5 Joints Webinar Series

The Hip

Dr. Grove Higgins

With Master Trainer Pat Marques

NeuroAthlete

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Outline

- Introductions – Dr. Kevin Steele
- Thank you and more to come
  - Gait Assessment Webinar – August 10, 2020
  - Live & Online Anatomy in Fall 2020 – Colorado
    - Like and share these webinars on Social Media to help raise interest
- Overview of the 5 Joints Webinars
- Anatomy
  - Hip Basic Anatomy
- Biomechanics
  - Hip Movement
  - Posture/Gait
  - Functional Movement Assessment
- Assessment
  - In person
  - Online
- NeuroBiomechanics
  - Drills and Tips
- Q&A

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Introduction

- Dr. Grove Higgins
  - Chiropractor & Soft Tissue Practitioner
  - Speaker and Educator
  - Functional Anatomy Instructor
  - Strength & Conditioning
  - Research
    - Biomechanics Gait and Foot Development
    - Anatomy of Lower Leg Modeling
    - Exercise & Hormonal Response
  - Been in Medicine Since 1993
- Patrick Marques
  - Lt. Col. USA Ret.
  - BS Exercise Science, CPT, ZHealth Master Trainer & Instructor
  - Speaker and Educator
  - Corrective Exercise Therapist
  - Research
    - Exercise & Hormonal Response, Sleep

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Introduction

- Neuroathlete & Clinic in Monument CO
  - Use a “Neural Lens” to address performance, pain, and recovery
  - Online – assessment and training all over the world
    - USA, Sweden, & 18,000ft on Mt Everest
  - Clinic – manual therapy, chiropractic, exercise therapy, neuropsychology
  - Work with trainers online and provide mentoring and tools

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5 Joints


Foot/Ankle – April 30th


Knee – May 7th


Hip – May 14th


Shoulder – May 21st


Elbow – May 28th

Thursdays
11:00-12:30PM MST

* Pay What You Can

https://www.medfitclassroom.org/five-joints/

GoToWebinar

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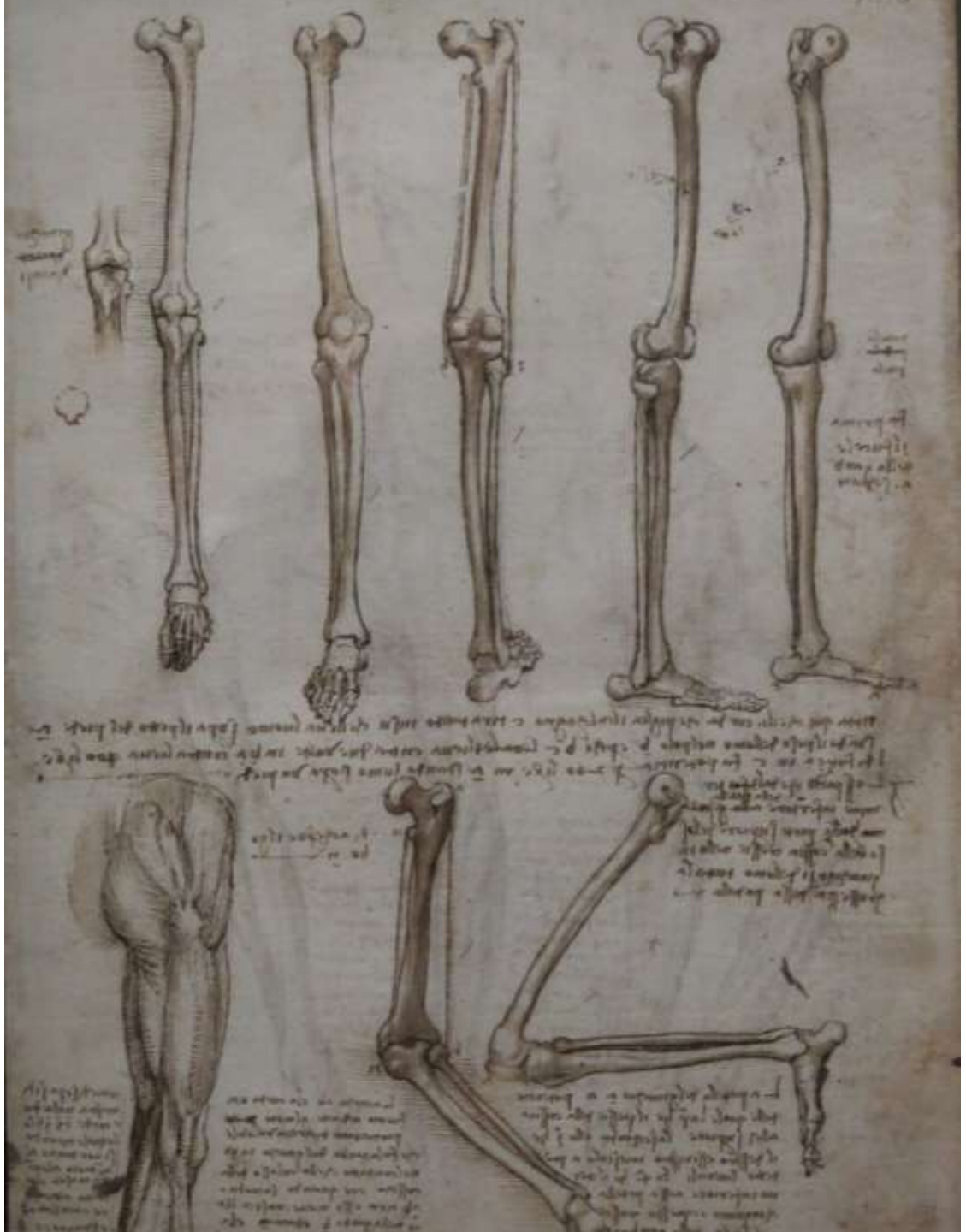
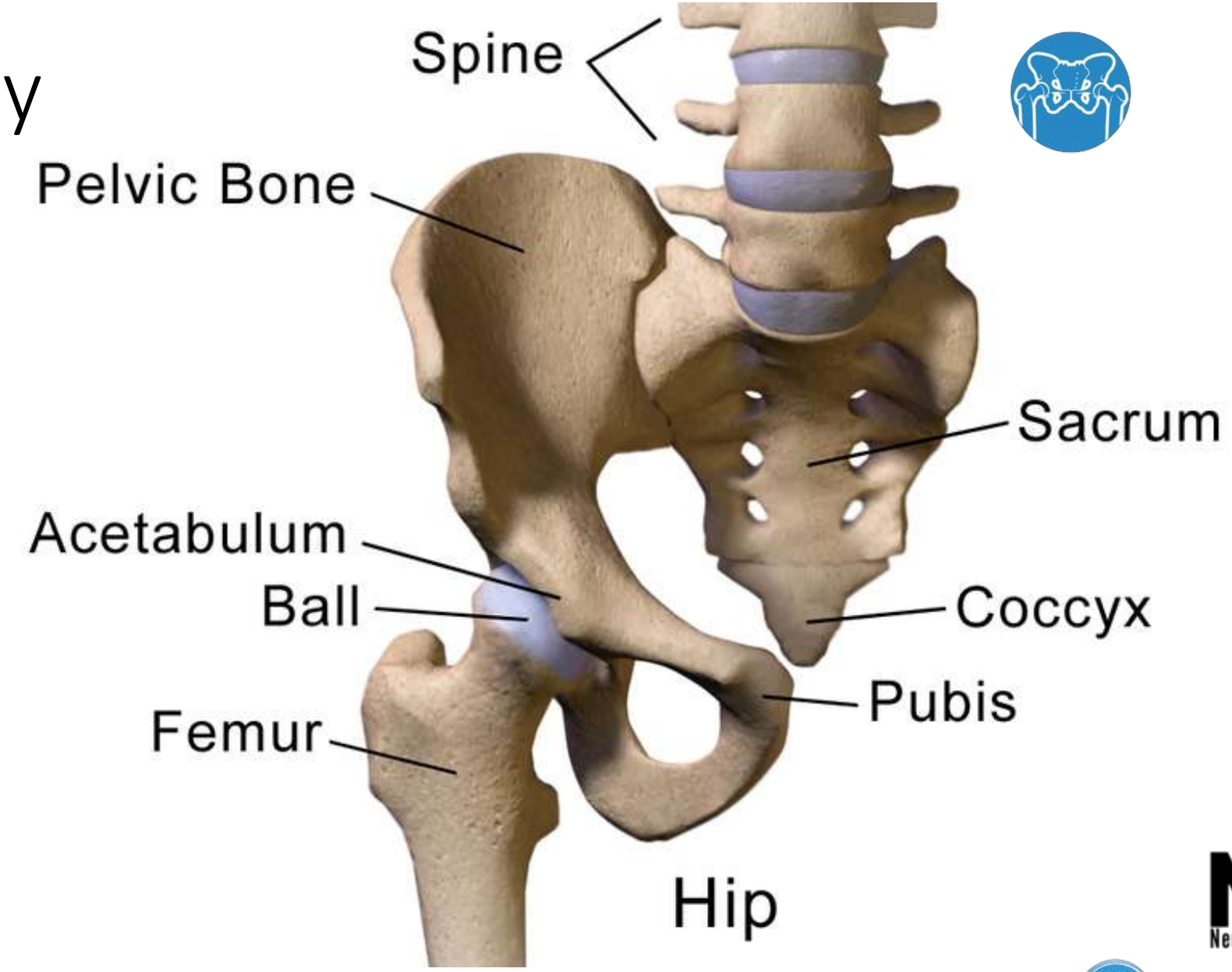
Anatomy of the Hip



