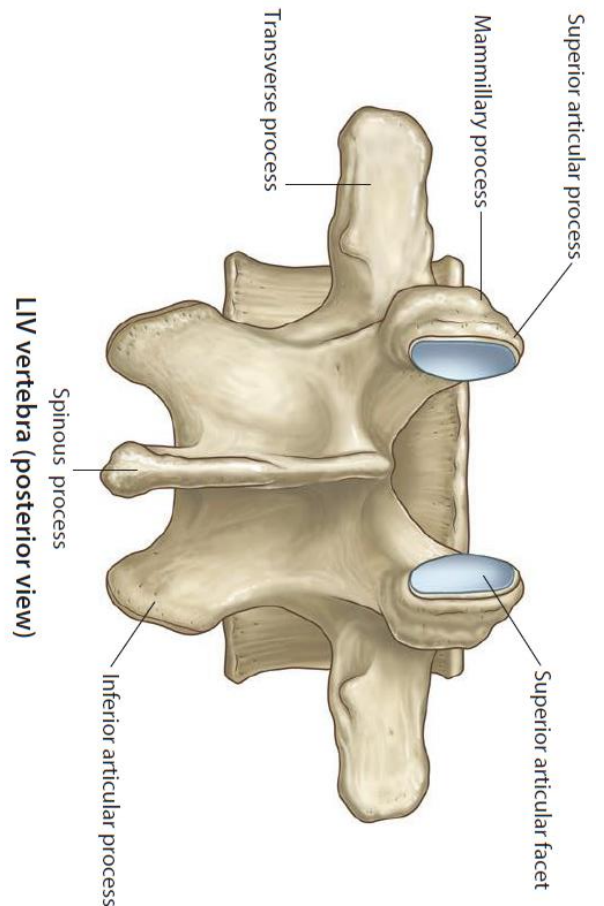
Thoracic vertebrae (lateral view)



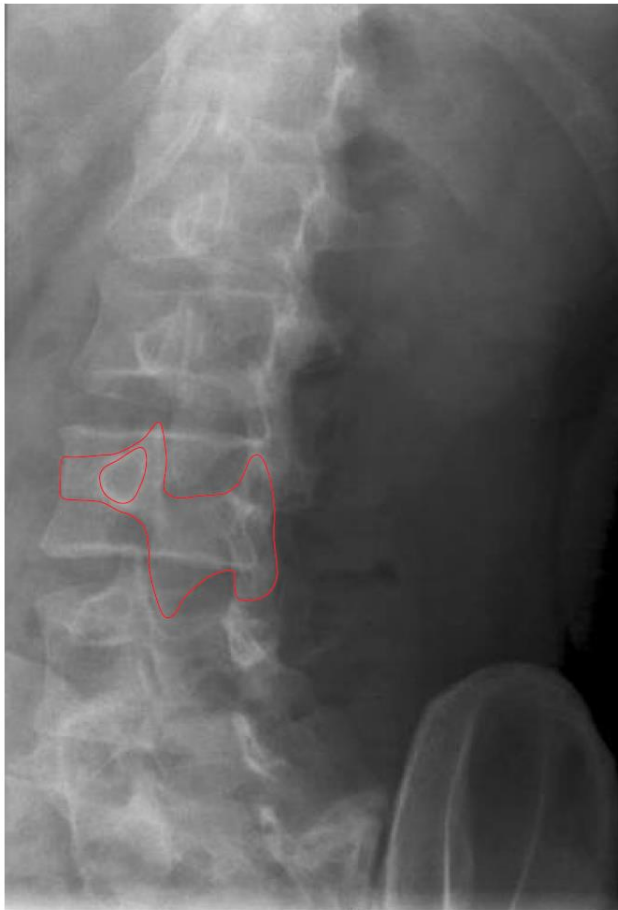
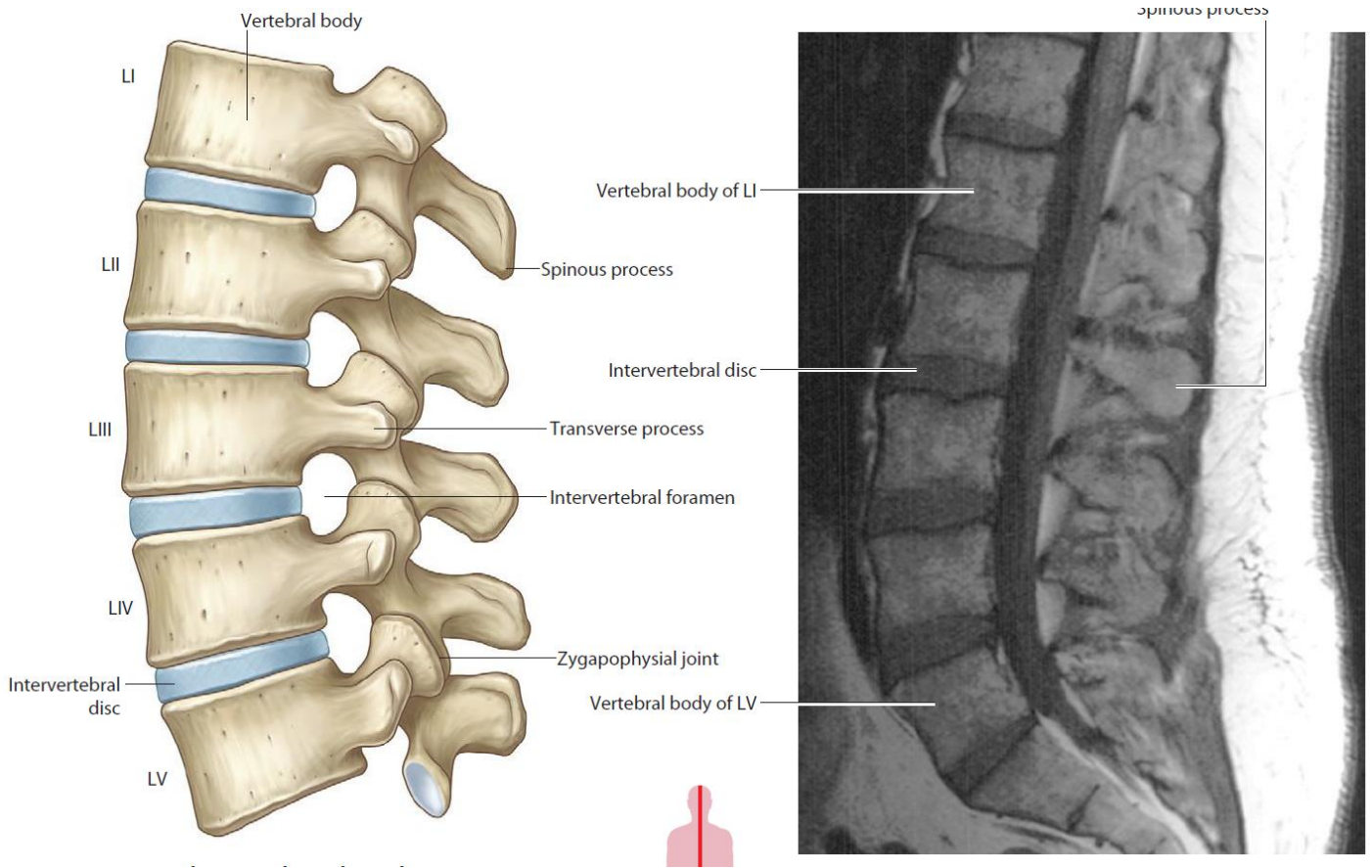
Thoracic region of vertebral column.
T2-weighted MR image in sagittal plane (compression fracture TIX)



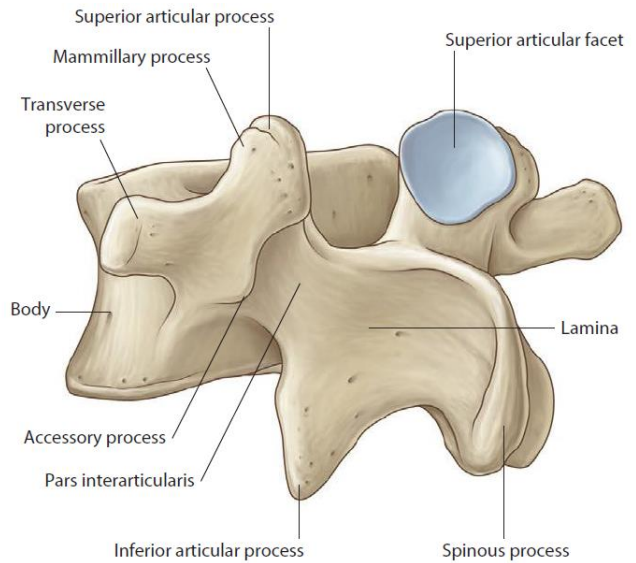
L1V vertebra (superior view)



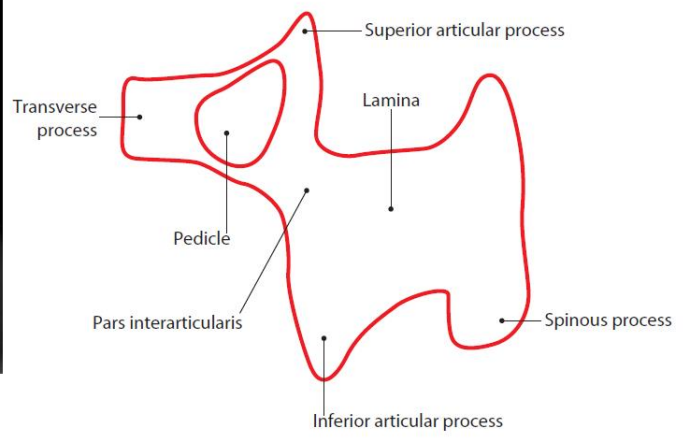
L1V vertebra (posterior view)

