### System: Musculoskeletal

### Condition: Foundational Sciences

*(BOLD content unlikely to be covered elsewhere in the curriculum)*

<table>
<thead>
<tr>
<th>Content</th>
<th>Educational objectives</th>
<th>Level of Mastery*</th>
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<tr>
<td><strong>Anatomy</strong></td>
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</table>
| • Anatomical structure and function of the musculoskeletal system and common gender differences | • Describe anatomy and neurology of musculoskeletal system  
• Explain the gender differences in lower extremity structural alignment  
• Discuss the differences in muscle mass between males and females across the lifespan and how this impacts functional performance | M  
P  
P |
| **Physiology** | | |
| • Normal physiological function of the musculoskeletal system  
• Aware of interaction of the musculoskeletal system with other body systems as it relates to functional movement | • Discuss the normal response of bone to loading  
• Describe the remodeling/repair cycle of bone, muscle, tendon/connective tissue and nerve  
• Understand the influence of estrogen on bone structure and function  
• Describe the differences in aerobic and anaerobic capacity between males and females across the lifespan | P  
M  
F  
F |
| **Pathophysiology** | | |
| • Common Conditions: osteoporosis, female athlete triad, athletic injuries  
• Aware of special diagnostic criteria established in medical community  
• Risk factors for osteoporosis (sex, age, hormone status, inactivity, poor diet) and other conditions specific to women | • Discuss mechanism related to development of osteoporosis, and female athletic triad and consequences to health and function for each  
• Demonstrate familiarity with the effects of hormonal imbalance on the reproductive and skeletal function  
• Describe common risk factors for osteoporosis  
  o Discussion anatomical factors linked to common fracture site such as anterior vertebral body and femoral neck  
  o Recognize disease process that may contribute to poor bone health  
  o Understand biomechanical changes associate with increased thoracic kyphosis  
• Understand the concept of energy availability in the pathophysiology of the female athlete triad  
  o Understand the effects on cardiac, respiratory, skeletal, and muscle systems  
  o Discuss the potential long-term health consequences of this condition  
• Recognize proposed anatomical and physiologic factors linked to increased incidence of ACL injuries such as hormonal state, notch size | F  
F  
M  
P |
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<th>Pharmacology</th>
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<td>• Physiologic changes of exercise on the musculoskeletal system function</td>
<td>• Identify medications used to treat musculoskeletal system conditions</td>
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<td>• Training programs for injury prevention targeting female non-contact ACL</td>
<td>• Assess impact of medications used to improve musculoskeletal system on physical therapy intervention</td>
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- **Pharmacology**
  - Identify medications used to treat musculoskeletal system conditions
  - Assess impact of medications used to improve musculoskeletal system on physical therapy intervention

- **Exercise Science**
  - Utilize specific exercise methods to elicit desired physiologic response in the musculoskeletal system
  - **Describe evidence supported training methods to improve bone health**
  - **Describe evidence supported training methods that minimize non-contact ACL injury**

- **Recognize biomechanical factors associate with ACL injuries and patellofemoral pain such as poor dynamic control of femur**
  - Describe the effect of excessive femoral internal rotation and adduction on knee and ankle kinematics
  - Discuss the effects of varying angles of hip and knee flexion on jump landing force distribution

* F = Familiar; P= Proficient; M= Mastery