Leonardo da Vinci. Anatomy of the leg bones. 1510-1511. Codex Windsor, RL 19008

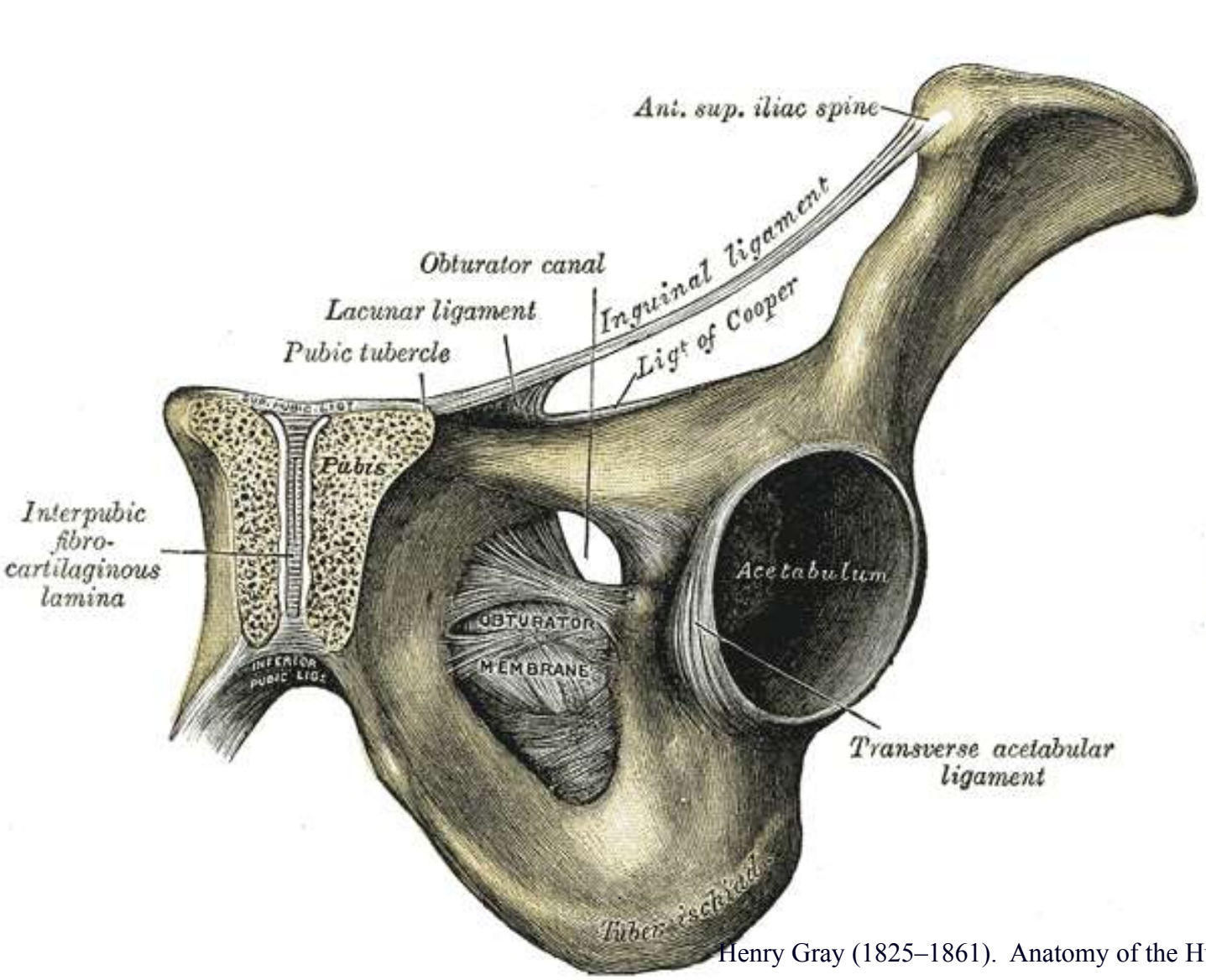
Hip – Anatomy

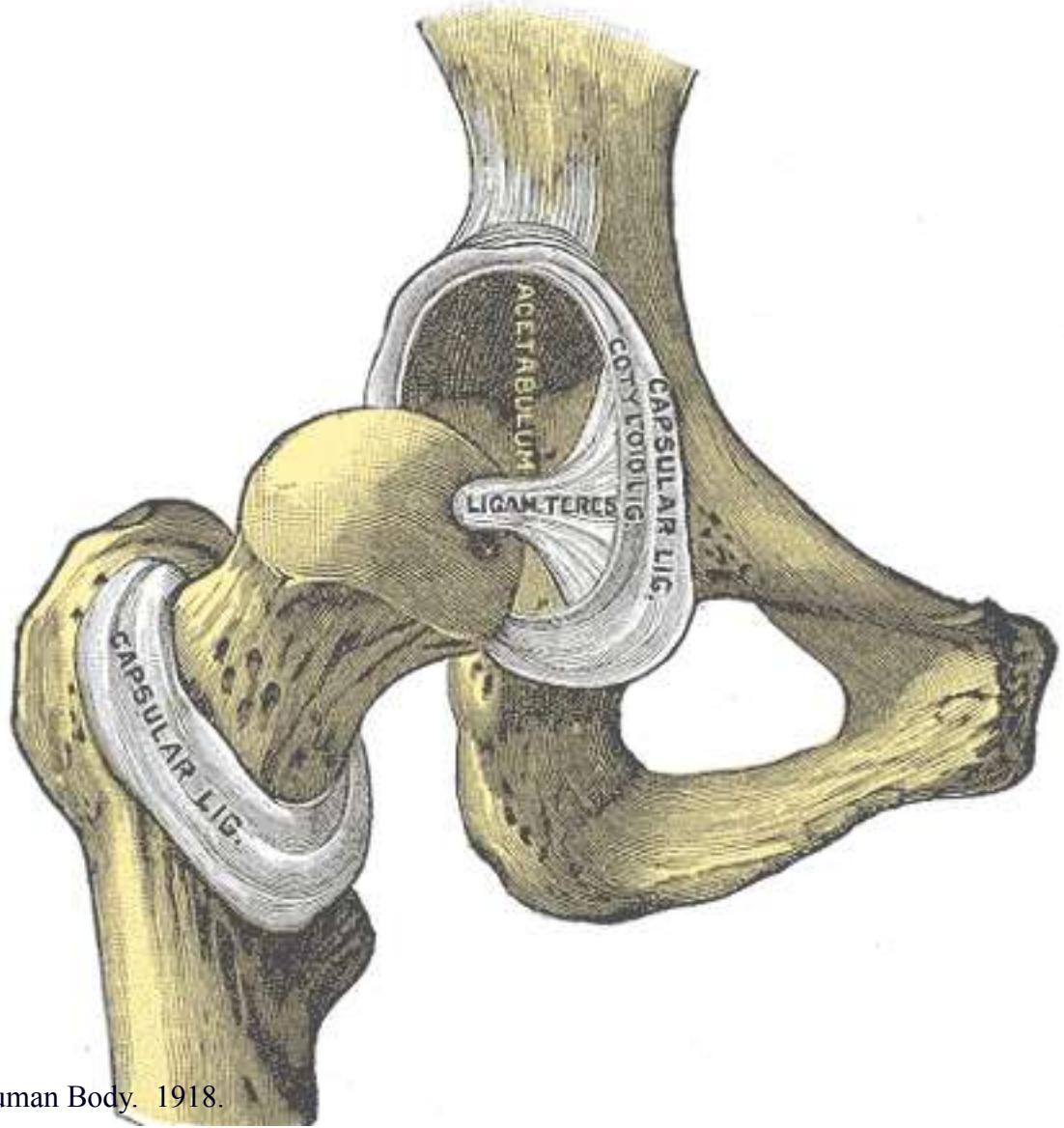
- 1 Joint
- 4 Major Ligaments
- Extensive Capsule
- Articular Cartilage
- Labrum
- 21 Muscles Cross
- 7 Nerves Drive



Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". *WikiJournal of Medicine* **1** (2). https://commons.wikimedia.org/wiki/File:Blausen_0488_HipAnatomy.png