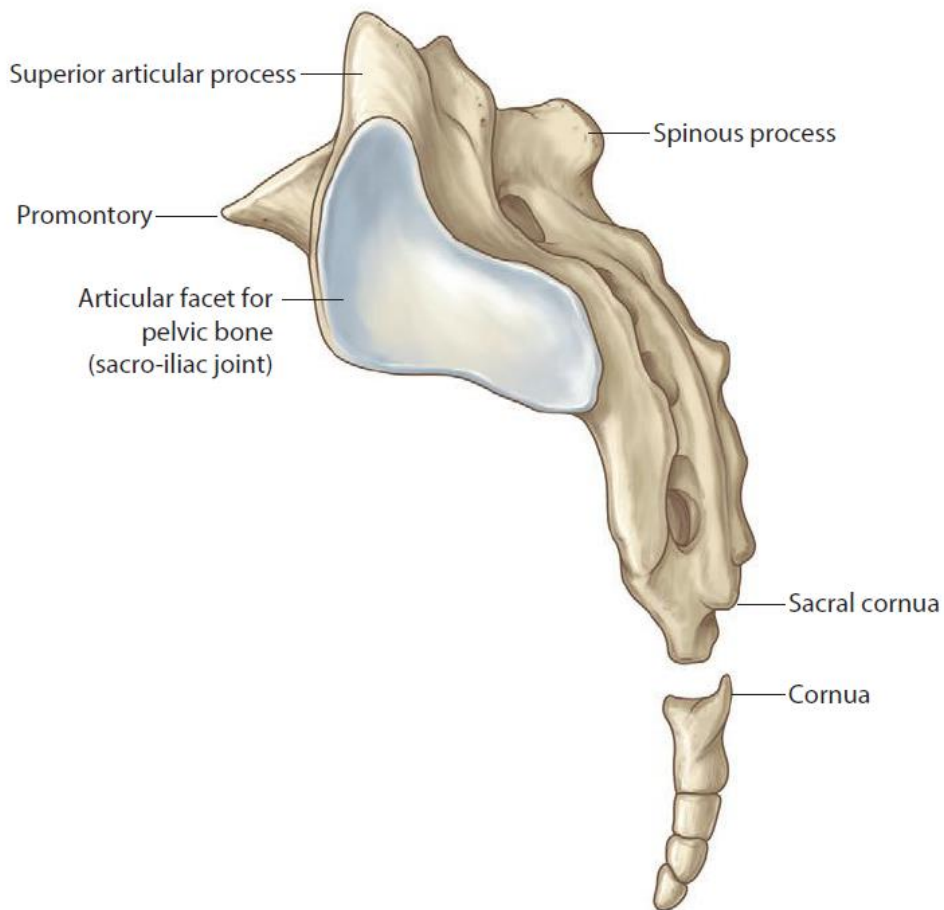
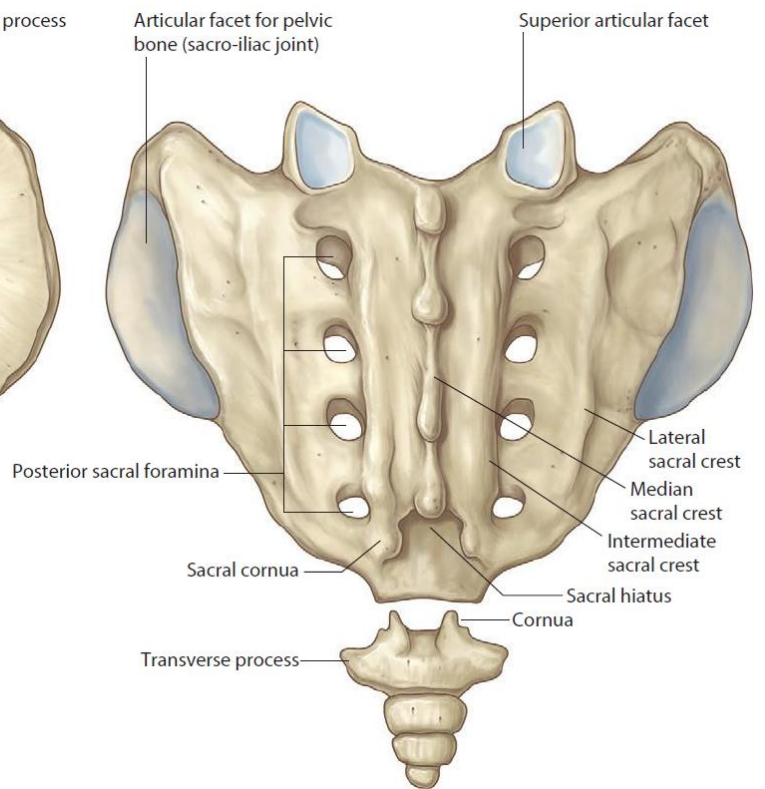
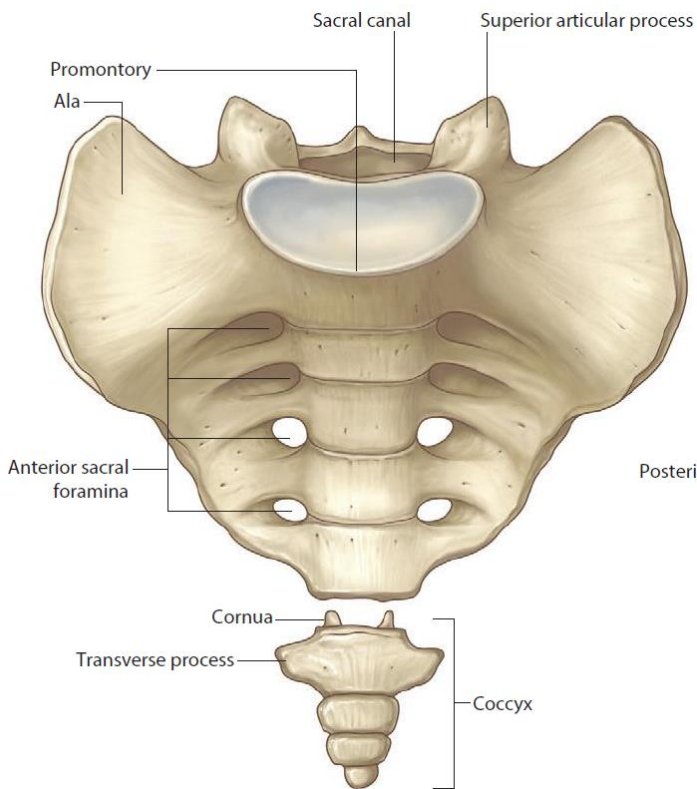


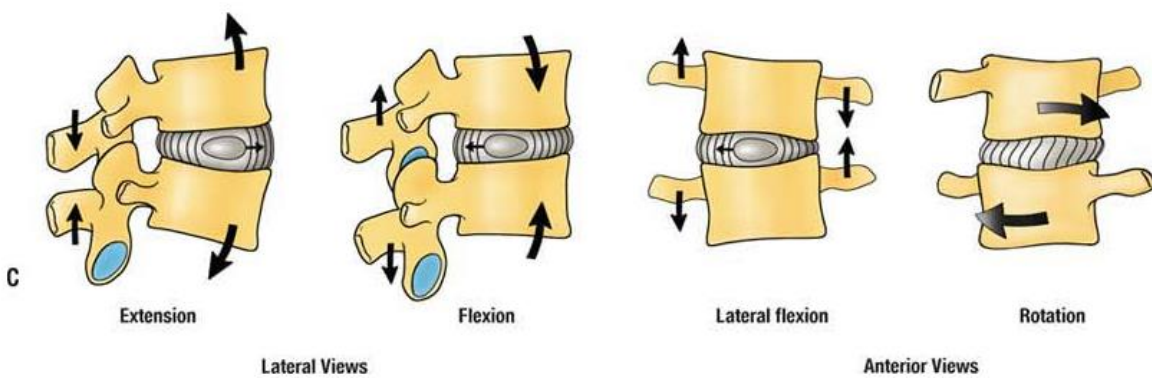
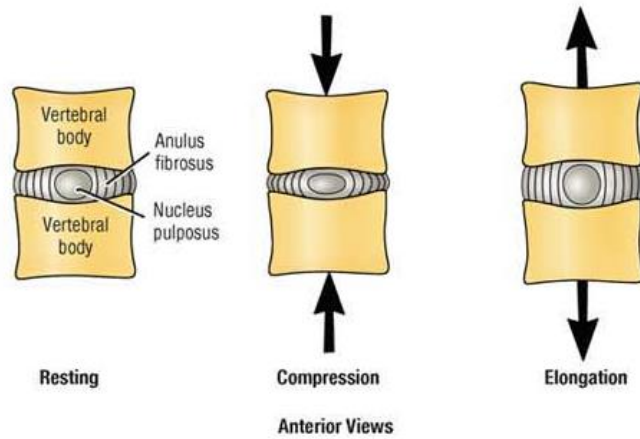
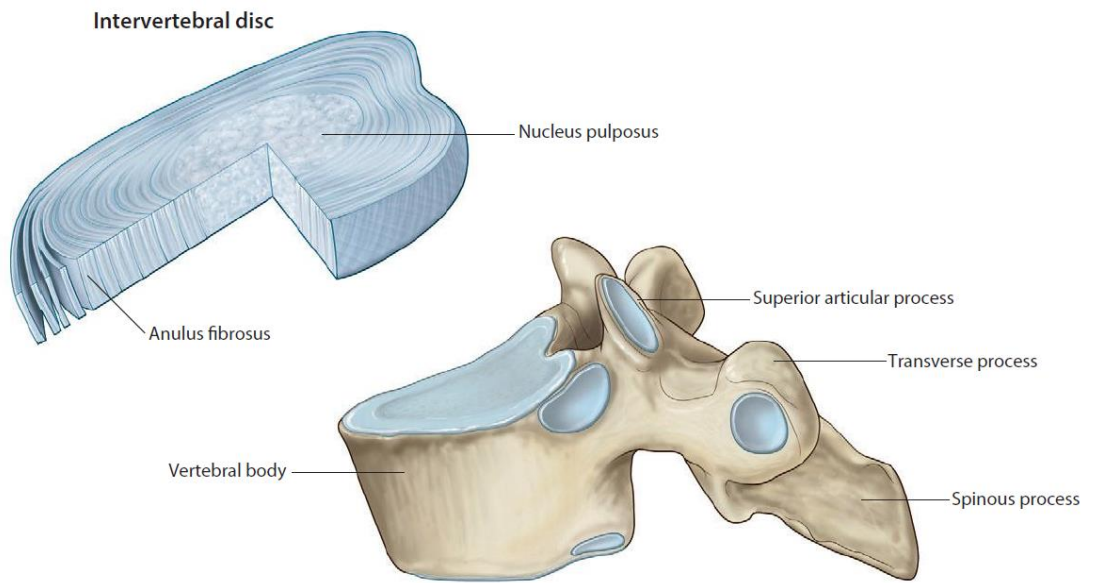
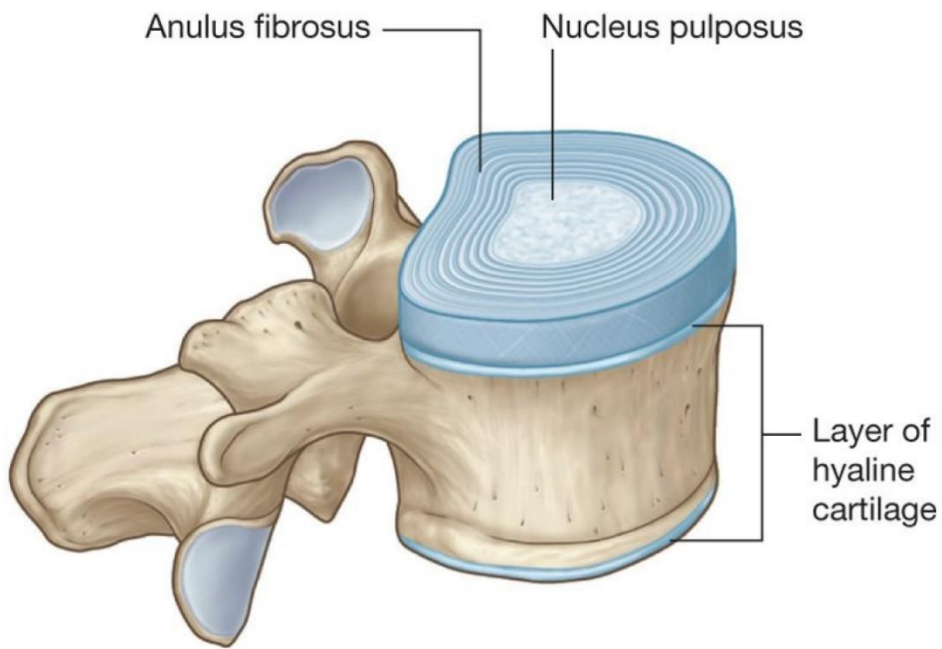
Lumbar region of vertebral column ("Scottie dog").
Radiograph, oblique view



LIV vertebra (oblique view)





