

Lab 1:

Regions of the thoracic limb (proximal to distal)	Bones of the region	Common Name	Species
Withers	Highest point of spinous processes of thoracic vertebrae		Horse
Shoulder	Scapula		All
Brachium	Humerus	Arm	All
Antebrachium	Radius, ulna	Forearm	All
Manus	Bones of carpus, metacarpus, digits		All
Carpus	Carpal bones	'Knee' – particularly in horse	All
Metacarpus	Metacarpal bones	'Cannon' – ungulate	All
Digit	Phalanges (proximal, middle, distal)	In ungulates, includes pastern and "foot"	All
Pastern	Proximal and middle phalanges		Ungulates
Foot	Distal phalanx	Hoof	Ungulates

Joints of the thoracic limb (proximal to distal)	Common Name
Scapulohumeral or glenohumeral joint	Shoulder
Cubital joint	Elbow
Carpus	“Knee” in horse
antebrachiocondylar joint	
middle carpal joint	
carpometacarpal joint	
Metacarpophalangeal joint	Fetlock, Ankle (ungulates)
Proximal interphalangeal joint	Pastern joint – ungulates
Distal interphalangeal joint	Coffin joint – ungulates

Osteology of Shoulder and Brachium		
Osteology	Features	Species differences/comments
Scapula	Scapular spine	
	Acromion	Two parts in cat; acromion not present in horse and pig
	Supraspinous fossa	
	Infraspinous fossa	
	Subscapular fossa	
	Supraglenoid tubercle	
	Serrated face	
	Glenoid cavity	
	Neck of scapula	
	Scapular cartilage (attached at dorsal margin of scapula)	Ungulate
Clavicle	Near point of shoulder.	Dog – a fibrous clavicular intersection; Cat – has bony clavicle
Humerus	Head of humerus	

	Greater tubercle	Horse – cranial and caudal parts
	Lesser tubercle	
	Intermediate tubercle	Horse
	Intertubercular (bicipital) groove	
	Neck of humerus	
	Shaft or body of humerus	
	Deltoid tuberosity	
	Teres major tuberosity	
	Teres minor tuberosity	
	Lateral supracondylar crest	
	Lateral/medial epicondyles	
	Humeral condyle	
	Supratrochlear foramen	Dog
	Supracondylar foramen	Cat

Osteology of Antebrachium		
Osteology	Features	Species differences/comments
Radius	Head of radius	
	Radial tuberosity	
	Shaft or body of radius	
	Medial styloid process	
Ulna	Olecranon of ulna/tuber olecrani/olecranon tuberosity	
	Trochlear notch	
	Anconeal process	
	Medial and lateral coronoid process	
	Ulnar tuberosity	
	Lateral styloid process	Fused to radius in horse

Osteology of Carpus	
Osteology	Species differences/comments
Intermedioradial carpal bone	Carnivore only (= fused intermediate and radial carpal bones)
Radial carpal bone	Ungulate only
Intermediate carpal bone	Ungulate only
Ulnar carpal bone	
Accessory carpal bone	projects palmarly as very palpable prominence
Carpal bones I, II, III, IV	Carnivore – 1, 2, 3, 4 Pig – 1, 2, 3, 4 Ruminant – Fused 2/3, 4 Horse – [inconsistent 1], 2, 3, 4
Sesamoid in abductor pollicis longus	Carnivore

Osteology of Metacarpus and Digit		
Osteology	Features	Species differences/comments
Metacarpal bones	Base (proximal end); Head (distal end)	
Metacarpal bone I		Carnivore only
Metacarpal bone II	Horse – “button” of splint bone at distal end	Horse – MC2 is the medial splint bone
Metacarpal bone III	Sagittal ridge of MC3	Horse
aka Cannon bone of ungulates	Metacarpal tuberosity	Ungulate – Insertion of ECR m. Ruminant – MC3+MC4 fused
Metacarpal bone IV	Horse – “button” of splint bone at distal end	Horse – MC4 is the lateral splint bone Ruminant – MC3+MC4 fused
Metacarpal bone V		Carnivore present, and ruminant – vestigially present
Proximal sesamoid bones	‘Base’, ‘apex’, axial and abaxial surfaces	Ungulate only; at level of palmar side of metacarpophalangeal joint
Dorsal sesamoid bones		Carnivore only
Distal sesamoid/Navicular bone	proximal border, distal border, flexor and articular surfaces, sagittal ridge of navicular bone	Ungulate at level of palmar distal interphalangeal joint.