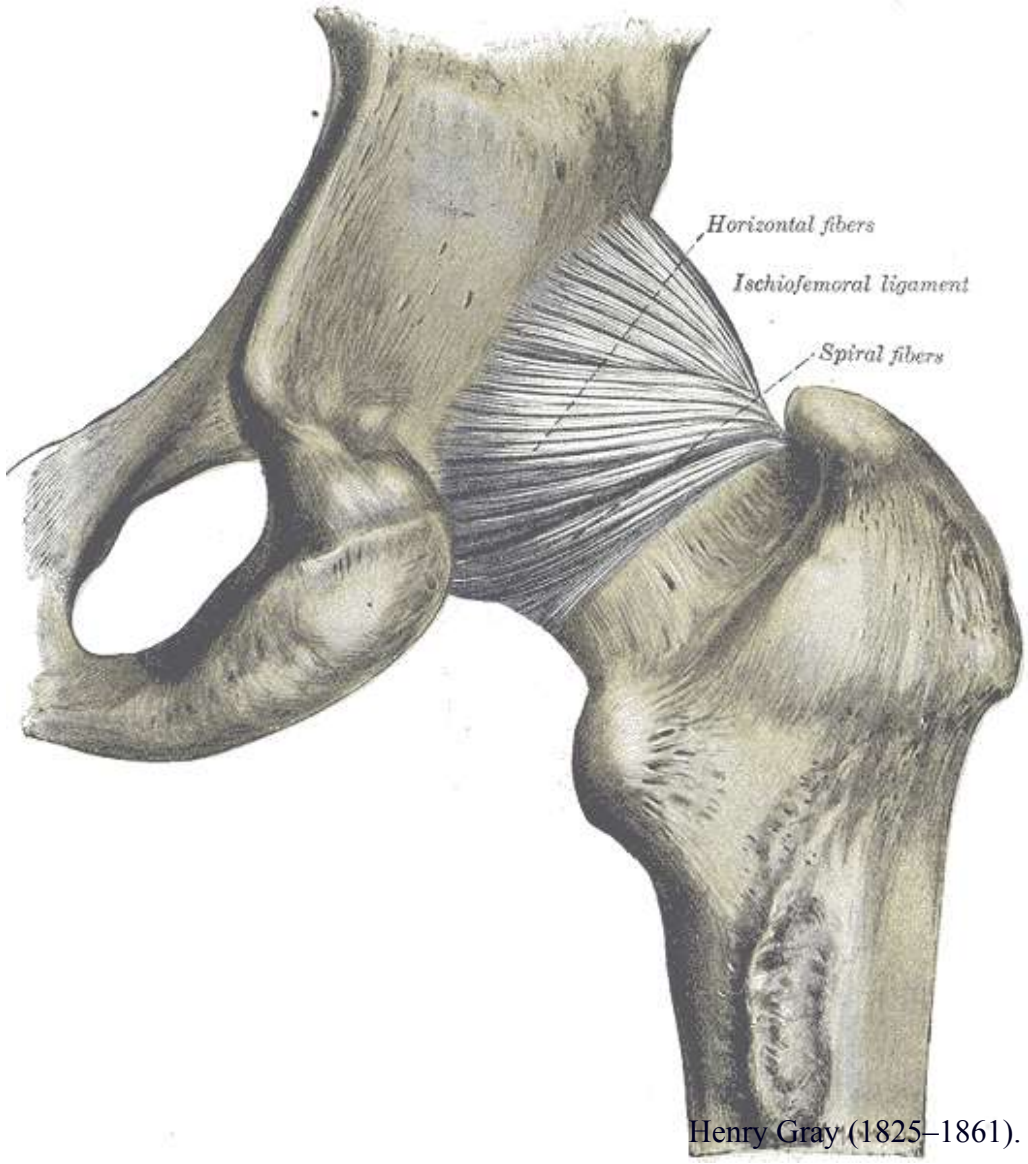
Hip – Anatomy

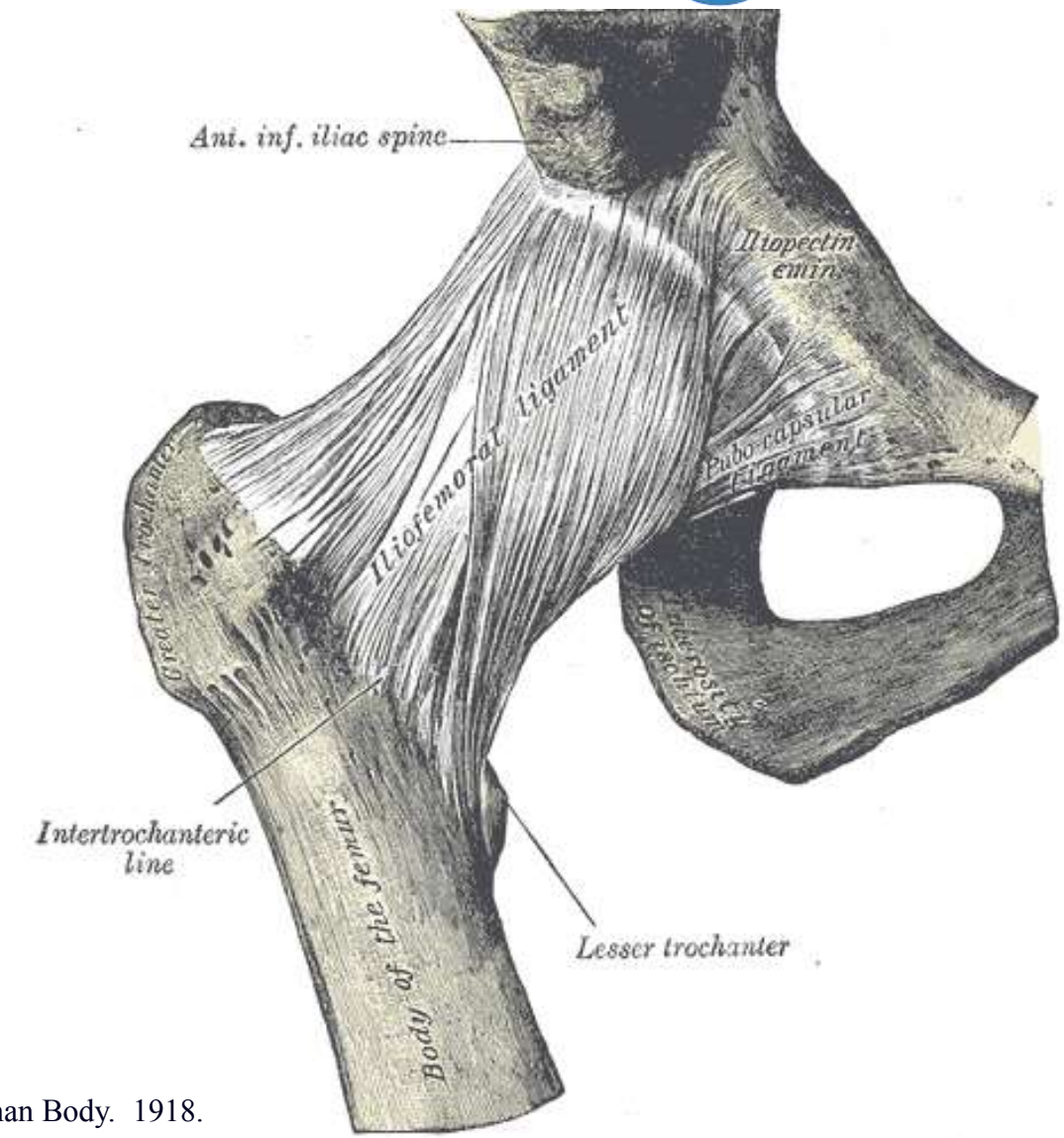




Henry Gray (1825–1861). Anatomy of the Human Body. 1918.

Hip – Anatomy





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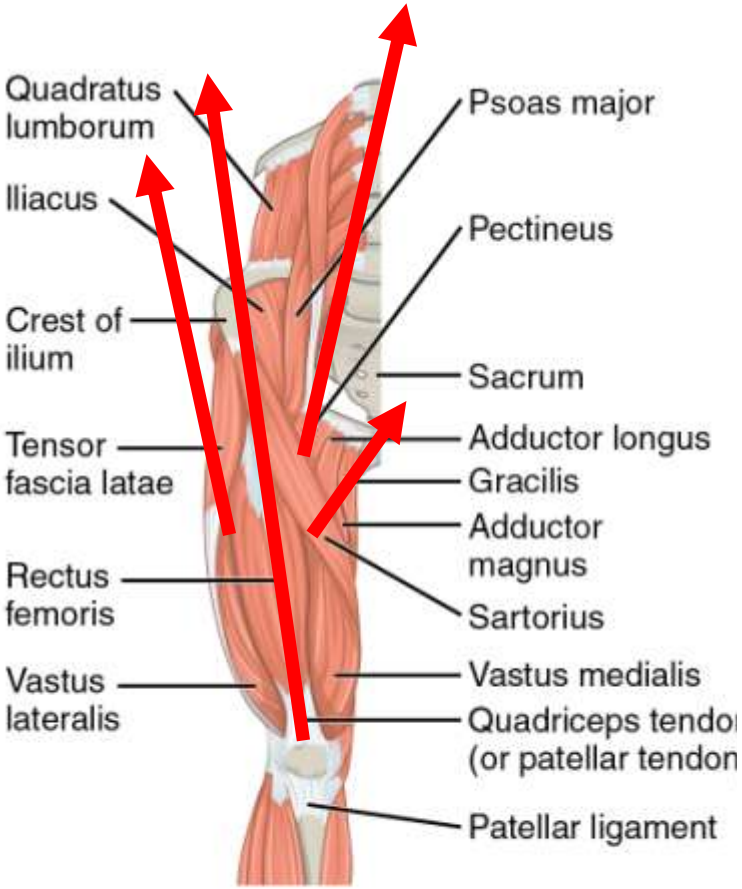
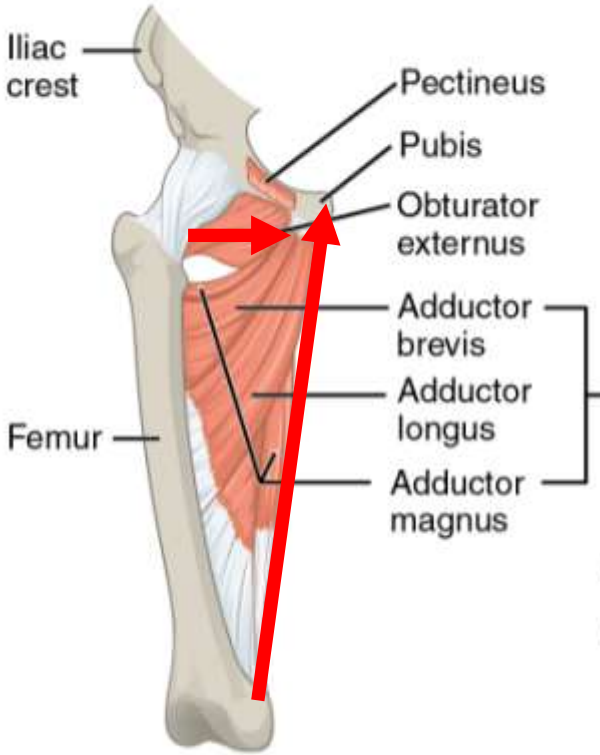
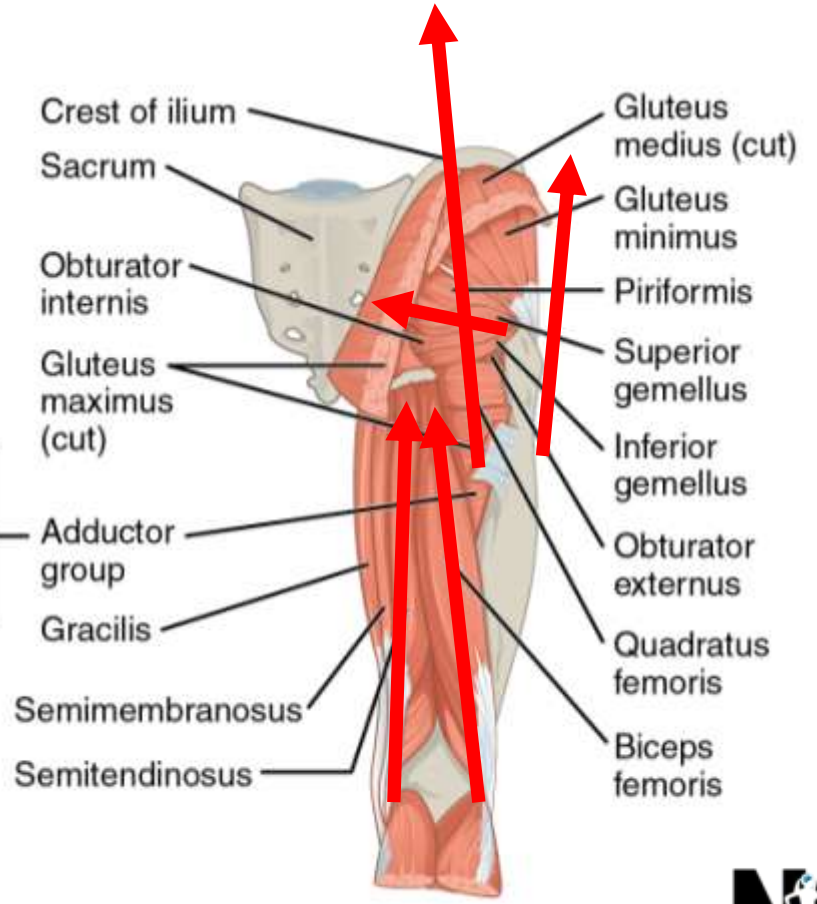


Superficial pelvic and thigh muscles of right leg (anterior view)



Deep pelvic and thigh muscles of right leg (anterior view)



Pelvic and thigh muscles of right leg (posterior view)

https://openstax.org/books/anatomy-and-physiology/pages/11-6-appendicular-muscles-of-the-pelvic-girdle-and-lower-limbs

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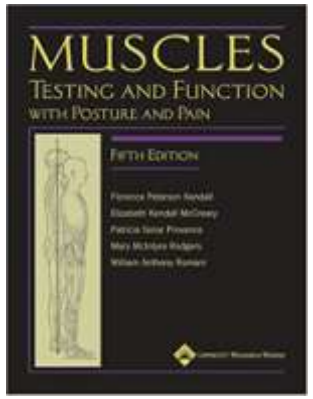
Hip – Anatomy

[CLINICAL COMMENTARY]