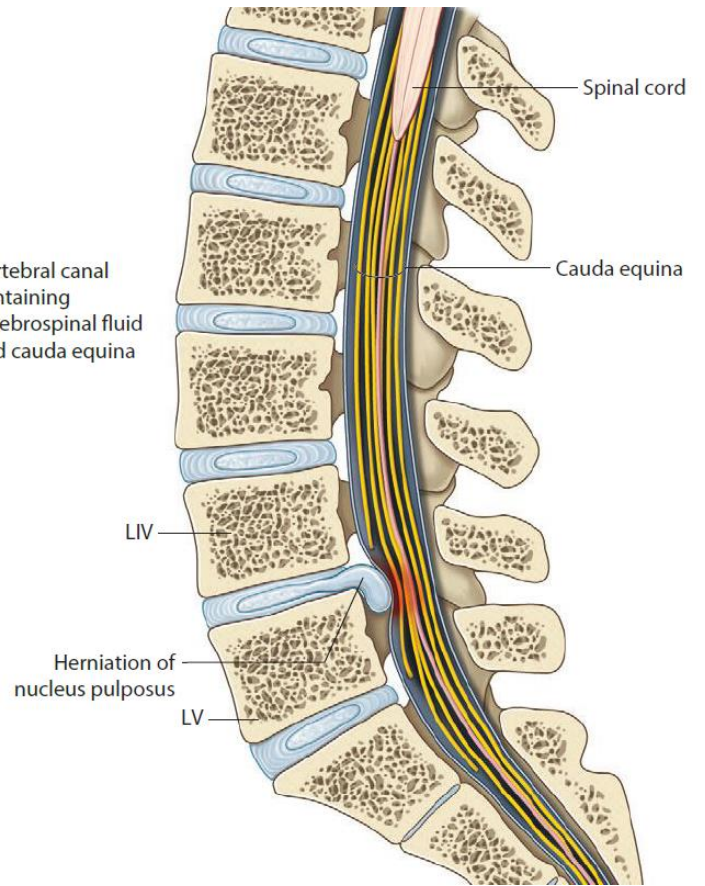




LIV vertebra

Disc protrusion

Vertebral canal containing cerebrospinal fluid and cauda equina



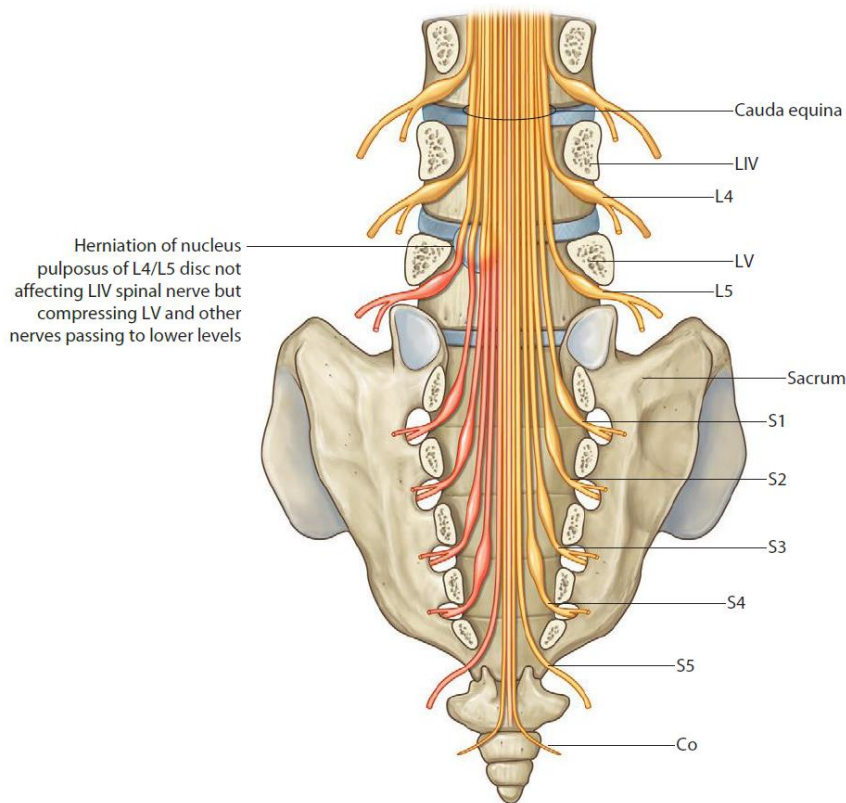
Spinal cord

Cauda equina

LIV

Herniation of nucleus pulposus

LV



Cauda equina

LIV

L4

LV

L5

Sacrum

S1

S2

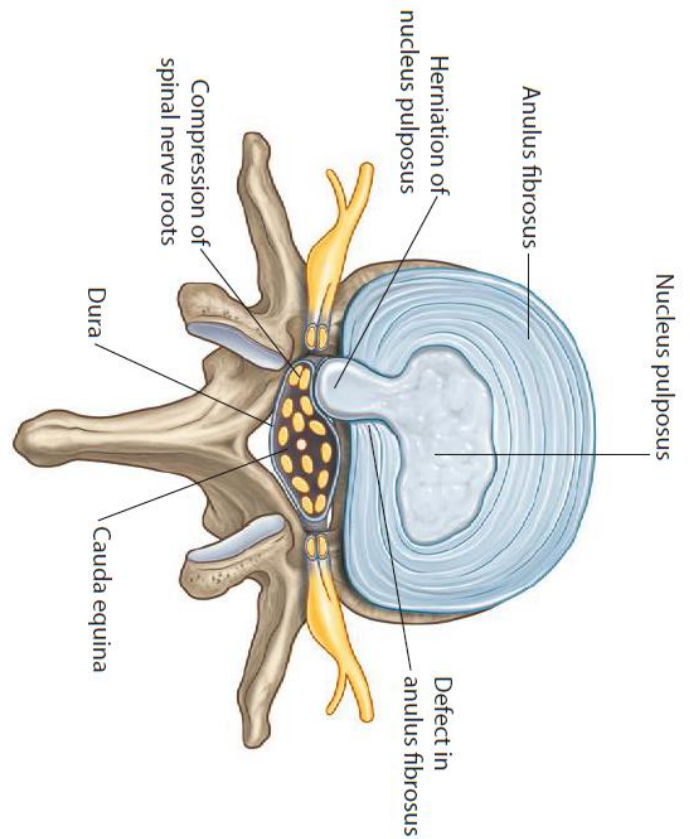
S3

S4

S5

Co

Herniation of nucleus pulposus of L4/L5 disc not affecting LIV spinal nerve but compressing LV and other nerves passing to lower levels



Compression of spinal nerve roots

Dura

Cauda equina

Anulus fibrosus

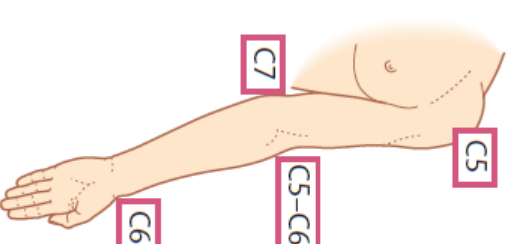
Herniation of nucleus pulposus

Defect in anulus fibrosus

Nucleus pulposus

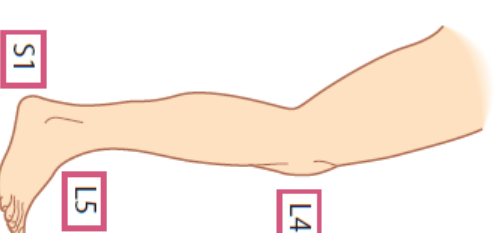
Nerve root	Main weakness	Reflex decreased	Area of sensory decrease	Disc involved
C5	Deltoid (biceps)	(biceps, pectoralis)	Shoulder, upper lateral arm	C4-C5
C6	Wrist extension	(biceps, brachioradialis)	1st and 2nd digits (lateral forearm)	C5-C6
C7	Triceps	Triceps	Third finger	C6-C7
C8	Intrinsic hand muscles		4th and 5th digits (medial forearm)	C7-T1

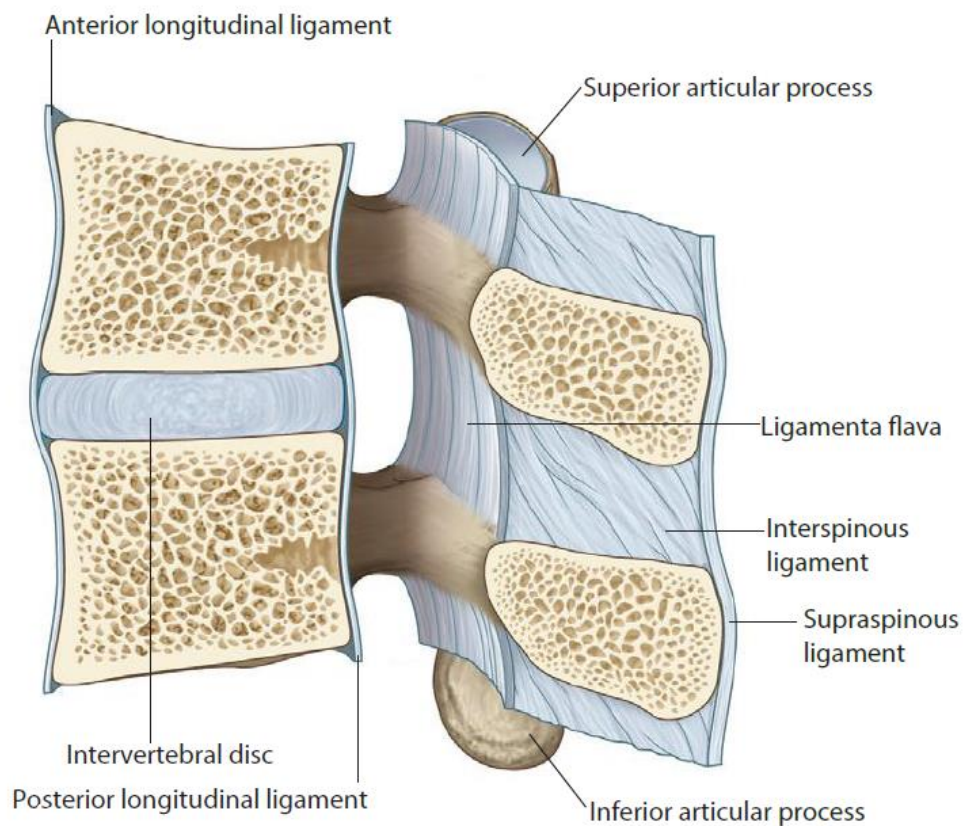
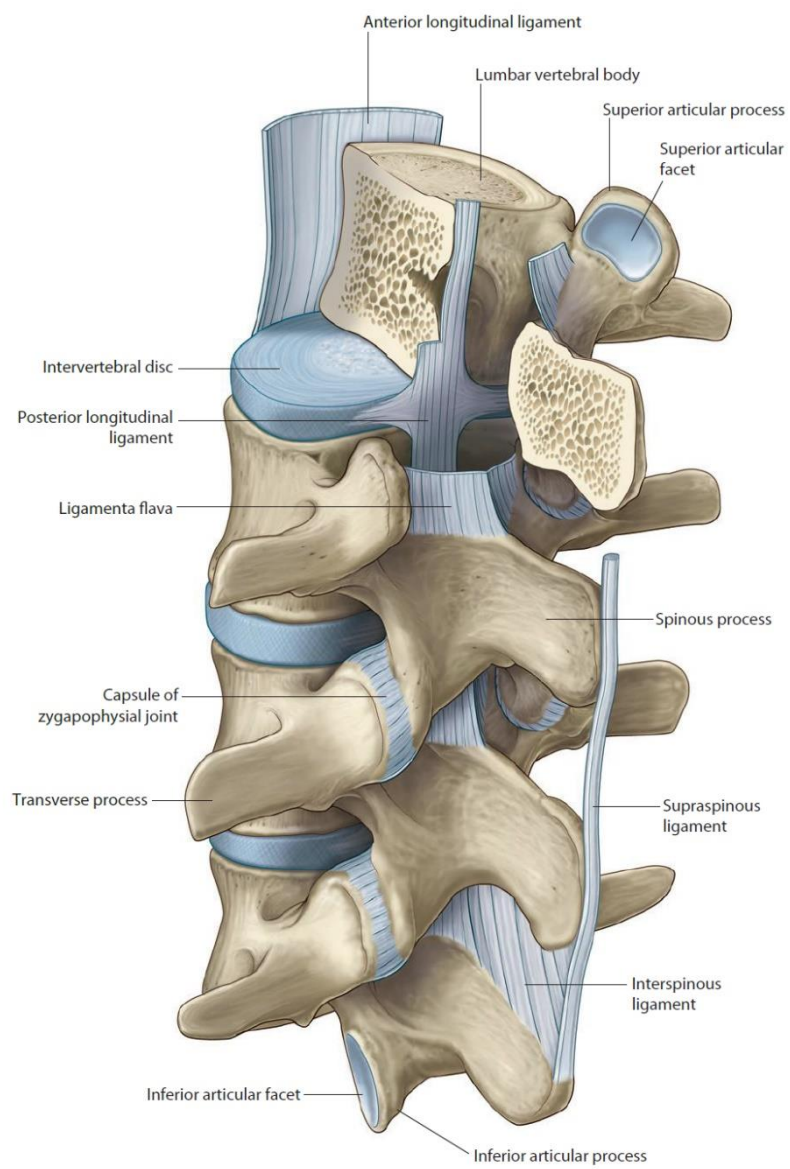
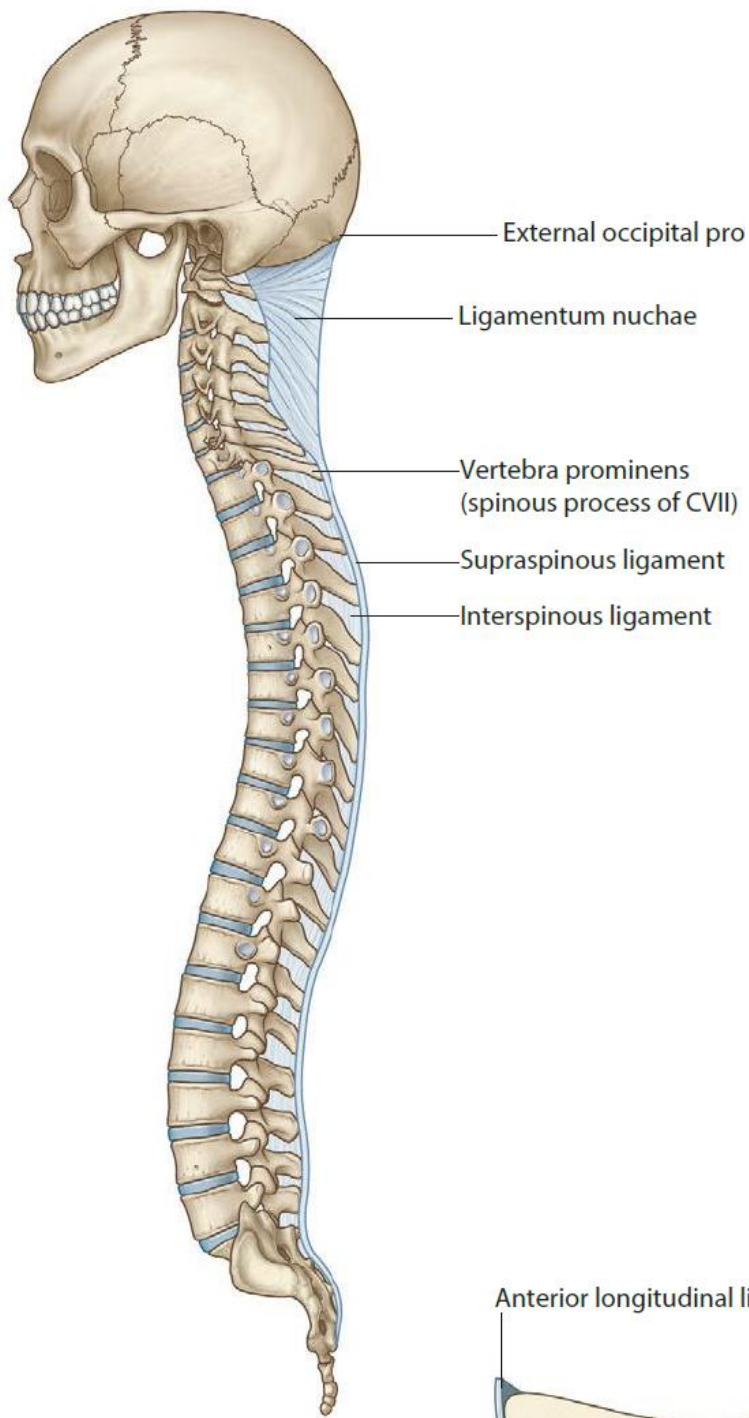
Clinically important nerve roots in the upper limb