Digits I-V – species variation	Consist of proximal, middle and distal phalanges; axial and abaxial side to each digit (or medial and lateral sides in horse since only one digit)	Carnivores – 5 digits (2-5 are weight bearing) Ruminant and Pig – 4 digits (3 and 4 are weight bearing; 2 and 5 = dewclaws) Horse – 1 digit (3rd digit, bears all weight of limb!)
Proximal phalanx	Base (proximal end); Head (distal end)	Ungulate – Pp, P1, long pastern bone
Middle phalanx	Base (proximal end); Head (distal end)	Ungulate – Pm, P2, short pastern bone Carnivore – Pm is absent in digit 1.
Distal phalanx		Ungulate – Pd, P3, coffin or pedal bone
	Extensor process	All (attachment of CDE)
	Flexor tubercle of Pd	Carnivore, Ruminant
	Solar border (margin)	Horse
	Crena marginis solearis	Horse
	Medial and lateral palmar processes ('wings') of Pd	Horse
	Solar surface	Horse (DDFT attaches to solar surface)

Ligaments related to bones and joints of the thoracic limb

Landmarks	Species differences/comments
Transverse humeral retinaculum	Carnivore
Medial/lateral collateral ligaments of elbow	
Medial/lateral collateral ligaments of carpus	
Elastic dorsal ligaments – know concept	Cat
Palmar (inter)sesamoidean ligament	Horse
Straight sesamoidean ligament	Horse – superficial, Y
Oblique sesamoidean ligament	Horse – middle, V
Cruciate sesamoidean ligament	Horse – deep, X
Collateral sesamoidean ligaments	Horse – proximal sesamoids to MC3 and Pp
Collateral (suspensory) ligg. of navicular bone	Horse
Distal navicular (impar) ligament	Horse
Proximal and distal interdigital ligaments	Ruminant

Lab 3: Extrinsic Thoracic Limb muscles and structures

Muscle/structure	Muscle attachments/comments	Muscle actions/comments
CUTANEUS TRUNCI M.	<ol style="list-style-type: none"> 1. Superficial fascia of the trunk and skin 	Twitches skin
SUPERFICIAL PECTORAL M.	<ol style="list-style-type: none"> 1. Cranial sternum (1st-3rd sternebrae) 2. Proximal cranial humerus (Crest of greater tubercle) 3. <ul style="list-style-type: none"> • Cat difference: limb attachment is on proximal ulna. 	Adduct limb
DEEP PECTORAL M.	<ol style="list-style-type: none"> 1. Ventral sternum 2. Lesser and greater tubercles (of humerus) 	Adduct limb
BRACHIOCEPHALICUS M.	<ol style="list-style-type: none"> 1. Clavicular intersection 2. Cranial midline neck and temporal bone (mastoid process). 3. Cranial, distal humerus 4. <ul style="list-style-type: none"> • Cat difference: limb attachment on proximal ulna. 	Extend shoulder joint; draw head and neck to the side
Clavicular intersection/clavicle in cat	The 'center' of the brachiocephalicus m. from which parts are named.	Note in carnivores only.
OMOTRANSVERSARIUS M.	<ol style="list-style-type: none"> 1. Wing of atlas (C1 vertebra) 2. Acromion of scapula and scapular spine 	Advance the limb; flex neck laterally

TRAPEZIUS M.	<ol style="list-style-type: none"> 1. Dorsal midline – neck to cranial thorax 2. Scapular spine 	Draw scapula dorsally (elevate scapula/limb)
RHOMBOIDEUS M.	<ol style="list-style-type: none"> 1. Skull, and dorsal midline – neck to cranial thorax 2. Dorsal border of scapula 	Draw scapula dorsally (elevate scapula/limb)
LATISSIMUS DORSI M.	<ol style="list-style-type: none"> 1. Thoracolumbar fascia 2. Teres major tuberosity (of humerus) 	Flex shoulder joint; draw free limb caudally, as in digging action.
SERRATUS VENTRALIS M.	<ol style="list-style-type: none"> 1. Cervical vertebrae and ribs 2. Serrated face of scapula 	Support the trunk
STERNOCEPHALICUS M.	<ol style="list-style-type: none"> 1. 1st sternebra (aka manubrium) 2. Occipital bone and mastoid process of temporal bone 	To draw the head and neck to the side
STERNOHYOIDEUS M.	<ol style="list-style-type: none"> 1. 1st sternebra & 1st costal cartilage 2. Hyoid apparatus 	Pull tongue & larynx caudally
STERNOTHYROIDEUS M.	<ol style="list-style-type: none"> 1. 1st costal cartilage 2. Thyroid cartilage of larynx 	Pull tongue & larynx caudally
OMOHYOIDEUS M.	Note in horse only; no need to know attachments	'Backstop muscle' of jugular groove in cranial neck.

CUTANEUS COLLI M.	Note in horse only; no need to know attachments	Covers external jugular v. in caudal neck.
SUBCLAVIUS M.	Horse, pig – no need to know attachments.	Extra pectoral muscle.
Superficial thoracic v.	Horse only feature.	

