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Extrinsic Muscles of the Forelimb Activity

Context: To amputate a damaged or diseased front leg in dogs and cats, most surgeons will remove the entire forelimb, including the scapula. Since the forelimb only has eight muscles that attach the front leg to the thorax, it is straightforward to remove the forelimb by cutting these muscles.

Purpose: In this activity, you will use models of the eight extrinsic muscles to provide you with a different "view" of these muscles, their attachments, and their three-dimensional (topographical) relationships.

Learning Outcomes: By the end of this activity, you should be able to:

1. Identify the eight extrinsic muscles of the forelimb on a model or cadaver.
2. Identify the proximal and distal attachments of these eight muscles on a model or cadaver.
3. Describe the topographical relationships between these eight muscles using correct anatomical terminology.

EXTRINSIC FORELIMB MUSCLES

MUSCLE	ATTACHMENTS
☐ **superficial pectoral m.**	proximal: ventral surface of cranial sternebrae distal: greater tubercle of humerus (proximal, cranial humerus)
☐ **deep pectoral m.**	proximal: ventral surface of sternebrae distal: lesser tubercle & greater tubercle of the humerus
☐ **brachiocephalicus m.**	Note: The brachiocephalicus m. is composed of three distinct muscles that share a common attachment at the clavicular intersection. In this class, we will consider it to be one functional muscle group. proximal: caudal skull; median raphe of the neck and underlying cervical vertebrae distal: distal, cranial humerus
☐ **omotransversarius m.**	proximal: transverse process (aka "wing") of atlas (C1) distal: distal spine of the scapula
☐ **trapezius m.**	proximal: median raphe of the neck; supraspinous ligament from cranial cervical to caudal thoracic vertebrae distal: spine of the scapula
☐ **rhomboideus m.**	proximal: caudal skull; median raphe of the neck and underlying cervical vertebrae; spinous processes of cranial thoracic vertebrae distal: dorsal, medial scapula
☐ **latissimus dorsi m.**	proximal: thoracolumbar fascia distal: proximal, medial humerus
☐ **serratus ventralis m.**	proximal: transverse processes of caudal cervical vertebrae; cranial ribs distal: proximal, medial scapula

Instructions: Work in groups of 3 to 4 students.

1. Identify all eight of the red felt extrinsic muscles.
   NOTE: Rubber cement has already been applied to the muscles at their attachment points (black circles with an x) and to the attachment points on the skeleton (black circles).

Shapes of the extrinsic muscle models.

2. Attach the **serratus ventralis m.**, first attaching this muscle to its proximal attachments (focusing on the attachments on the ribs) and then to its distal attachment on the proximal, medial scapula. [Note: The model of the serratus ventralis m. focuses on the thoracic portion of this muscle.]

3. Attach the **rhomboideus m.**, first attaching this muscle to its proximal attachments and then to the distal attachment on the dorsal, medial scapula.

4. Attach the **deep pectoral m.**, first attaching this muscle to its proximal attachments on the ventral surface of the sternebrae and then to the distal attachment on the lesser tubercle & greater tubercle of the humerus.

5. Attach the **superficial pectoral m.**, first attaching this muscle to its proximal attachments on the ventral surface of the cranial sternebrae and then to the distal attachment on the greater tubercle of the humerus.

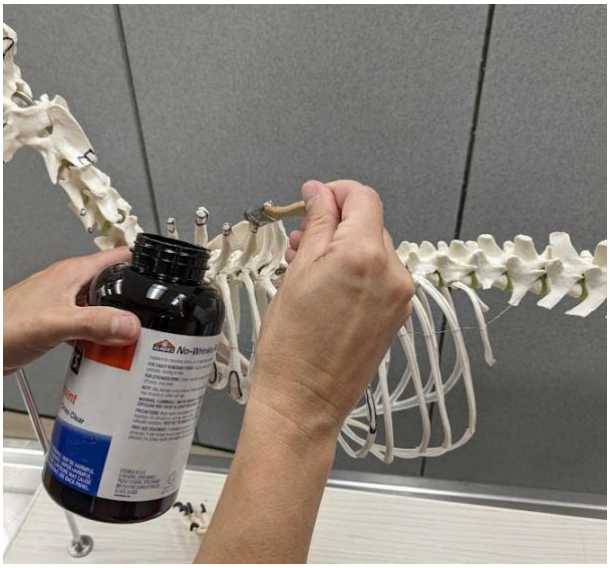
6. Attach the **trapezius m.**, first attaching this muscle to its proximal attachments and then to the distal attachment on the spine of the scapula.

