living anatome: The Back #1

I. INTRODUCTION

II. WARM-UP

III. BONY ANATOMY OF THE SPINE

Axial skeleton

Talking points:

- Axial (evolutionarily older skeleton): skull, vertebral column, ribcage (ribs, sternum)
- Appendicular (evolutionarily newer skeleton): bones of the pelvic girdle (pelvis and sacrum/coccyx), shoulder girdle (scapulae, clavicle), and extremities.

Exercise *(yoga): Cat/cow*

- In this pose, appreciate how you are creating a foundation with your appendicular skeleton, but only moving thru the axial one. Appreciate bony relationship of appendicular and axial skeletons, which articulate at sacrum/ilia.

Segments & curvatures

Talking points:

- 7 cervical vertebrae – secondary curve (formed after birth, when baby able to lift head from hands-and knees position)
- 12 thoracic v. – primary curvature (formed in utero, fetal position)
- 5 lumbar v. – secondary curvature
- 5 sacral v. (fused) – primary curvature
- 4 coccygeal v. (fused; number variable, 3-5)
- *Clinical Correlate:* Kyphosis (excessive thoracic curvature), lordosis (excessive lumbar curvature), scoliosis (lateral deviation of the spine)

Exercise*: Spinal articulation (from a standing position, roll down slowly, articulating thru each vertebral body; then, roll back up, pausing in a forward bend to enjoy a hamstring/lower back stretch and prevent dizziness)*

IV. JOINTS OF THE SPINE

Talking points:

- Synovial (for movement):
    - Atlanto-Occipital: between Atlas (C1) and occipital condyles which permits nodding and sideways tilting of the head (shaking head “yes” and “maybe”)

- Atlanto-Axial: between Atlas (C1) and Axis (C2) which permits rotation of the head (shaking head "no")

***Exercise**: Head & neck rolls*

Talking points:

- Synovial, cont. (help fluid movements and transitions)
  - Zygapophysial joints or facet joints between superior and inferior articular facets of adjacent vertebrae. Where big movement occurs, versus symphysis joints
- Symphysial (stabilization): Intervertebral discs sandwiched btwn adjacent vertebrae. Important in helping maintain the integrity of the spine during each movement.

***Exercise** (yoga): Sun salutation series A*

- *Finish in child pose, explaining that this pose highlights the primary curvatures; have students lift neck to demonstrate secondary curvature.*

V. MUSCLES OF THE BACK

<u>Superficial</u>

***Exercise** (Pilates): Breast Stroke Prone* and/or *Breast Stroke Kneeling*

- Featured muscle: Latissimus dorsi (latissimus means "widest" and "dorsi: means "back")
- Function: Adduction, extension and internal rotation of arm
- Innervation: Thoracodorsal n. (C6-8)
- Notes: This muscle is the one that becomes big in swimmers, employed in many of their swimming strokes, like the breast stroke

***Exercise** (Pilates): Scapular Elevations and Depression with flex band*

- Featured Muscle: Trapezius, with upper/middle/lower fibers
- Function: Elevation (upper fibers), depression (lower fibers), retraction (middle fibers) and upward rotation of scapula
- Innervation: Spinal accessory n. (cranial nerve XI)
- Notes: Most superficial of the muscles, shaped like a trapezoid, hence its name.

- Featured muscle: Levator scapulae
- Function: Elevation of scapula
- Innervation: Dorsal scapular nerve (C5)
- Notes: Helps trapezius shrug shoulders. Totally overworked in our hunched-over society, that's why it's so tight in many people.

Exercise *(Pilates): Scapular Retraction with flex band*

- Featured muscles: Rhomboid major and minor; Trapezius, middle fibers, see above
- Function: Retraction, elevation and downward rotation of scapula
- Innervation: Dorsal scapular nerve (C5)
- Notes: The major and minor work together as a pair.

<u>Deep</u>

Exercise (yoga): *Seated spinal twist*

- Featured muscles: Transversospinales: **S**emispinalis, **M**ultifidus, **R**otatores
- Function: Extension and rotation of spine
- Innervation: DORSAL RAMI!!! (all deep back muscles are innervated by dorsal rami—all other skeletal muscle innervated by ventral rami)
- Notes: The muscles run superficial to deep in that order in between transverse processes and spinous processes of superior vertebrae. Family-friendly mnemonic with which to remember the three muscles of the transversospinales group: **S**tudying **M**uscles **R**ocks!

Exercise (yoga): *Cobra pose*

- Featured muscles: Erector spinae: **I**liocostalis, **L**ongissimus, **S**pinalis (run lateral to medial) on either side of the spinal column
- Function: Extension and lateral flexion of spine
- Innervation: DORSAL RAMI!!! (all deep back muscles are innervated by dorsal rami—all other skeletal muscle innervated by ventral rami)
- *Notes*: Family-friendly mnemonic with which to remember the three muscles of the erector spinae group: **I L**ove **S**tudying!

VIII. SAVASANA

OM!