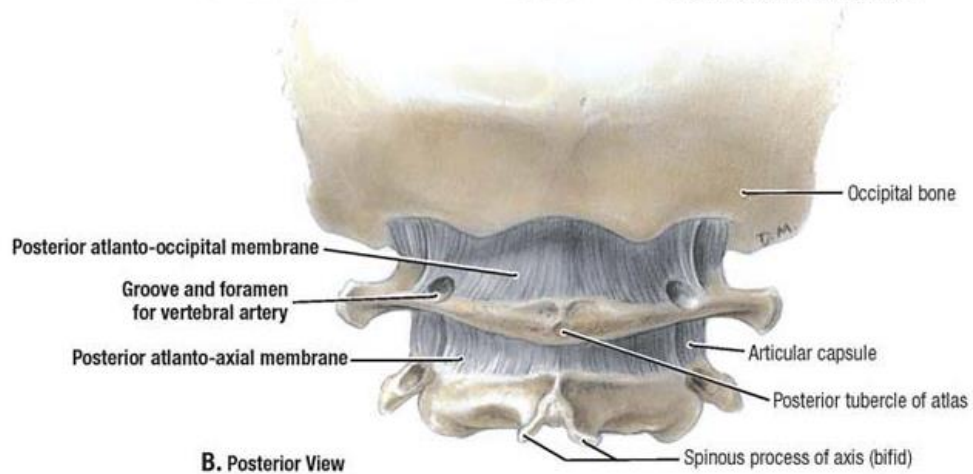
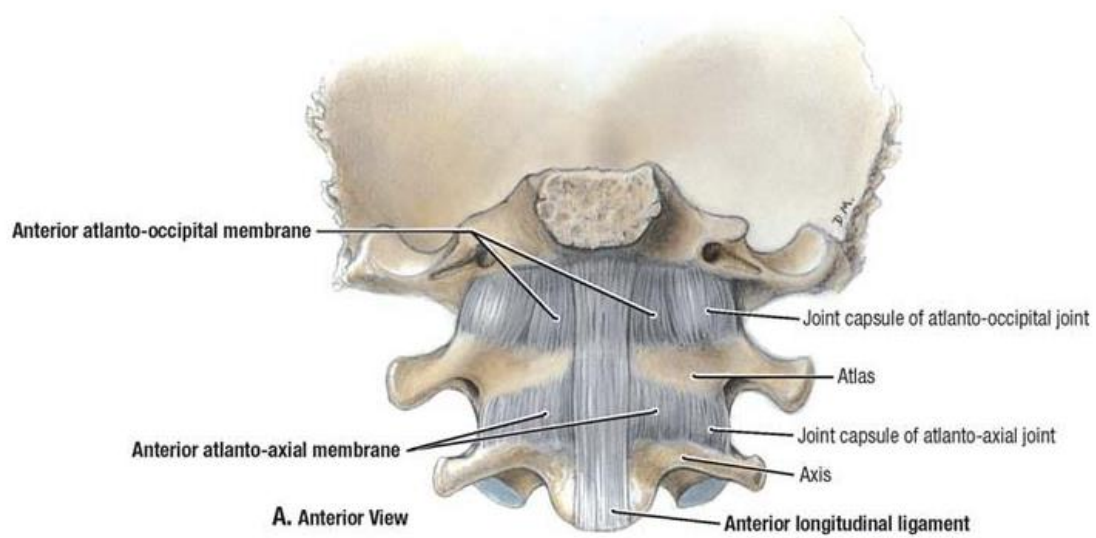
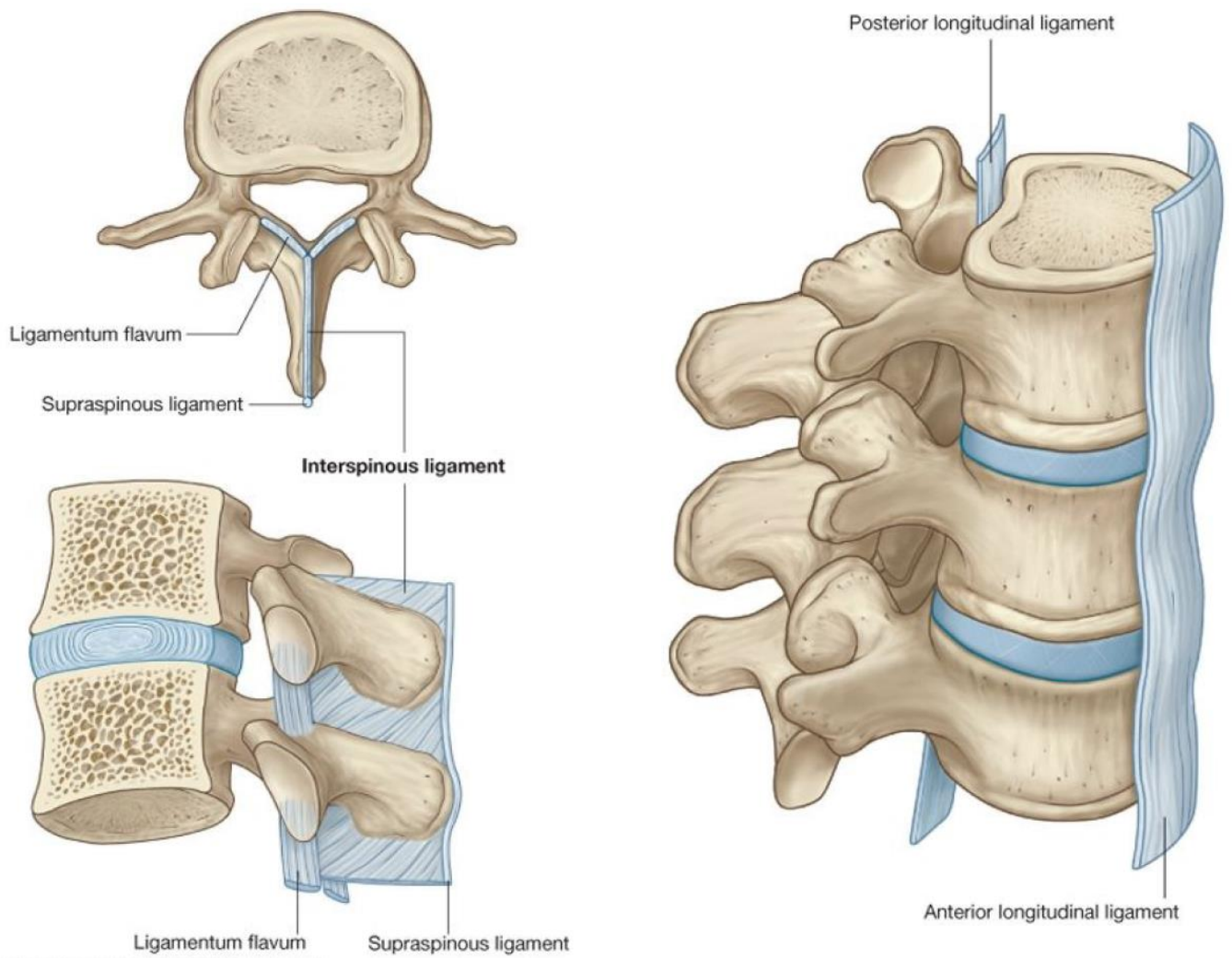


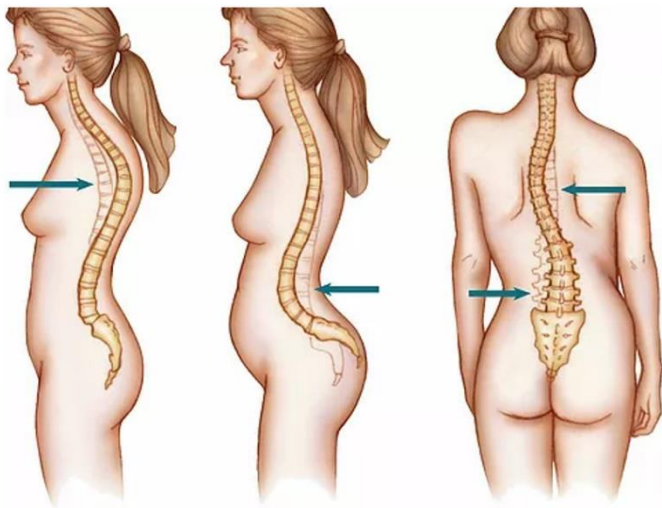
Nerve root	Main weakness	Reflex decreased	Area of sensory decrease	Disc involved
L4	Iliopsoas and quadriceps	Patellar tendon (knee jerk)	Knee, medial lower leg	L3-L4
L5	Dorsiflexion of foot at ankle (big toe extension, foot eversion and inversion)		Dorsum of foot, big toe	L4-L5
S1	Plantar flexion of foot at ankle	Achilles tendon (ankle jerk)	Lateral foot, small toe, sole	L5-S1

