

Pilates Mat Certification Workshop

Neck, Upper Back, and Shoulder girdle

Purchase College, SUNY

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July 10th and 11th, 2010

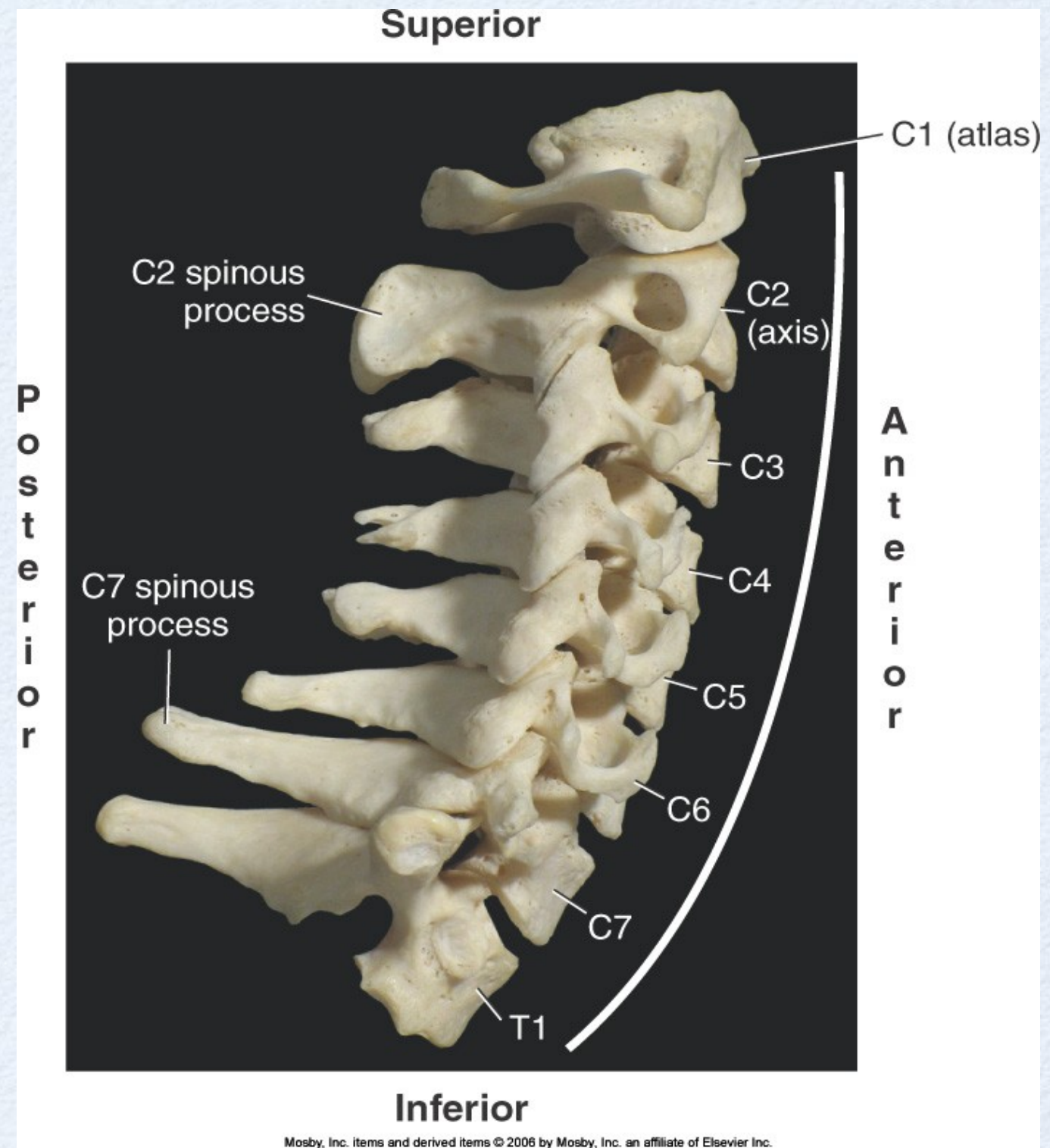
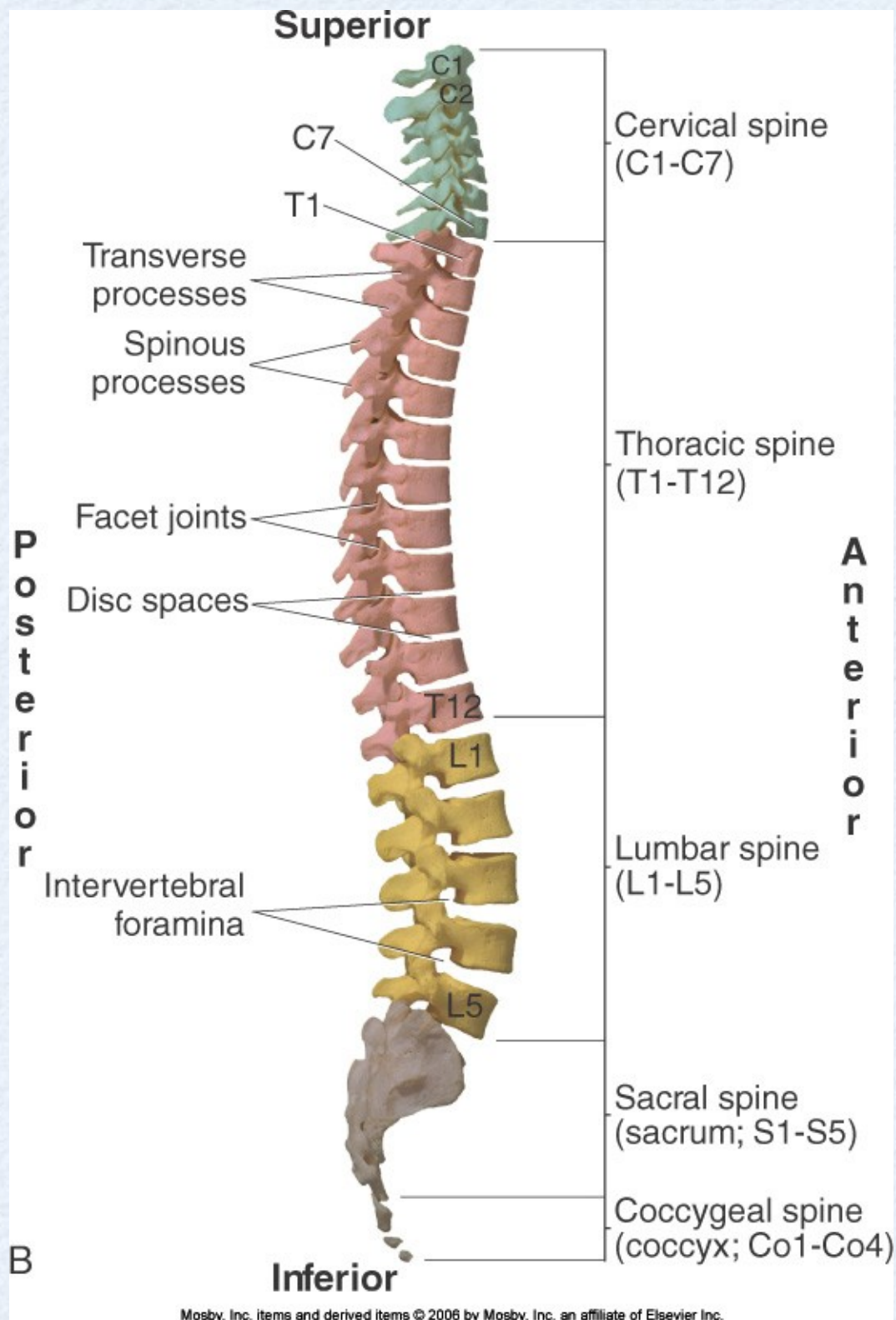
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 - Anatomy and physiology - soft tissues
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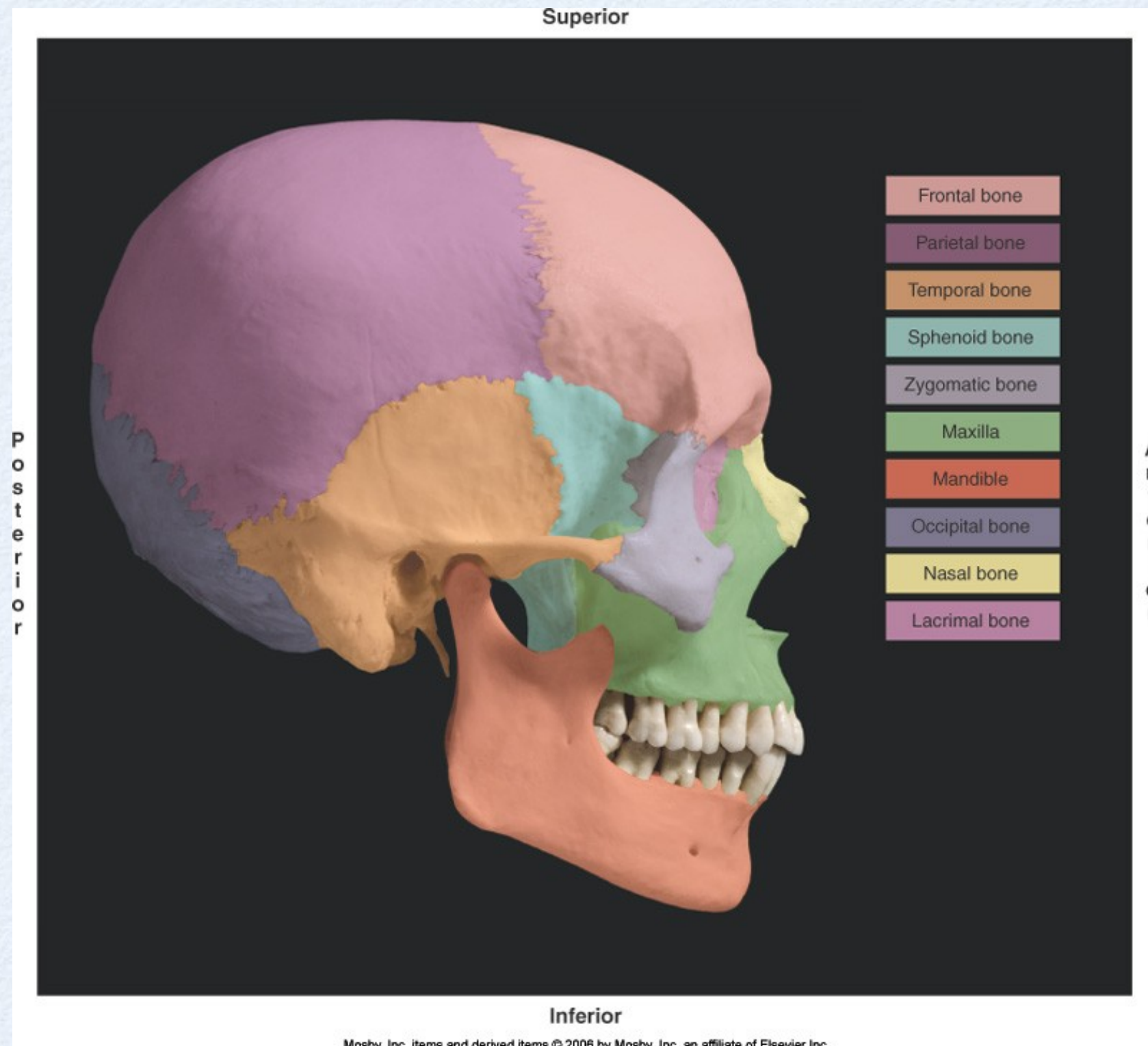
Anatomy of the neck

- Cervical spine
- Seven vertebrae named C1-C7
 - C1 is also known as the atlas
 - C2 is also known as the axis

