

living anatome: The Back #2

I. INTRODUCTION

II. WARM-UP

III. BONES OF THE SPINE

Talking points:

- Part of axial skeleton
- Vertebral column components
 - 7 Cervical
 - 12 Thoracic
 - 5 Lumbar
 - 5 Sacral (fused)
 - 4 Coccygeal (fused)

Exercises:

- *Cat/Cow (yoga)*
- *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)

III. JOINTS OF THE SPINE

Talking points:

- Synovial joints (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 roll*

Talking points:

- Synovial joints, cont.
 - Zygapophysial joints (a.k.a. facet joints) between superior and inferior articular facets of adjacent vertebrae (use skeleton). Where big movement occurs, versus symphysis joints.
- Symphysial joints (for stabilization): in between vertebrae
 - Intervertebral disc btwn adjacent vertebrae.

Exercise (yoga): Sun salutation (surya namaskar)

- Finish in child's pose

Talking points:

- Curvatures
 - Primary: thoracic and sacral (concave, think “fetal position”)
 - Secondary: cervical and lumbar (convex, lifting the head, then walking)
 - *Clinical Correlate:* kyphosis (excessive thoracic curvature), lordosis (excessive lumbar curvature), scoliosis (lateral deviation of the spine)

Exercise (yoga): Child's pose

III. MOVEMENTS OF THE BACK

Flexion

Muscles responsible found on the anterior abdominal wall:

- Featured muscle: Rectus abdominis (vertical fibers)
- Origin: Pubic symphysis and crest
- Insertion: Costal cartilage of ribs 5,6,7
- Function: Flexion of trunk
- Notes: What makes your six-pack?
 - Linea Alba (sister of Jessica ☺), a fibrous band in the ventral midline that is the combined aponeurosis of the 4 ab muscles
 - Tendinous horizontal insertions of the rectus abdominis that cut it into 3 or 4 bellies (giving you a 6 or an 8 pack)

- Featured muscle: External Oblique (“hands-in-pocket” fibers)
- Origin: Lower 8 ribs
- Insertion: Linea alba, pubis, anterior iliac crest
- Function: a) Unilaterally rotate you to contralateral side, i.e. right obliques rotate you left; b) Unilateral lateral flexion to ipsilateral (same) side; c) bilaterally flex the trunk

- Featured muscle: Internal Oblique (“hugging myself” fibers)
- Origin: Lower 8 ribs (5-12)
- Insertion: Linea alba, pubis, anterior iliac crest
- Function: a) Unilaterally rotate you to ipsilateral side, i.e. right obliques rotate you right; b) Unilateral lateral flexion to ipsilateral (same) side; c) bilaterally flex the trunk

Exercises (Pilates):

- *Ab-prep*
- *Half roll back*

- *The Hundred*

Extension

Muscles responsible found on back:

- Featured muscle: Erector Spinae: Iliocostalis, Longissimus, Spinalis (run lateral to medial) on either side of the spinal column
- Origin:
 - Ilio: Thoracolumbar aponeurosis, post ribs
 - Long: Thoracolumbar aponeurosis, lumbar/thoracic transverse processes
 - Sp: Ligamentum nuchae, cervical/thoracic spinous processes
- Insertion:
 - Ilio: Posterior ribs, cervical/thoracic transverse processes
 - Long: cervical/thoracic transverse processes, mastoid
 - Sp: cervical/thoracic spinous processes, occiput
- Function: 1) B/l to extend the spine, and 2) U/l to laterally flex the spine to the ipsilateral side
- Innervation: DORSAL RAMI!!! (all deep back muscles are innervated by dorsal rami—all other skeletal muscle innervated by ventral rami)
- Featured muscle: Transversospinales: semispinalis, multifidus, rotatores (run superficial to deep in that order in between transverse processes and spinous processes of superior vertebrae)
- Origin:
 - Semi: cervical/thoracic transverse processes
 - Mult: sacrum, PSIS, all transverse processes
 - Rot: all spinous processes
- Insertion:
 - Semi: cervical/thoracic spinous processes (spans 3-6 vertebrae)
 - Mult: all spinous processes (spans 2-4 vertebrae)
 - Rot: all spinous processes (spans 1 vertebra)
- Function: 1) B/l to extend, and 2) U/l to rotate the spine contralaterally
- Innervation: DORSAL RAMI!!! (all deep back muscles are innervated by dorsal rami—all other skeletal muscle innervated by ventral rami)

Exercises (yoga):

- *Baby cobra*
- *Upward dog*
- *Bridge pose, three times*

Rotation

Talking points:

- Review Transversospinalis and Obliques

- FF about 125-140 degree rotation, including head, necc. for bipedal gait and golf.

Exercises (Pilates):

- *Half-roll back with rotation*
 - *Discuss obliques*
- *Spinal twist*

Lateral Flexion

Talking points:

- Review Erector Spinae (working ipsilaterally) and obliques (working ipsilaterally)
- Quadratus Lumborum
 - Origin: Posterior iliac crest
 - Insertion: 12th rib, Transverse processes of L1-4
 - Function: Lateral flexion of trunk OR raises hip (“hip hiker”)
 - Innervation: Ventral rami

Exercises (yoga):

- *Extended side angle*
- *Gate pose*

IV. Savasana

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