7. Attach the **omotransversarius m.**, first attaching this muscle to its proximal attachment on the transverse process of the atlas and then to the distal attachment on the distal spine of the scapula.

8. Attach the **brachiocephalicus m.**, first attaching this muscle to its proximal attachments, including the mastoid part on the caudal skull, and then to the distal attachment on the distal, cranial humerus.

9. Attach the **latissimus dorsi m.**, first attaching this muscle to its proximal attachments and then to the distal attachment on the proximal, medial humerus.

10. Take a moment to examine the three-dimensional (topographical) relationships of the extrinsic muscles on your completed model.

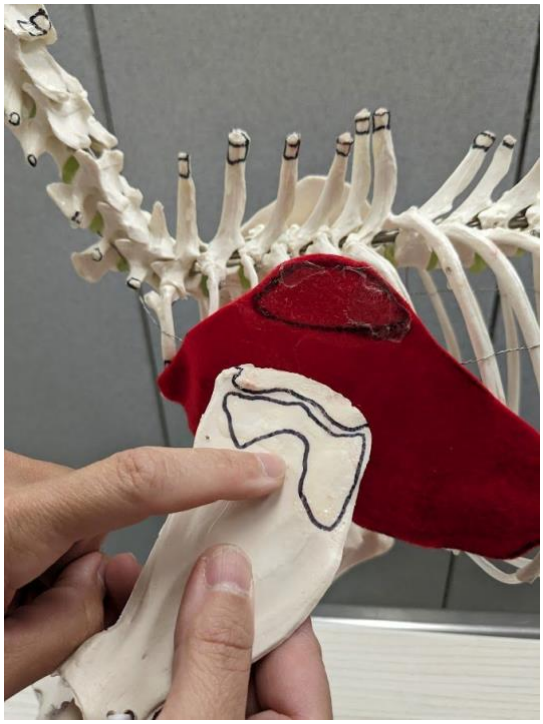


11. GENTLY remove all of the muscle models from the skeleton and lay them back on the table.

12. Apply a layer of rubber cement to all of the attachment sites (outlined in black ink) on both the skeleton and the left forelimb.

Connections:

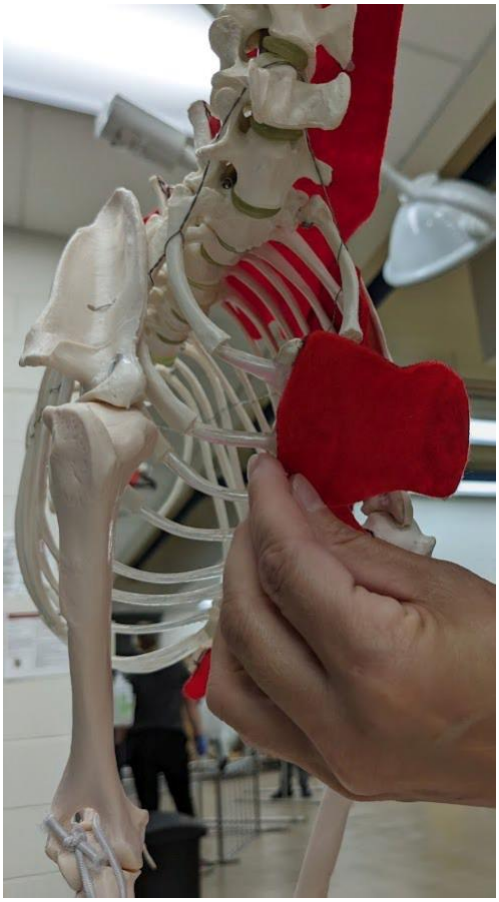
1. How did building the extrinsic muscles from the inside out help you to achieve the learning outcomes?
2. How could you use your knowledge of the eight extrinsic muscles to perform a forelimb amputation as a veterinarian?



Distal attachment of serratus ventralis m. on the scapula outlined in black.

Model after attaching serratus ventralis and rhomboideus mm.

Attaching the deep pectoral m. to the humerus.



Attaching the superficial pectoral m. to the cranial sternebrae.

Model after attaching omotransversarius and trapezius mm.

Model with all 8 extrinsic muscles attached.