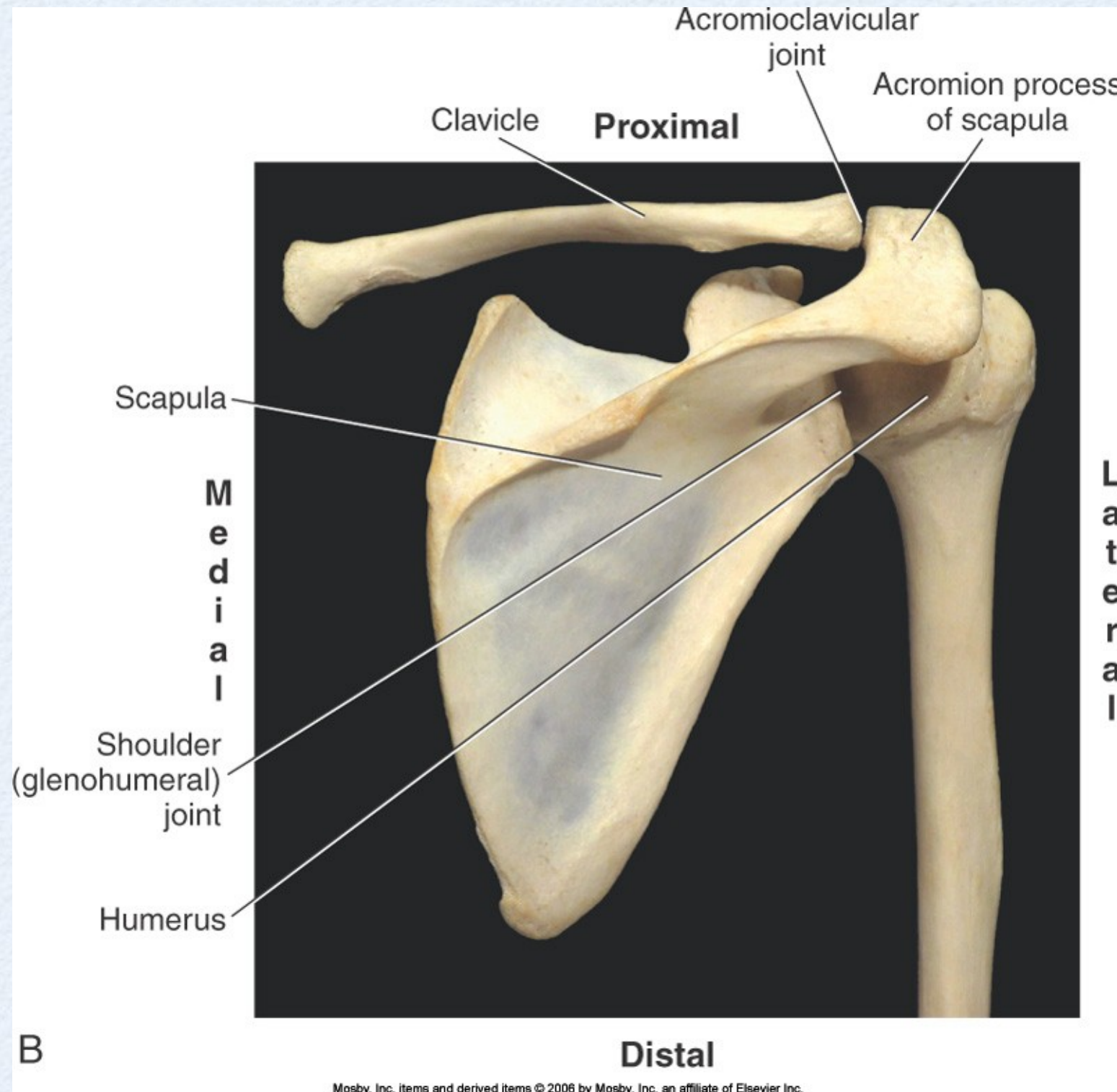
The spine - lateral views



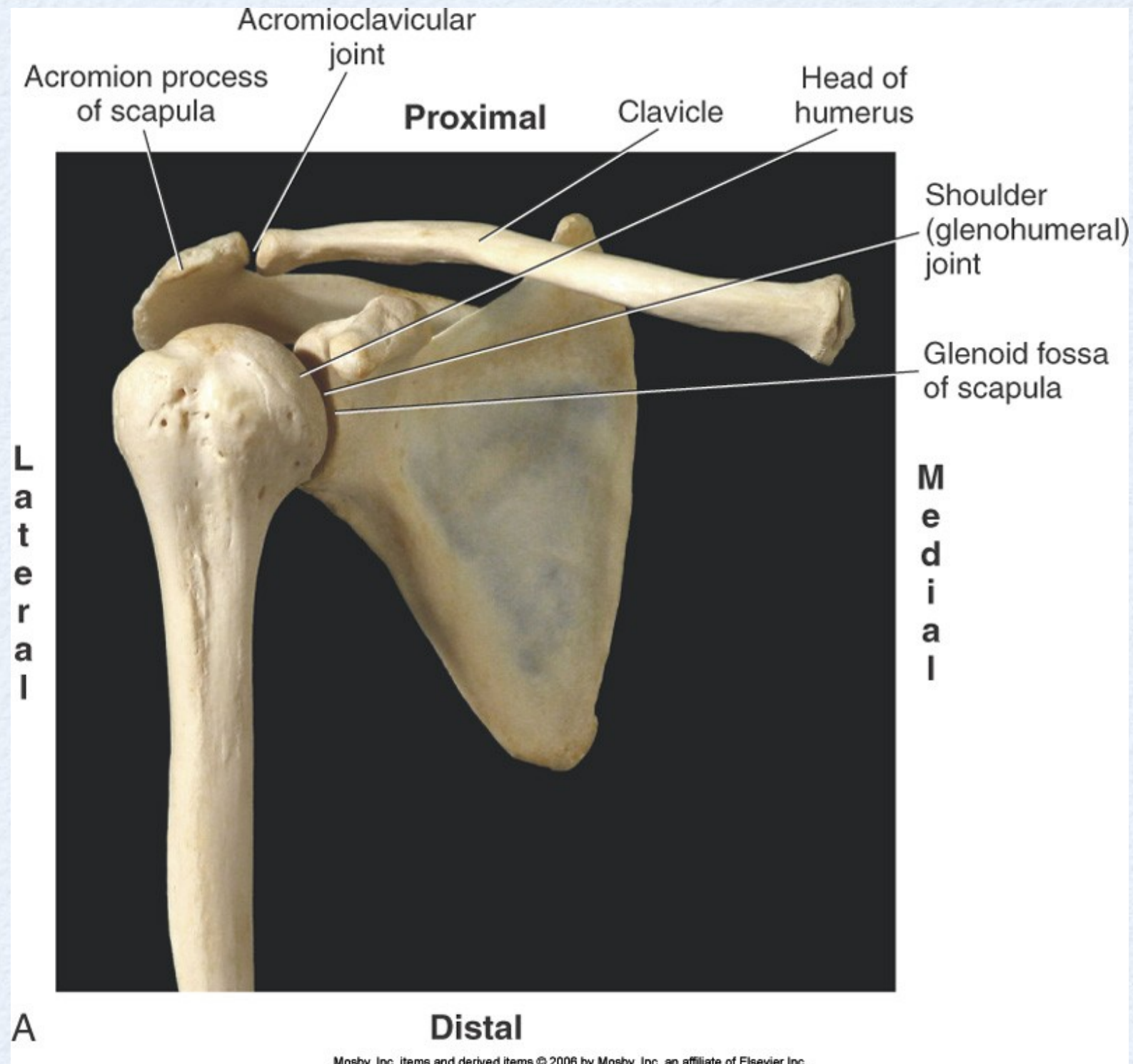
The skull - lateral view



SHOULDER GIRDLE - POSTERIOR VIEW



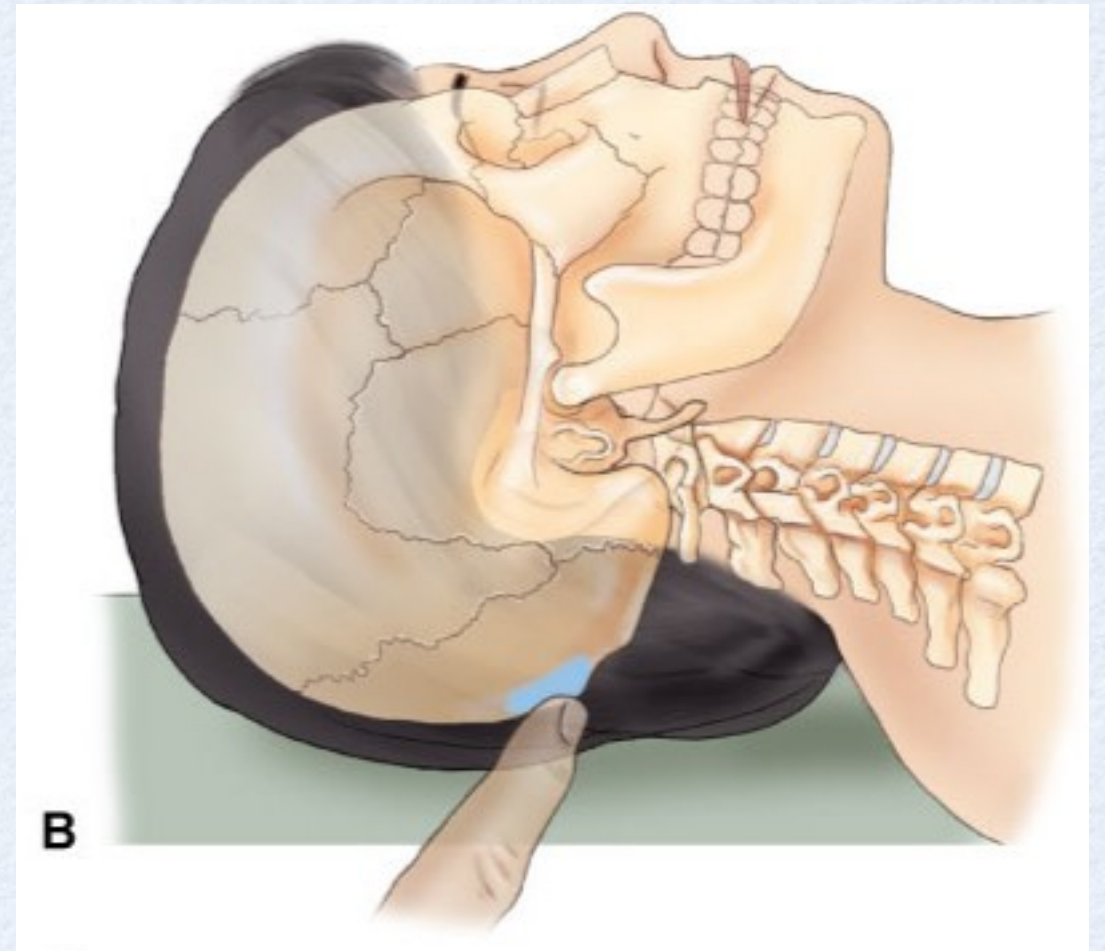
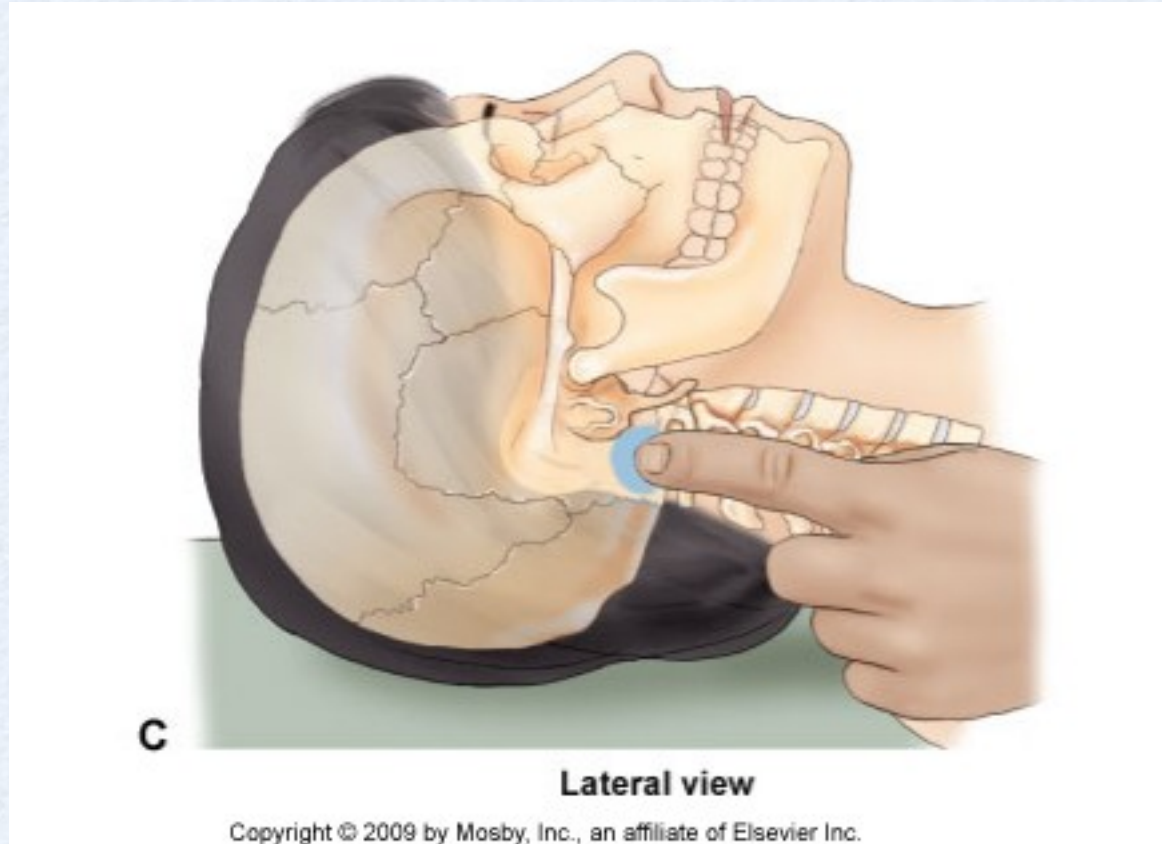
SHOULDER GIRDLE - ANTERIOR VIEW



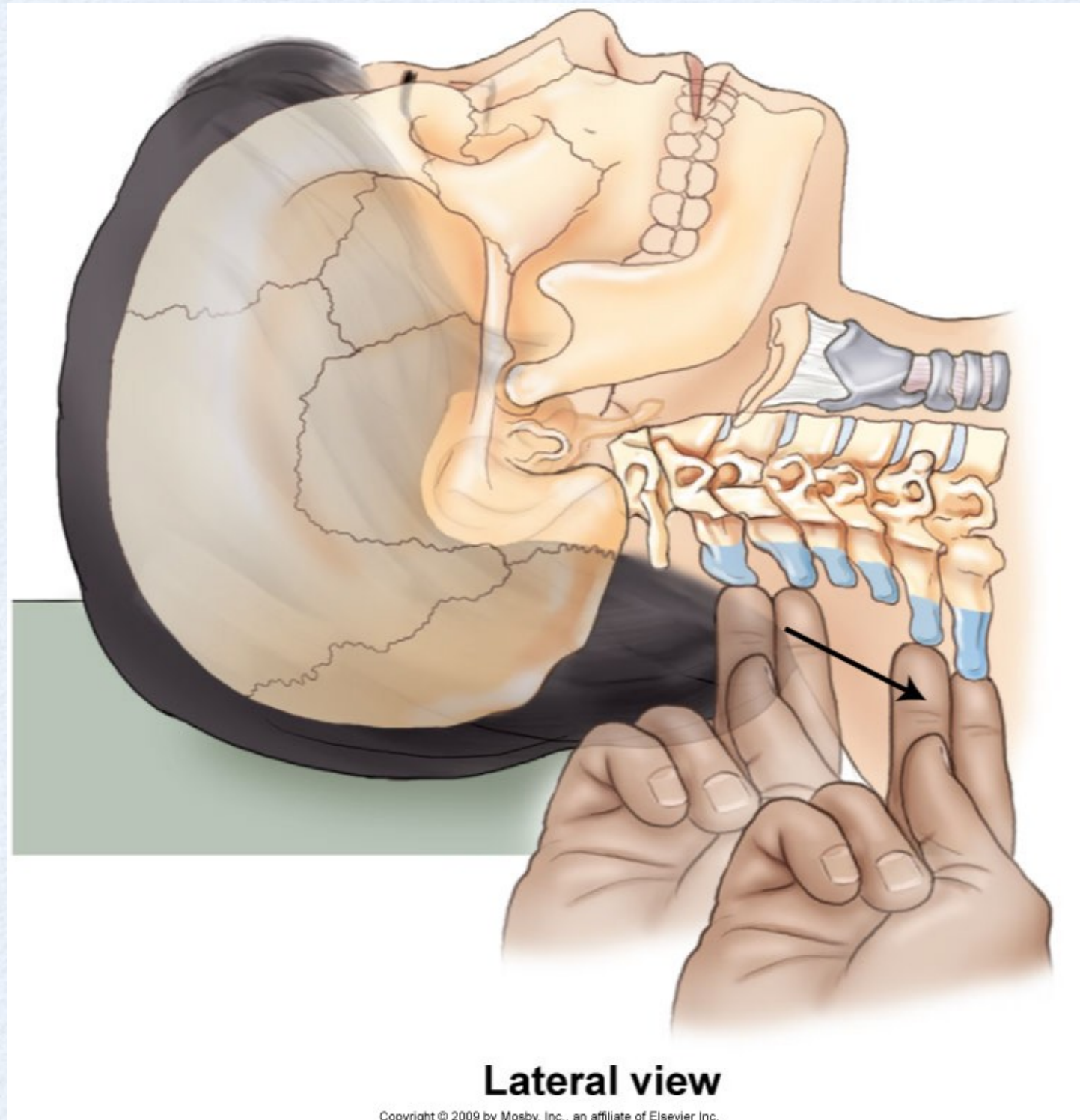
palpate bones

- Skull
 - Mastoid process
 - EOP (external occipital protuberance)
- Neck
 - Spinous processes (C2 and C7)
- Shoulder girdle
 - Scapula and clavicle

palpate SKULL



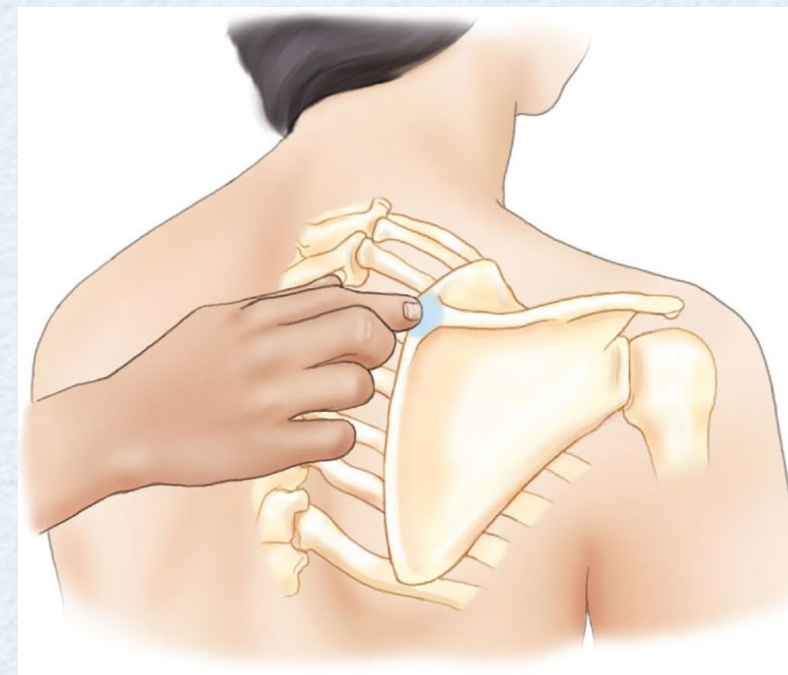
palpate VERTEBRAE



palpate SCAPULA



A Posterolateral view



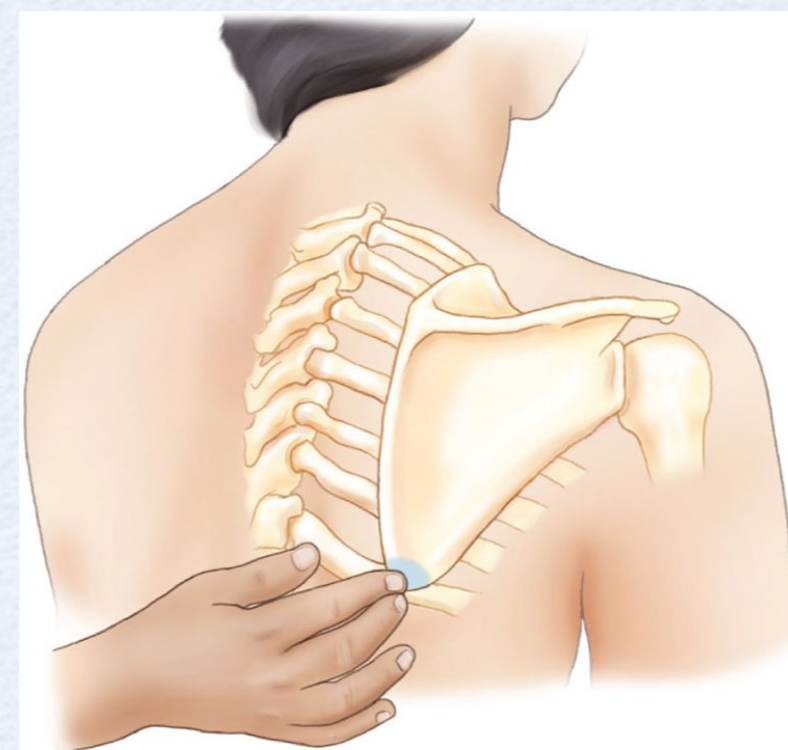
Posterolateral view

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B Posterolateral view

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Posterolateral view

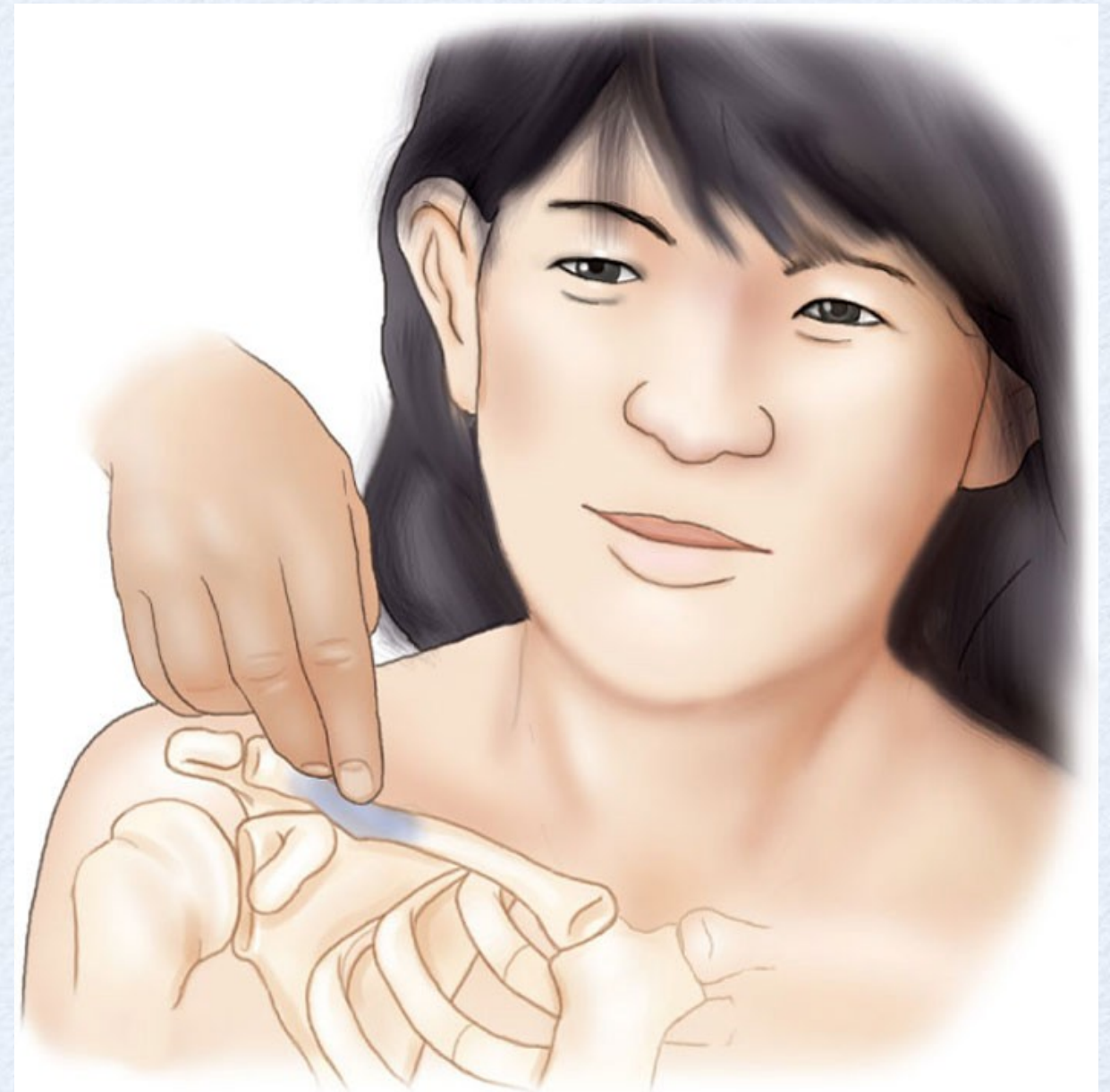
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PALPATE CLAVICLE



Anteromedial view

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Anteromedial view

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Joint function

- Joint function: allow motion
 - Must also be stable
 - Balance between mobility and stability

