

Muscular System of the Cat

Laboratory Exercise 1: Muscular System of the Cat I

Introduction

Muscle dissection requires the very careful separation of individual muscles from each other. Remember that muscles are enclosed by an epimysium that is continuous with the deep fascia located beneath the hypodermis. Identification of individual muscles can often be made by looking at the direction in which individual muscle fibers run. Follow each muscle to its origin and insertion as far as is practical. Once you have isolated and identified a muscle it may be transected in order to identify the underlying deep muscles.

Skinning the Specimen

THIS REQUIRES TIME AND PATIENCE! Place the cat on its ventral surface. Massage the skin of the dorsal neck region to separate it from the underlying muscles and make a small longitudinal slit through the skin in the midline. Do not cut through the superficial fascia under the skin.

Continue the shallow incision down the center of the back to the base of the tail. While cutting, pull the skin toward you (away from the underlying muscle) to assure you are not cutting too deeply. From this cut make additional incisions through the skin around the neck; around the tail, anus, and external genitals. Continue down the lateral surface of each leg and around the wrist and ankles.

Beginning on the back, separate the skin from the underlying muscles. Pull the skin gently but firmly with one hand while tearing through the superficial fascia with your fingers or a blunt probe in the other hand.

Continue separating the skin from the muscles in the neck region and upper appendages. As you reach the neck you will see fine, parallel muscle fibers attached to the dermis of the skin. This is the platysma muscle. Remove it with the skin.

Turn the cat over and separate the skin from the muscles on the ventral surface. Here the skin is attached to a thin, brownish sheet of muscle that originates along the linea alba. This muscle is the cutaneous maximus which adheres to the latissimus dorsi and pectoralis muscles in the axillary region. The cutaneous maximus inserts on much of the dermis. To remove the skin you must separate it from the cutaneous maximus by pulling the skin upward, away from the body to expose the attachments of this muscle. Using a scalpel, cut the cutaneous maximus close to its attachment to the trunk along the linea alba and axillary regions. In the axillary region take care not to damage the latissimus dorsi and pectoralis muscles.

As you separate the skin from the ventral surface of the body, avoid damaging the reproductive structures. If you are dissecting a male, do not remove the scrotal integument. Also note that a number of cutaneous blood vessels and nerves which

supply the skin must be cut as the skin is pulled away. Cut these with a scalpel, but try to leave larger vessels intact wherever possible.

Complete the separation of the skin from underlying muscles in the lower appendages. The skin should now be ready to remove in one piece. Beginning at the ventral surface of the neck, remove the skin by pulling it downward toward the caudal end. You should begin here in order to avoid damaging the delicate structures of the neck region. Continue pulling until the skin is completely removed except from the feet, head, and tail. The tail can be removed with bone snips. You are now ready to dissect the muscular system. Remember to keep your cat wrapped in a damp towel and sealed in its plastic bag when not in use. This will help prevent it from drying out and will prolong its use.

Dorsal Muscles of the Neck and Pectoral Regions

Place your specimen on its ventral surface. Beginning at the neck, clear away the connective tissue, but do not remove the fascia in the midline of the back or in the shoulder region. Working caudally from the neck, the following muscles should be located and examined:

Unlike the human, three trapezius muscles can be identified in the cat. The clavotrapezius is a large anterior muscle extending from neck to shoulder; an extension of this muscle onto the shoulder is the clavobrachialis. The acromiotrapezius is a thin muscle extending from the occipital bone to the metacromion process of the scapula and is the middle of the three trapezius muscles. Caudal to the acromiotrapezius, the spinotrapezius originates along the middorsal line at the thoracic spines and the lumbodorsal fascia, and inserts on the spine of the scapula. The spinotrapezius is superficial to the cranial border of the latissimus dorsi, which is a broad, flat muscle arising on the thoracolumbar fascia and spinous processes of the last six thoracic vertebrae. It inserts on the humerus and retracts and flexes the brachium. The levator scapulae ventralis is a long band of muscle originating on the atlas and inserting on the metacromion process of the scapula. You will notice that its fibers pass beneath the clavotrapezius. Deep to the acromiotrapezius, the rhomboids pass from the spines of the thoracic vertebrae to the vertebral border of the scapula. Identify the rhomboideus and rhomboideus capitus. Reflect the clavotrapezius and locate the splenius muscle which covers the dorsal side of the neck.