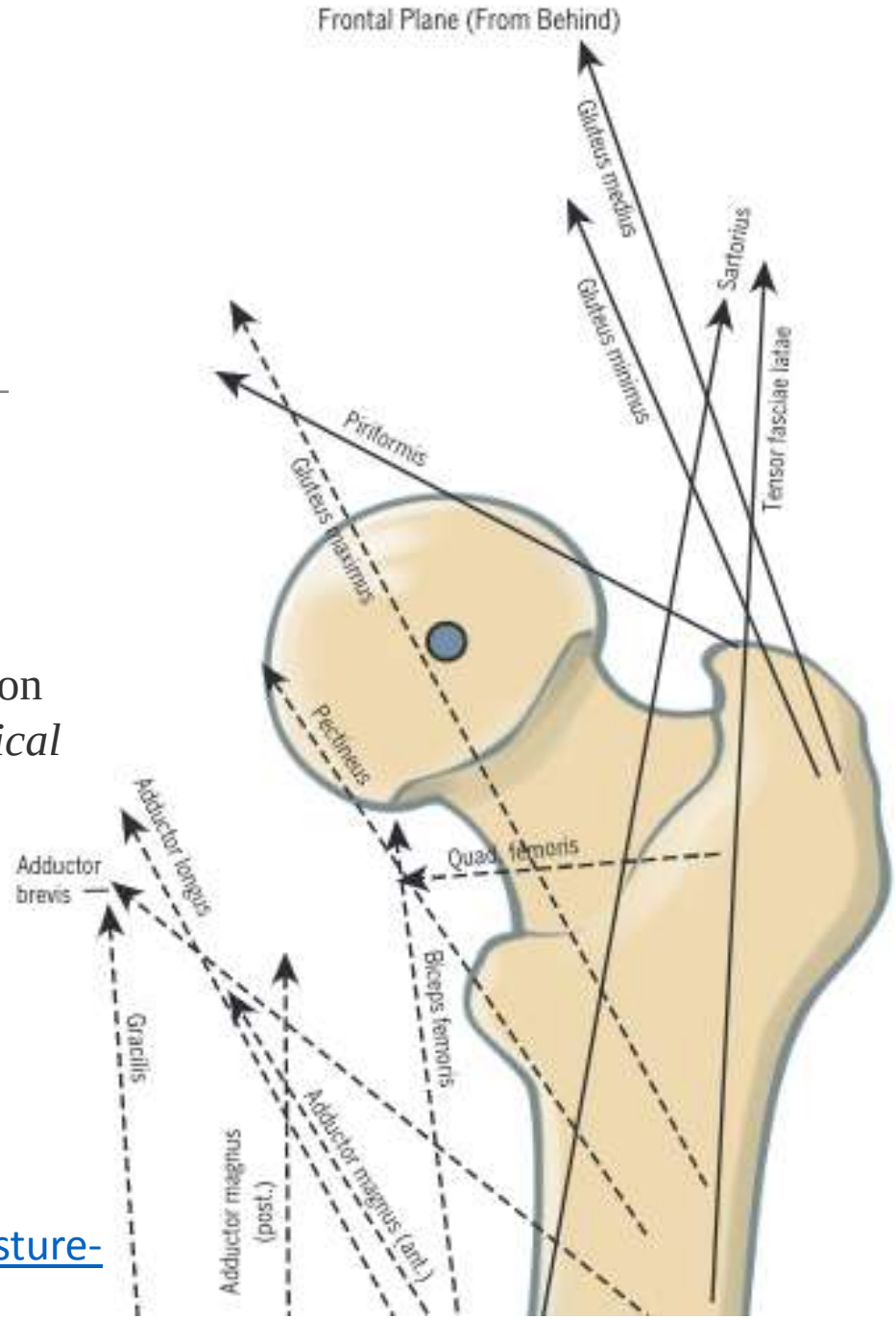
DONALD A. NEUMANN, PT, PhD, FAPTA[1]

Kinesiology of the Hip: A Focus on Muscular Actions

Neumann, D. A. (2010). Kinesiology of the Hip: A Focus on Muscular Actions. *Journal of Orthopaedic & Sports Physical Therapy*, *40*(2), 82–94. doi: 10.2519/jospt.2010.3025



https://www.amazon.com/Muscles-Testing-Function-Posture-Kendall-ebook/dp/B00QKKPA9U



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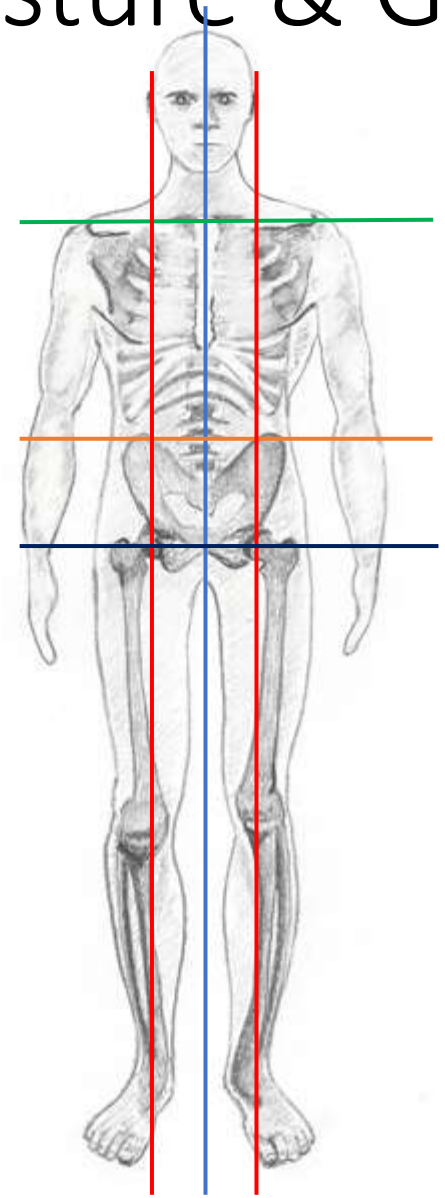
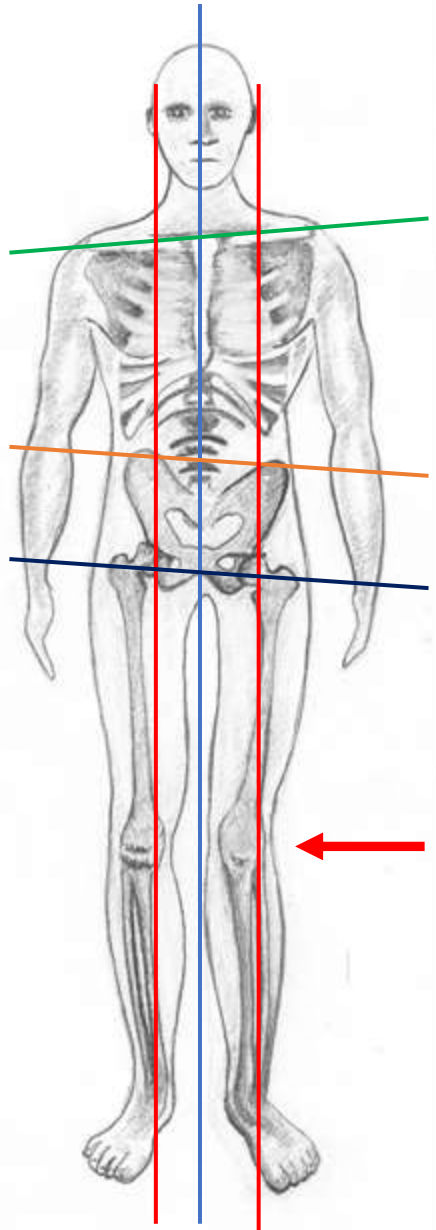
Hip – Posture & Gait





Functional Short Leg

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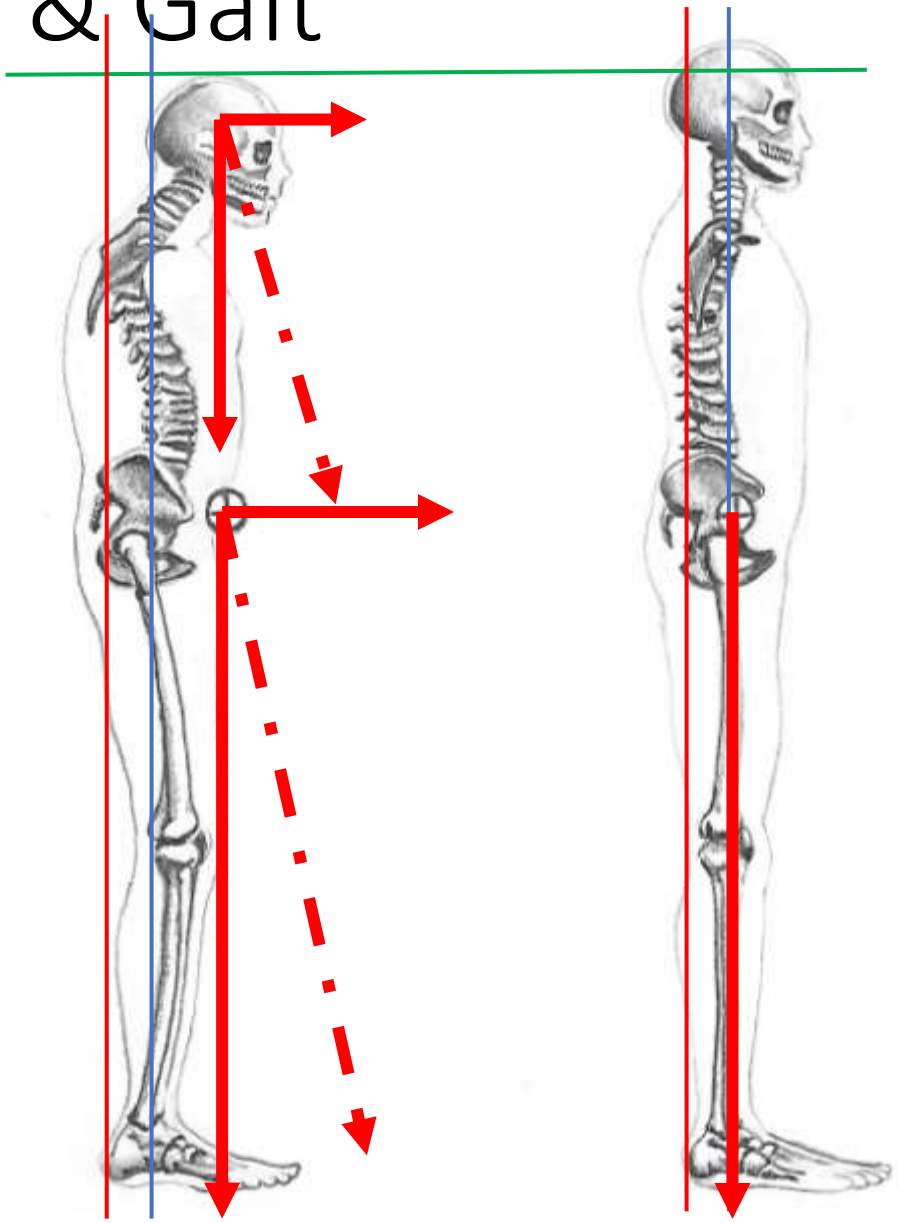
Hip – Posture & Gait