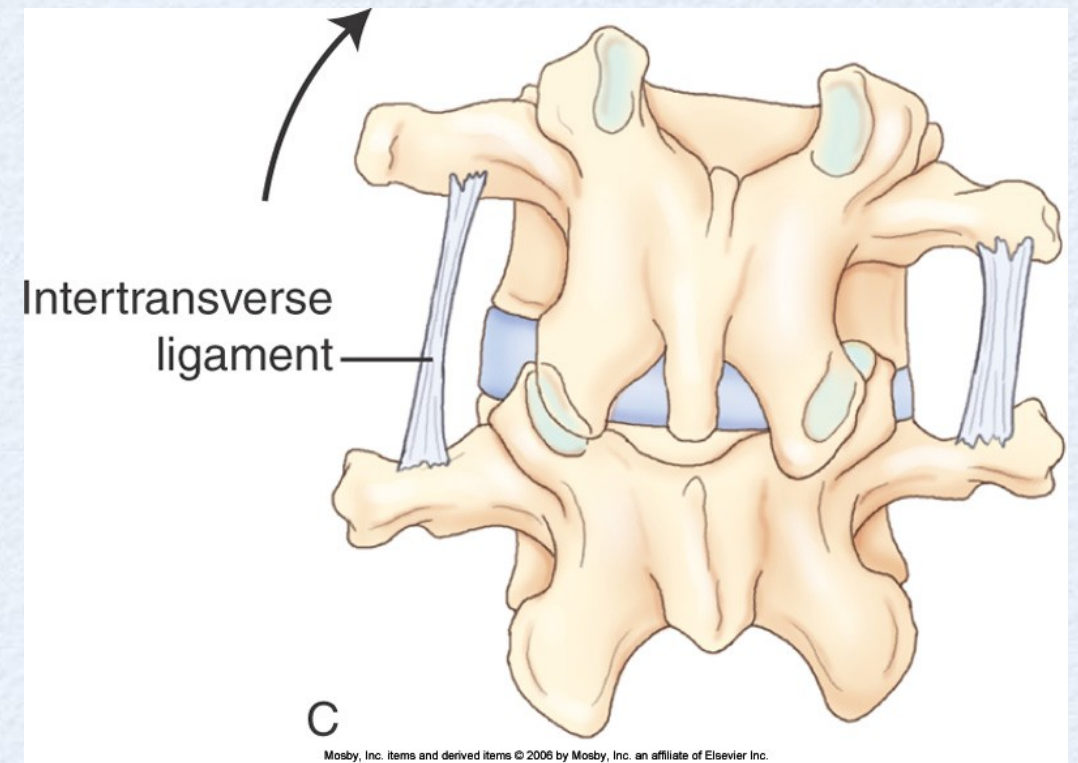
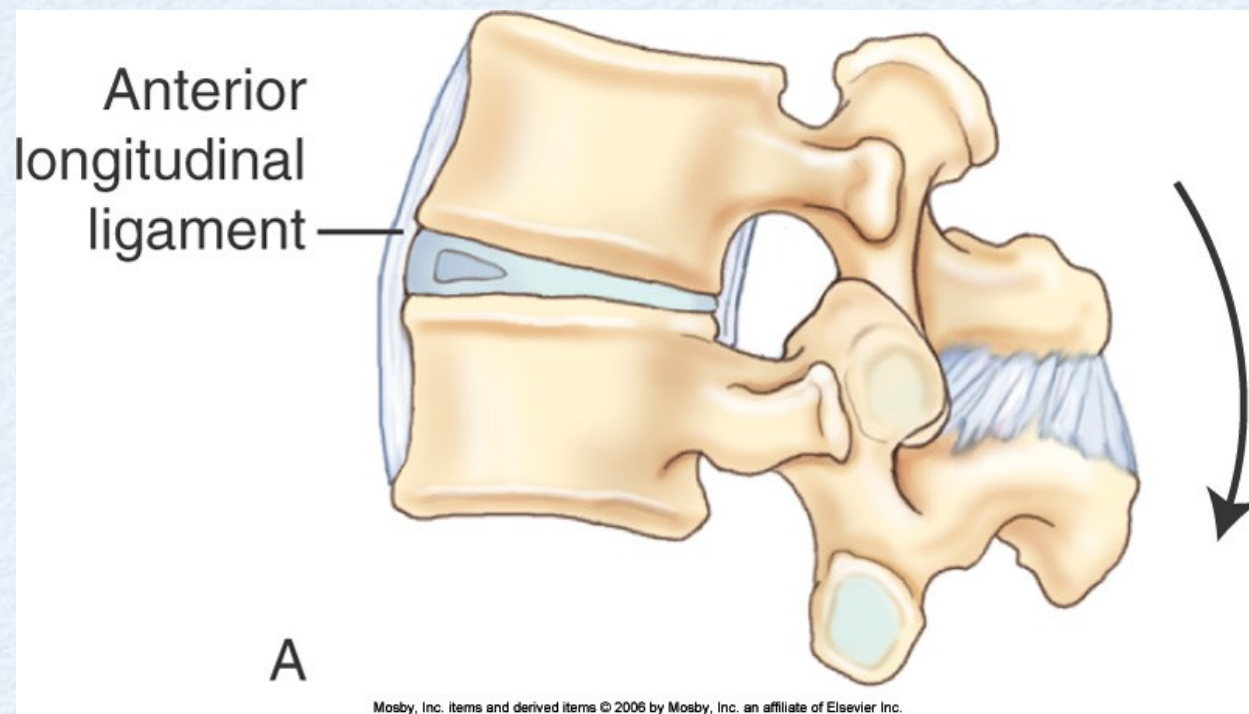
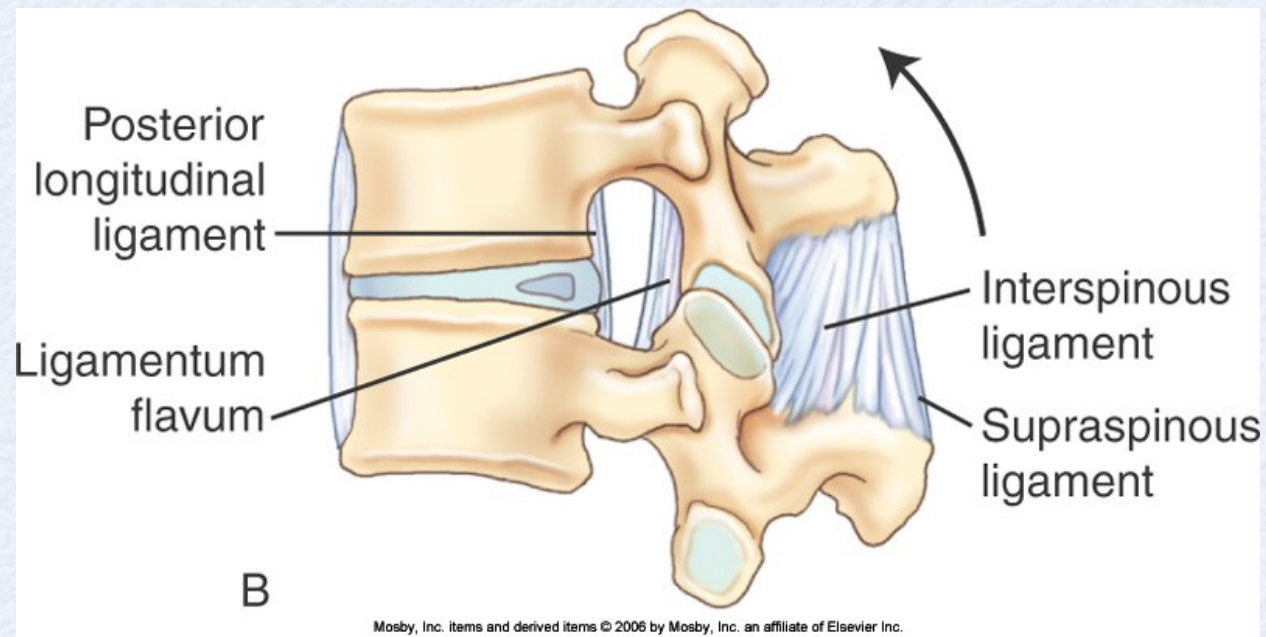
stability/mobility of a joint

- Bony shape
- Ligaments
- Muscles

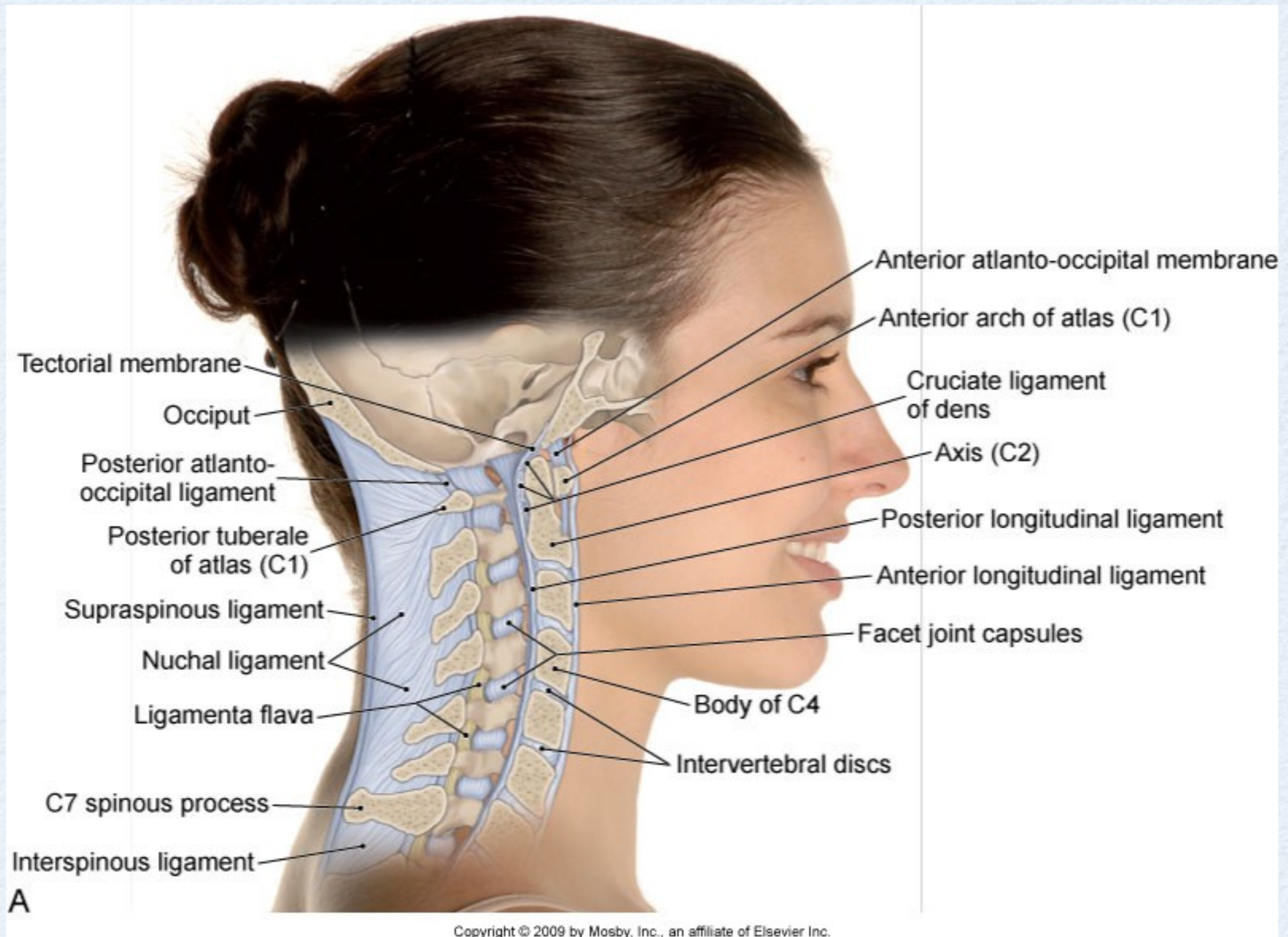
ligaments

- Ligaments are essentially passive structures that connect from bone and bone and stabilize the joint.

ligament function



ligaments of the neck - lateral view



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MUSCLES

- When a muscle contracts...
- it create a pulling force

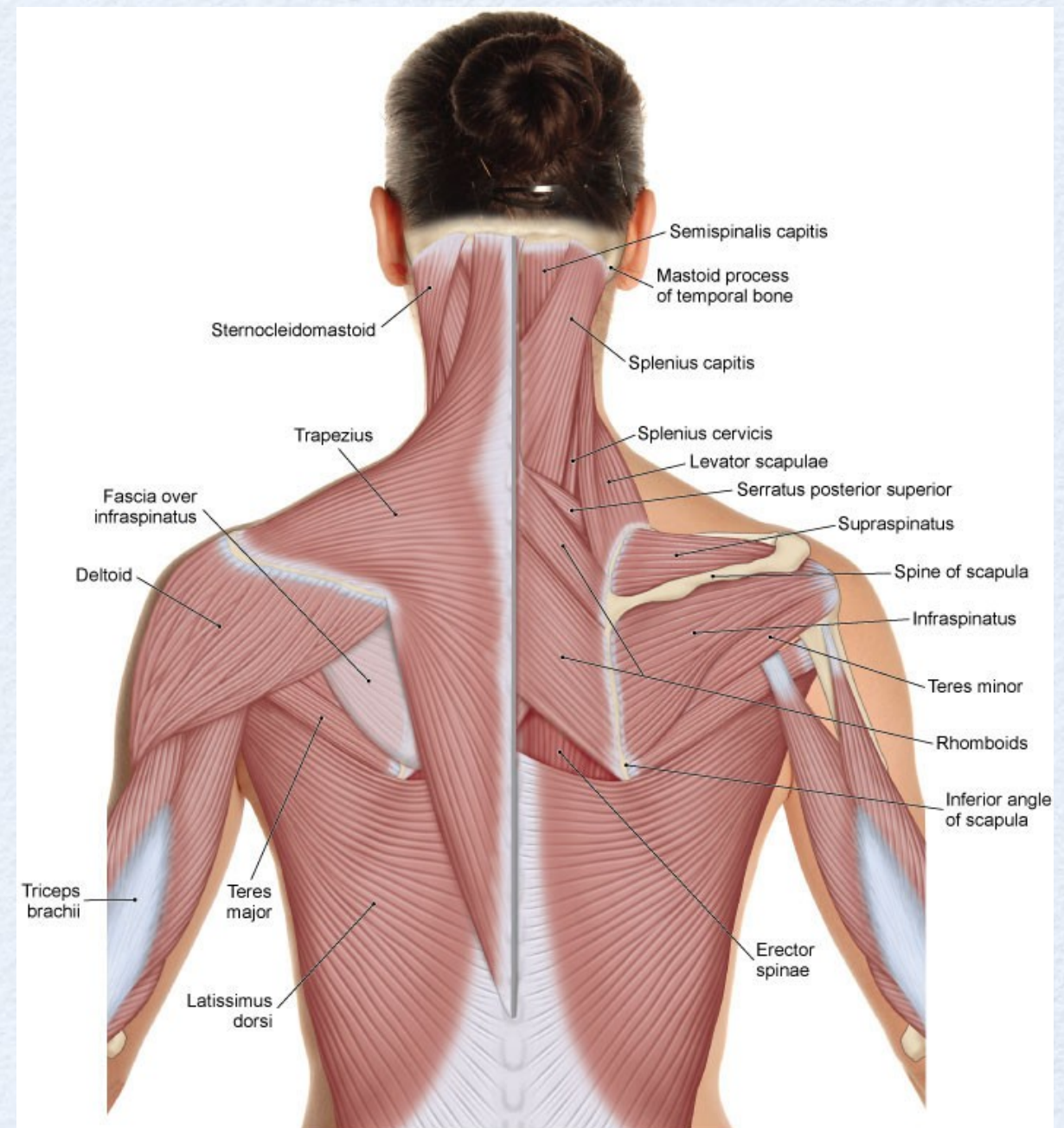
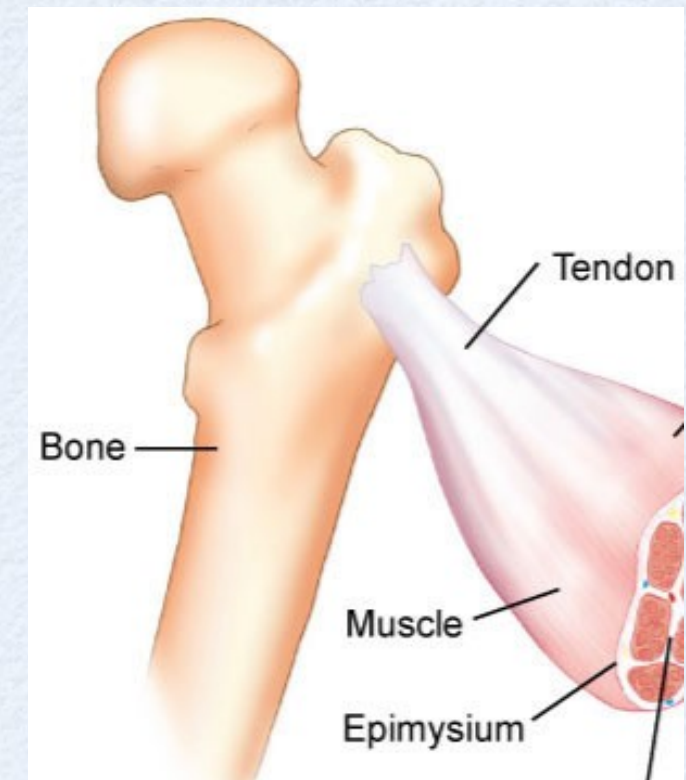
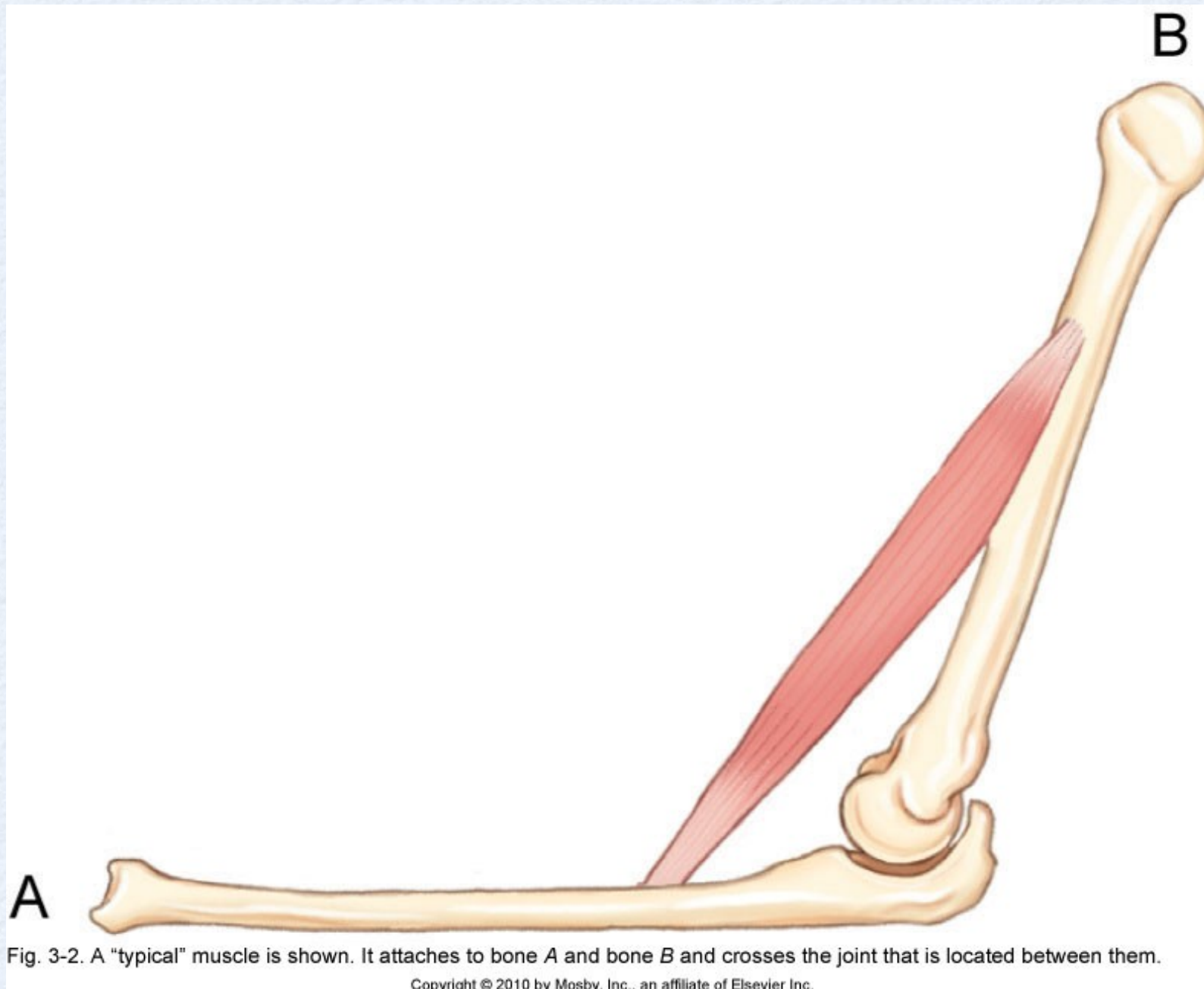


Fig. 4-1. The left side is superficial. The right side is deep (the deltoid, trapezius, sternocleidomastoid, and infraspinatus fascia have been removed).