Clinically important nerve roots in the lower limb





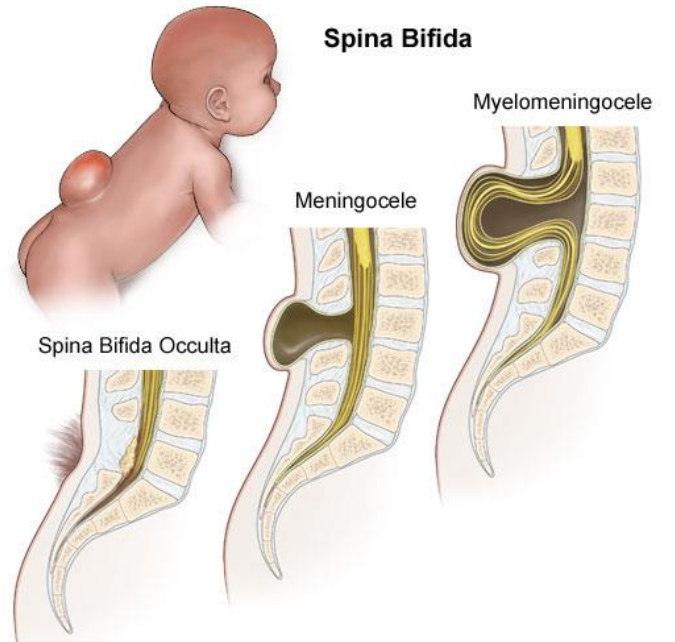




Kyphosis

Lordosis

Scoliosis



Spina Bifida

Myelomeningocele

Meningocele

Spina Bifida Occulta



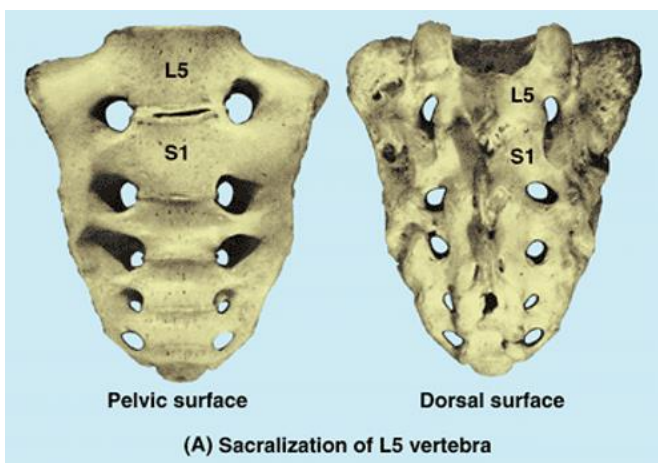
A

Fused bodies of cervical vertebrae



B

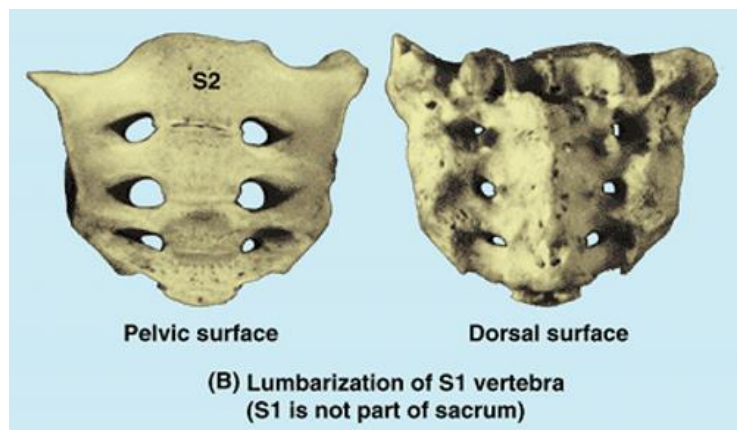
Hemivertebra



Pelvic surface

Dorsal surface

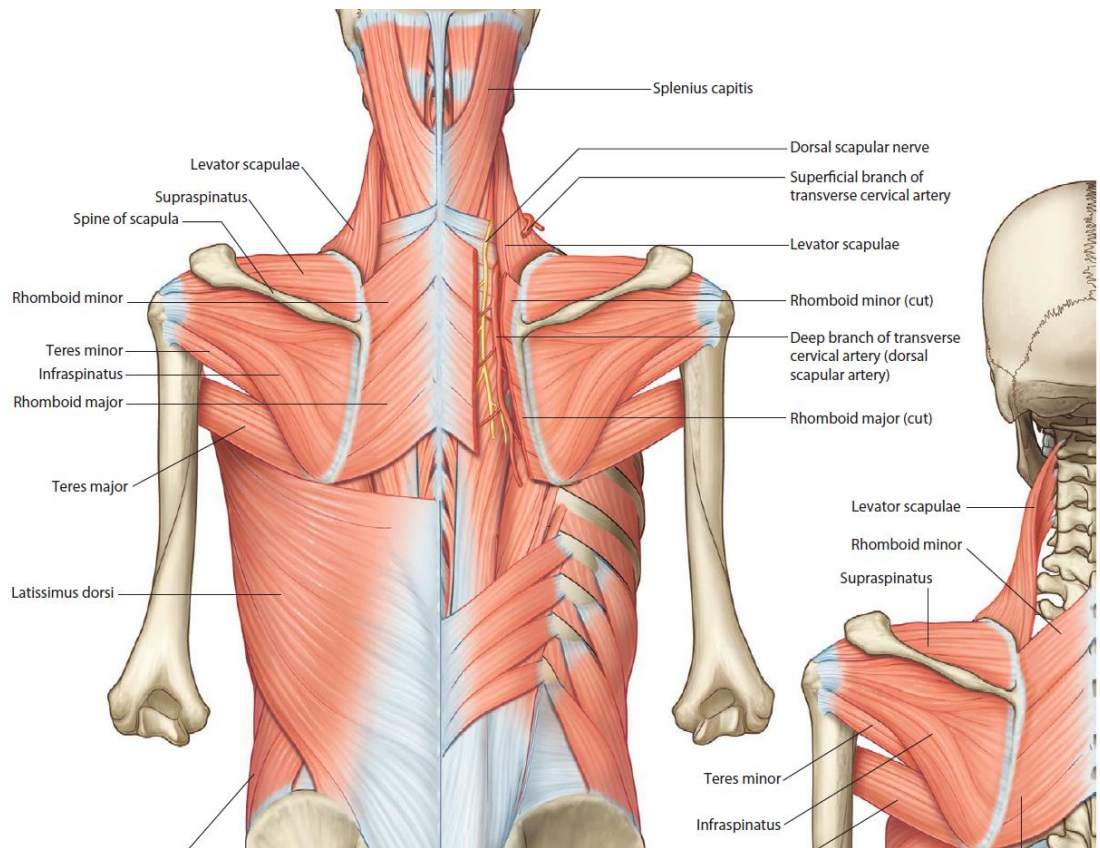
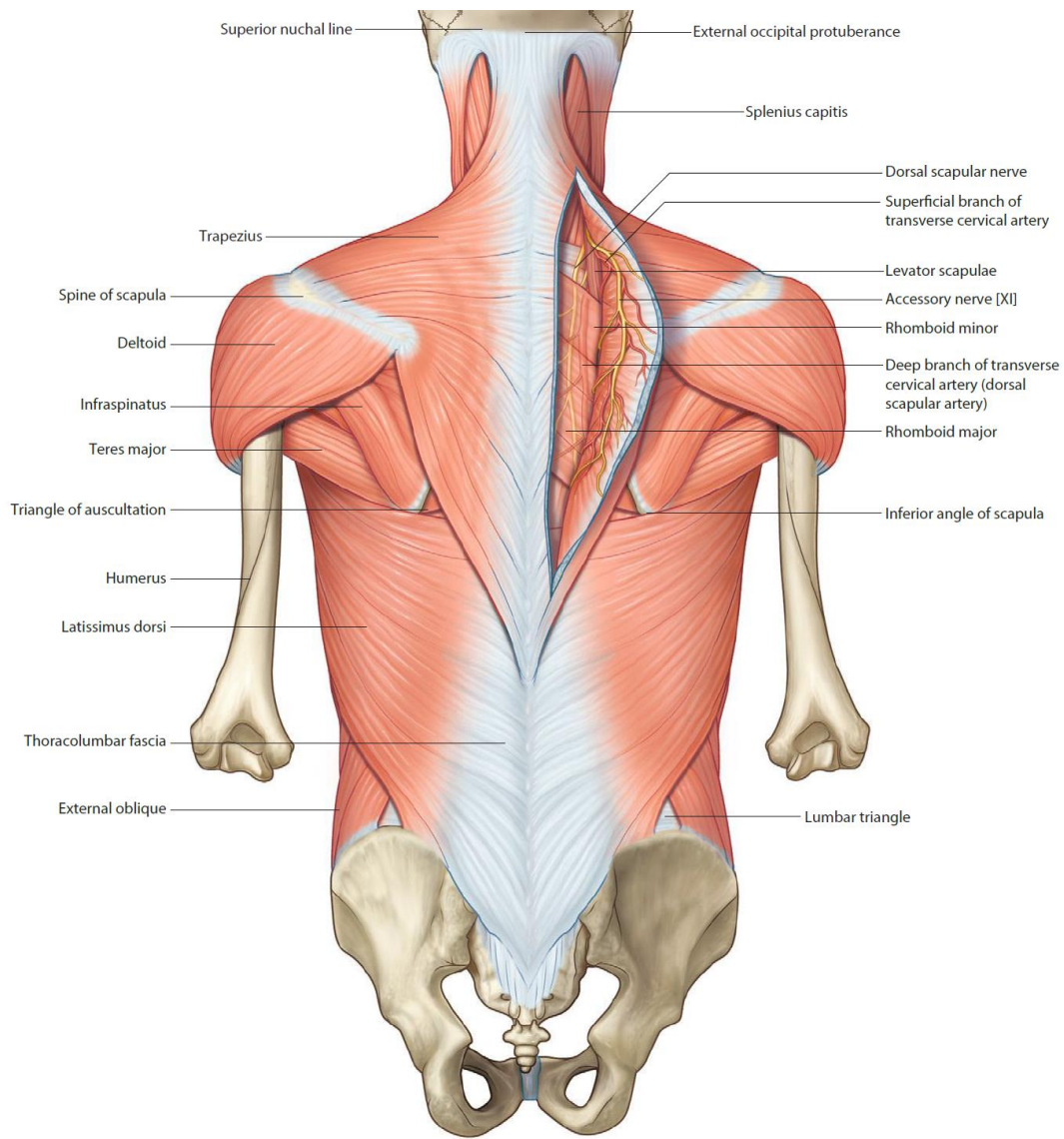
(A) Sacralization of L5 vertebra

