

Veterinary Bioscience: Digestive System



PRACTICAL 3 INTRODUCTION TO DISSECTION

TEACHING STAFF

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LOCATION

- WEBS (Building 125) Dissection Laboratory (Room B104)

INTENDED LEARNING OUTCOMES

At the end of this class, you should be able to:

- Incise the skin and fascia using a scalpel.
- Separate adjacent structures using sharp or blunt dissection techniques and appreciate the advantages and disadvantages of each.
- Recognise superficial fascia, deep fascia, muscles and their tendons of origin and insertion, ligaments, articular cartilage, bones, arteries, veins and nerves.
- Isolate and transect a muscle, or other soft tissue structure, without damaging adjacent or underlying tissues or structures.
- Distinguish by palpation only: muscle, ligament/tendon, bone.

CLASS PREPARATION

- A suite of video tutorials to demonstrate the techniques used in this class is available on the LMS. Students should review these **prior** to attending class.
- Refresh knowledge of safe instrument handling using the notes and videos available on the LMS.

NOTE

The first time dissecting a cadaver can be confronting and it is quite normal for some students to initially feel uncomfortable. If you feel faint, or need to take a short break outside during class, please bring this to the attention of a staff member.

PROCEDURE

Each table group will be supplied with a specimen to dissect. Depending on availability, these can be either whole cadavers, or an individual forelimb or hind limb, from either a dog or a cat.

The aim of this exercise is to acquaint you with the 'art' of dissection, i.e. the careful and considered deconstruction of an anatomical specimen in order to enhance knowledge. You will be required to perform some basic dissection techniques, identify some basic anatomical structures and use some limited anatomical terminology. You should understand the meanings of any of the terms used in this class prior to commencing the activities. You do not have to perform the techniques very well – this is a preliminary activity to acquaint you with animal tissues and the use of instruments. You should not hesitate to perform each of the tasks but you should exercise some care and approach the activities seriously if you are to benefit from subsequent dissection classes.

Basic dissection techniques:

- Identification
- Incision of skin
- Sharp dissection
- Blunt dissection
- Isolation
- Transection
- Reflection
- Retraction

Basic anatomical tissues and structures encountered:

- Skin
- Fascia
- Muscle
- Tendon
- Ligament
- Articular cartilage
- Artery
- Vein
- Nerve

Basic anatomical terminology:

- Proximal
- Distal
- Medial
- Lateral

SKIN AND FASCIA

During this activity you will disrupt the superficial fascia (a layer of loose fibrous connective tissue that holds the skin to the body) and separated the skin from the deep fascia (a layer of dense fibrous connective tissue that closely binds the muscles and other structures) to expose the underlying structures.

Forelimb

Identify by palpation the lateral epicondyle of the humerus on the lateral aspect (surface) of the limb just proximal to the elbow joint.

Stabilize the skin proximal to this point and incise the skin longitudinally on the lateral aspect of the antebrachium (forearm) with a scalpel to just distal to the carpal (wrist) joint. Separate the skin edges of the incision from the underlying tissues to enable the skin edges to be grasped with forceps.

Make transverse incisions at the extremities of the initial incision for approximately 5 cm either side. Retract the skin edges with forceps while you separate the skin from the underlying tissues to the extent of the transverse incisions – use sharp dissection one side and blunt dissection the other, and compare the 2 methods – which is faster? which is less damaging to tissues for learning?

Hind limb

Identify by palpation the head of the fibula on the lateral aspect of the limb just distal to the stifle (knee) joint.

Stabilize the skin proximal to this point and incise the skin longitudinally on the lateral aspect of the crus (lower limb) with a scalpel to just distal to the tarsal (hock / ankle) joint.

Separate the skin edges of the incision from the underlying tissues to enable the skin edges to be grasped with forceps.

Make transverse incisions at the extremities of the initial incision for approximately 5 cm either side. Retract the skin edges with forceps while you separate the skin from the underlying tissues to the extent of the transverse incisions – use sharp dissection one side and blunt dissection the other, and compare the 2 methods – which is faster? which is less damaging to tissues for learning?

MUSCLES AND TENDONS

Forelimb / Hind limb

Select one of the muscles now visible and isolate it by incising the deep fascia along the entire length of each of its cranial and caudal borders - use a scalpel, scissors or your fingers to disrupt the fascia from completely around this muscle's belly thus isolating it from the surrounding structures.

