

PFTA SCHOOLS



Master Trainer Manual

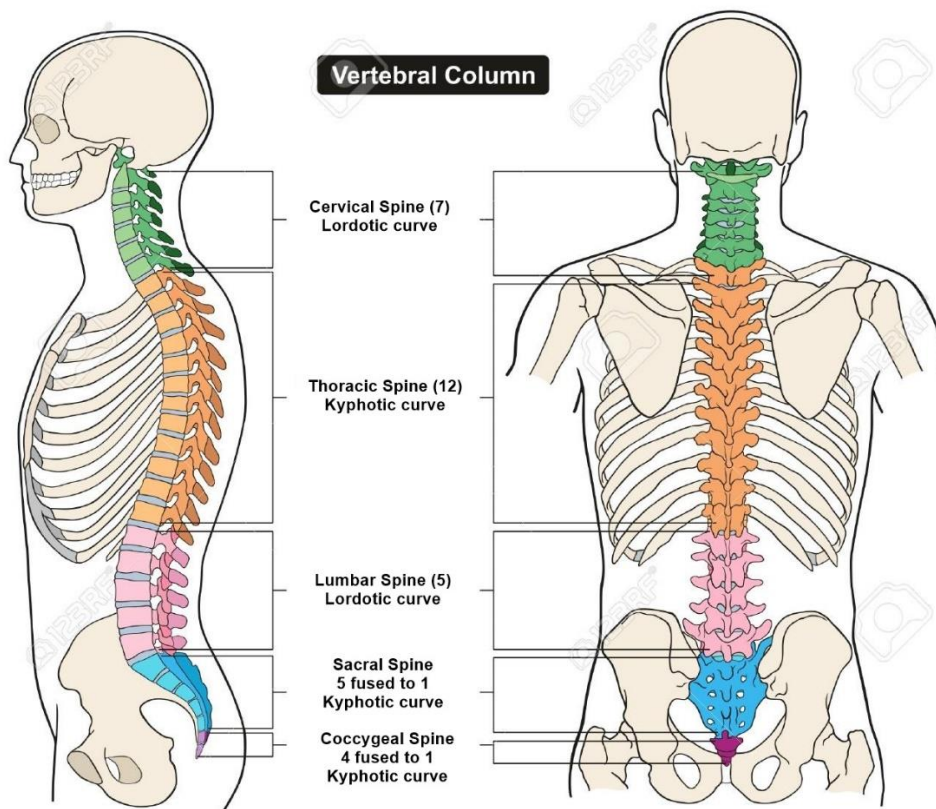
Revised 5/18/2019

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The Skeleton

1. Axial skeleton - skull, hyoid bone, vertebral column, and rib cage
2. Appendicular skeleton - limbs and their respective girdle
3. Bone classifications
 - a. Long bone - humerus, femur
 - b. Short bone - carpals and tarsals
 - c. Flat bone - scapulae, patella
 - d. Irregular - vertebrae
4. Bone growth
 - a. Bone growth, or ossification, is the increase in bone size due to an increase in bone cells.
 - i. Can increase in length at the epiphyseal plate, which is the cartilage at the end of the long bone (growth plate) until a certain age.
 - ii. Can increase in density as well
 - b. In most humans, 90% of bone mass is reached by age 18.
5. Bone cells
 - a. Osteocytes - removing and replacing calcium salts
 - b. Osteoclasts - bone destroying cells causing resorption
 - c. Osteoblasts - bone forming cells lead to deposition
6. Five regions of the spine

