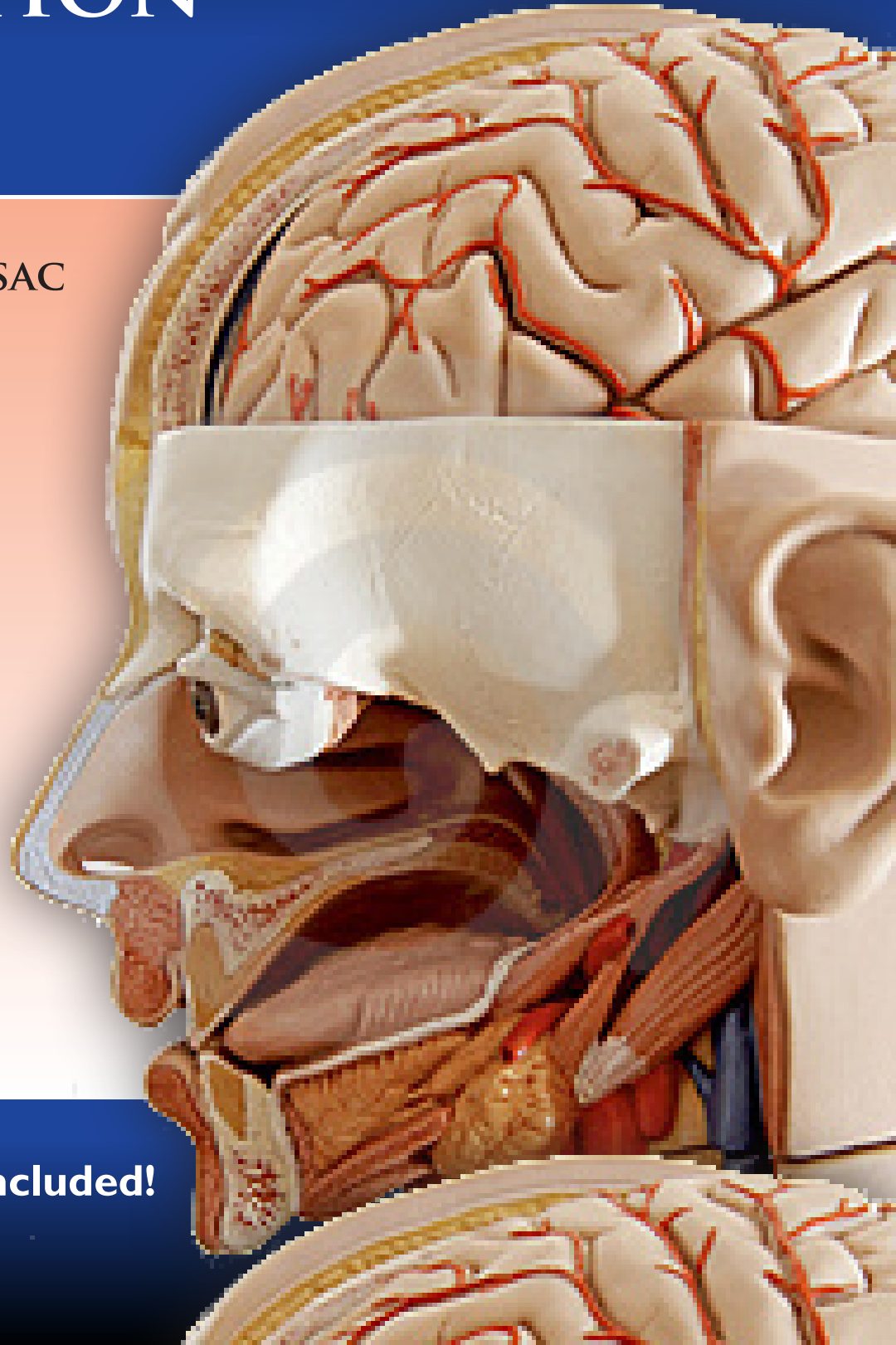
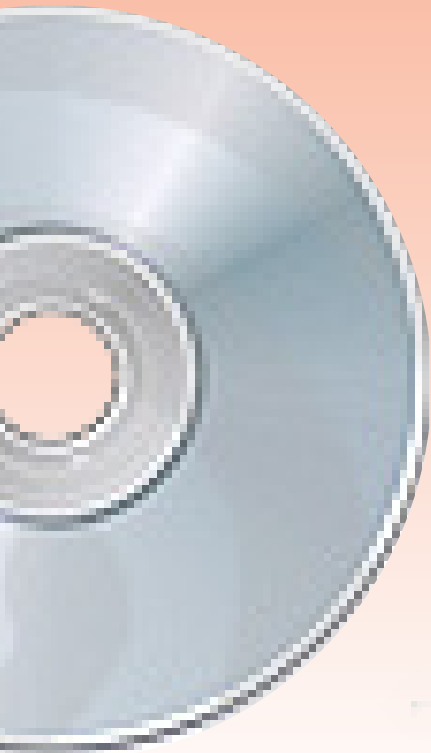


