Preclinical MSK High Yield Review Resource

Rotator Cuff Musculature Anatomy and Function
Supraspinatus: suprascapular n. (c4,5,6) initiates abduction
Infraspinatus: suprascapular n. (c4,5,6) externally rotates
Teres Minor: axillary n. (c5,6) externally rotates
Subscapularis: subscapular nn. (c5,6) internally rotates
NOTE: all RC muscles stabilize the GH joint

Neurological Injury to the Upper Extremity
DON'T learn brachial plexus; learn brachial plexus injury clinical consequences

Brachial plexus lesions
1. Warten's tip (Erbi's palsy)
2. Total claw hand (Klumpke's palsy)
3. Wrist drop
4. Winged scapula
5. Deltoid paralysis
6. Saturday night palsy (wrist drop)
7. Difficulty flexing elbow, variable sensory loss
8. ↓ thumb function ("ape hand")
9. Intrinsic muscles of hand, claw hand ("Pope's blessing")

Clavicle fracture is relatively common—brachial plexus is protected from injury by subclavious muscle.
Functional Anatomy of the Hand and Wrist

Know carpal bones: Scaphoid Lunate Triquetrum Pisiform Trapezium Trapezoid Capitate Hamate [proximal row from radial to ulnar, then distal row radial to ulnar]

Understand scaphoid anatomy. Artery to scaphoid enters distally, thus proximal fractures are at high risk of nonunion and must be treated surgically. Pain in anatomic snuff box.

Knee Functional Anatomy
Bony stability is little (lots of motion, but prone to injury)
Patella acts as pully to increase mechanical advantage of quadriceps knee extensors.
Menisci enhance ability of tibial plateau to hold femoral condyles
Ligamentous stability from:
  ACL/PCL – resist anterior and posterior translation of tibia relative to femur
  MCL/LCL – resist valgus and varus stress
Chronic significant ligamentous injury leads to instability and early OA due to alterations in biomechanics of knee
**Neurological Injury to the Lower Extremity**

Know clinical consequences of injury to lower extremity compartments (via nerves affected)

**Lower extremity nerves**

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Cause of Injury</th>
<th>Motor Deficit</th>
<th>Sensory Deficit</th>
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</thead>
<tbody>
<tr>
<td>Obturator</td>
<td>Anterior hip dislocation</td>
<td>Thigh adduction</td>
<td>Medial thigh</td>
</tr>
<tr>
<td>Femoral</td>
<td>Pelvic fracture</td>
<td>Thigh flexion and leg extension</td>
<td>Anterior thigh and medial leg</td>
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<tr>
<td>Common peroneal</td>
<td>Trauma to lateral aspect of leg or fibula neck fracture</td>
<td>Foot eversion and dorsiflexion; toe extension</td>
<td>Anterolateral leg and dorsal aspect of foot</td>
</tr>
<tr>
<td>Tibial</td>
<td>Knee trauma</td>
<td>Foot inversion and plantarflexion; toe flexion</td>
<td>Sole of foot</td>
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<tr>
<td>Superior gluteal</td>
<td>Posterior hip dislocation or polio</td>
<td>Thigh abduction</td>
<td>(positive Trendelenburg sign)</td>
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<tr>
<td>Inferior gluteal</td>
<td>Posterior hip dislocation</td>
<td>Can’t jump, climb stairs, or rise from seated position</td>
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</tbody>
</table>

PED = Peroneal Everts and Dorsiflexes; if injured, foot drop PED (dorsiflex = extend foot).
TIP = Tibial Inverts and Plantarflexes; if injured, can’t stand on TIP toes.
Basic Sciences

Know the exact steps involved in muscle contraction/sliding filament theory

1. The active site on actin is exposed as Ca^{2+} binds troponin.

2. The myosin head forms a cross-bridge with actin.

3. During the power stroke, the myosin head bends, and ADP and phosphate are released.

4. A new molecule of ATP attaches to the myosin head, causing the cross-bridge to detach.

5. ATP hydrolyzes to ADP and phosphate, which returns the myosin to the "cocked" position.