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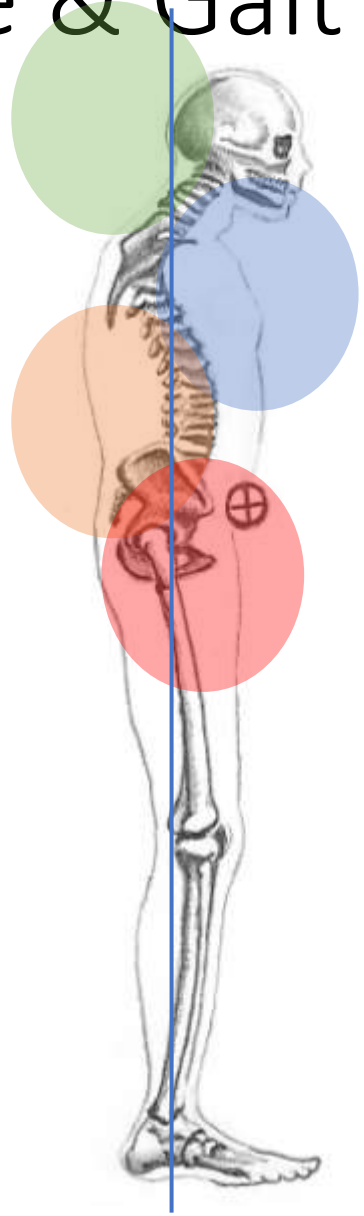
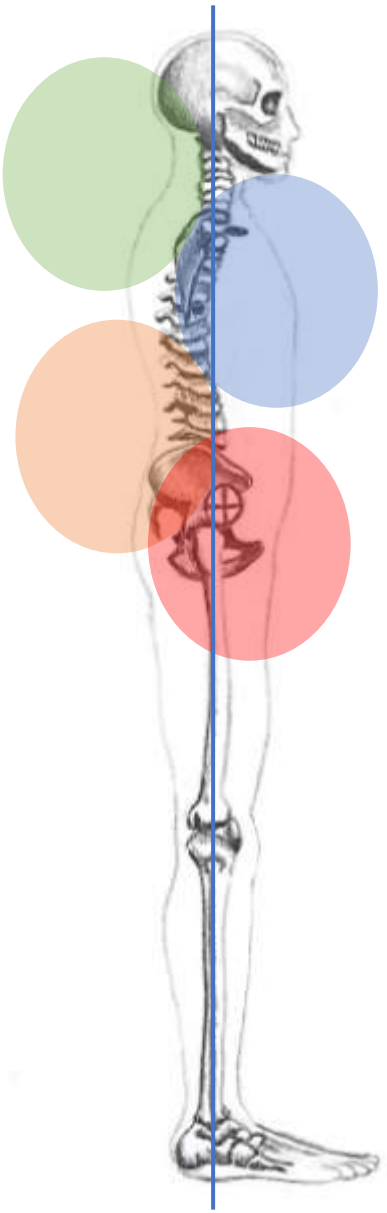
Hip – Posture & Gait





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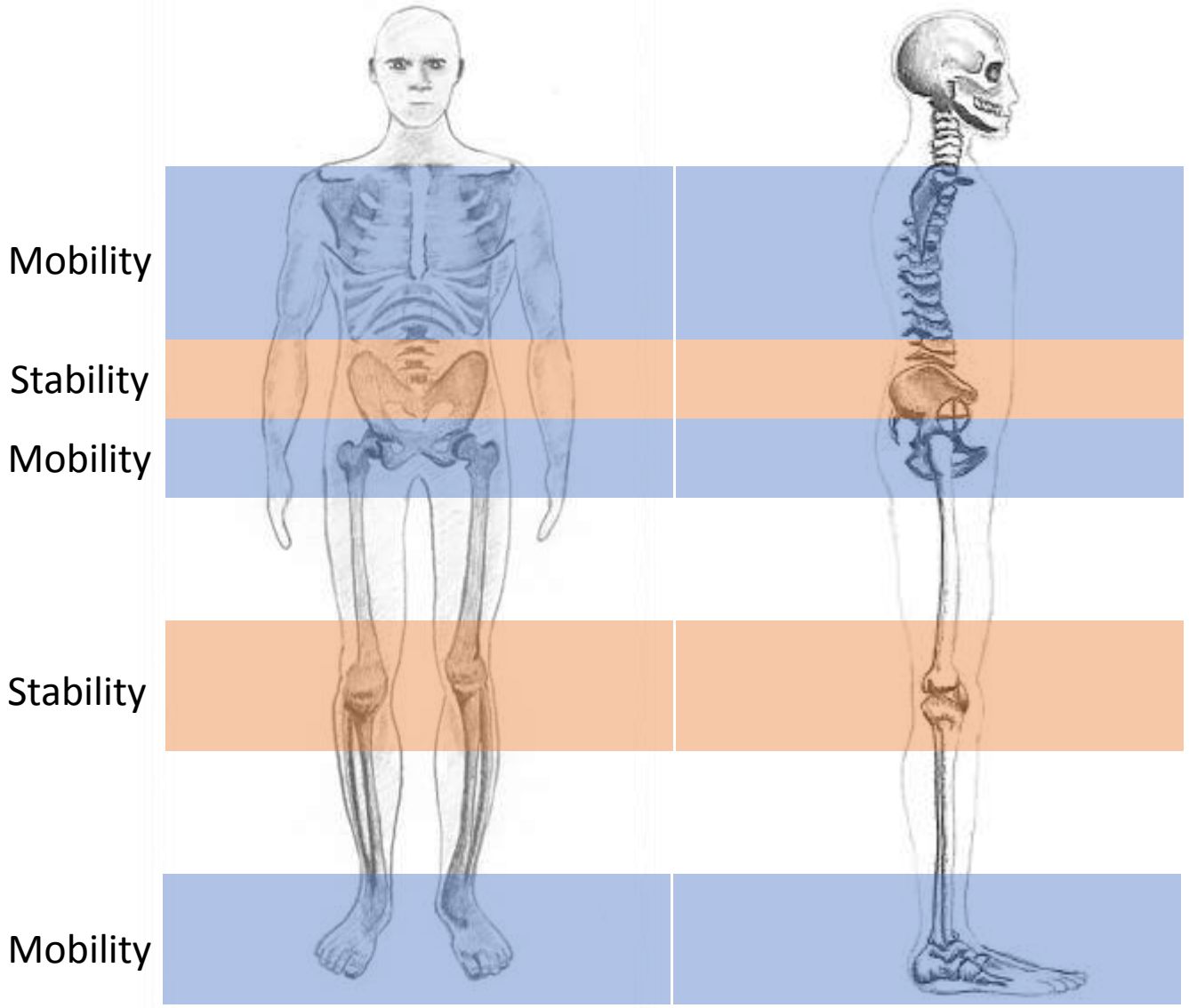
Joint by Joint Model – Mobility vs. Stabilit



Boyle, M., Verstegen, M., & Cosgrove, A. (2015). *Advances in functional training: training techniques for coaches, personal trainers and athletes*. Santa Cruz, CA: On Target Publications.

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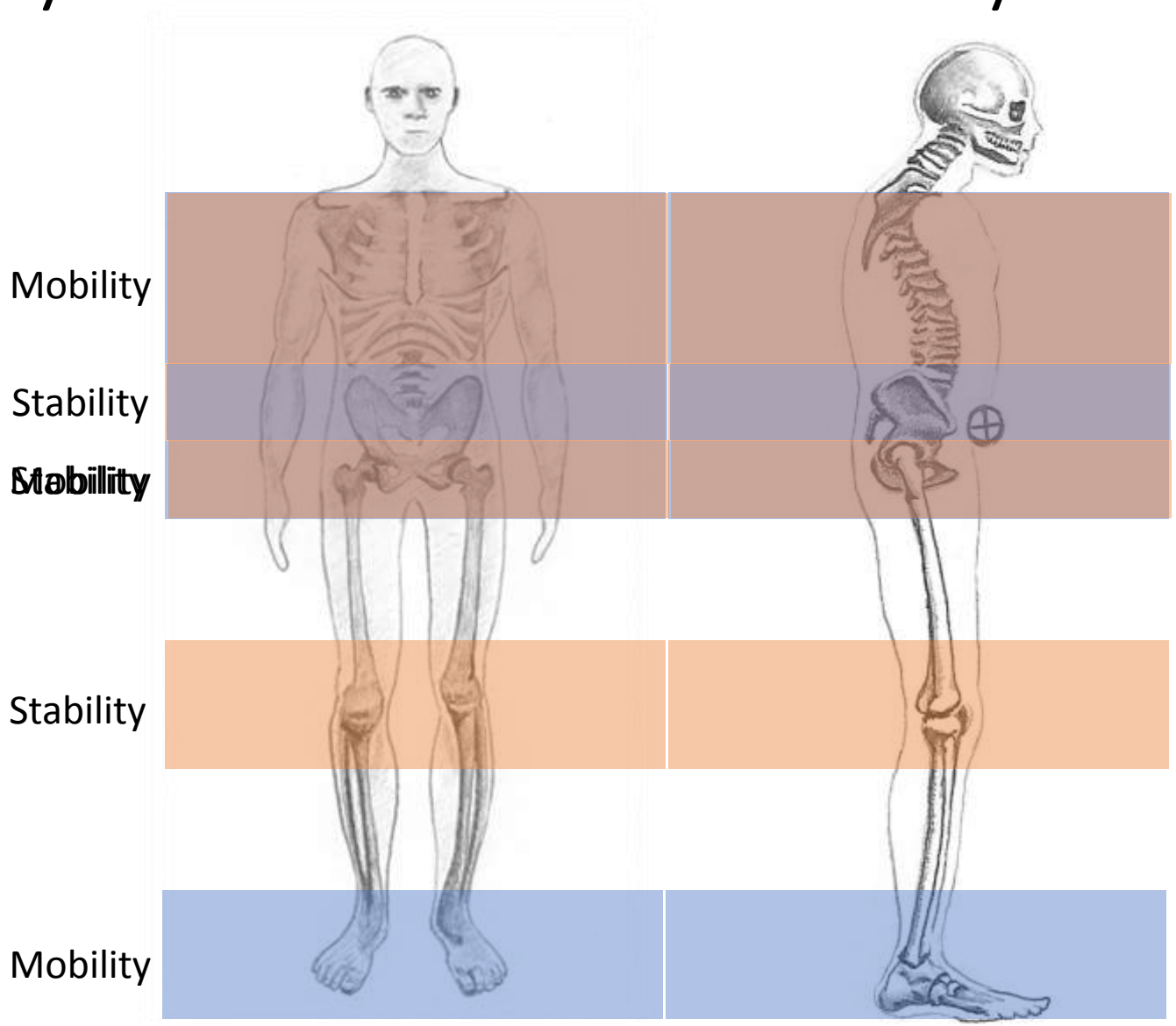
Joint by Joint Model – Mobility vs. Stabilit