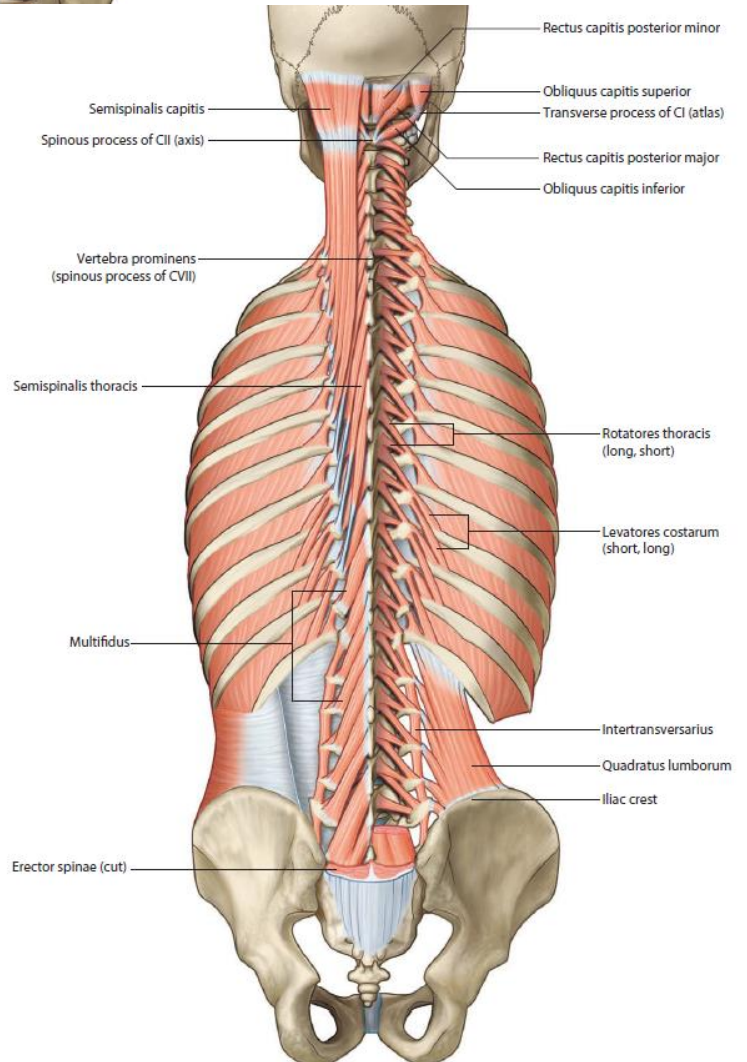
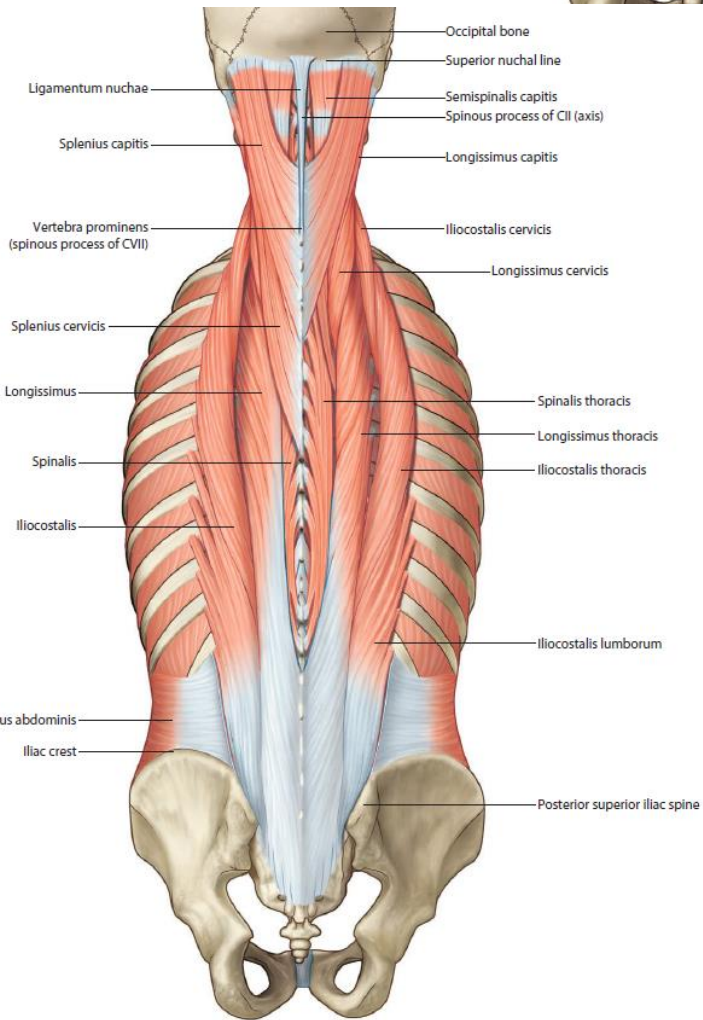
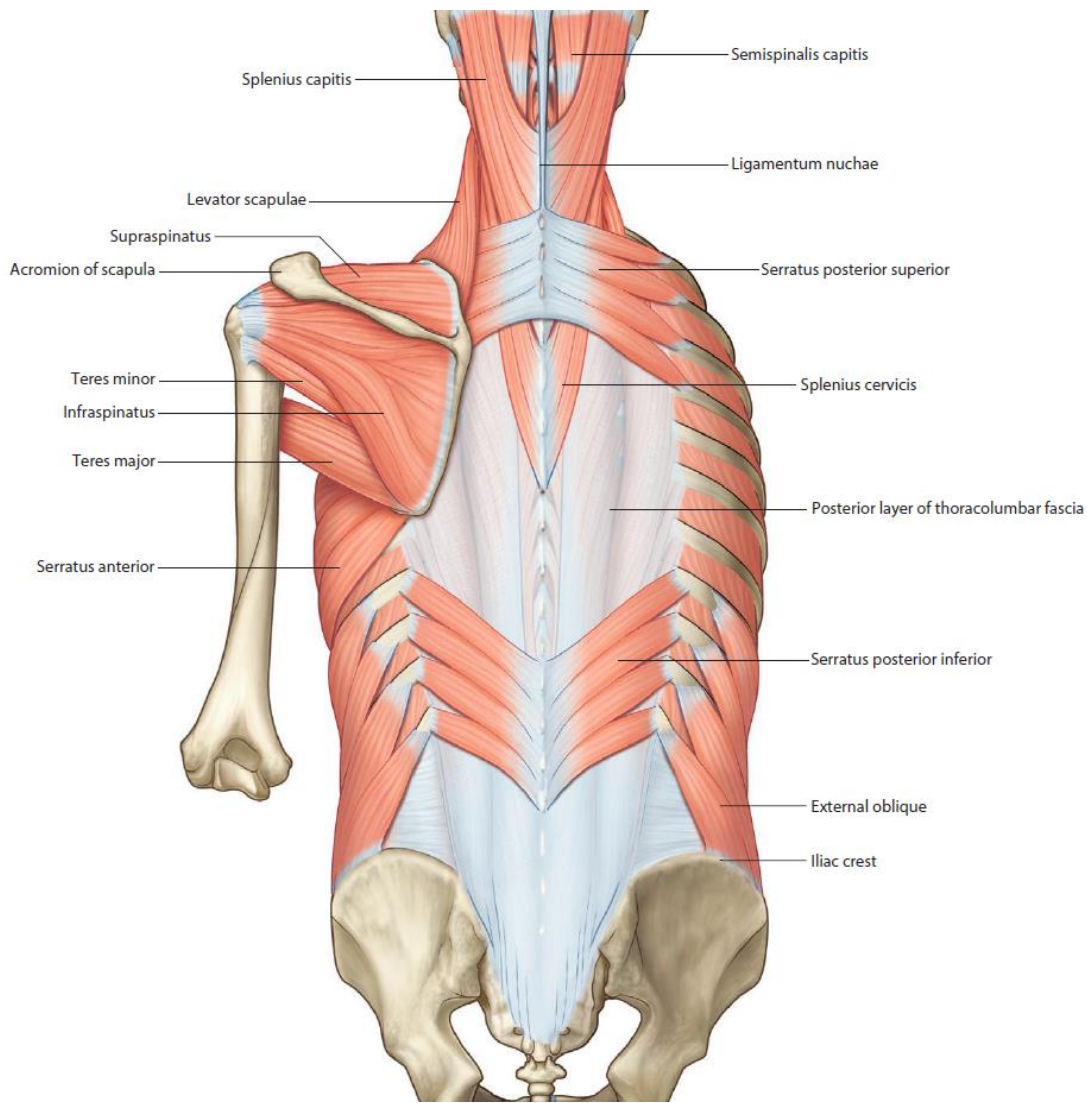


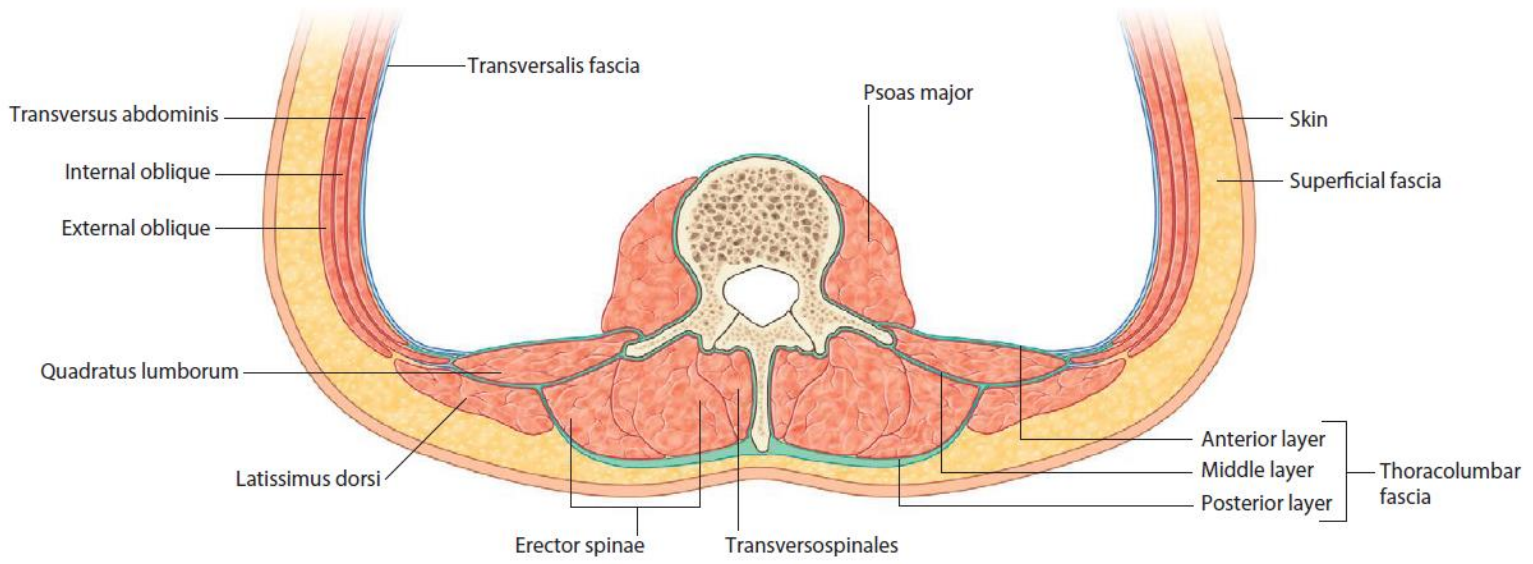
Pelvic surface

Dorsal surface

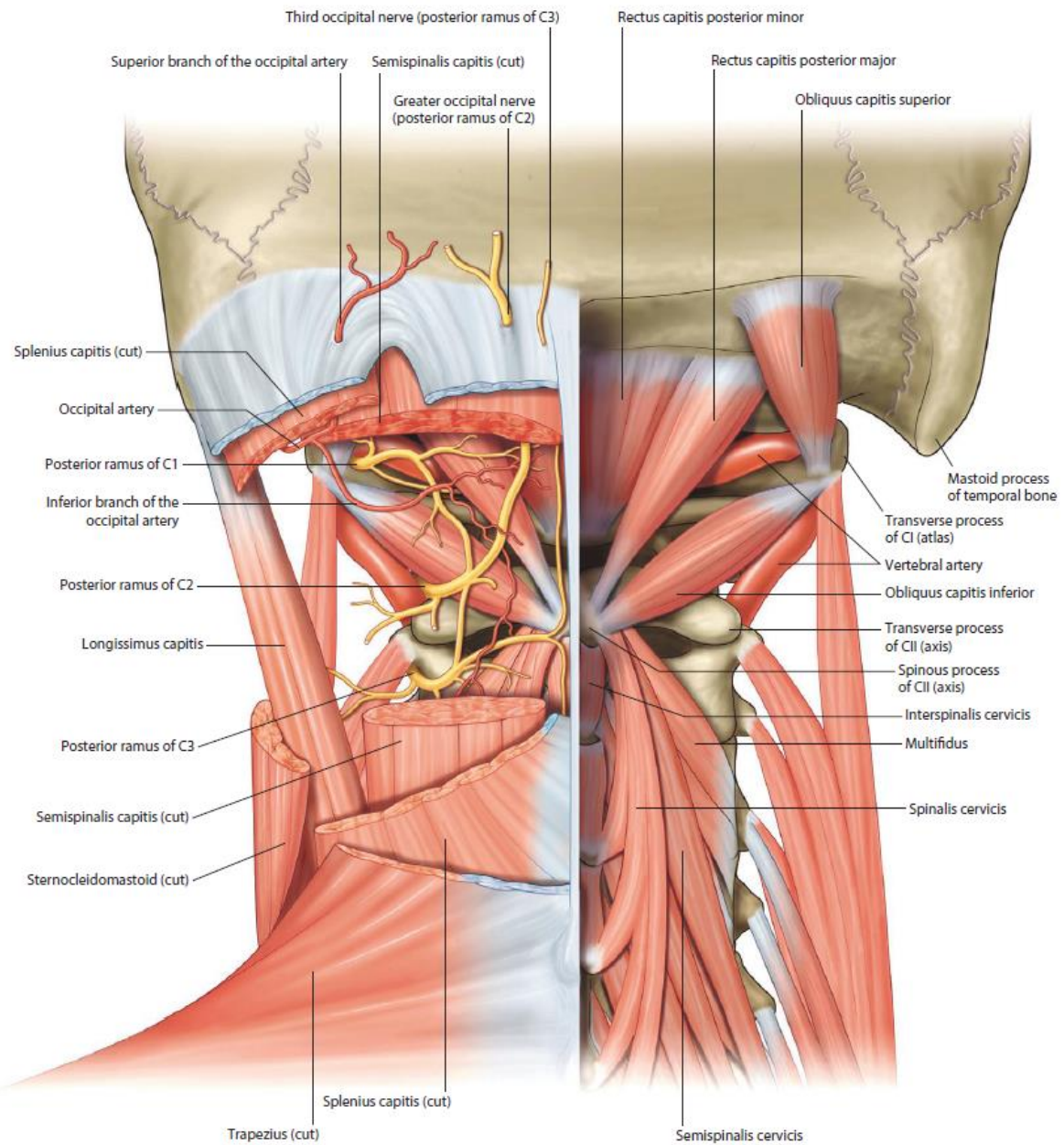
**(B) Lumbarization of S1 vertebra
(S1 is not part of sacrum)**