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typical muscle



Shortening contraction

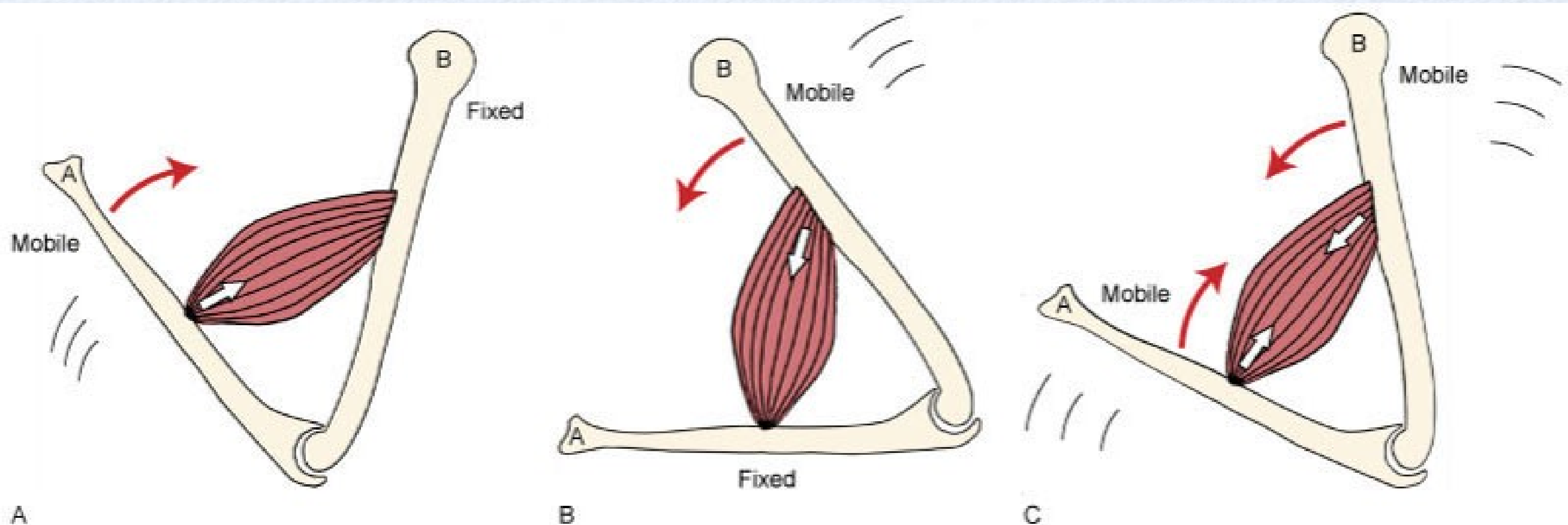
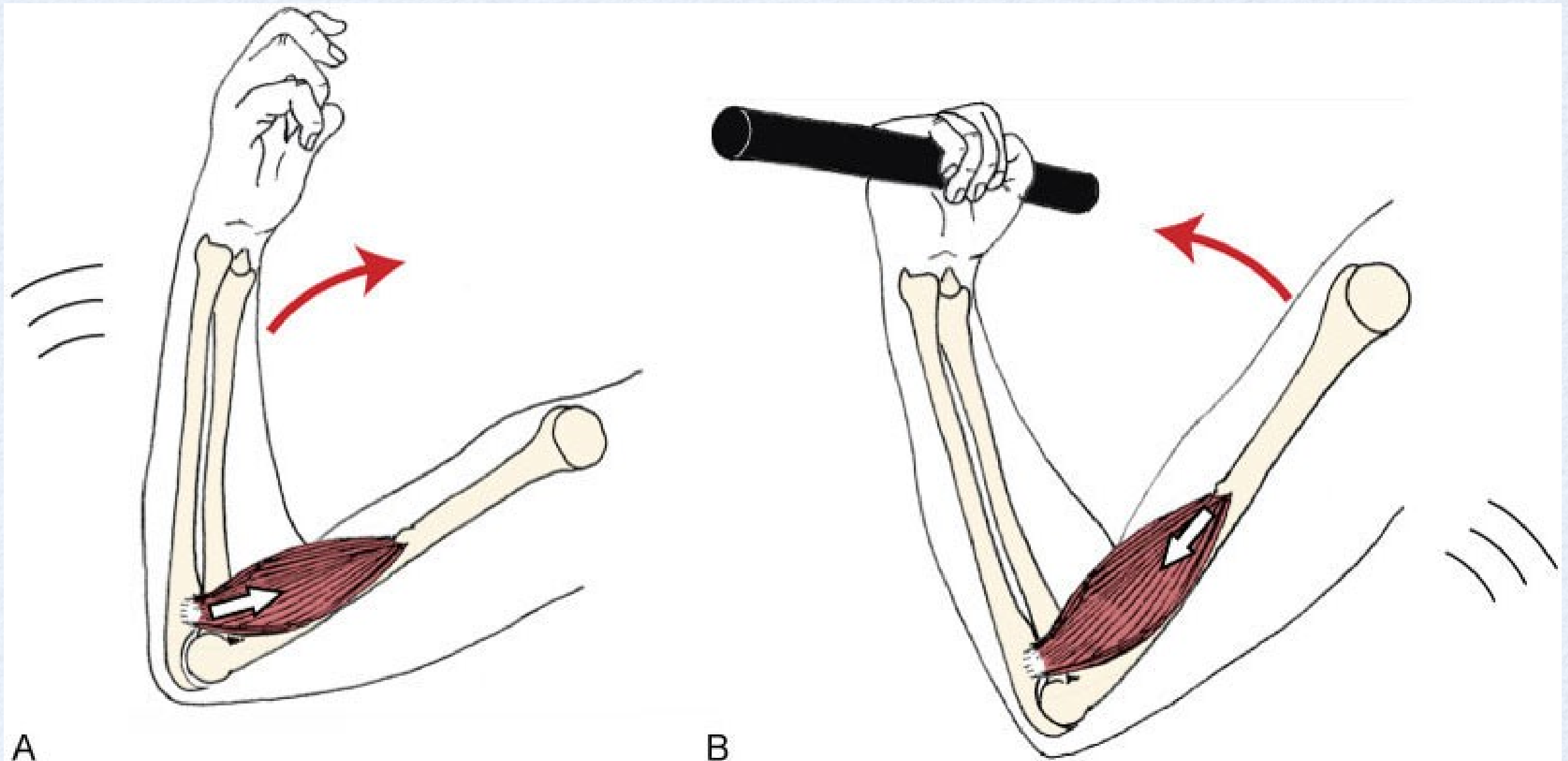


Fig. 3-3. A muscle can concentrically contract and cause motion in one of three ways. By naming the muscle's attachments *A* and *B*, we can describe these three scenarios. In **A**, bone *A* moves toward bone *B*. In **B**, bone *B* moves toward bone *A*. And in **C**, both bones *A* and *B* move toward each other.

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reverse action



A Fig. 3-4. **A**, The standard mover action of the brachialis muscle in which the distal forearm moves toward the proximal arm. **B**, When the hand is fixed, the reverse mover action occurs; the proximal arm moves toward the distal forearm.

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lengthening and isometric contractions

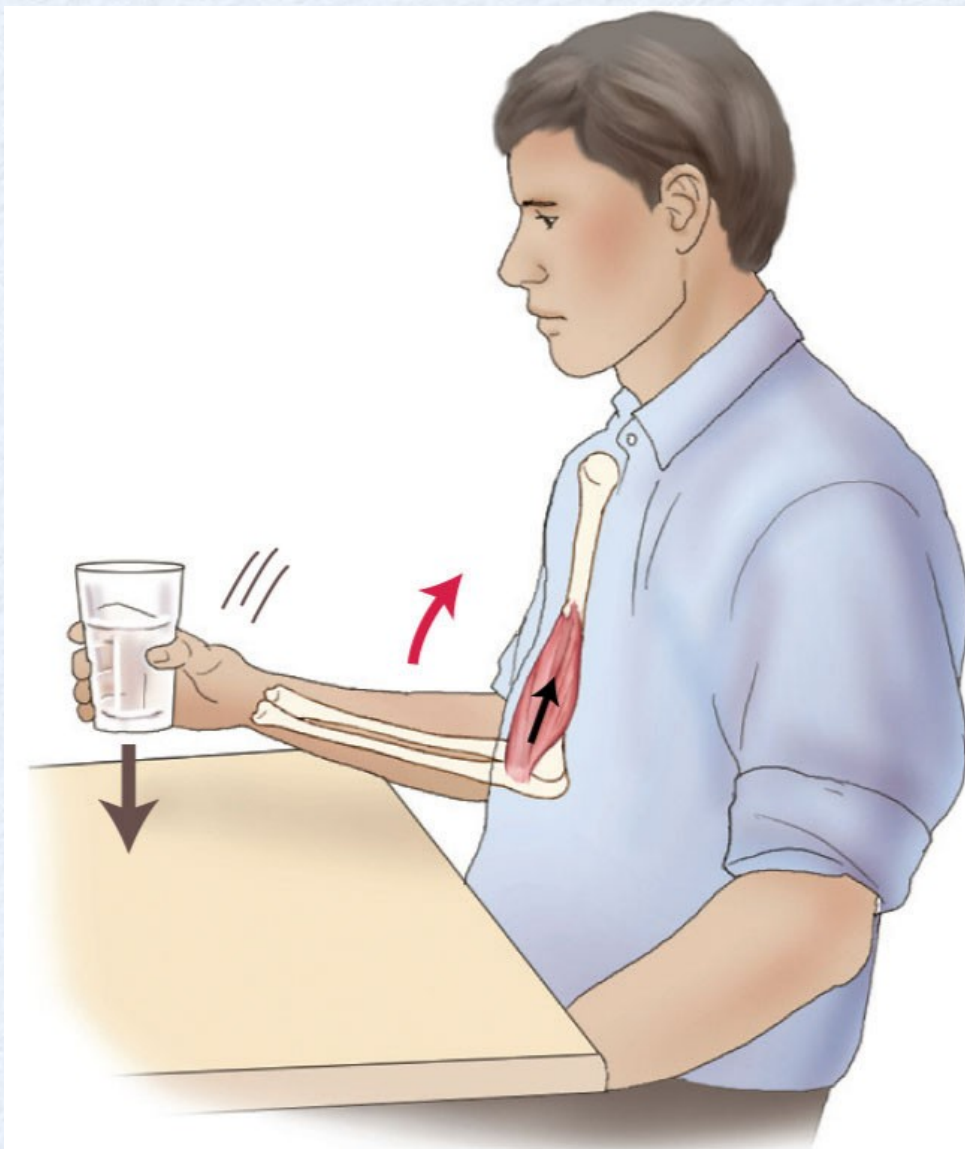


Fig. 3-6. While the force of gravity causes extension of the forearm at the elbow joint to lower the person's forearm and hand toward the table, the person's musculature (brachialis muscle) contracts with an upward pull toward flexion of the forearm at the elbow joint to slow the descent of the glass of water. In this scenario, the person's muscle lengthens as it contracts. Even though it does not succeed in shortening, its lengthening contraction is critically important to slow and restrain the force of gravity so that gravity does not cause the glass to come crashing down and break. In this scenario, this muscle is eccentrically contracting as an antagonist to the joint action that is occurring.

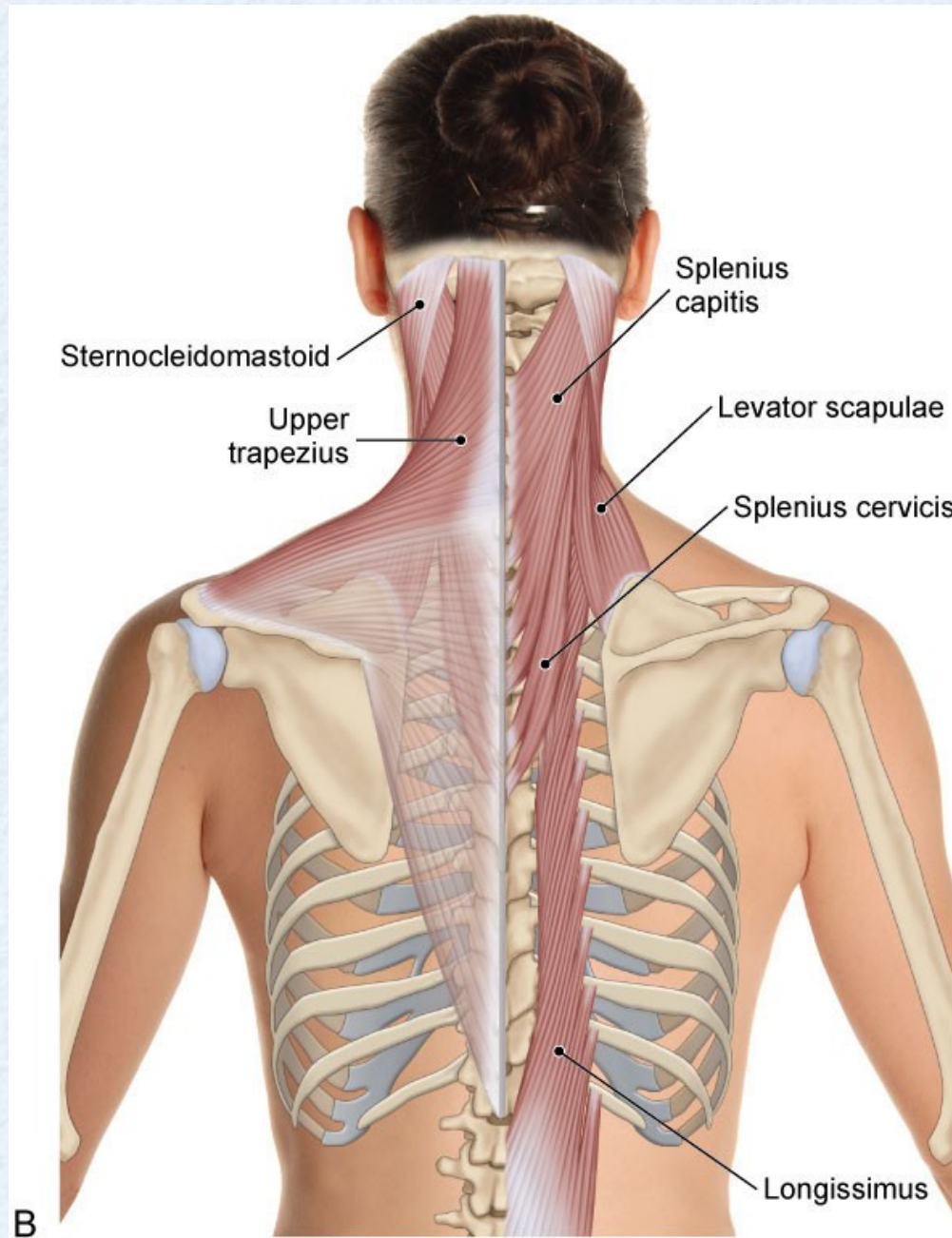
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functional groups of neck muscles

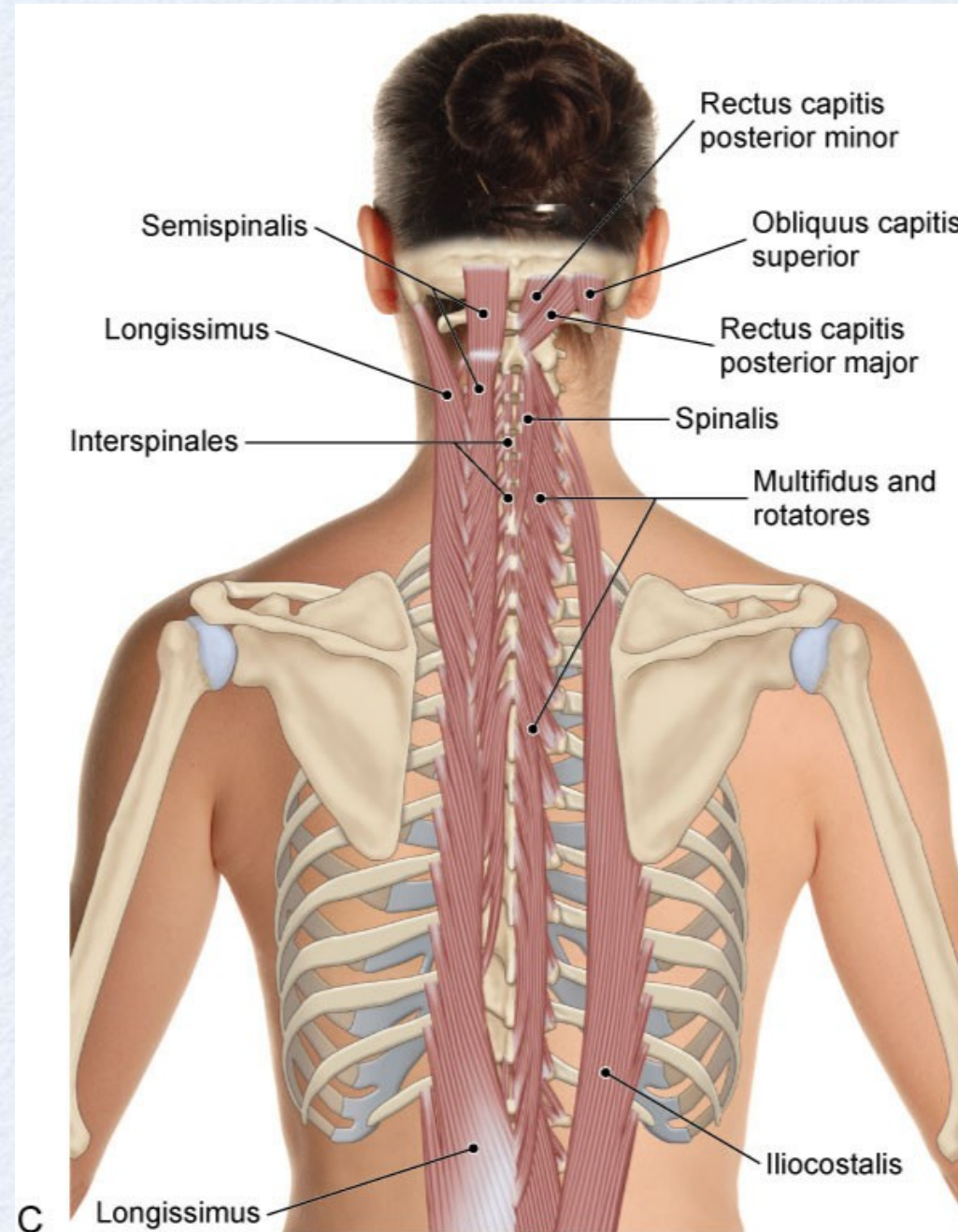
- Extensors
- Flexors
- Right lateral flexors (side-bending to right)
- Left lateral flexors (side-bending to left)
- Right rotators
- Left rotators

extensors



B
 Fig. 19-20. Flexors and extensors of the cervical spinal joints (neck and head). **B**, Posterior view of neck and head extensors (superficial). The middle and lower trapezius have been ghosted in.