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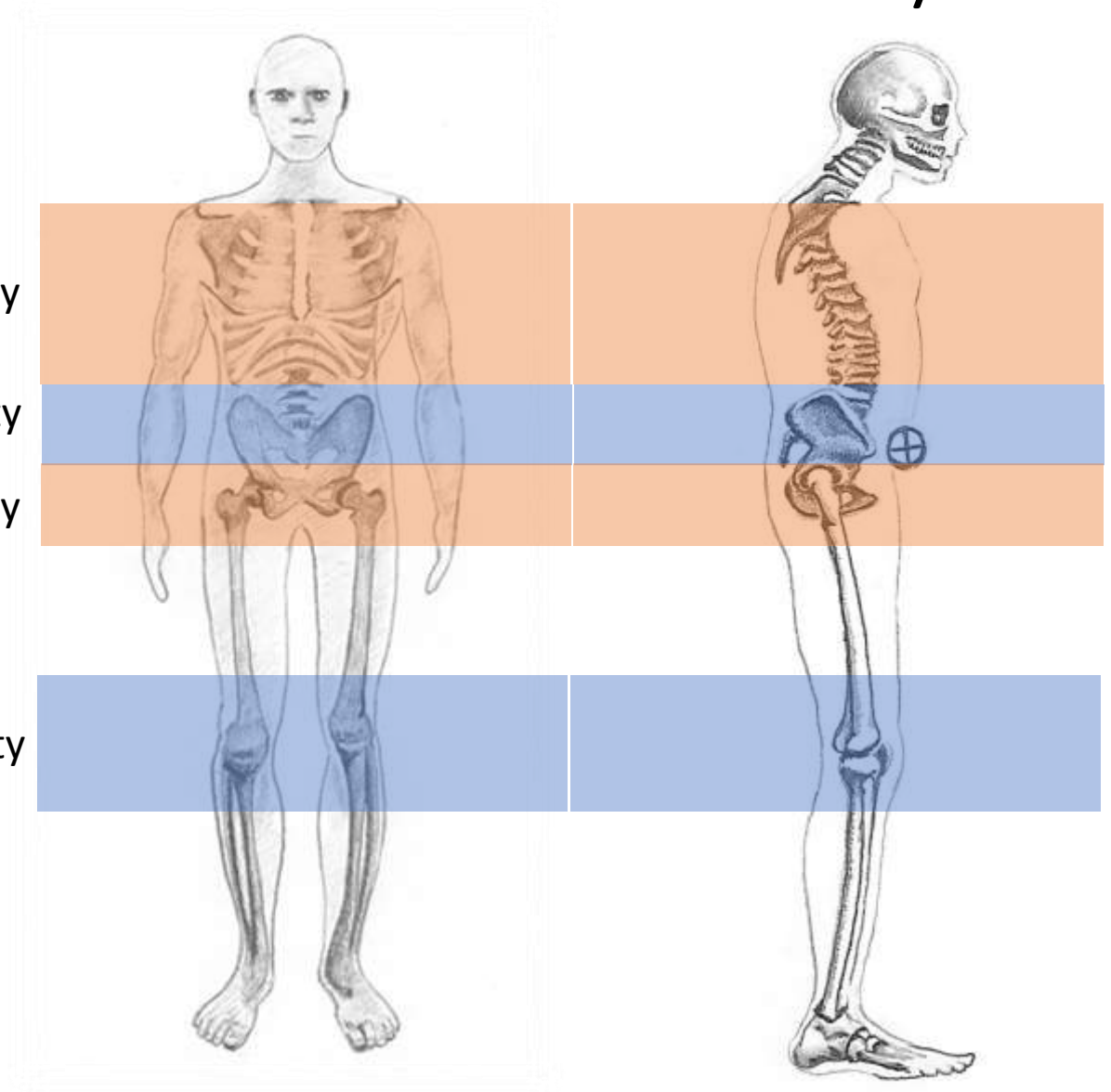
Joint by Joint Model – Mobility vs. Stability



Stability

Mobility

Stability

Mobility

Back Stiffness

Back Pain

Hip Tightness & Loss of ROM

“Weak Hamstrings” & Sciatica

Knee Pain

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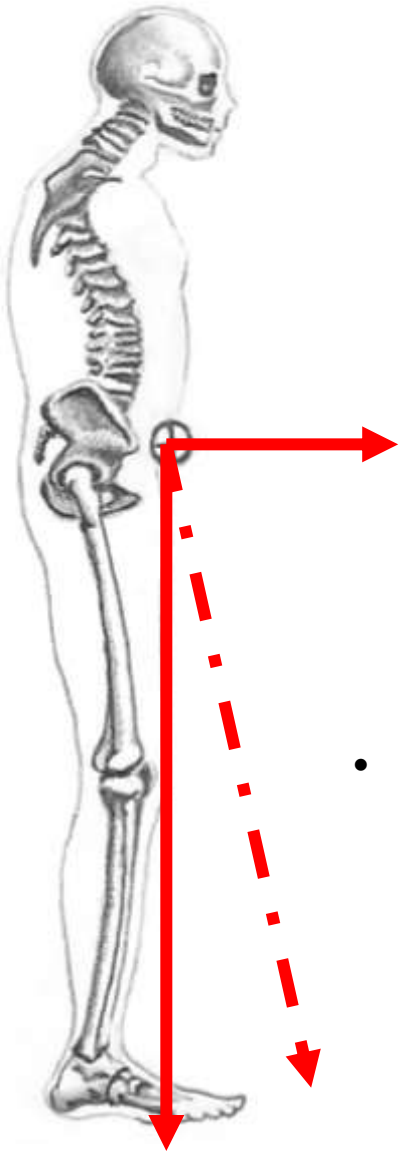
Hip – Posture & Gait

- Neck & Shoulder Issues
- (next Week!)
- Back Pain
- Hip Tightness
  & Loss of ROM
- Tight Weak Hamstrings
- & Glutes
- Sciatica
- Knee Pain



- Balance Issues

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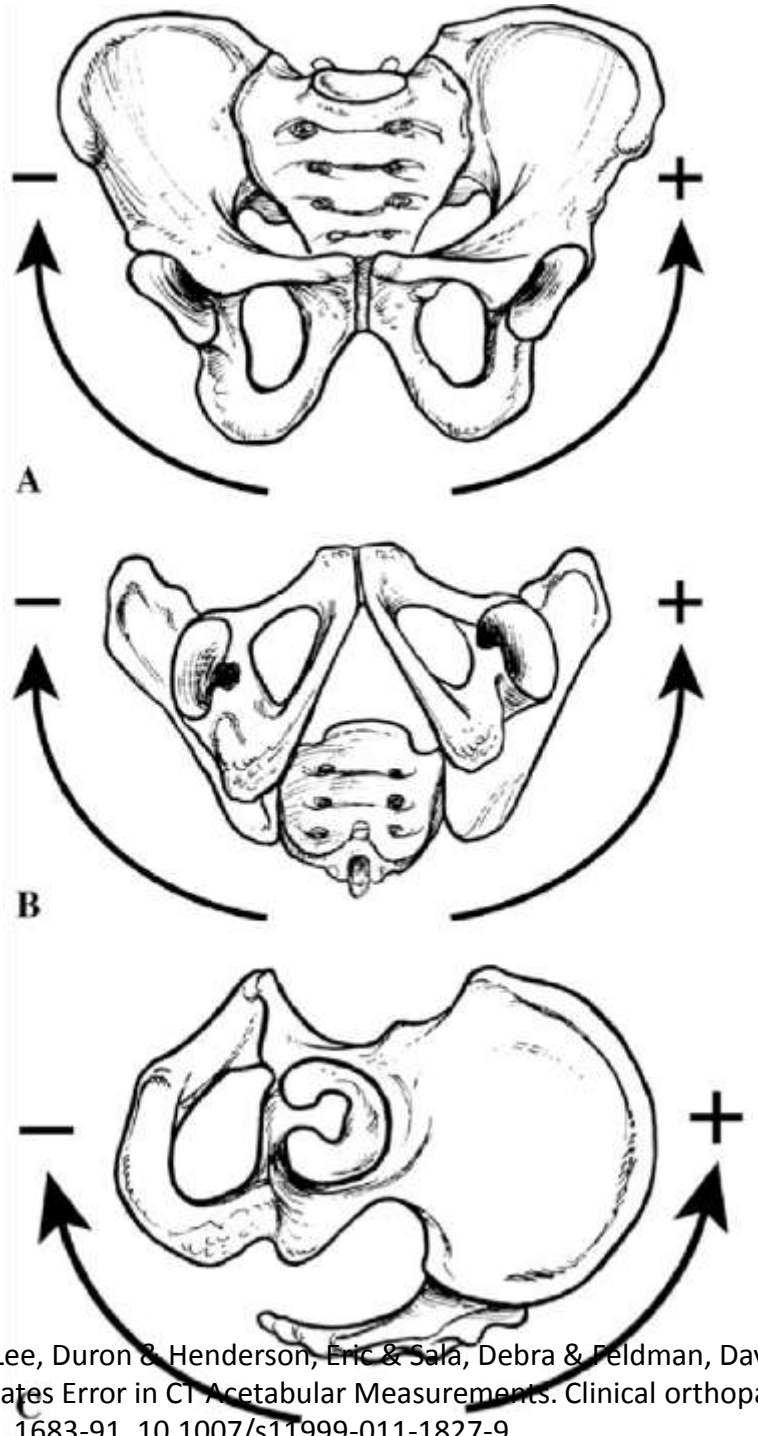
Hip – Pelvic Obliquity

- Functional Short Leg Issues
  - Posture
- Gait Issues
  - Toe/Knee Out/In – Duck/Pigeon Toed
  - Short Gait on One Side or Both
    - Extension or Flexion
  - Waddling – Side to Side
- Functional Movement Issues
  - Hip Impingement
  - Stability
- Lots of Upstream Issues
  - Shoulders (Next Week)



van Bosse, Harold & Lee, Duron & Henderson, Eric & Sala, Debra & Feldman, David. (2011). Pelvic Positioning Creates Error in CT Acetabular Measurements. Clinical orthopaedics and related research. 469. 1683-91. 10.1007/s11999-011-1827-9.

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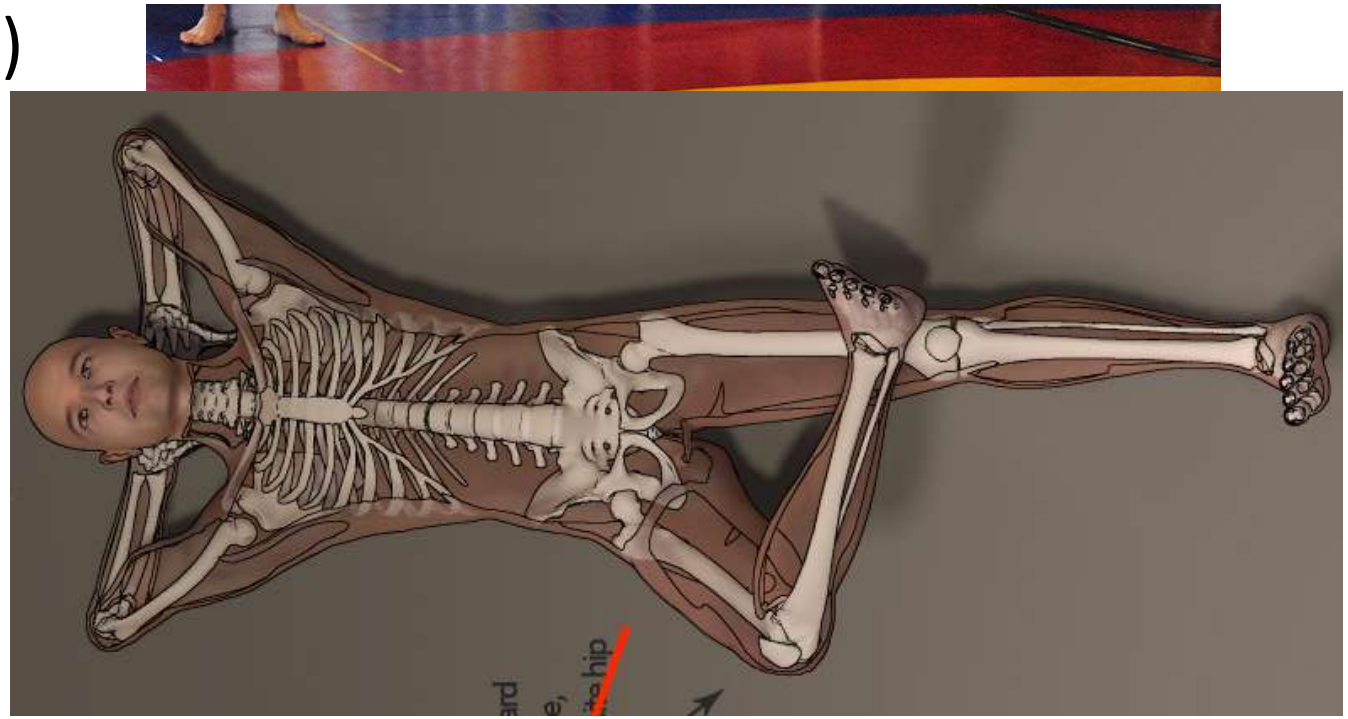
Hip – Simple Assessment