Lab 4: Intrinsic muscles of shoulder and brachium

Muscle Action Groups	
Extensors of the shoulder	<ul style="list-style-type: none">• Supraspinatus• Infraspinatus• Subscapularis
Flexors of the shoulder	<ul style="list-style-type: none">• Deltoideus• Teres minor• Teres major
Extensors of the elbow	<ul style="list-style-type: none">• Tensor fasciae antebrachii• Triceps brachii
Flexors of the elbow	<ul style="list-style-type: none">• Biceps brachii• Brachialis• Brachioradialis (cat, next lab)

Muscle/structure	Attachments/comments	Action/comments
SUPRASPINATUS M.	<ol style="list-style-type: none"> 1. Supraspinous fossa 2. Greater and lesser tubercle (of humerus) – species variation 	Extend shoulder joint/shoulder stabilization
INFRASPINATUS M.	<ol style="list-style-type: none"> 1. Infraspinous fossa 2. Greater tubercle (of humerus) – lateral aspect 	Extend shoulder joint/shoulder stabilization
Infraspinatus m. bursa	Deep to superficial tendon of m. ie it is a subtendinous bursa	Protect tendon as passing over bone
SUBSCAPULARIS M.	<ol style="list-style-type: none"> 1. Subscapular fossa 2. Lesser tubercle (of humerus) 	Extend shoulder joint/shoulder stabilization
DELTOIDEUS M.	<ol style="list-style-type: none"> 1. Scapula (acromion and spine) – species variation. 2. Deltoid tuberosity (of humerus) 	Flex shoulder joint
TERES MINOR M.	<ol style="list-style-type: none"> 1. Caudal border of scapula (distal) 2. Teres minor tuberosity of humerus 	Flex shoulder joint; rotate shoulder laterally
TERES MAJOR M.	<ol style="list-style-type: none"> 1. Caudal border of scapula (proximal) 2. Teres major tuberosity (of humerus) 	Flex shoulder joint
TENSOR FASCIAE ANTEBRACHII M.	<ol style="list-style-type: none"> 1. Fascia covering latissimus dorsi m. 2. Olecranon of ulna 	Extend elbow joint (weak)

TRICEPS BRACHII M. (LONG HEAD)	<ol style="list-style-type: none"> 1. Caudal border of scapula 2. Olecranon of ulna 	Extend elbow joint (secondary: flex shoulder joint)
TRICEPS BRACHII M. (LATERAL HEAD)	<ol style="list-style-type: none"> 1. Proximal lateral humerus 2. Olecranon of ulna 	Extend elbow joint
TRICEPS BRACHII M. (ACCESSORY HEAD)	<ol style="list-style-type: none"> 1. Neck of the humerus 2. Olecranon of ulna 	Extend elbow joint
TRICEPS BRACHII M. (MEDIAL HEAD)	<ol style="list-style-type: none"> 1. Proximal medial humerus 2. Olecranon of ulna 	Extend elbow joint
BICEPS BRACHII M.	<ol style="list-style-type: none"> 1. Supraglenoid tubercle 2. Ulnar and radial tuberosities – species variation 	Flex elbow joint (secondary: extend shoulder joint)
Intertubercular (bicipital) bursa	Horse and ruminant structure	Protects tendon passing over point of shoulder
Lacertus fibrosus	Horse; long tendon of insertion of biceps into Extensor Carpi Radialis m.	
BRACHIALIS M.	<ol style="list-style-type: none"> 1. Proximal lateral humerus 2. Ulnar and radial tuberosities – species variation 	Flex elbow joint

Lab 5: Intrinsic Thoracic Limb mm. – antebrachium

Muscle Action Groups	
Extensors of carpus and digits	<ul style="list-style-type: none">• Extensor carpi radialis• Common digital extensor• Lateral digital extensor• Abductor digiti I longus
Flexors of carpus and digits	<ul style="list-style-type: none">• Ulnaris lateralis• Flexor carpi radialis• Superficial digital flexor• Deep digital flexor• Flexor carpi ulnaris
Supinators	<ul style="list-style-type: none">• Brachioradialis (cat)• Supinator
Pronators	<ul style="list-style-type: none">• Pronator teres• Pronator quadratus