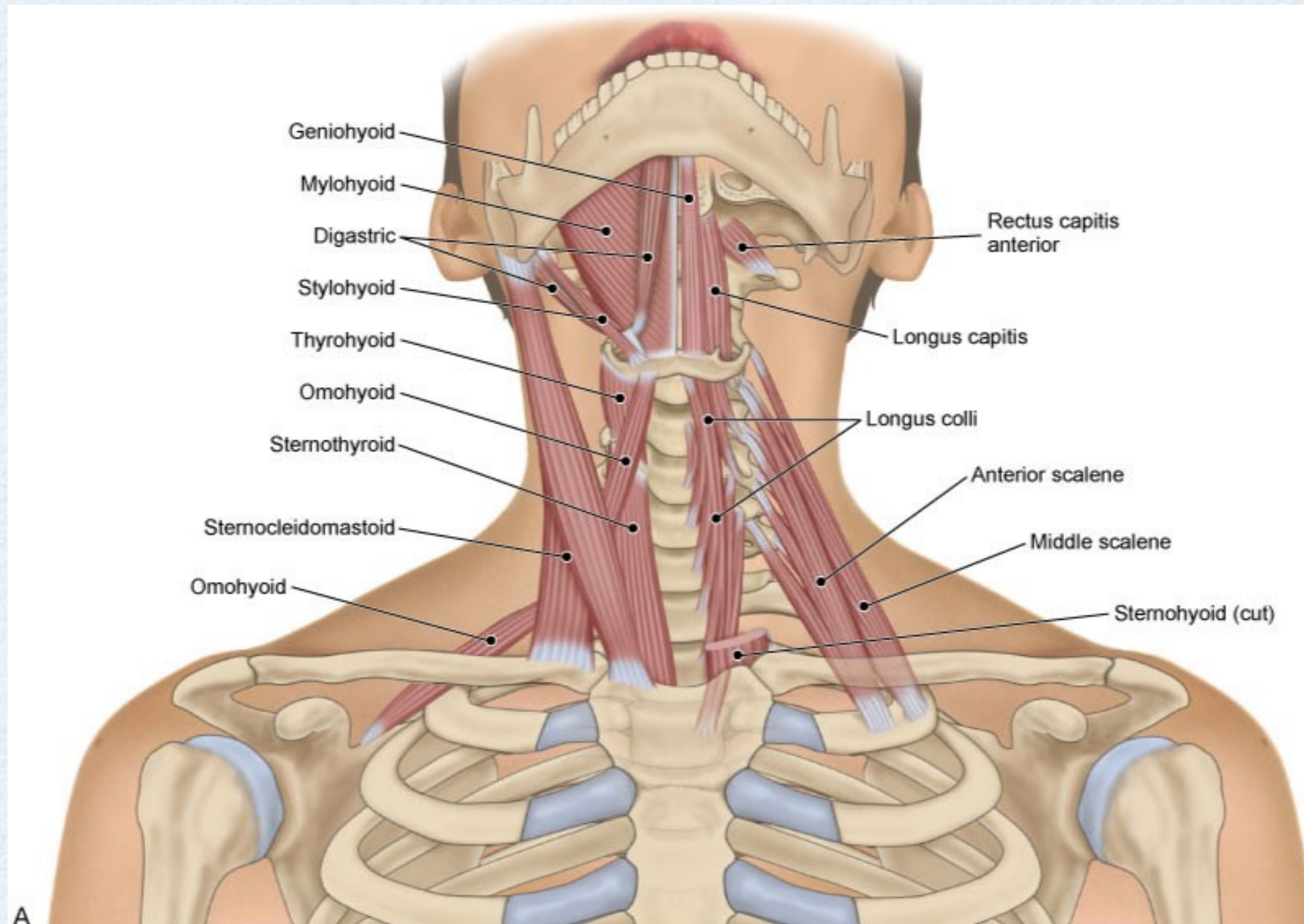
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C
 Fig. 19-20. Flexors and extensors of the cervical spinal joints (neck and head). **C**, Posterior view of neck and head extensors (deep).

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flexors



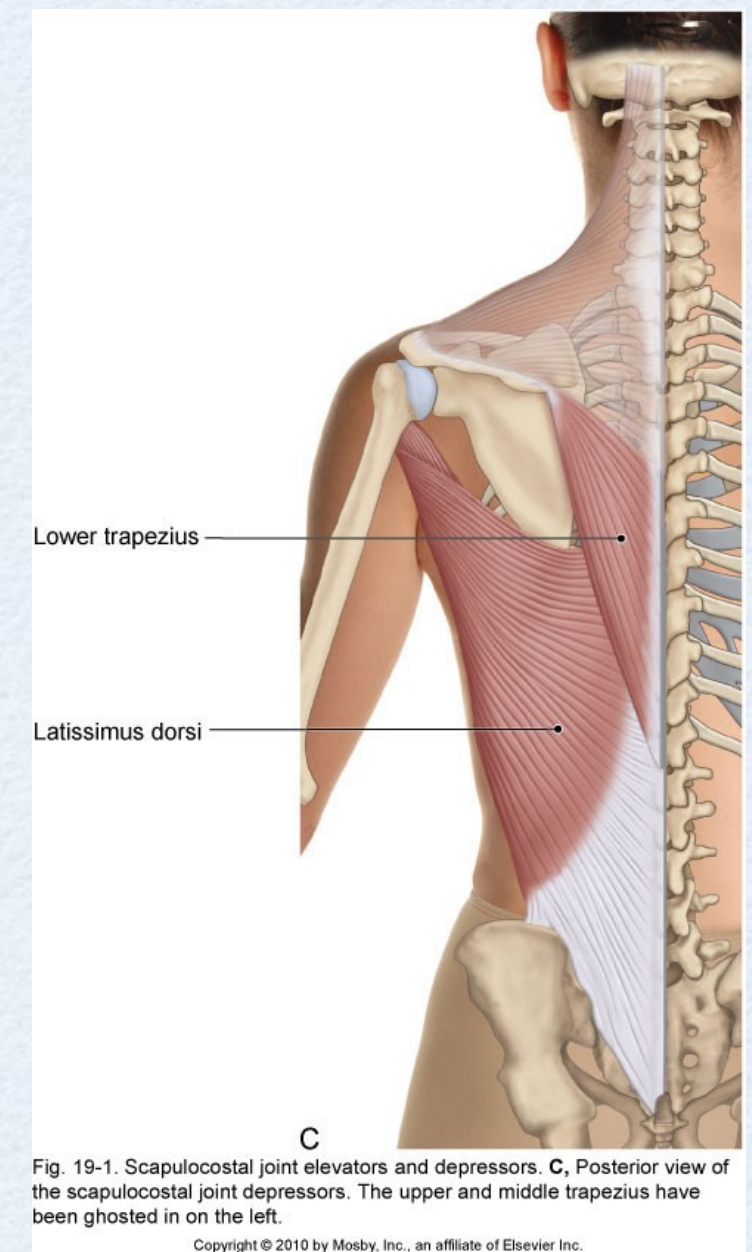
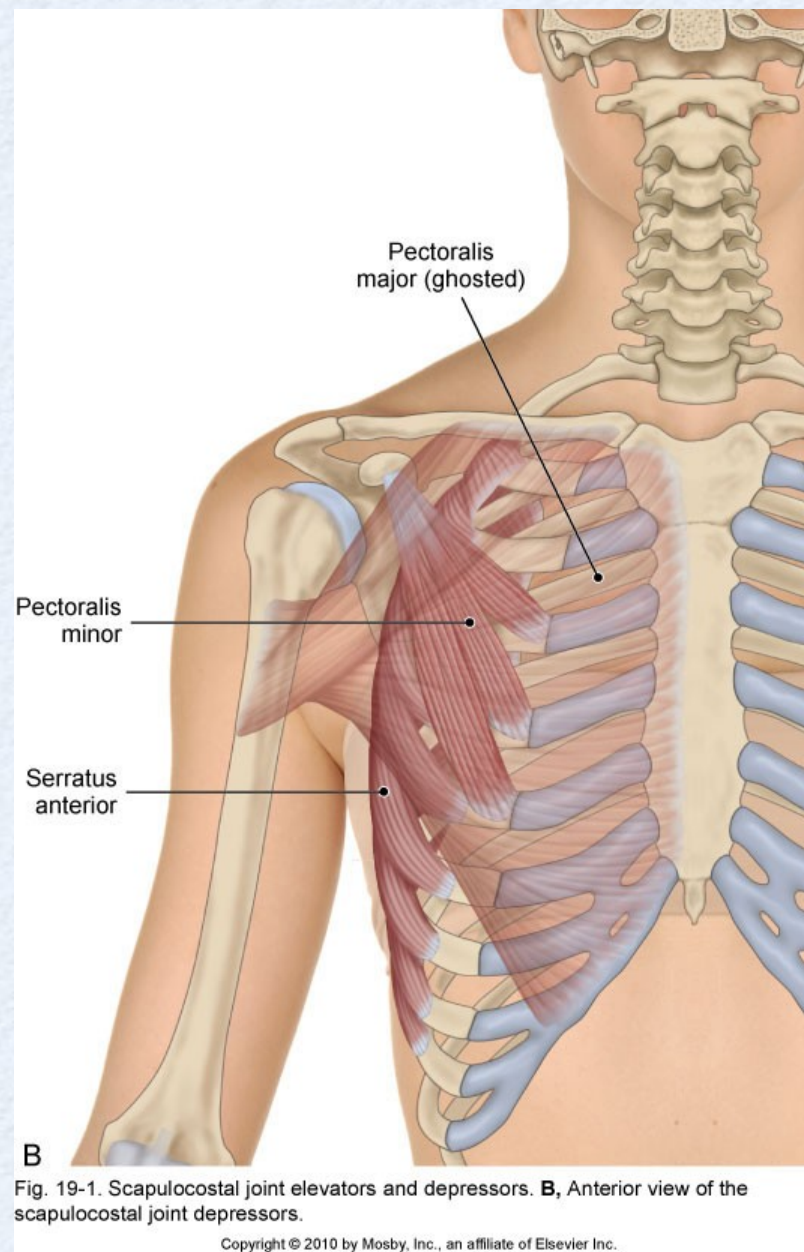
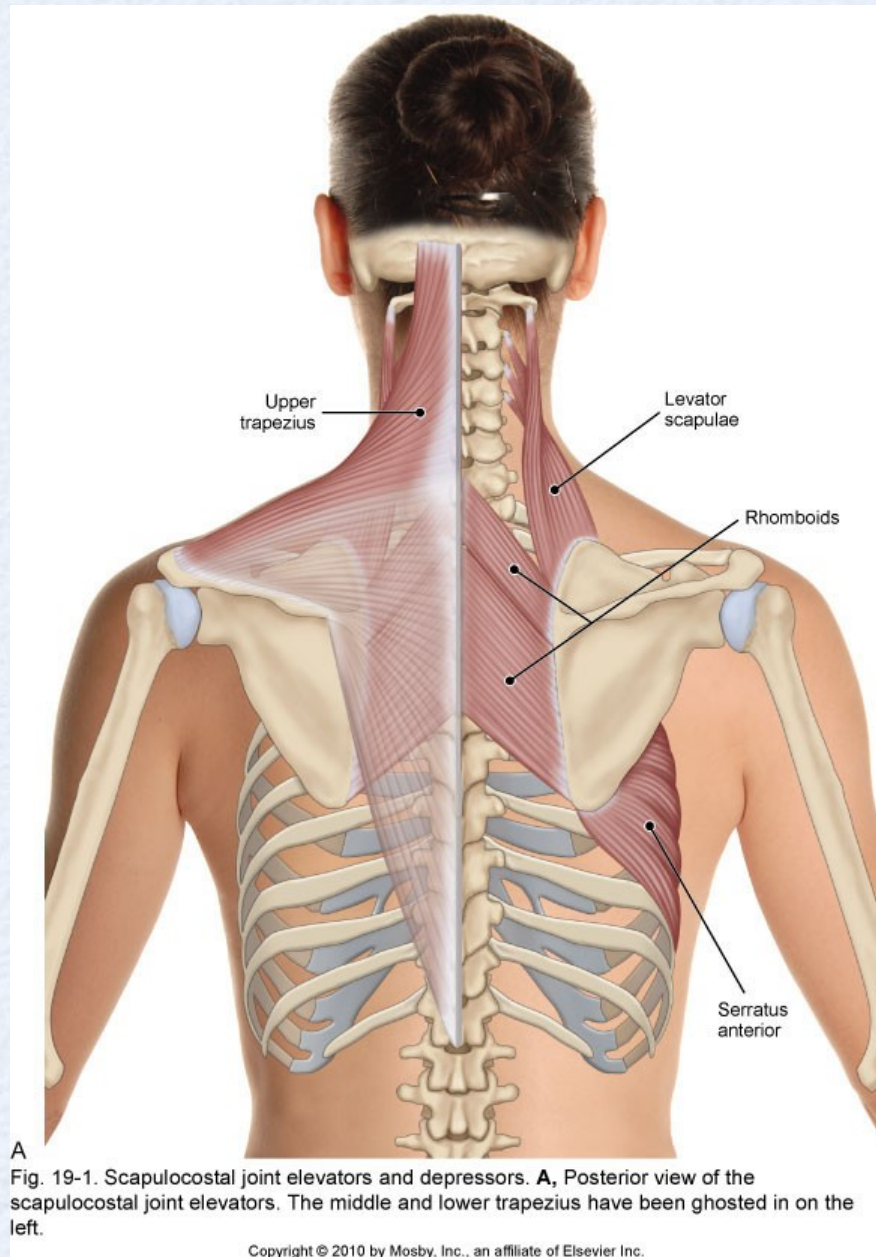
A Fig. 19-20. Flexors and extensors of the cervical spinal joints (neck and head). **A**, Anterior view of neck and head flexors.

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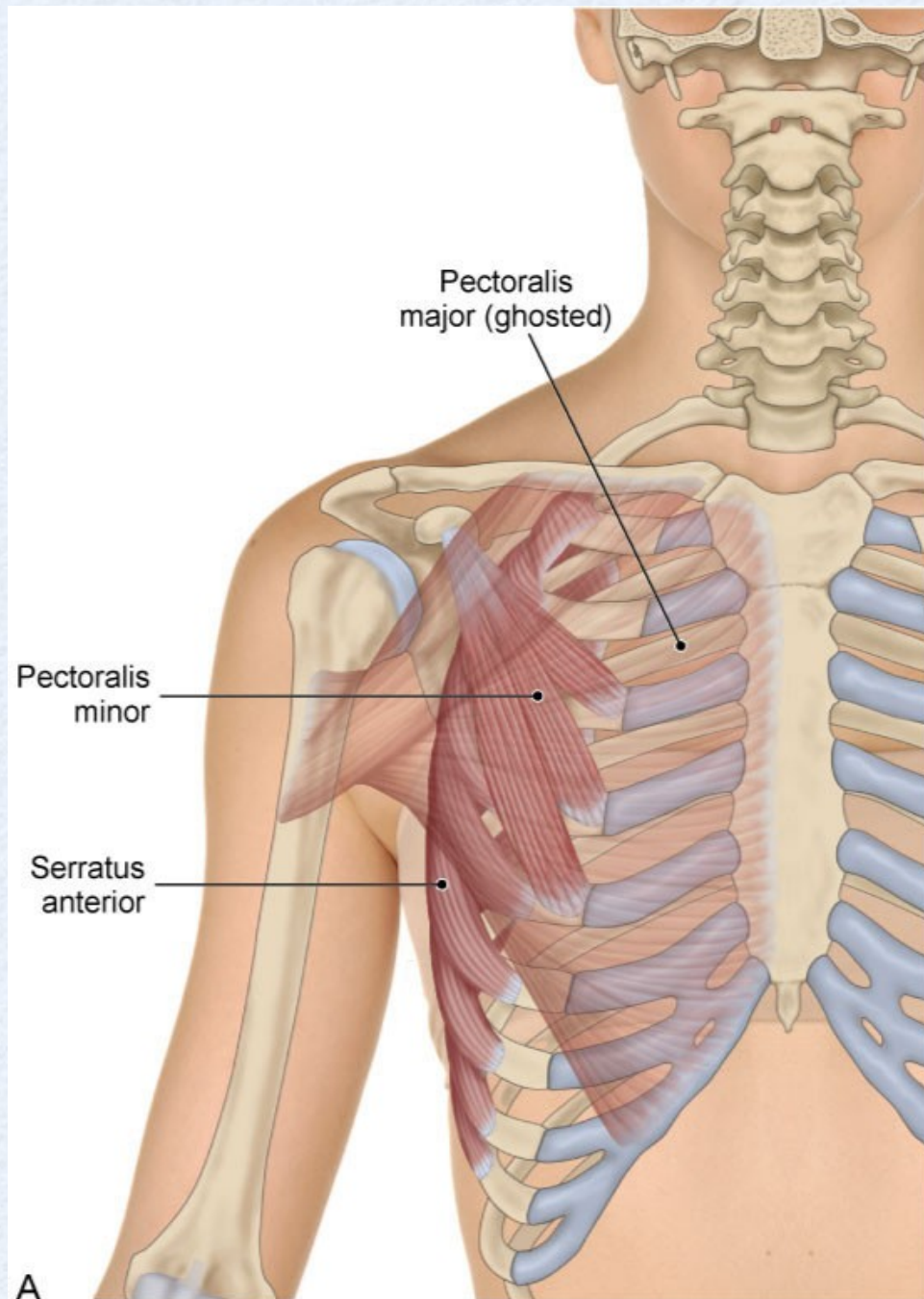
functional groups of shoulder girdle muscles