- Gait – Walking is your #1 Screening Tool ALWAYS!
- Forward Flexion (Toe Touch)
- Extension (Back Bend)
- Squat
- Forward Lunge
- Knee To Chest
- Figure Four Position



- FMS (Functional Movement Screen) is awesome: https://www.functionalmovement.com/system/fms

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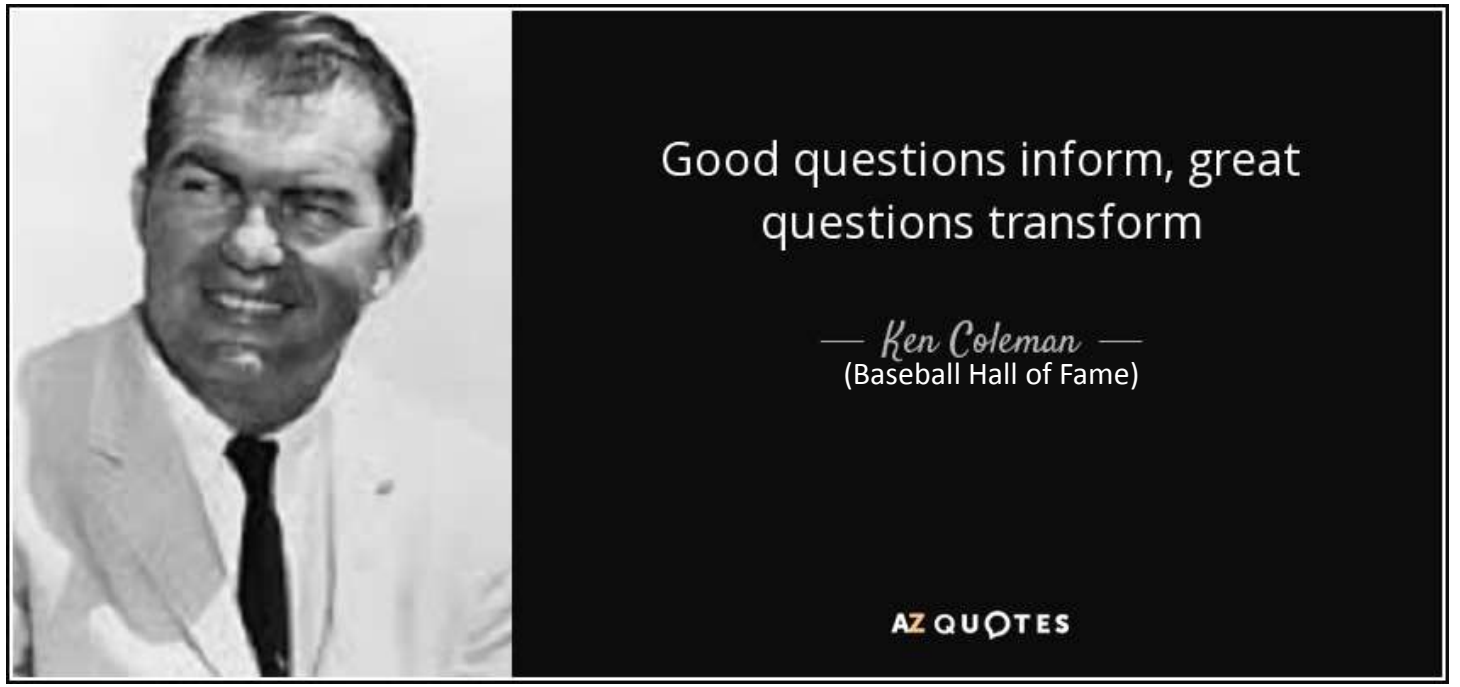
Questions?



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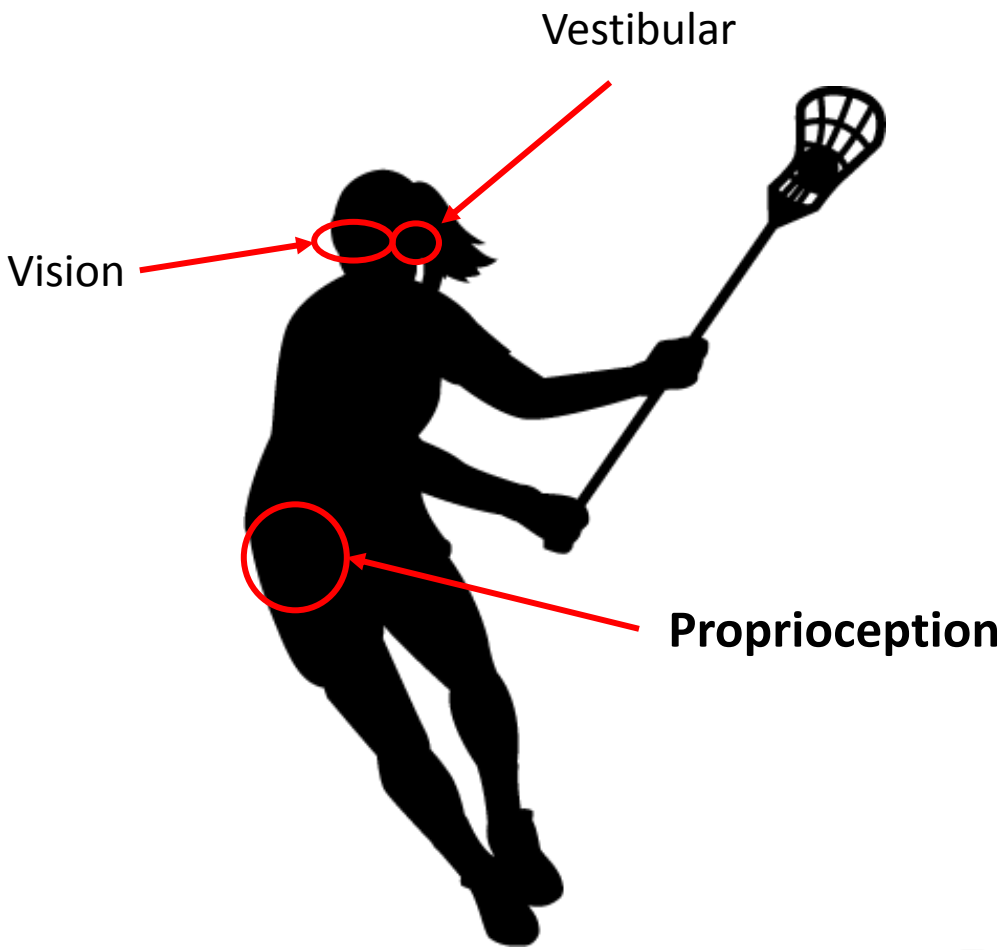
NeuroBiomechanics of the Hip

- Good balance & movement requires input from 3 systems:
  - Vision
  - Vestibular
  - **Proprioception**

- Your Brain is the GPS, these systems are the satellites



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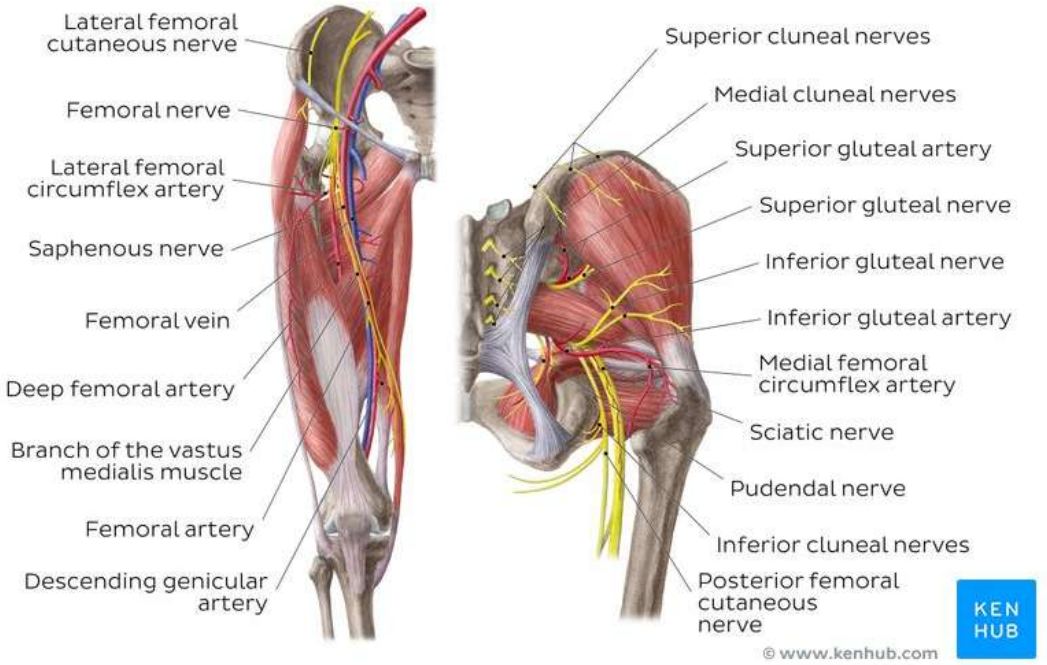
NeuroBiomechanics of the Hip

- Proprioception
  - Lives in the brain
  - Your brain's 3D map of you in time and space

- Nerve endings that provide many different types of information to the nervous system such as:
  - Mechanoreceptors (**end ROM = more input!*)
  - Chemoreceptors
  - Thermoreceptors
  - Baroreceptors
  - Electromagnetic Receptors
  - Nociceptors