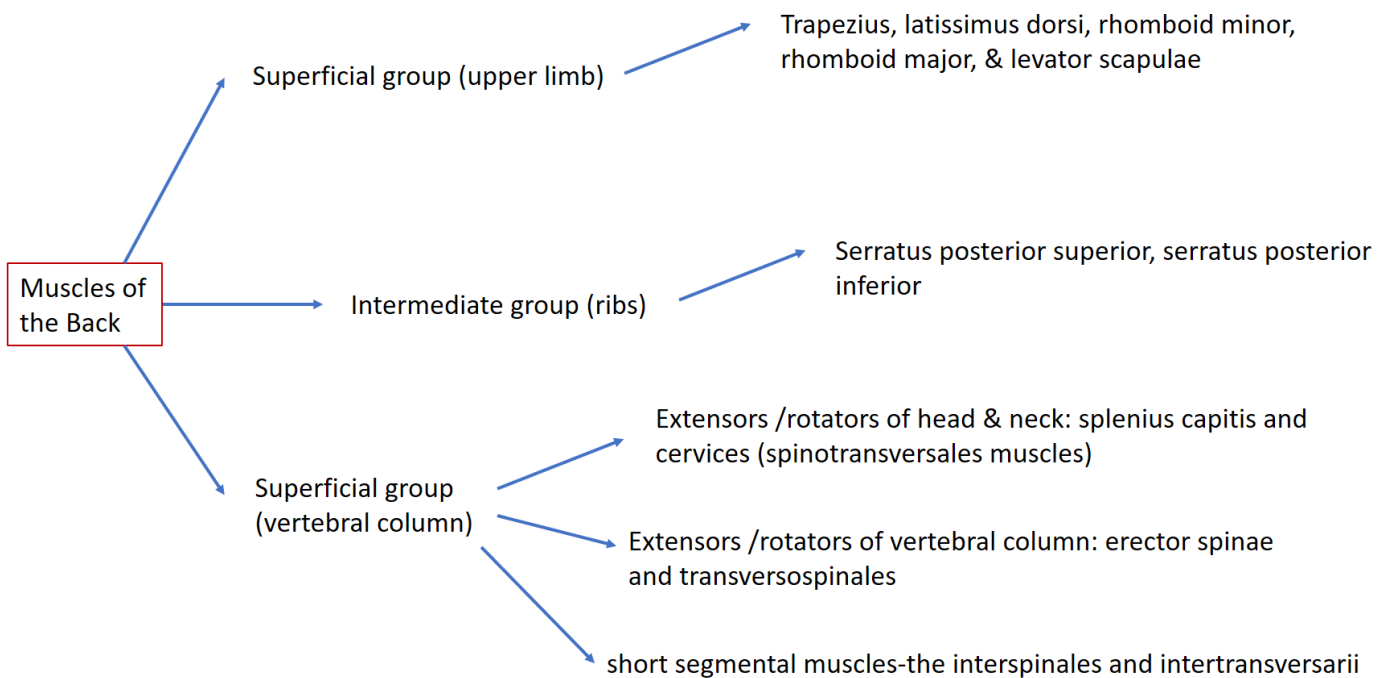
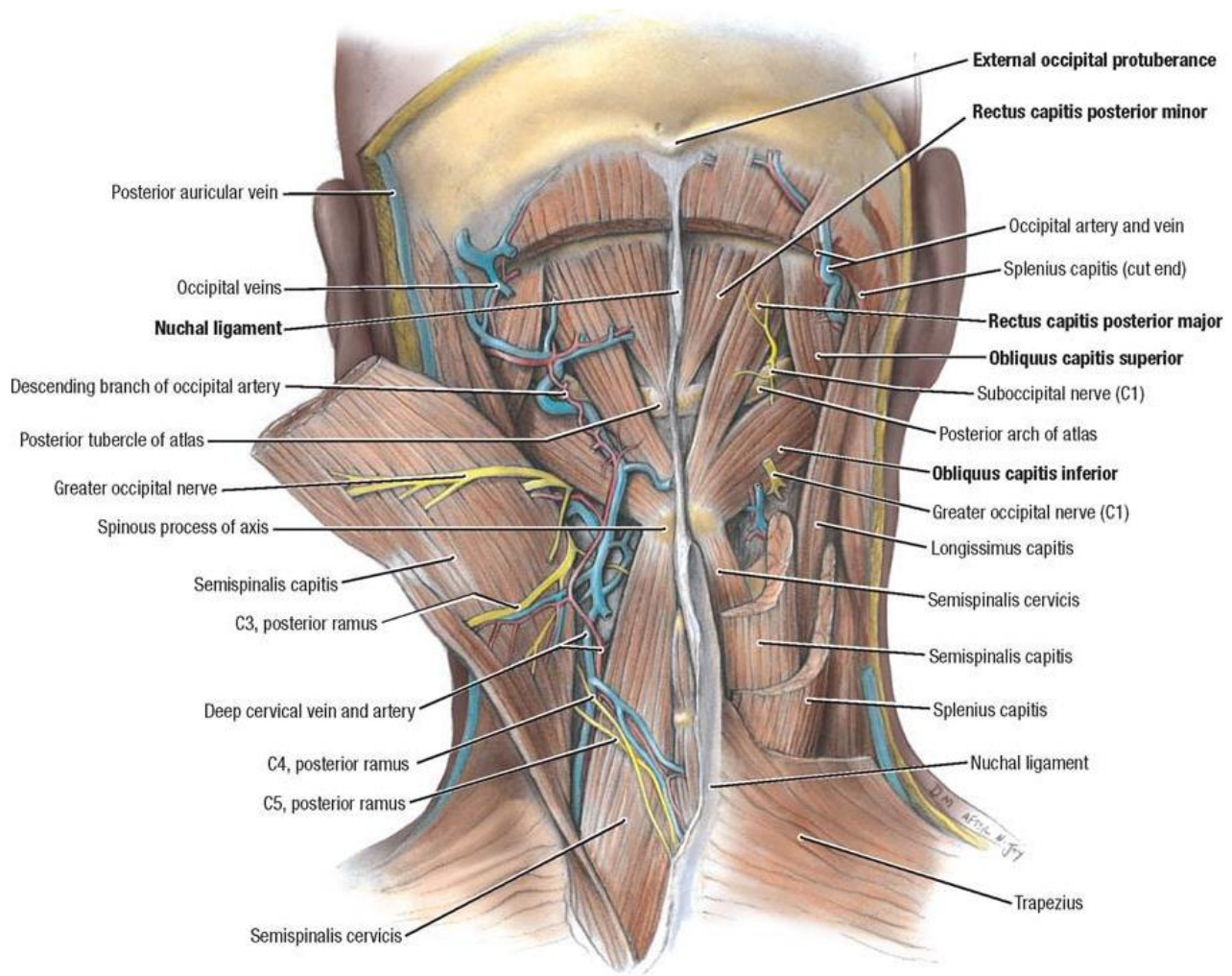






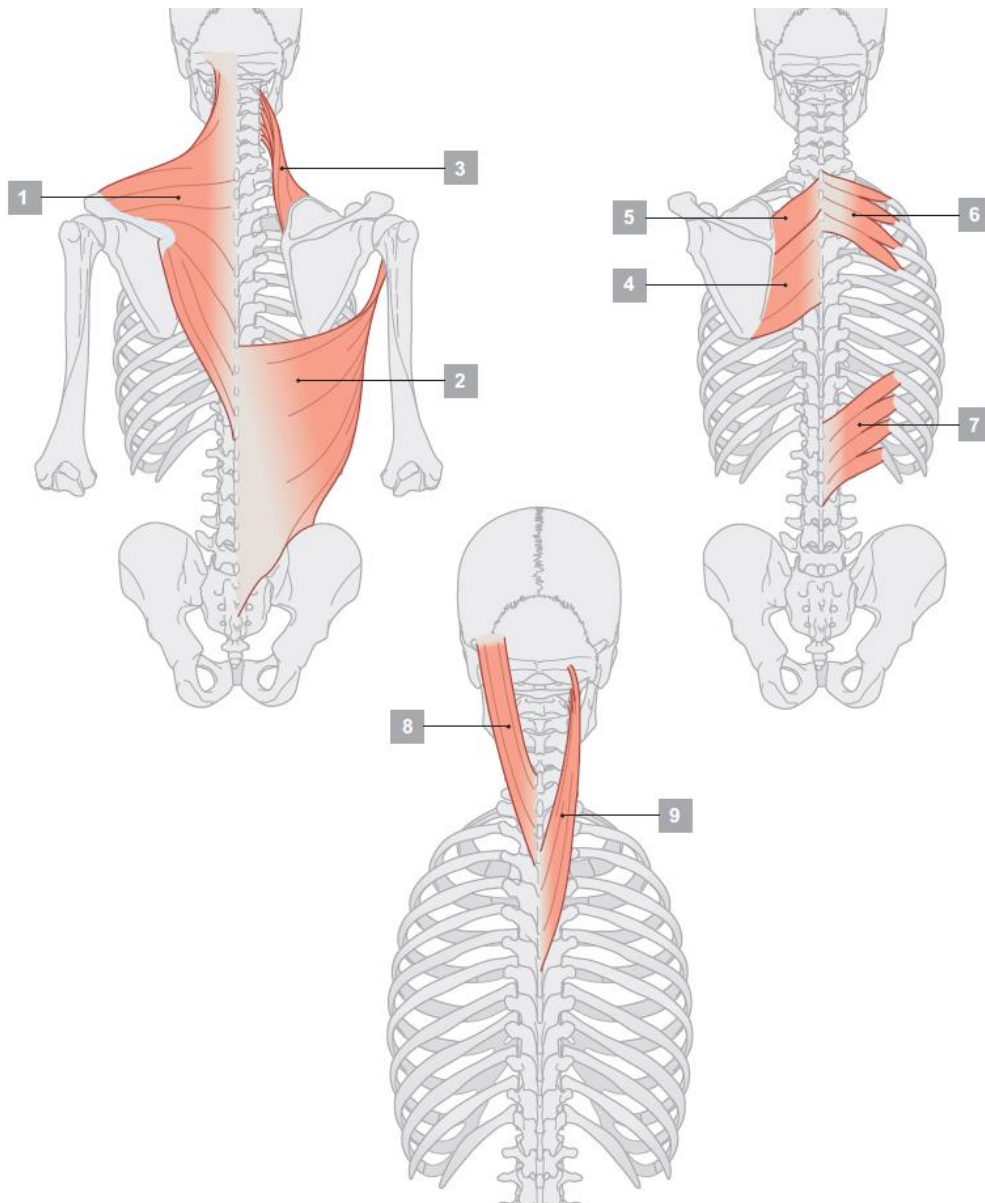
**Thoracolumbar fascia and the deep back muscles
(transverse section – lumbar region)**





Superficial (appendicular) group of back muscles

Muscle	Origin	Insertion	Innervation	Function
Trapezius	1 Superior nuchal line, external occipital protuberance, ligamentum nuchae, spinous processes of CVII to TXII	Lateral one third of clavicle, acromion, spine of scapula	Motor—accessory nerve [XI]; proprioception—C3 and C4	Assists in rotating the scapula during abduction of humerus above horizontal; upper fibers elevate, middle fibers adduct, and lower fibers depress scapula
Latissimus dorsi	2 Spinous processes of TVII to LV and sacrum, iliac crest, ribs X to XII	Floor of intertubercular sulcus of humerus	Thoracodorsal nerve (C6 to C8)	Extends, adducts, and medially rotates humerus
Levator scapulae	3 Transverse processes of C1 to CIV	Upper portion of medial border of scapula	C3 to C4 and dorsal scapular nerve (C4, C5)	Elevates scapula
Rhomboid major	4 Spinous processes of TII to TV	Medial border of scapula between spine and inferior angle	Dorsal scapular nerve (C4, C5)	Retracts (adducts) and elevates scapula
Rhomboid minor	5 Lower portion of ligamentum nuchae, spinous processes of CVII and T1	Medial border of scapula at the spine of scapula	Dorsal scapular nerve (C4, C5)	Retracts (adducts) and elevates scapula