Muscle/structure	Attachments/comments	Action/comments
EXTENSOR CARPI RADIALIS M.	<ol style="list-style-type: none"> 1. Lateral supracondylar crest of the humerus 2. Dorsal base of metacarpal(s) – species variation 	Extend carpus
COMMON DIGITAL EXTENSOR M.	<ol style="list-style-type: none"> 1. Lateral epicondyle of the humerus 2. Extensor process of the distal phalanges – species variation. 	Extend digits and carpus
LATERAL DIGITAL EXTENSOR M.	<ol style="list-style-type: none"> 1. Lateral epicondyle of the humerus – carnivores Proximal radius and ulna – ungulates 2. Dorsal base (ie proximal end) of phalanges – species variation 	Extend digits and carpus
ABDUCTOR DIGITI I LONGUS M.(ABDUCTOR POLLICIS LONGUS)	<ol style="list-style-type: none"> 1. Craniolateral ulna 2. Base of medial metacarpus – species variation 	Abduct first digit (as exists) and extend carpus
Extensor retinaculum	Fibrous band of thickened fascia at level of dorsal carpus	Binds down extensor tendons
ULNARIS LATERALIS M.	<ol style="list-style-type: none"> 1. Lateral epicondyle of the humerus 2. Base of lateral metacarpus – species variation 	Flex carpus; abduct manus at carpus
Ulnaris lateralis bursa	Synovial ‘cushion’ deep to proximal tendon of origin	Horse
FLEXOR CARPI RADIALIS M.	<ol style="list-style-type: none"> 1. Medial epicondyle of the humerus and medial radius 	Flex carpus

	<ol style="list-style-type: none"> Palmar base of metacarpals – species variation 	
SUPERFICIAL DIGITAL FLEXOR M.	<ol style="list-style-type: none"> Medial epicondyle of the humerus Palmar base of middle phalanges (plus proximal phalanx in horse) <ul style="list-style-type: none"> Note, two bellies in ruminant. 	Flex proximal interphalangeal joints; flex carpus and metacarpophalangeal joints)
Accessory ligament of SDF	aka proximal (superior) check ligament	Horse
DEEP DIGITAL FLEXOR M. (Humeral, Ulnar, Radial heads)	<ol style="list-style-type: none"> Medial epicondyle of the humerus, caudal ulna, medial radius Flexor tubercle of distal phalanges (solar surface in horse) 	Flex digits and carpus
Accessory ligament of DDF	aka distal or inferior check ligament	Horse
Flexor retinaculum	Fibrous band with superficial and deep parts on the palmaromedial carpus	Binds digital flexors within carpal canal
FLEXOR CARPI ULNARIS M. (Humeral and Ulnar heads)	<ol style="list-style-type: none"> Medial epicondyle of humerus, and olecranon Accessory carpal bone 	Flex carpus
BRACHIORADIALIS M <i>(Cat Only; Vestigial, but frequently seen, in Dog)</i>	<ol style="list-style-type: none"> Lateral distal humerus Distal radius 	Supination
SUPINATOR M.	<ol style="list-style-type: none"> Lateral epicondyle of the humerus Cranial, proximal radius 	Supination of distal limb (and flex elbow)

PRONATOR TERES M.	<ol style="list-style-type: none">1. Medial epicondyle of the humerus2. Medial border of proximal mid radius	Pronation of the distal limb (and flex elbow)
PRONATOR QUADRATUS M.	<ol style="list-style-type: none">1. Apposed surfaces of the radius and ulna	Pronation of the distal limb
Synovial tendon sheaths	Surround tendons of muscles passing over joints	Also to view in next lab

Lab 7: Ungulate distal limb

Note, a number of these terms have been introduced in previous labs.

Structure/feature	Comments/species specific
Ligament of ergot	Horse – if remains visible after skin reflection
Lateral and medial collateral ligaments of carpus	
Carpal canal	Bound by 3 structures
Flexor retinaculum	
Palmar carpal ligament	
Accessory carpal bone	
Carpal sheath	Synovial sheath wrapped around flexor tendons in carpal canal.
Dorsal metacarpal ligament	Horse
Common digital extensor tendon(s)	Two tendons present in ruminant
Lateral digital extensor tendon	
Tendon sheath	
Suspensory ligament	Recall, fused 3rd and 4th interossei in ruminant.
Superficial digital flexor tendon	Two tendons in ruminant

Deep digital flexor tendon	
Accessory ligament of DDFT = distal check ligament	Horse
Dorsal pouch fetlock joint	Horse
Synovial fold	Horse – within dorsal pouch of fetlock joint
Palmar pouch of fetlock joint	Horse
Digital flexor tendon sheath	Horse
Manica flexoria	Horse – part of SDFT surrounding DDFT
Palmar (inter)sesamoidean ligament	Horse
Palmar annular ligament	
Proximal digital annular ligament	Horse
Distal digital annular ligament	Horse
Dtraight sesamoidean ligament	Horse
Cruciate sesamoidean ligament	Horse
Oblique sesamoidean ligament	Horse – model
Short sesamoidean ligament	Horse – model
Distal navicular ligament = impar ligament	Horse

Collateral (suspensory) ligaments of navicular bone	Horse
Navicular bursa	Horse
Proximal interdigital ligament	Ox
Distal interdigital ligament	Ox