- Elevators
- Depressors
- Protractors
- Retractors
- (Upward/Downward rotators)

elevators/Depressors

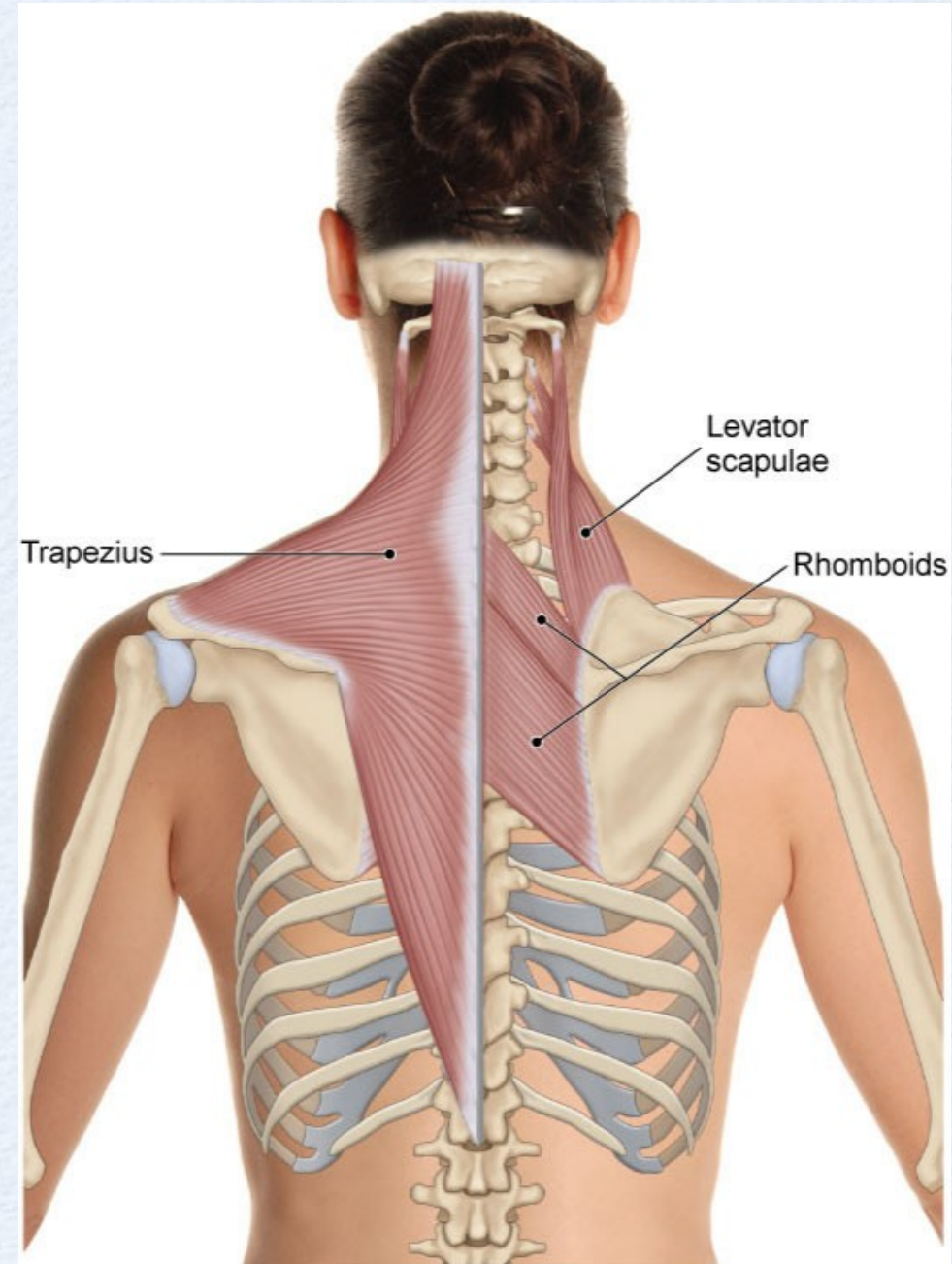


protractors/retractors



A
Fig. 19-2. Scapulocostal joint protractors and retractors. **A**, Anterior view of the scapulocostal joint protractors. The pectoralis major has been ghosted in.

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B
Fig. 19-2. Scapulocostal joint protractors and retractors. **B**, Posterior view of the scapulocostal joint retractors.

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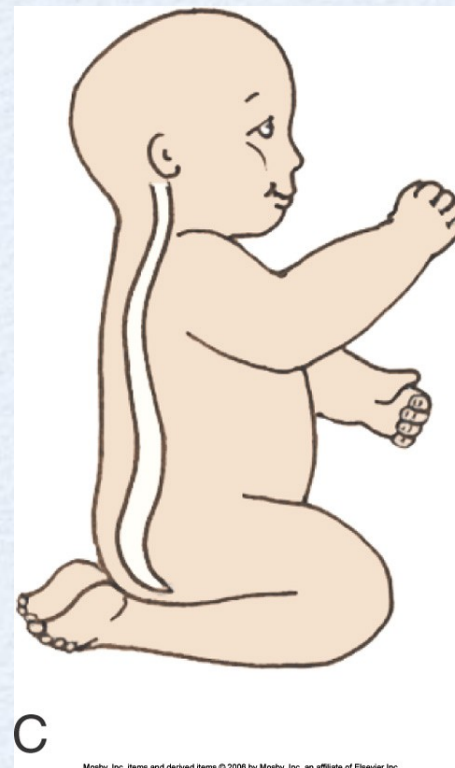
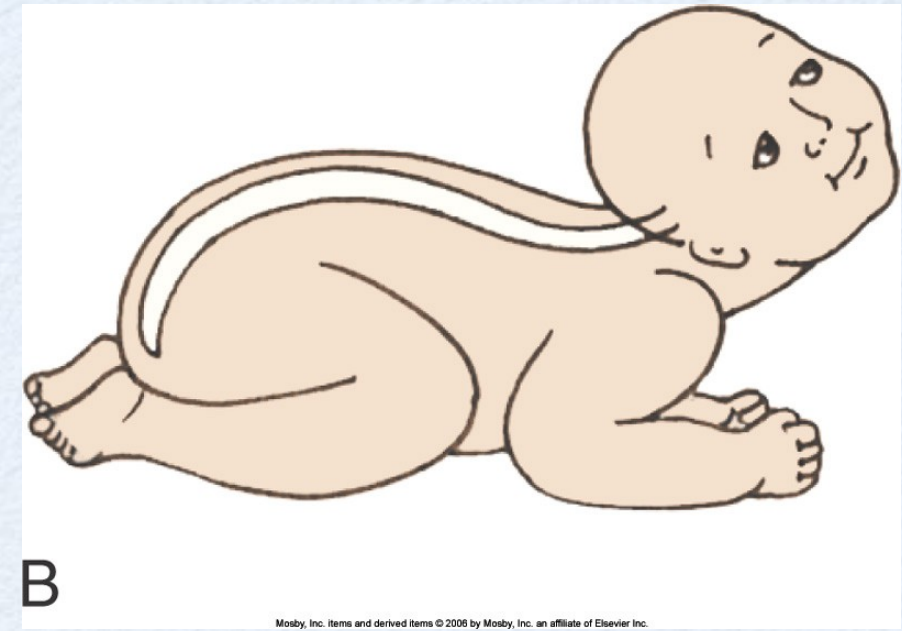
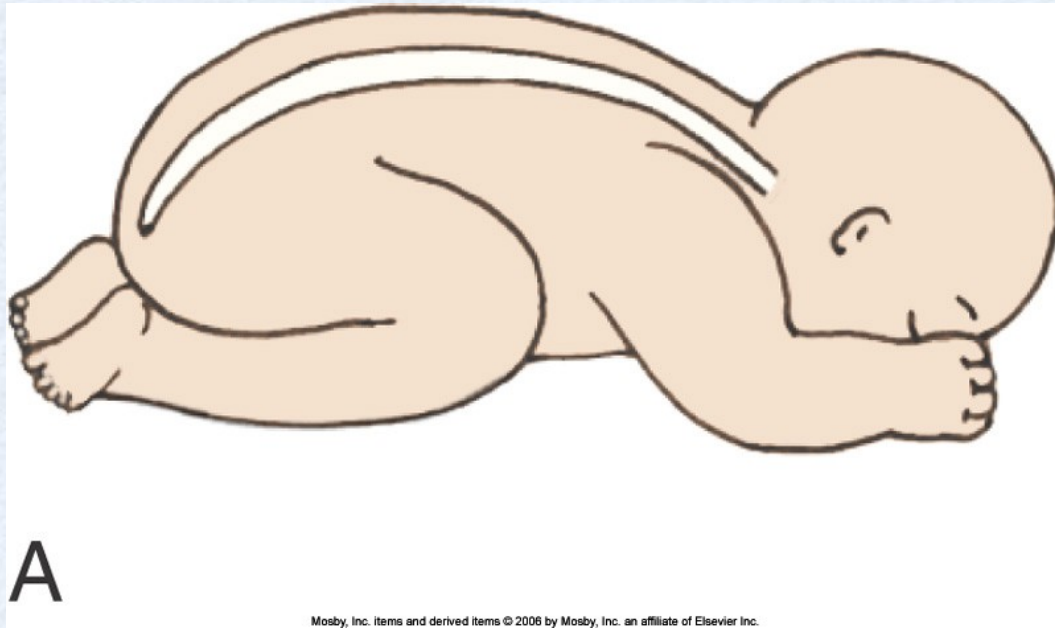
miscellaneous concepts

- Pain-spasm-pain cycle
- Muscle splinting
- Gate theory

posture of a joint...

- Posture means position.
- Posture of a joint or region of the skeleton is determined by the relative forces that act on the bone(s).
- Examples...?

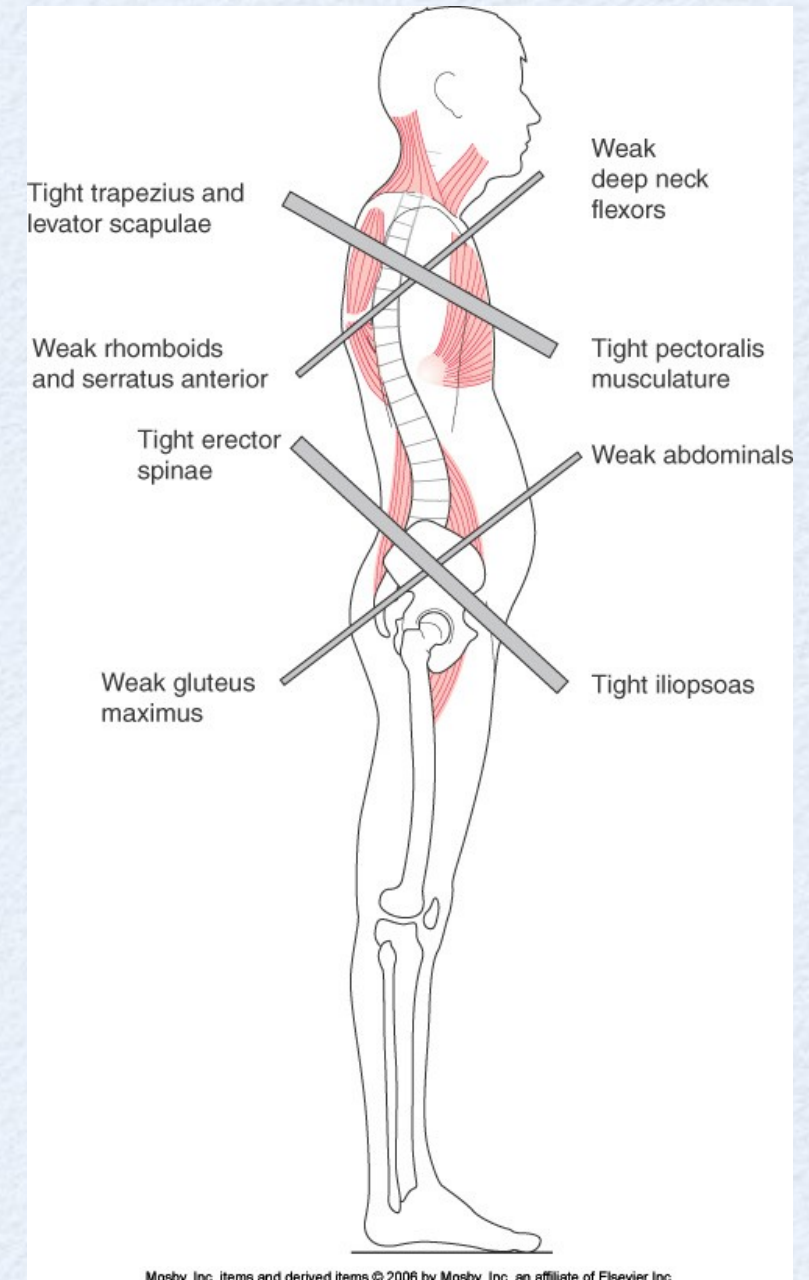
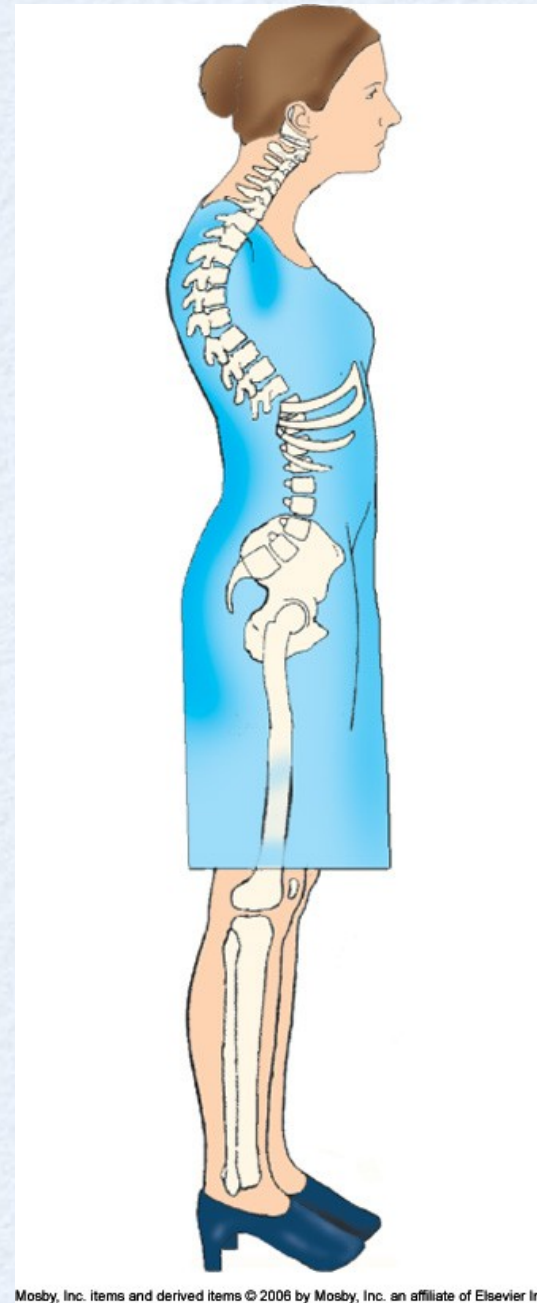
forming neck posture



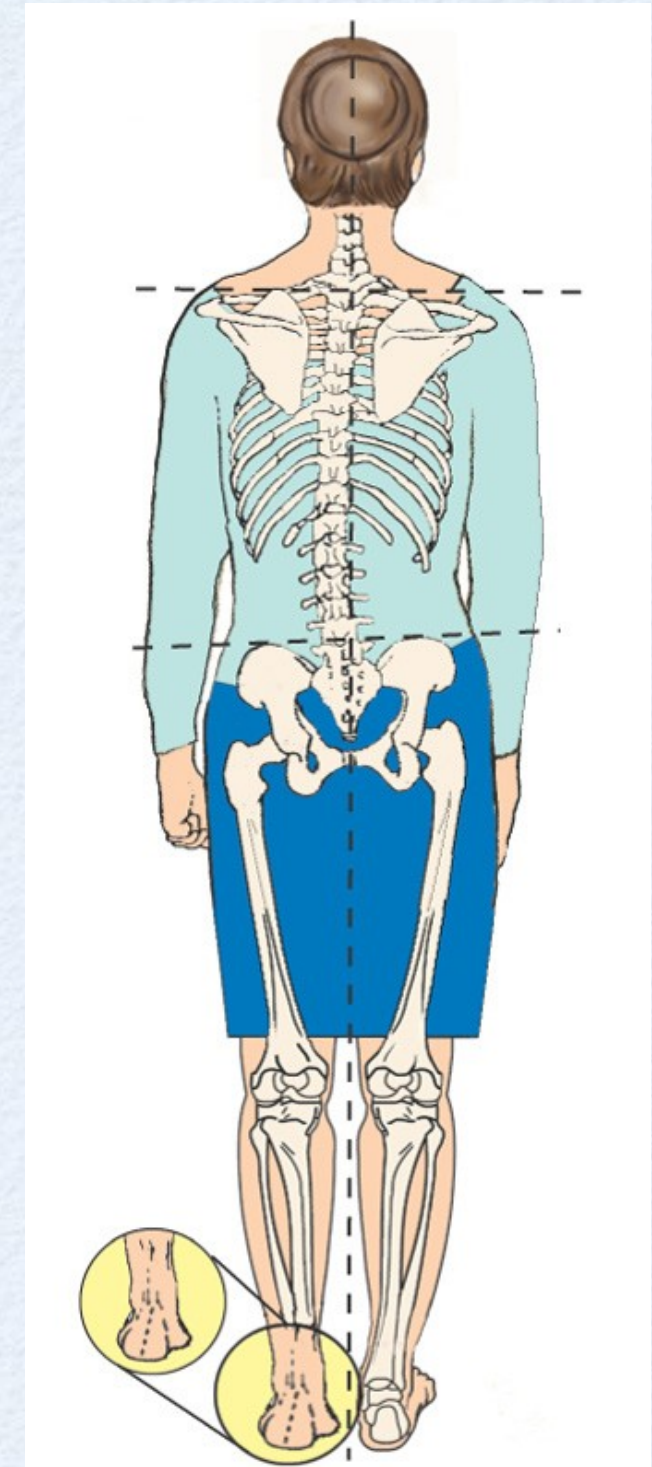
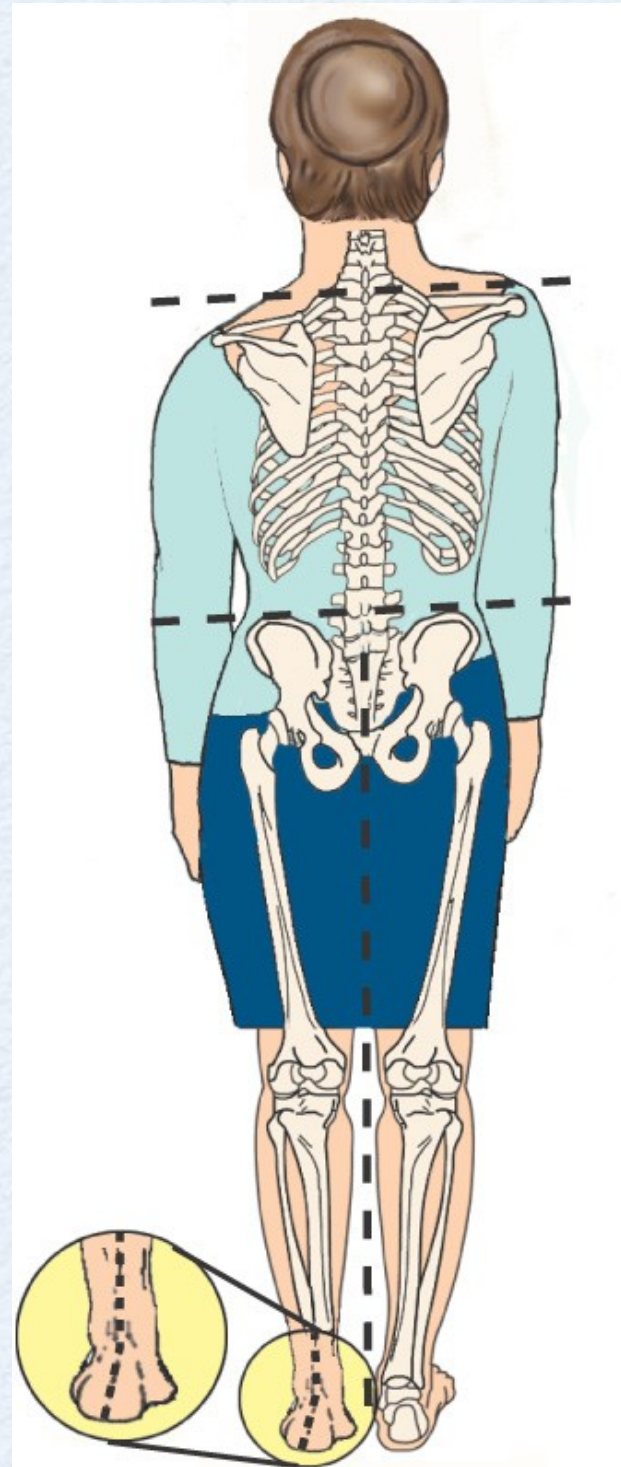
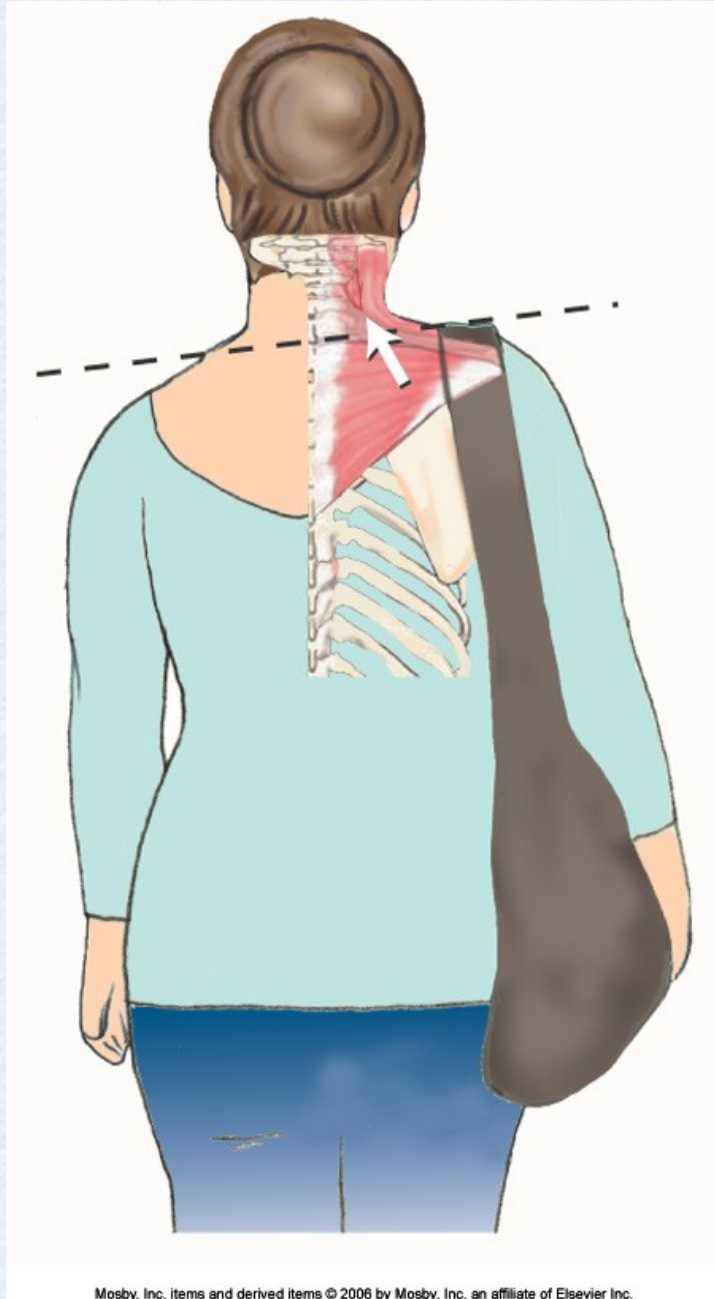
common postural distortion patterns

