School of Veterinary Medicine
UNIVERSITY OF WISCONSIN-MADISON

Primary author: Dr. McLean Gunderson
Collaborators: Dr. Jessica Rippe
Dr. Karen Hershberger

Movement & Support of the Equine Distal Limb & Foot

Context

The equine distal limb consists of a complex set of structures that enables horses to ambulate over most surfaces, conserve energy, and be athletic despite their large size. While 90% of lamenesses in the horse are isolated to the foot, there are many structures in the equine limb that are also prone to injury and responsible for causing lameness. Communication with clients around these concepts is essential to enact effective treatment plans, improve the quality of life for your patients and return them to normal function.

Learning Outcomes

By the end of the session, you should be able to:

- ☐ Identify the crucial anatomical components of the equine distal limb to include bones (anatomic and common names), ligaments, tendons, soft tissue structures, and joints (anatomic and common names).
- ☐ Explain the topographical relationships of the various musculoskeletal structures of the equine distal limb.
- ☐ Describe the distal tendon attachments.
- ☐ Explain the actions of the distal tendons (flexion and extension) displayed on this model.
- ☐ Describe how the structures of the equine distal limb mitigate physical forces when weight bearing.
- ☐ Differentiate between lateral cartilages and side bones.
- ☐ Describe the action that the distal flexor tendons will have on the digital joints if the equine foot is affected by laminitis (inflammation of the lamina) and P3 separates from the hoof wall.

Criteria for Success

1. Use resources effectively to complete all learning outcomes.
2. Meet all expectations for the learning community during ALE participation.
3. Complete the Connect section.
4. Devise a plan to clear up points of confusion on your own.

Active Learning Instructions

1. Identify the following structures of the distal limb model as you disassemble it:
    - ☐ Epidermis/hoof wall (insensitive)
    - ☐ Hoof regions
        - ☐ Quarter
        - ☐ Heel
        - ☐ Bulbs of heel
        - ☐ Toe
    - ☐ Dermis/corium (sensitive)
    - ☐ Tendons, ligaments & soft tissue structures
        - ☐ Distal tendon of superficial digital flexor (SDF)
            - ☐ Flexor manica

- ☐ Distal tendon of deep digital flexor (DDF)
- ☐ Distal tendon of the long or common digital extensor
- ☐ Suspensory ligament (Interosseous ligament)
- ☐ Medial & lateral extensor branches of the interosseous ligament
- ☐ Distal sesamoidean ligaments
- ☐ Lateral cartilages
- ☐ Digital cushion
- ☐ Navicular bursa

- ☐ Bones & bony structures
  - ☐ Cannon bone (metacarpal/metatarsal 3)
  - ☐ Splint bones (metacarpals/metatarsals 2 & 4)
    - ☐ Buttons
  - ☐ Medial & lateral proximal sesamoids
  - ☐ Long pastern, short pastern & coffin bones (proximal [P1], middle [P2] & distal [P3] phalanges)
    - ☐ Extensor process of P3
  - ☐ Navicular bone (distal sesamoid)

- ☐ Joints (do not disarticulate the joints- leave collateral ligaments intact)
  - ☐ Metacarpophalangeal/metatarsophalangeal (fetlock) joint
  - ☐ Proximal interphalangeal (pastern) joint
  - ☐ Distal interphalangeal (coffin) joint

2. Using the crafting supplies provided, create the following structures.
   - ☐ Annular ligaments of the fetlock
   - ☐ Intersesamoidean ligaments
   - ☐ Distal navicular ligament (impar ligament)

3. Reassemble the model, associating structure & location to function.

4. Using the model, demonstrate the:
   - ☐ Landing and breakover pattern of the equine foot
   - ☐ Hyperextension of the distal joints upon impact through breakover of the foot
   - ☐ Flexion of the distal joints that would occur during the swing phase of locomotion

Connect

1. Complete all learning outcomes listed above.
2. Demonstrate with a drawing or labeled image a sagittal versus transverse section.
3. Draw or label one of each of the following various shapes of bones.
   - ☐ Long bone
   - ☐ Short bone
   - ☐ Sesamoid bone
4. Demonstrate with a drawing or labeled image the regions of long bones.
   - ☐ Diaphysis
   - ☐ Epiphysis
   - ☐ Physis
   - ☐ Metaphysis