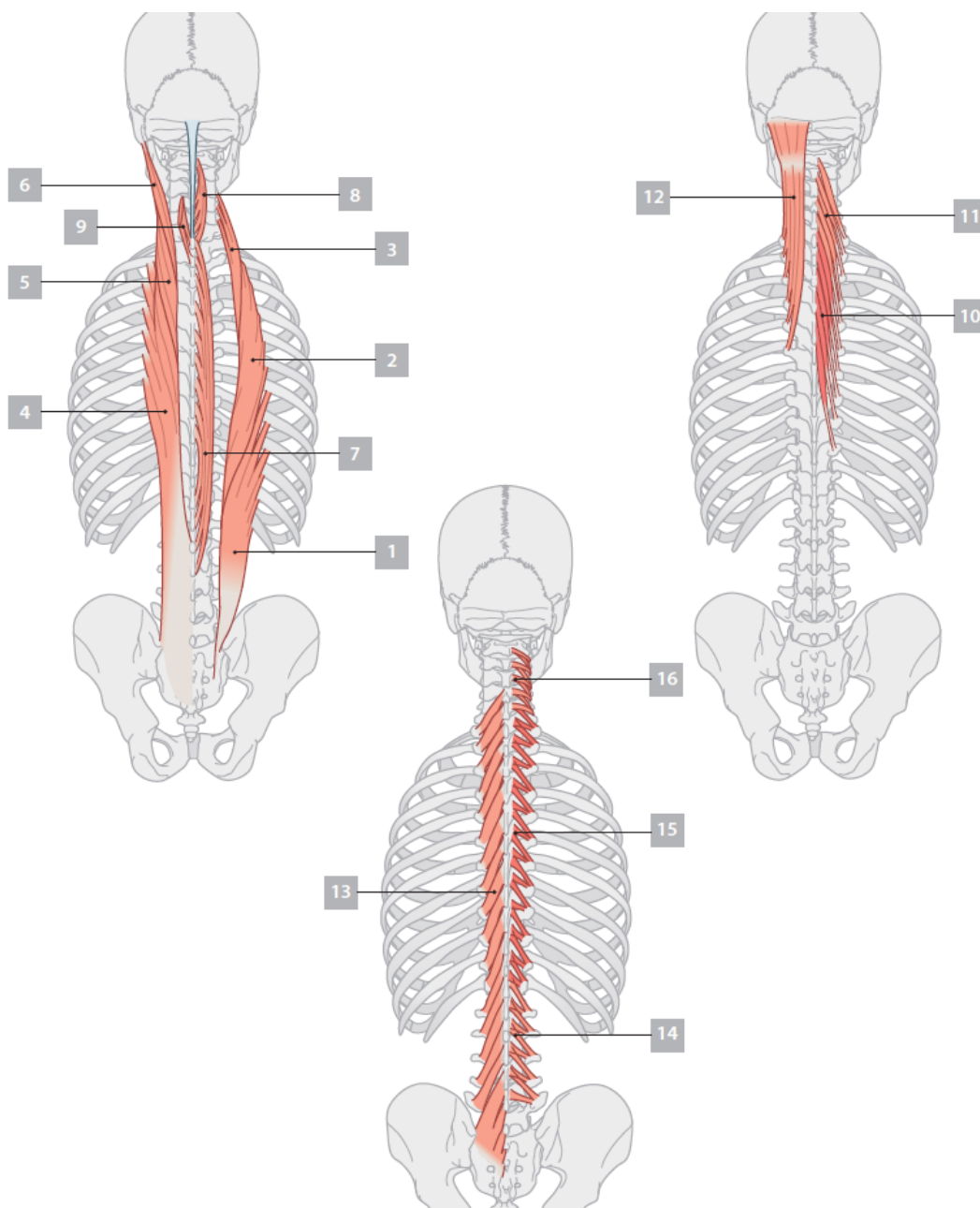


Intermediate (respiratory) group of back muscles

Serratus posterior superior	6	Lower portion of ligamentum nuchae, spinous processes of CVII to TIII and supraspinous ligaments	Mastoid process, skull below lateral one third of superior nuchal line	Anterior rami of upper thoracic nerves (T2 to T5)	Elevates ribs II to V
Serratus posterior inferior	7	Spinous processes of TXI to LIII and supraspinous ligaments	Lower border of ribs IX to XII just lateral to their angles	Anterior rami of lower thoracic nerves (T9 to T12)	Depresses ribs IX to XII and may prevent lower ribs from being elevated when the diaphragm contracts

Spinotransversales muscles

Splenius capitis	8	Lower half of ligamentum nuchae, spinous processes of CVII to TIV	Mastoid process, skull below lateral one third of superior nuchal line	Posterior rami middle cervical nerves	Together—draw head backward, extending neck; individually—draw and rotate head to one side (turn face to same side)
Splenius cervicis	9	Spinous processes of TIII to TVI	Transverse processes of CI to CIII	Posterior rami lower cervical nerves	Together—extend neck; individually—draw and rotate head to one side (turn face to same side)



Erector spinae group of back muscles

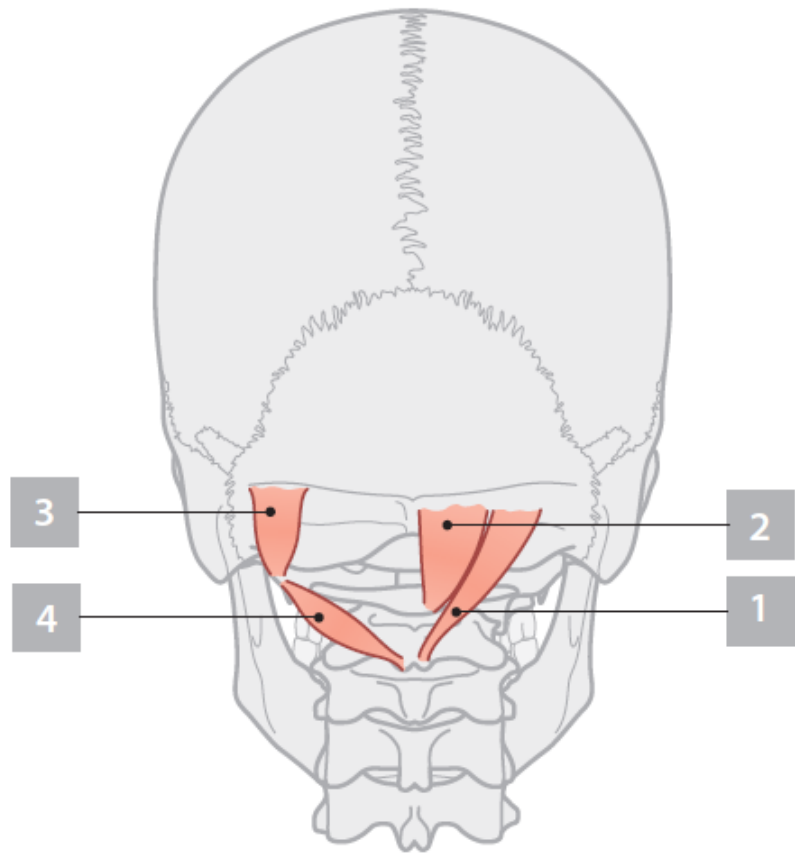
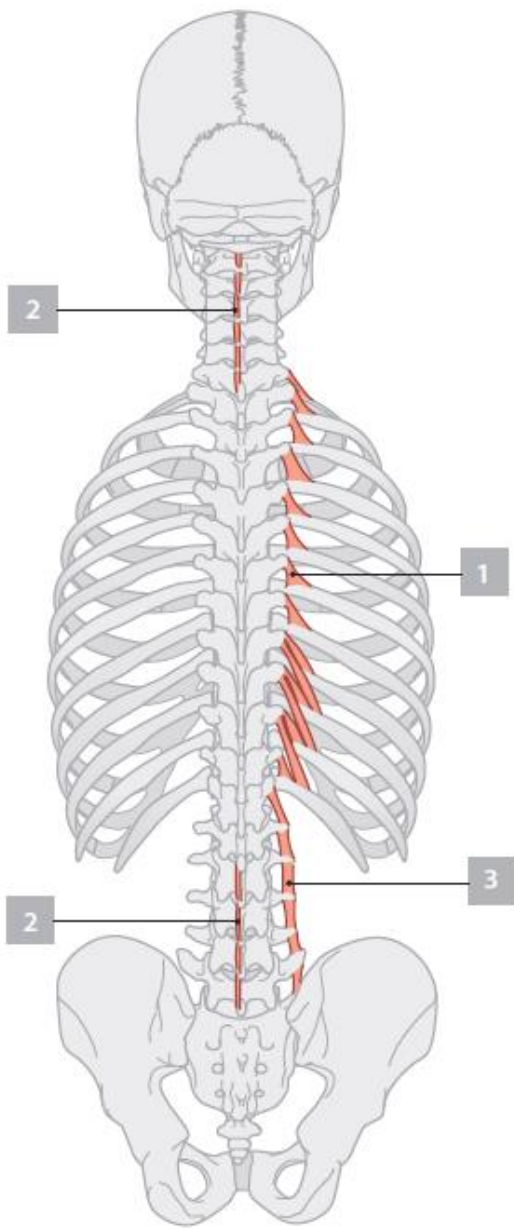
Muscle	Origin	Insertion
Iliocostalis lumborum	1 Sacrum, spinous processes of lumbar and lower two thoracic vertebrae and their supraspinous ligaments, and the iliac crest	Angles of the lower six or seven ribs
Iliocostalis thoracis	2 Angles of the lower six ribs	Angles of the upper six ribs and the transverse process of CVII
Iliocostalis cervicis	3 Angles of ribs III to VI	Transverse processes of CIV to CVI
Longissimus thoracis	4 Blends with iliocostalis in lumbar region and is attached to transverse processes of lumbar vertebrae	Transverse processes of all thoracic vertebrae and just lateral to the tubercles of the lower nine or ten ribs
Longissimus cervicis	5 Transverse processes of upper four or five thoracic vertebrae	Transverse processes of CII to CVI
Longissimus capitis	6 Blends with iliocostalis in lumbar region and is attached to transverse processes of lumbar vertebrae	Transverse processes of all thoracic vertebrae and just lateral to the tubercles of the lower nine or ten ribs
Spinalis thoracis	7 Spinous processes of TX or TXI to LII	Spinous processes of T1 to TVIII (varies)
Spinalis cervicis	8 Lower part of ligamentum nuchae and spinous process of CVII (sometimes T1 to TII)	Spinous process of CII (axis)
Spinalis capitis	9 Usually blends with semispinalis capitis	With semispinalis capitis

Transversospinales group of back muscles

Semispinalis thoracis	10 Transverse processes of TVI to TX	Spinous processes of upper four thoracic and lower two cervical vertebrae
Semispinalis cervicis	11 Transverse processes of upper five or six thoracic vertebrae	Spinous processes of CII (axis) to CV
Semispinalis capitis	12 Transverse processes of T1 to TVI (or TVII) and CVII and articular processes of CIV to CVI	Medial area between the superior and inferior nuchal lines of occipital bone
Multifidus	13 Sacrum, origin of erector spinae, posterior superior iliac spine, mammillary processes of lumbar vertebrae, transverse processes of thoracic vertebrae, and articular processes of lower four cervical vertebrae	Base of spinous processes of all vertebrae from LV to CII (axis)
Rotatores lumborum	14 Mammillary processes of lumbar vertebrae	Spinous processes of lumbar vertebrae
Rotatores thoracis	15 Transverse processes of thoracic vertebrae	Spinous processes of thoracic vertebrae
Rotatores cervicis	16 Articular processes of cervical vertebrae	Spinous processes of cervical vertebrae

Segmental back muscles

Muscle	Origin	Insertion	Function
Levatores costarum	1 Short paired muscles arising from transverse processes of CVII to TXI	The rib below vertebra of origin near tubercle	Contraction elevates rib
Interspinales	2 Short paired muscles attached to the spinous processes of contiguous vertebrae, one on each side of the interspinous ligament		Postural muscles that stabilize adjoining vertebra during movements of vertebral column
Intertransversarii	3 Small muscles between the transverse processes of contiguous vertebrae		Postural muscles that stabilize adjoining vertebra during movements of vertebral column



Suboccipital group of back muscles

Muscle	Origin	Insertion	Innervation	Function
Rectus capitis posterior major	1 Spinous process of axis (CII)	Lateral portion of occipital bone below inferior nuchal line	Posterior ramus of C1	Extension of head; rotation of face to same side as muscle
Rectus capitis posterior minor	2 Posterior tubercle of atlas (CI)	Medial portion of occipital bone below inferior nuchal line	Posterior ramus of C1	Extension of head
Obliquus capitis superior	3 Transverse process of atlas (CI)	Occipital bone between superior and inferior nuchal lines	Posterior ramus of C1	Extension of head and bends it to same side
Obliquus capitis inferior	4 Spinous process of axis (CII)	Transverse process of atlas (CI)	Posterior ramus of C1	Rotation of face to same side