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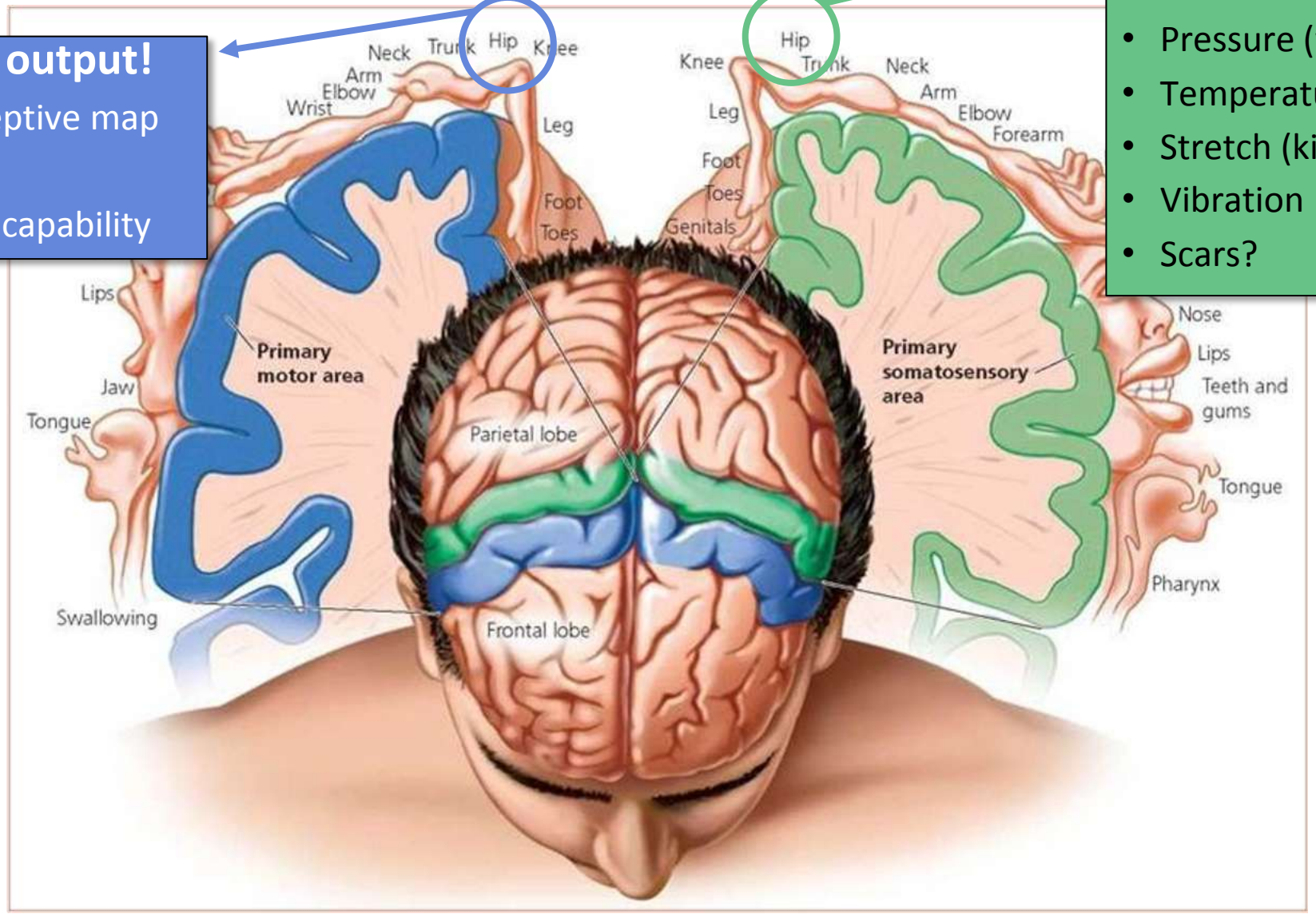
NeuroBiomechanics of the Hip

2. Better Motor output!

- Clearer proprioceptive map
- Less threat
- Better predictive capability



1. Increased sensory input:

- Skin Stimulation
- Pressure (wraps)
- Temperature (hot/cold)
- Stretch (kinesiology tape)
- Vibration
- Scars?

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NeuroBiomechanics of the Hip

- Assessments:
  - Squat or Lunge (quality/depth)
  - Active Pain-Free ROM
- Individual Joint Mobility Drills:
  - Lower Twists
  - Hip Openers
  - Pelvic Tilts
  - Hip Circles (4-Position)
- Femoral Nerve Glide

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NeuroBiomechanics of the Hip

- Lower Twists
  - Lying on back, feet on floor, knees bent at 90º, feet & knees together
  - Arms out to the sides
  - Keeping feet & knees together, let legs fall to left, then to the right
  - Repeat for 3-5 repetitions in each direction

- Hip Openers
  - Left leg folded over right knee, then the following for 4 reps:
    - Legs just fall to the left & return
    - Legs fall again, but push a bit w/ left foot
    - Right foot walks out to the right a couple inches, then let the legs fall
    - Right foot walks out again to the right a couple inches, then let the legs fall
  - Repeat on opposite side

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NeuroBiomechanics of the Hip

- Pelvic Tilts (forward/back)
  - Neutral stance with knees slightly bent.
  - Tilt the pelvis forward & back, making sure to keep the low back as still as possible
  - Keep the abdominals relaxed throughout the movement
  - Common errors:
    - Arching the low back to create motion
    - Tightening abs and/or holding breath
    - Excessive tension in upper or lower body musculature
  - Repeat for 3-5 repetitions

Forward/Anterior Tilt

Rearward/Posterior Tilt

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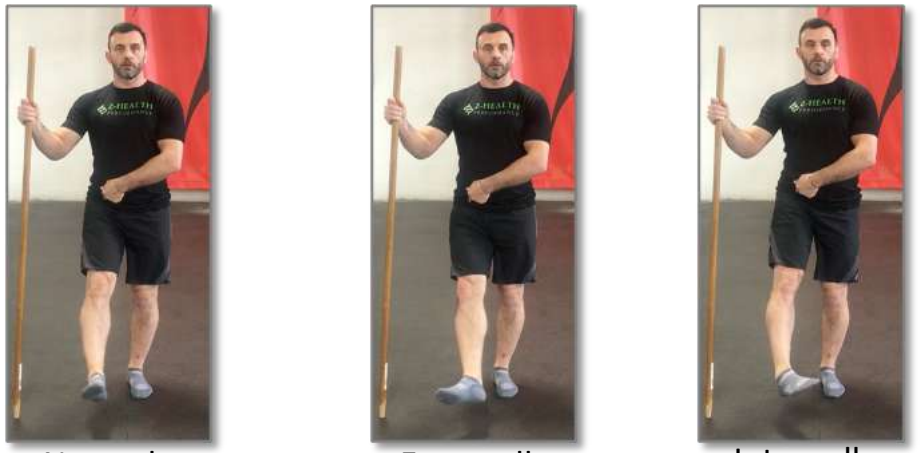
NeuroBiomechanics of the Hip

- Hip Circles (4-Position):
  - Standing in neutral stance & long spine
  - Knee is locked; pelvis straight & level
  - Perform circles at the hip joint in four positions:
    - Crossbody
    - Front
    - Side
    - Rear
  - Focus on the hip joint – not the leg
  - 3-5 circles in each direction

- Regressions:
  - Can do seated or lying
  - Very small circles or linear movements
- Progressions:
  - Externally & internally rotated hip joint
  - Not holding on for balance
  - Light band at the ankle for resistance



Neutral | Externally Rotated | Internally Rotated

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NeuroBiomechanics of the Hip

Femoral Nerve Glide Tensioning:

- **Start Position:**
  - Knee of working leg on chair w/ knee flexion
  - Kneeling w/ working leg down
- **Tensioning Sequence:**
  - Hip extension & knee flexion
  - Posterior pelvic tilt (tuck tailbone)
  - Glide hips forward (for more hip extension)
  - Laterally flex and rotate lumbar spine:
    - To opposite side
    - To same side

Femoral Nerve Flossing:

- Taking one joint in and out of the tensioned position:
  - Glide hips forward & back (in and out of hip extension
  - Flex and extend the knee
  - In and out of the spinal lateral flexion & rotation
- 6-8 reps of “flossing”

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NeuroBiomechanics of the Hip

<u>Femoral Nerve Glide Tensioning/Flossing Regressions:</u>

- **Kneeling with support:**
  - Foot unsupported = less knee flexion/less intense
  - Foot supported = more knee flexion/more intense
- **Seated with leg off chair:**
  - Foot unsupported = less knee flexion/less intense
  - Foot supported = more knee flexion/more intense
- **Standing in lunge:**
  - No knee flexion

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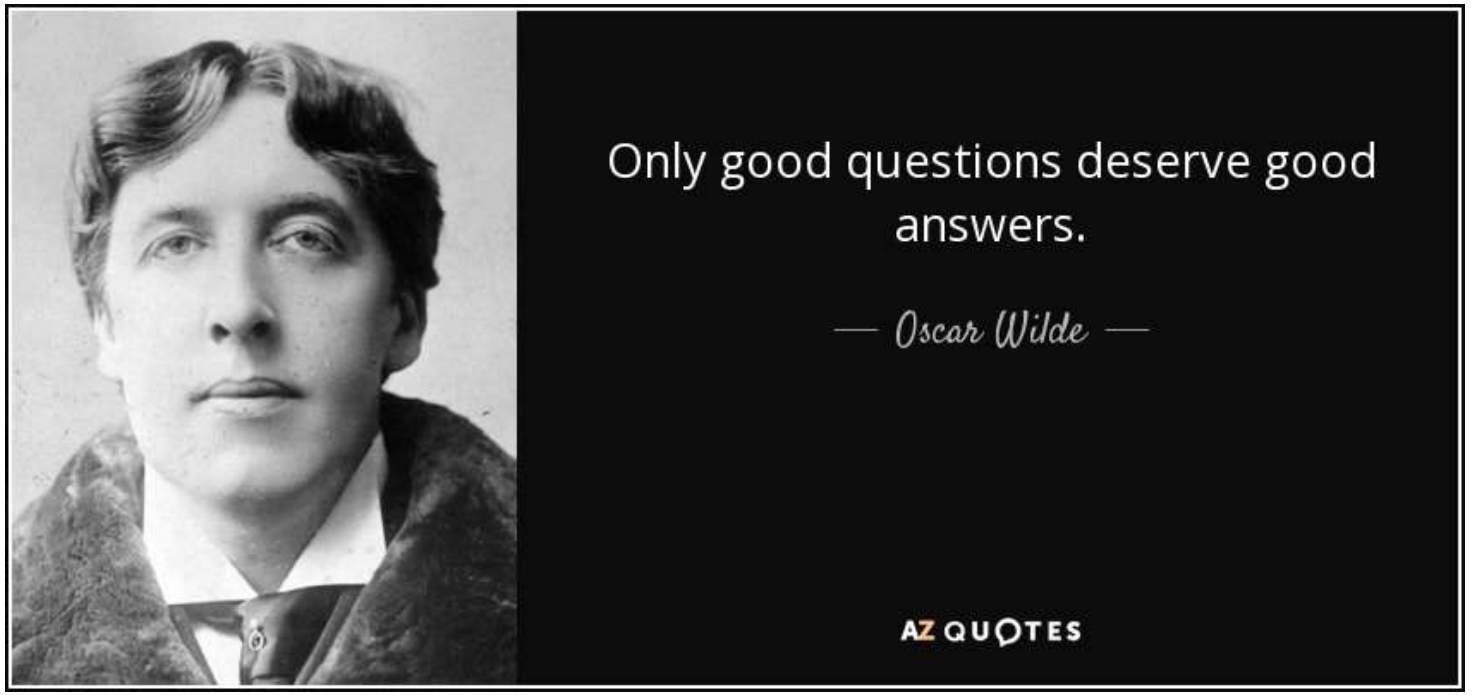
Questions?



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Elbow – May 28th

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