- Protracted (forward) head
- Military neck
 - (decreased lower cervical curve with increased upper cervical curve)
- Hyperkyphotic (rounded) upper back
- Rounded shoulders

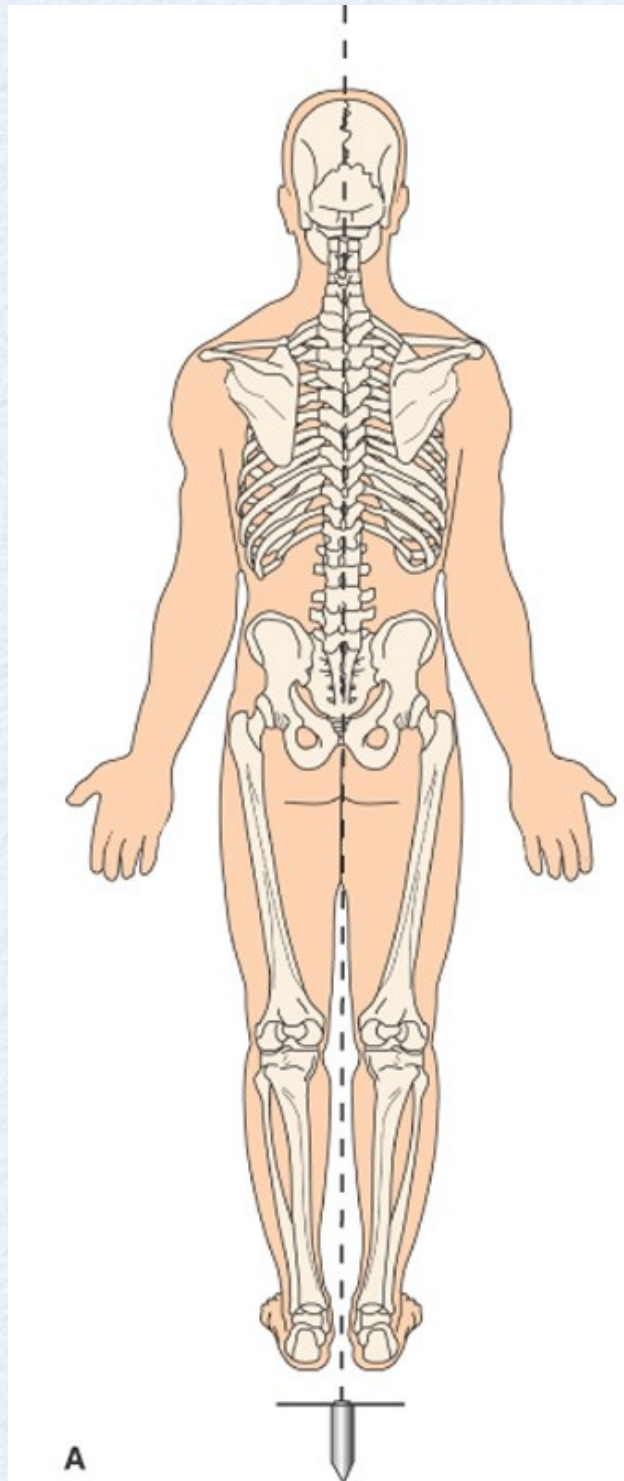
postural distortion patterns - (sagittal plane)



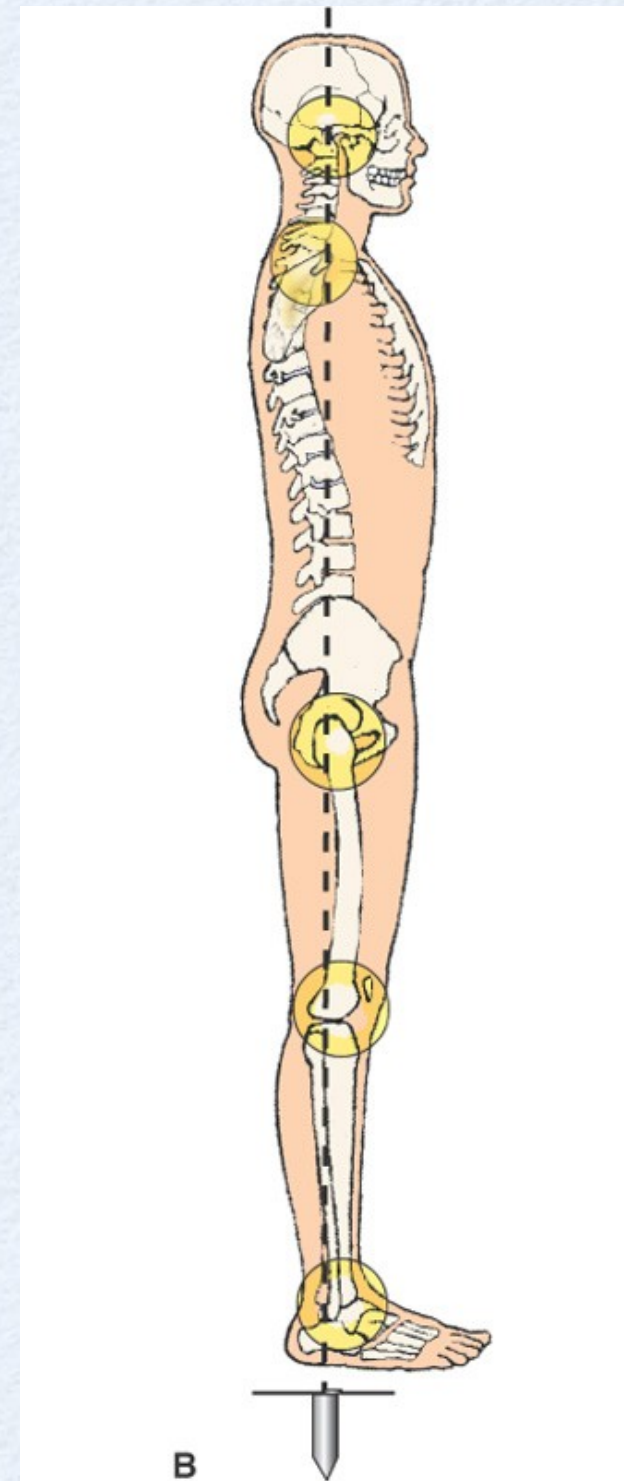
postural distortion patterns - (frontal plane)



visual postural assessment



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other pathologic conditions

- Tight muscles
- Whiplash
- Scoliosis
- Pathologic disc
- Degenerative joint disease (DJD)
- Thoracic outlet syndrome (TOS)

tight muscles

- Globally tight muscle
- Trigger point (muscle knot)
 - can refer pain to a distant site
- Possible results:
 - decreased joint mobility

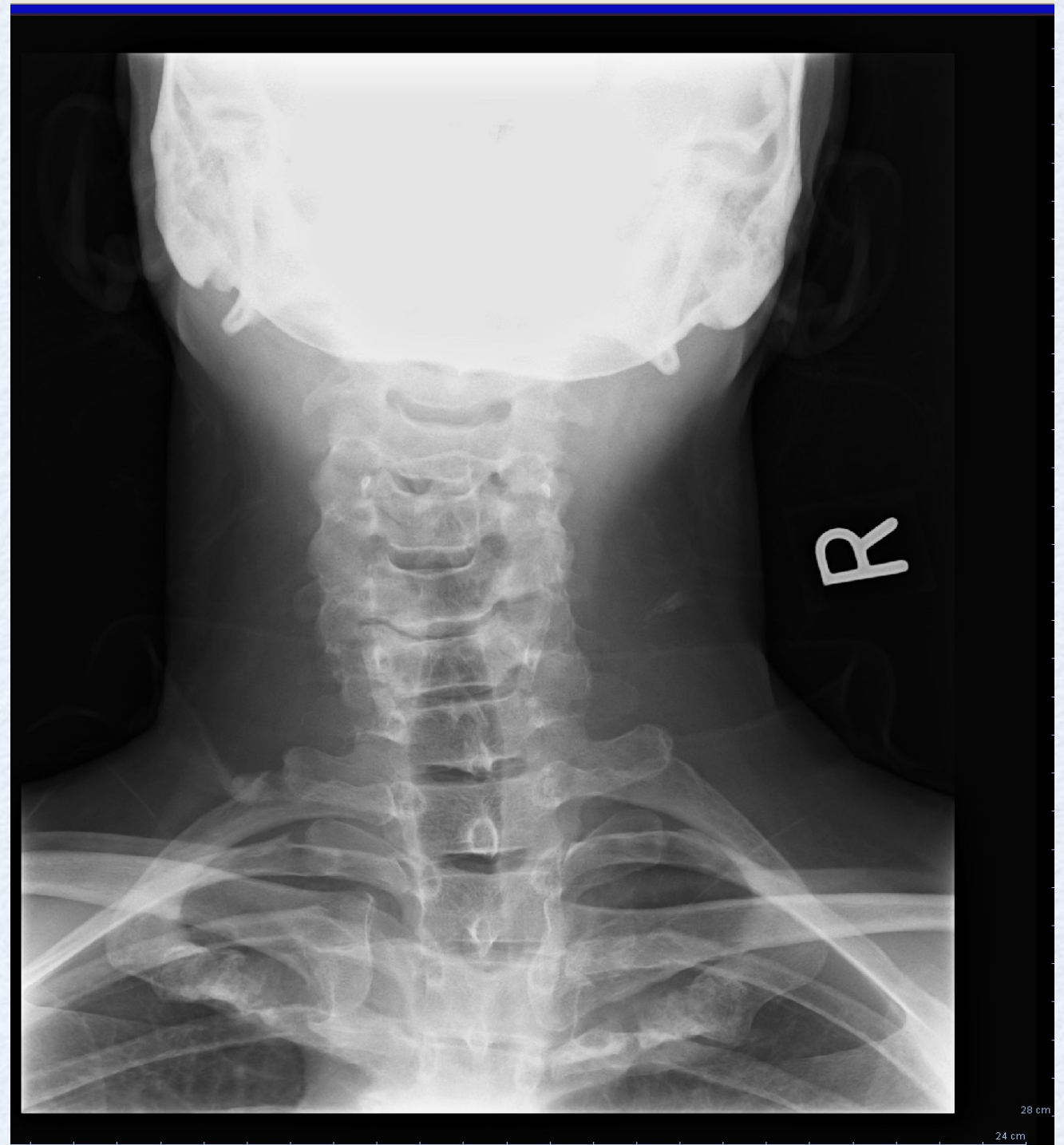
whiplash

- Sprain (of ligament)
- Strain (of muscle)
- Possible results:
 - sprains cause hypermobility/instability
 - muscle compensate and tighten (hypomobility)

scoliosis

- Lateral curvature of spine
 - ...with rotational distortion too
- Possible results:
 - asymmetrical forces on spine and all associated tissues

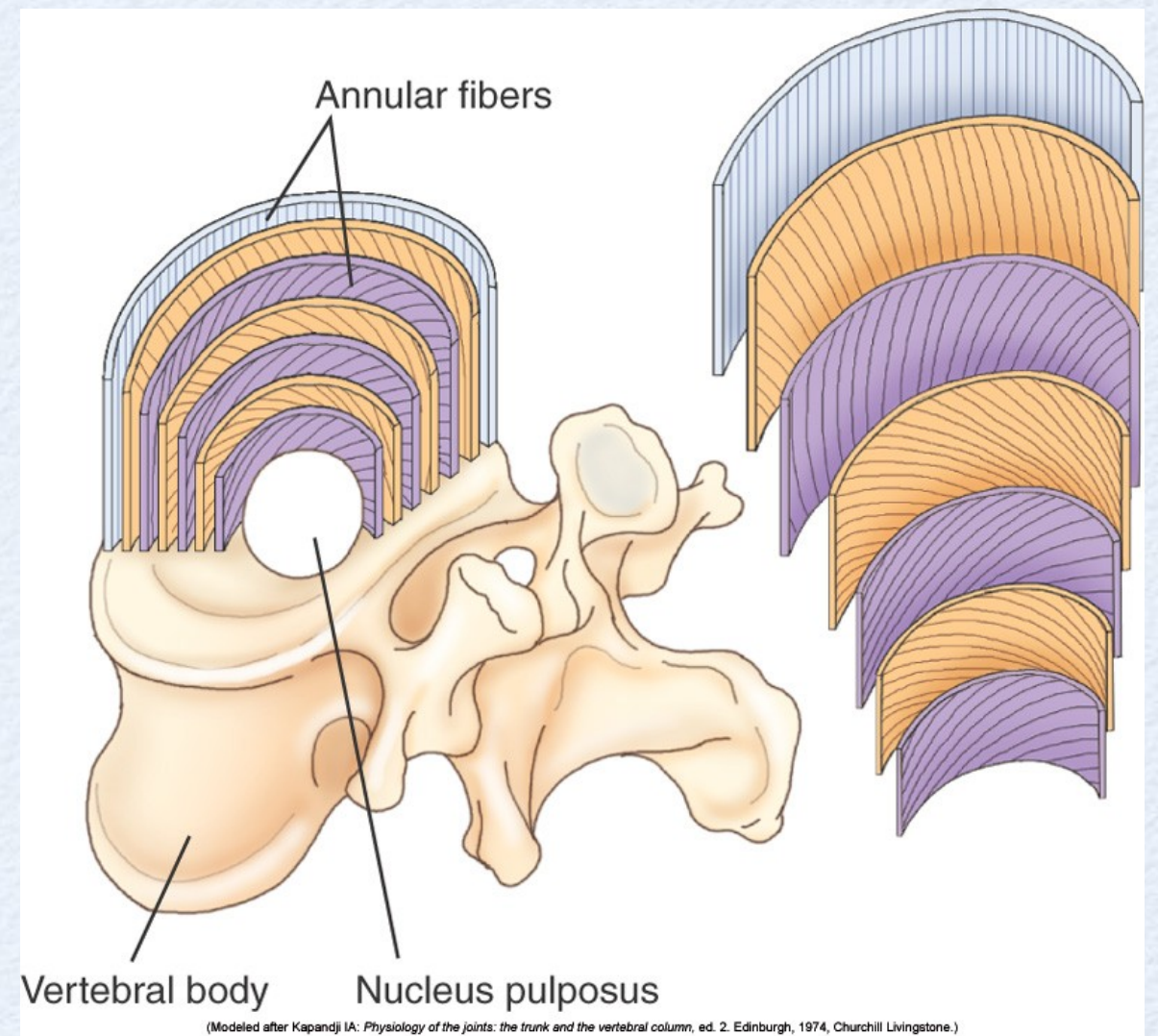
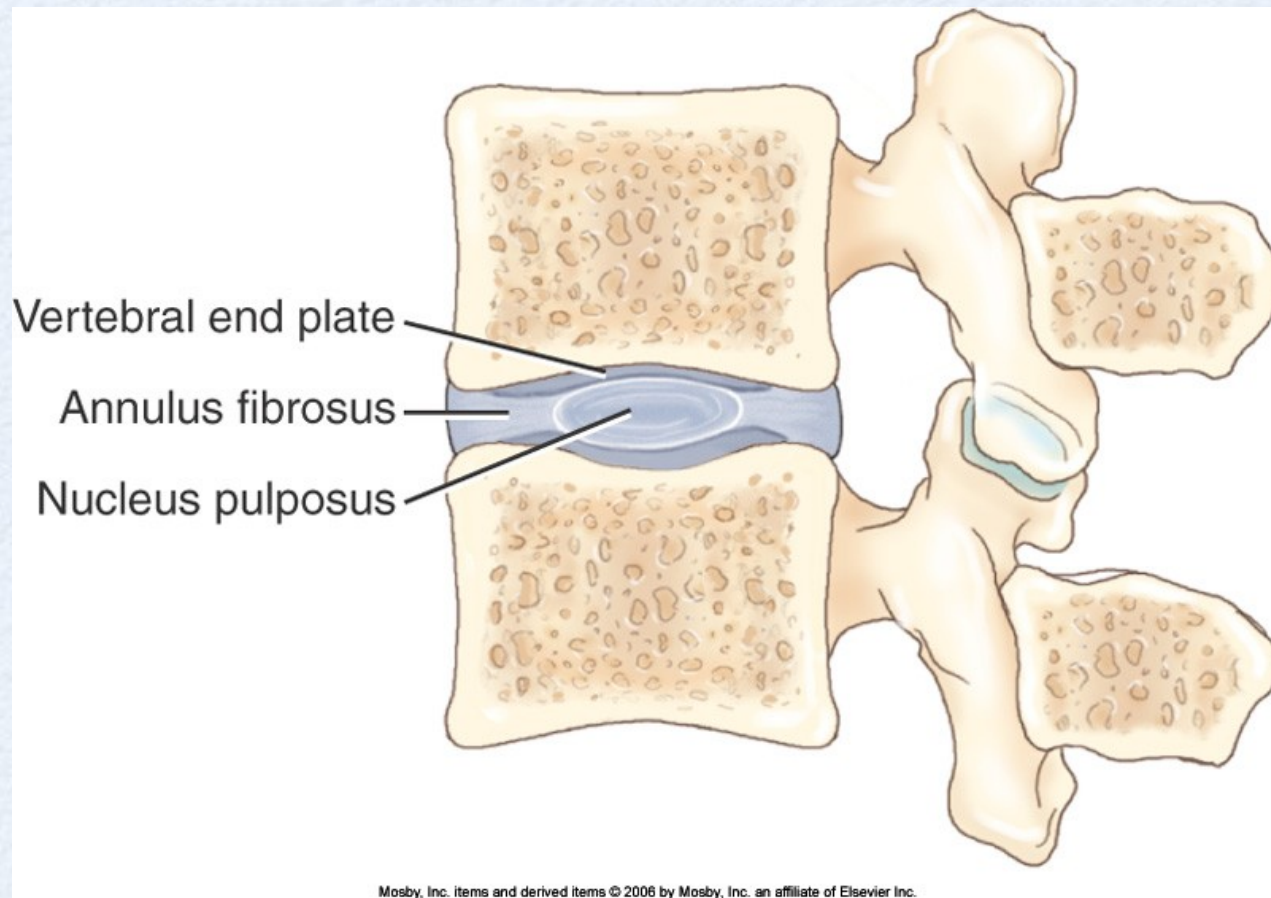
scoliosis X-Rays