Examine either end of this muscle and note the tendons that attach it to the bones – the proximal tendon is the tendon of origin, the distal one, the tendon of insertion – if possible give each a tug to appreciate how firmly the muscle is attached to the respective bones. Feel the muscle along its entire length to appreciate its shape and texture – you might consider looking away or closing your eyes while doing this so that you get a greater tactile appreciation of its nature – quite often in your career you will be working blind during examinations and surgery and the ability to identify structures by palpation alone will be of great importance.

Insert an instrument, eg a pair of scissors, under the midpoint of this muscle's belly to elevate it away from the underlying structures. Now transect (cut through) the muscle at this point using a scalpel and cutting down onto the scissors or other instrument – this prevents the underlying structures from being unintentionally damaged. Now reflect the 2 parts of the muscle – one portion will be reflected proximally, the other distally to expose the underlying tissues and structures.

Re-examine the tendons of origin and insertion to more fully appreciate the extent of their attachments and the bony features (eg tuberosities) onto which they attach.

Tendons are composed of dense fibrous connective tissue (similar to deep fascia) and appear white in colour – the typical appearance of fibrous connective tissue.

BONES

Forelimb – ulna / radius

Hindlimb – tibia / fibula

Depending on the muscle you have transacted and reflected, a portion of a major limb bone will be visible - if not feel for the bone beneath the other muscles and disrupt the fascia between these and retract them (pull them aside) to expose the bone. Examine the bone and its surface as much as possible by sight and by palpation (again looking away or closing your eyes).

LIGAMENTS AND ARTICULAR CARTILAGE

Ligaments of the musculoskeletal system are composed of dense fibrous connective tissue similar to tendons, but ligaments join one structure to another e.g. a bone to a bone at a joint. You will examine the collateral ligament of one of the following joints depending on your specimen – the lateral aspect is suggested but you could use the medial aspect if you wish.

Forelimb - collateral ligament of the elbow

Hindlimb - collateral ligament of the stifle

To expose and examine a collateral ligament on the specimen you have do the following manipulation – repeatedly move two of the major sections of the limb relative to each other (eg brachium and antebrachium if you have a forelimb, thigh and crus if you have a hind limb) to determine the point of rotation of the intervening joint - on either the medial (inside) or lateral (outside) aspect identify the point of rotation of the joint by observing where there appears to be no movement of one section relative to the other - incise the skin longitudinally over this point and dissect away the overlying fascia or muscle to expose the collateral ligament - this will look somewhat like a tendon, a strong white fibrous band, but in this case it will be joining the bones of each section of the limb. Manipulate the limb as before to confirm that this is a collateral ligament and test the stability of the joint. Now transect this ligament and see if there is any difference in the stability of the joint after it is cut.

Cut the tissues surrounding the joint sufficiently to enable you to open the joint and expose the articular cartilage covering the articular surfaces of the bones. Note how smooth and slippery the articular cartilage is. How does this cartilage layer facilitate joint function?

ARTERIES, VEINS AND NERVES

The examination of these structures will be carried out on the medial aspect of the brachium (forelimb) or thigh (hind limb).

Can you differentiate between an artery, a vein and a nerve using the following basic criteria?

An artery is relatively thick-walled elastic tube of smaller diameter than its accompanying vein

A vein is a relatively thin-walled collapsible tube

A nerve is a white, solid cord and, if stretched rebounds to take on an undulating or wavy appearance

Hint – to determine if a structure is tubular make a small cut in its wall to expose its lumen.

Forelimb

The major vessels and nerves are concentrated on the medial aspect of the brachium overlying the humerus or just along its caudal border. Identify the humerus by palpation and carefully incise the skin over the medial surface of this bone. Retract the skin edges to expose the vessels and nerves which run longitudinally within the limb within the fascia between the major muscle groups. Disrupt this fascia longitudinally by scraping it using the closed blades of a pair of dissecting scissors, or by using a stab & split action with the scissors - this should preserve the structures and enable their exposure and separation from each other and the adjacent muscles. Now try to identify three nerves, and the major artery and accompanying large vein.

Hind limb

The major vessels, and a medium-sized nerve, are concentrated on the medial aspect of the thigh overlying the femur or just along its caudal border. Identify the femur by palpation and carefully incise the skin in line with the caudal border of the femur for the length of the thigh. Retract the skin edges to expose the vessels which run longitudinally within the limb within the fascia between the major muscle groups. At the proximal end of the incision disrupt the fascia longitudinally by scraping it using the closed blades of a pair of dissecting scissors, or by using a stab & split action with the scissors - this should preserve the structures and enable their exposure and separation from each other and the adjacent muscles. Now try to identify a large vein and artery and a nerve – the nerve is closely apposed to the cranial surface of the artery which in turn lies cranial to the vein.