Muscles of the Shoulder

These muscles are examined on the dorsal surface of the animal. After removing the connective tissue from the shoulder and upper appendages, examine the following muscles: deltoids, supraspinatus, infraspinatus, teres major, teres minor, and subsacpularis.

The human deltoid forms a major muscle of the shoulder which abducts the arm. In the cat it is divided into three units. The cleidodeltoid is the most cranial portion of the deltoid, originates on the clavicle and inserts on the humerus. The acromiodeltoid arises from the acromion process and inserts on the humerus. The spinodeltoid represents the caudal portion which arises from the spine of the scapula and also inserts on the humerus. Transect the spinodeltoid and locate the supraspinatus which occupies the supraspinous fossa of the scapula. From the scapula, this muscle inserts

on the humerus.

The infraspinatus also originates on the scapula in the infraspinous fossa, and extends to the humerus. Along the caudal border of the scapula locate the teres major which passes forward to insert on the humerus. The teres minor is a small muscle arising from the scapula and inserting on the humerus.

By reflecting the latissimus dorsi and pectorales you can locate the subscapularis muscle in the subscapular fossa of the scapula. Like most of the others, it inserts on the humerus.

Ventral Muscles of the Pectoral Region

Place your specimen on its dorsal surface and examine the pectorales muscles. Be careful not to damage the brachial nerve plexus and subclavian vessels which lie deep to these muscles.

The superficial pectoral muscles include the pectoantebrachialis, the most anterior pectoral muscle and the pectoralis major, a larger band that originates at the sternum and inserts on the humerus. The pectoralis minor (pectoralis profundus) also arises on the sternum and inserts on the humerus and is partly covered by the pectoralis major. The xiphihumeralis is the most posterior of the superficial pectoral muscles.

Deep Thoracic Muscles

These may be located by transecting the superficial pectoral muscles and removing fat and fascia from the body wall on one side. Gently rotate the scapula and locate the serratus ventralis muscle which extends from the ribs to the scapula. The levator scapulae is an anterior continuation of the serratus. Next, examine the external and internal intercostals which enclose the ribs. Also locate the scalenus and the transverse costarum muscles.

Abdominal Muscles

The abdominals are relatively thin muscles arranged in layers. Four muscles make up this group and you should be able to identify each. The external and internal obliques are broad, flat muscles that cover the abdomen and unite in the midline to form the linea alba. Beneath the internal oblique is the very thin transversus abdominus, whose fibers run ventrolaterally. Running down the midline is a broad, strap like muscle, the rectus abdominus, which extends from the sternum to the pubis.

Laboratory Exercise 2: Muscular System of the Cat II

Muscles of the Head and Neck

After removing the skin and superficial fascia from the head and neck, carefully separate and identify the following major muscles. Beginning at the cranial end of the sternum, locate the two sternomastoids which form a V-shaped muscular collar at the base of the neck. Between this "V" locate the paired sternohyoids (carefully separate them down the midline and observe the thyroid gland which lies just below the larynx. Locate the digastric and myohyoid muscles which lie medial to the body of the mandible. Both are major muscles of mastication. As you examine these muscles, also locate the three major salivary glands, parotid, submandibular, and sublingual, which

will be important in our examination of the digestive system. Before leaving the head and neck, be sure to identify the masseter and temporalis muscles located along the angle of the jaw (masseter).

Muscles of the Upper Arm

Examine the medial surface of the upper arm after you have transected the pectoral muscles. Locate the biceps brachii and epitrochlearis muscles. Avoid cutting or removing the brachioradialis. Now examine the lateral surface and identify the triceps brachii, aconeus, and brachialis muscles.

Muscles of the Pelvis and Thigh

Our study of the pelvis and thigh will be limited to the relatively superficial muscles; deep muscles of the thigh will be omitted. After you have removed the superficial fascia from the medial surface of the thigh, identify the sartorius ("tailor's muscle) and the gracilis muscle. Transect these muscles to locate the following: rectus femoris, vastus medialis, vastus lateralis, and vastus intermedius. Together these are referred to as the quadriceps femoris. Beneath the gracilis, locate the adductor femoris and semimembranosus. On the lateral surface of the thigh, the tensor fascia lata and biceps femoris are easily seen as major superficial muscles. Transect these to better observe the vastus lateralis.