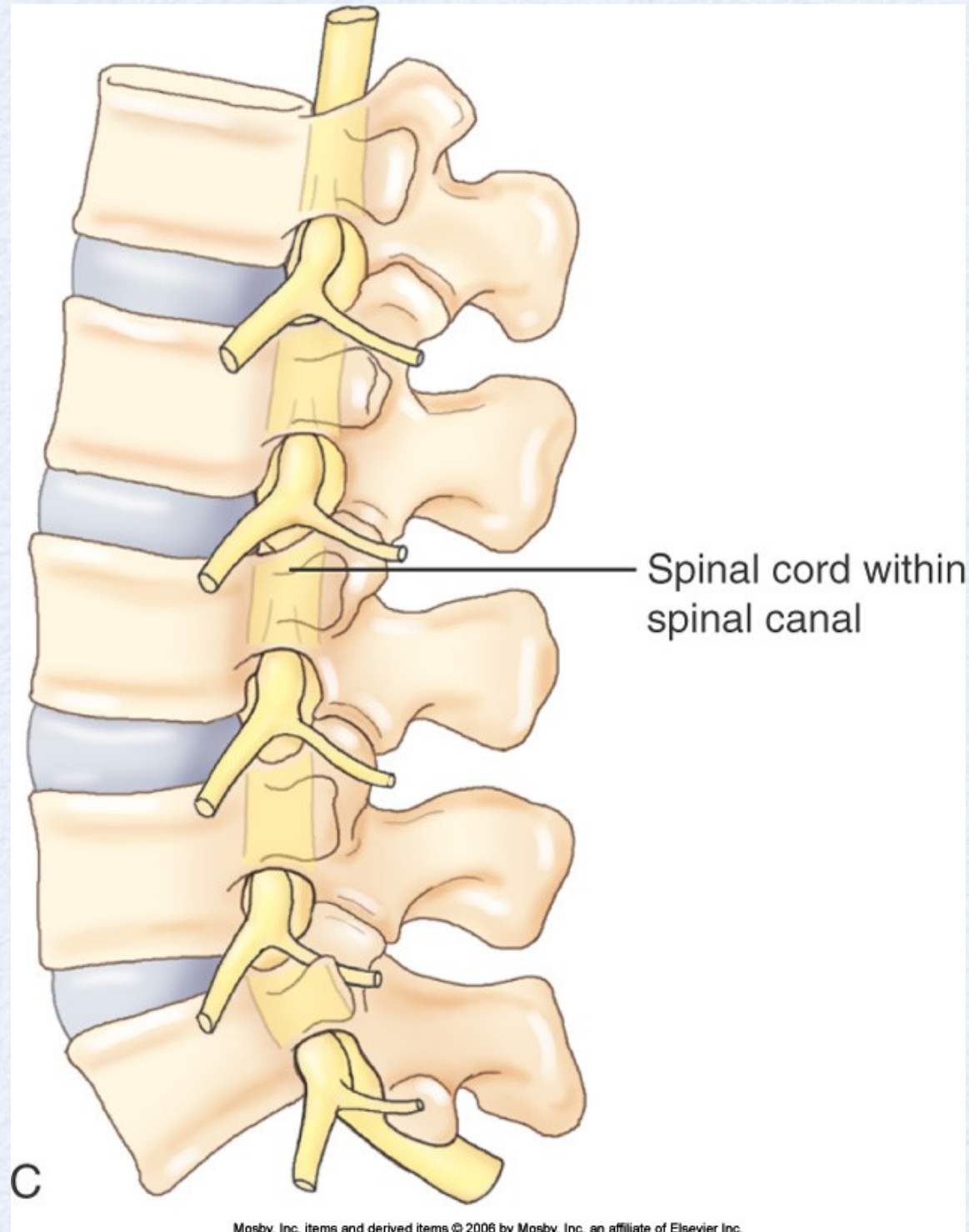
pathologic disc

- Three types:
 - disc thinning
 - disc bulge
 - disc herniation/rupture
- Possible results:
 - nerve compression
- Avoid: Any movement that reproduces referral into the upper extremity!

intervertebral disc



Note: spinal nerve compression

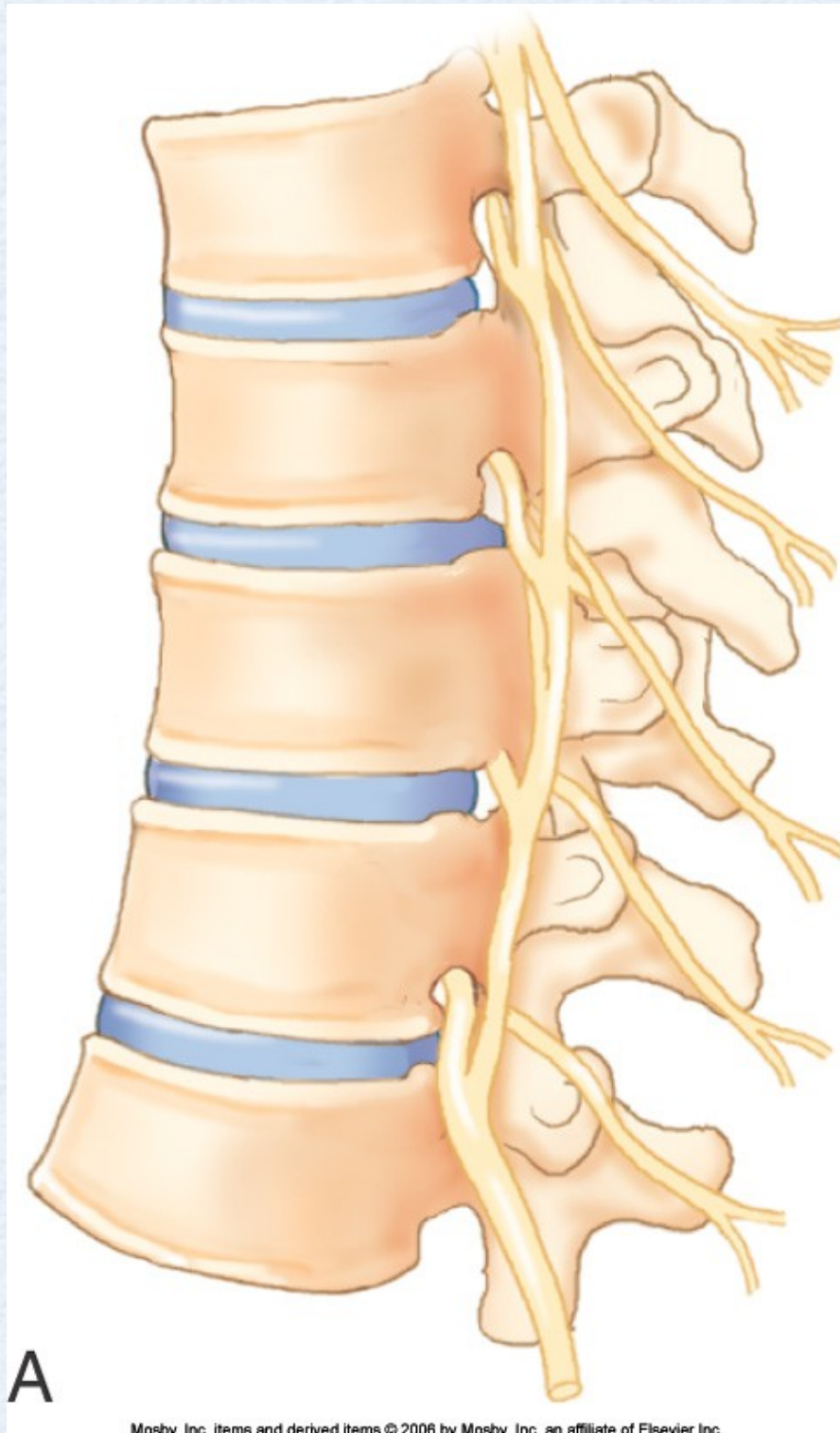


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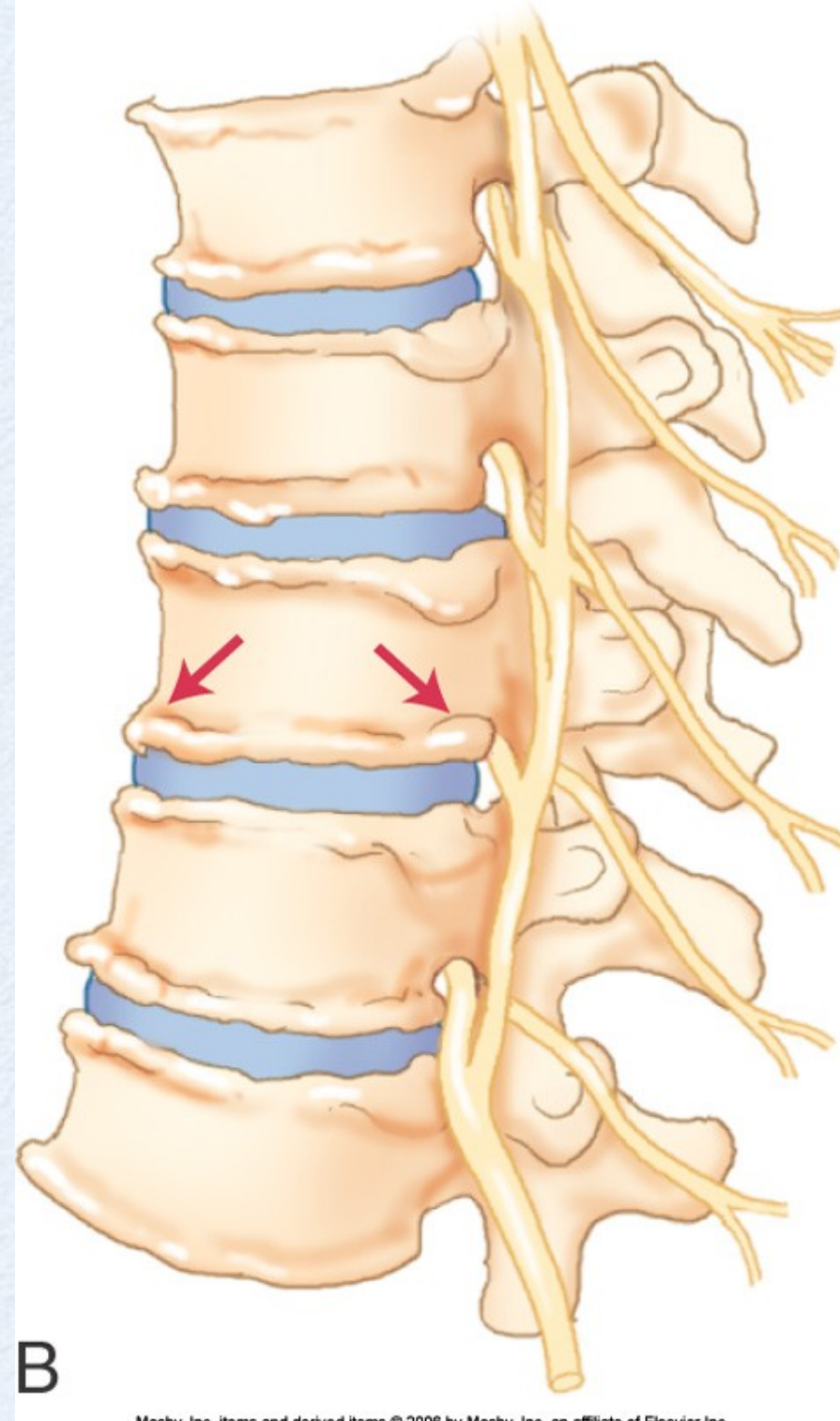
Degenerative joint disease (djd)

- a.k.a. osteoarthritis, OA
- Cartilage breakdown
- Bone spur formation
- Possible results:
 - nerve compression, decreased mobility
- Avoid: Any movement that reproduces referral into the upper extremity!

djd figures

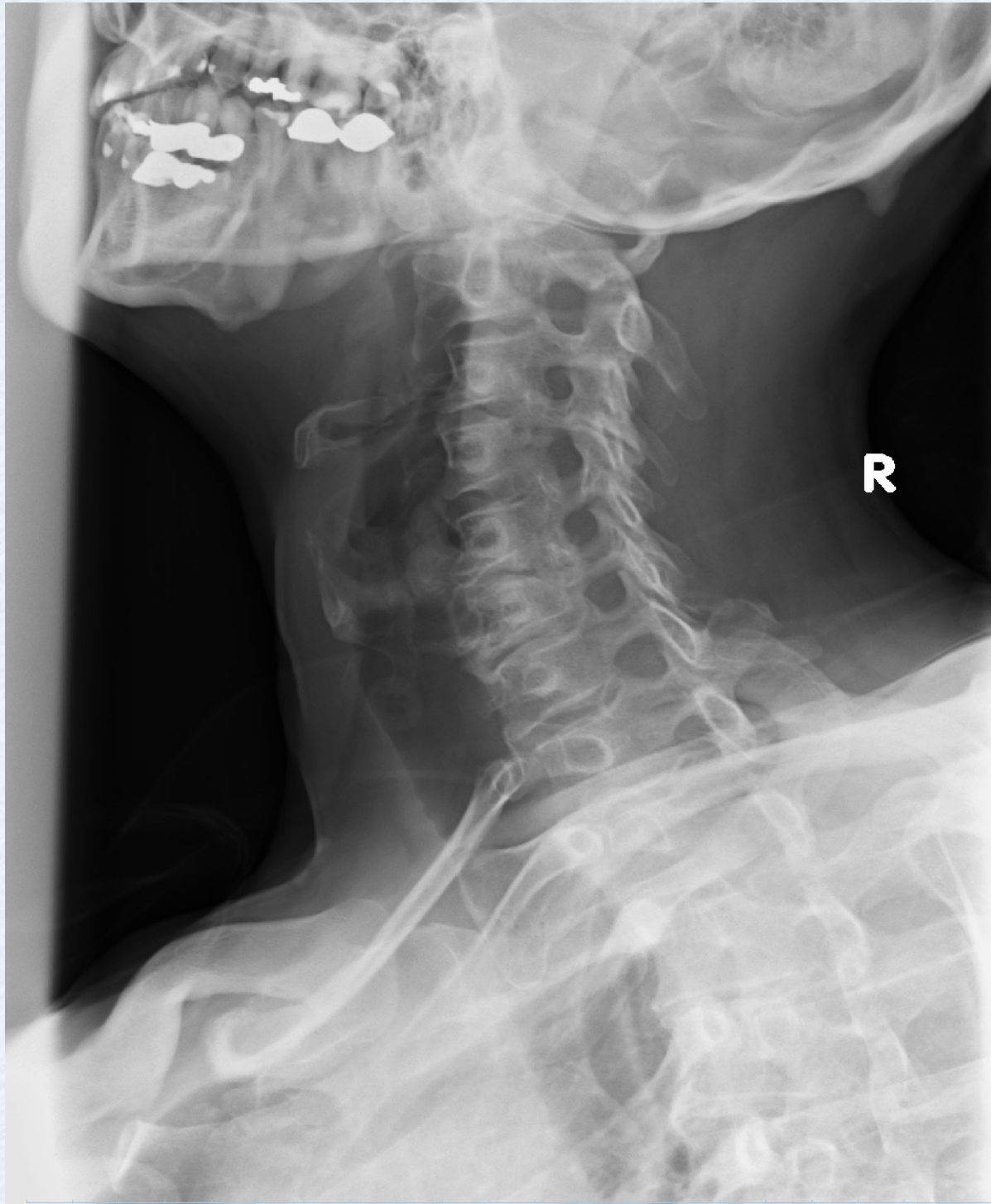


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djd X-Rays



thoracic outlet syndrome (tos)

- Three types
 - anterior scalene syndrome (tight anterior neck muscles)
 - costoclavicular syndrome (rounded and collapsed shoulder posture)
 - pectoralis minor syndrome (rounded and collapsed shoulder posture)
- Possible results:
 - nerve compression into upper extremity

thoracic outlet syndrome figure