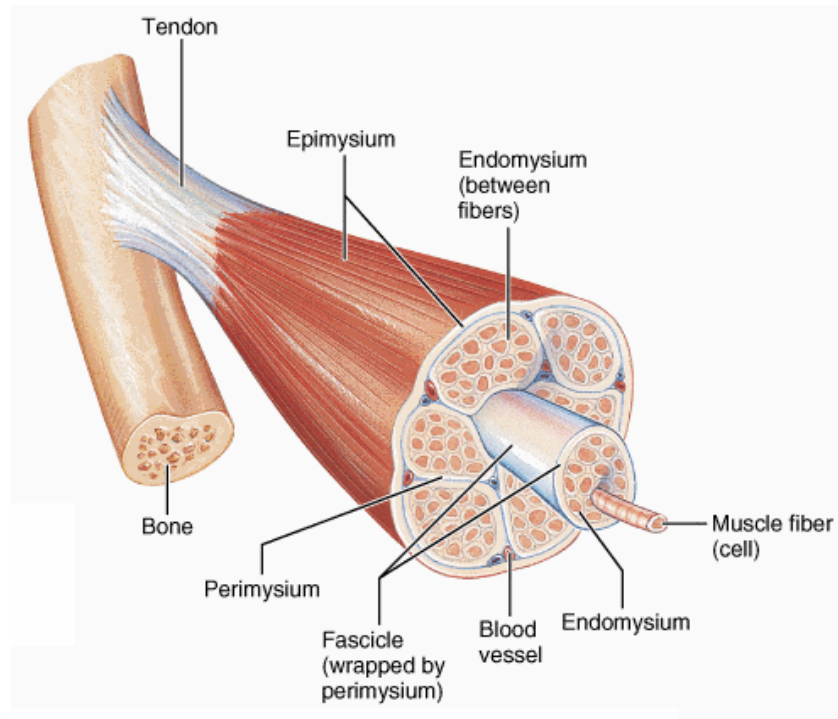


7. Exaggerated curvatures
 - a. Anterior pelvic tilt

- i. Increases the convexity (lordosis) of the lumbar spine
 - ii. May be caused by tight hip flexors and/or rectus femoris
 - b. Posterior pelvic tilt
 - i. Kyphosis - common in the elderly
 - ii. Also position held during crunches and sit-ups
- 8. Neutral spine or exercise spine
 - a. Spinal position that retains the three natural curves:
 - i. Small lordotic curve at the base of the neck
 - ii. Small kyphotic curve at the middle back
 - iii. Small lordotic curve in the low back
 - b. The erector spinae muscles normally serve as stabilizers, i.e., squats, deadlifts, rows, etc.

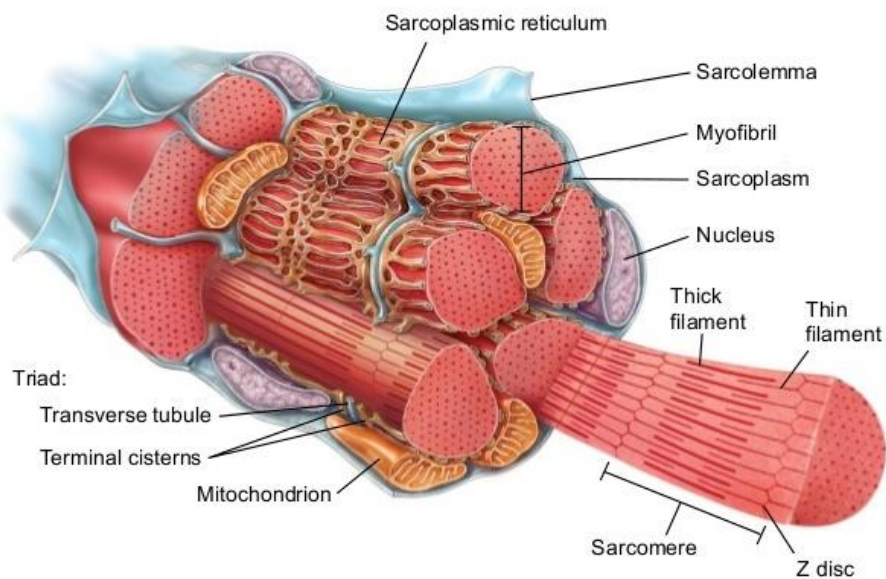
Muscles

1. The basic structure of a muscle

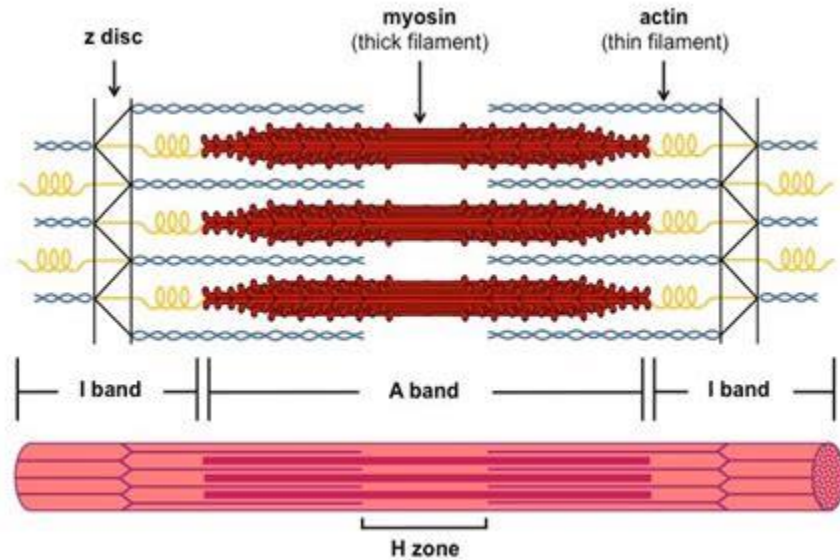


- Tendon connects muscle to bone
- Epimysium surrounds the entire muscle belly
- Perimysium surrounds a bundle of muscle fibers called a fascicle
- Endomysium surrounds each individual muscle fiber

2. The structure of a muscle fiber



- a. The thick filaments are myosin
 - b. The thin filaments are actin
 - c. The sarcoplasmic reticulum houses the calcium ions which are used to unlock the bond between actin and myosin
 - d. Sarcomeres are defined as Z disc to Z disc
3. The structure of a myofibril
- a. Titin binds the myosin with the Z discs



- b. A bands are the length of the myosin
- c. I bands are actin only