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INTERACTIVE CADAVERIC DISSECTION GUIDE

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MARK BISHOP



Interactive DVD included!

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Introduction



ANATOMY . . . IS THE VESTIBULE OF THE TEMPLE OF MEDICAL SCIENCE.

—DE LINT, 1926¹

The ability to perform dissection provides a unique opportunity to observe the intricate interplay of human structure. This is especially true if the student is able to participate in an anatomy laboratory in which several (or many) different cadavers are located. A consistent theme in the treatises of early anatomists is awe and wonder at the incredible complexity and variety of the human organism.

This unique and special opportunity was not always available to aspiring students. Imagine the difficulty of performing studious dissection before the development of effective embalming or refrigeration, for example. Anatomists traveled from town to town to study from “fresh” bodies that had not yet begun to decay. To compound matters, dissection of human bodies sometimes happened in secret, in closed rooms and furtively at night.

For more than 4000 years, we have sought to determine the structure and function of the human body. Chinese writings and drawings from about 2500 BCE describe circulation, breathing, and many internal organs.² Around 1600 BCE, Egyptians recorded that the blood vessels were known to come from the heart, and these early anatomists recognized the liver, spleen, kidneys, uterus, and bladder.² Hindu medicine dating from 600 BCE contains references to the skeleton and advanced surgical procedures.²

In the third and fourth centuries BCE, Hippocrates, Aristotle, and their followers compiled observations about the musculoskeletal system and organs. Most of these were made by combining external observation with conjecture based on the dissection of nonhuman animals.² Herophilus and Erasistratus, working as surgeons in Alexandria in approximately 300 BCE, made systematic studies designed to discover the workings of human anatomy.²

However, the most influential anatomist of ancient times was, perhaps, Galen. As a physician to the gladiators, Galen likely studied many different types of wounds. He also compiled much of the work of previous writers and studied internal organs by performing vivisection on animals. Although he was able to examine human skeletons from remains found in tombs, his drawings were based mostly on dogs, apes, and pigs.² Despite this limitation, Galen’s works became the standard anatomy textbook for 1500 years.

After Galen, the study of anatomy progressed little in Europe. However, it flourished in the Islamic world. Arabic philosopher–physicians studied medicine from the wide Persian Empire, including Indian, Greek, and Egyptian sources. An unattributed saying goes, “Medicine is born; Hippocrates created it. It was dead; Galen revived it. It was scattered; Rhazes reassembled it. It was imperfect; Avicenna perfected it.”³ Rhazes was a prolific writer and compiler of medical knowledge; however, Avicenna contributed to more than the science of anatomy, presenting a classification of the organs and their function.² Avicenna expanded the Galenic teachings on anatomy in *The Canon of Medicine* (ca. 1000 CE),² which became the standard text used throughout the Islamic world and Christian Europe.

The physicians Ibn Zuhr and Ibn Jumay performed human dissections and postmortem autopsy, recording their findings. This work was extended by the Arabian physician Ibn al-Nafis. In 1242, he described the pulmonary and coronary circulation of the blood. He also developed new systems of anatomy and physiology to replace the Avicennian and Galenic doctrines followed in *The Canon of Medicine*.

In Christian Europe, advancement of anatomy coincides with the rise of the university, especially in Italy. Dissection of a human body occurred annually at centers that had medical

4. It is suggested that a pencil eraser be used to turn pages in your atlas when dissecting, since your hands will be very greasy.

TOOLS OF THE TRADE

1. A dissection kit is REQUIRED **Figure 0.1**. Most kits include:
 - a. Scalpel and blades:
 - i. You will need approximately 20–30 blades (#10) for a semester.
 - ii. Do NOT use your fingers to change the scalpel blade. Refer to the DVD for a demonstration of inserting and removing a scalpel blade.
 - b. Angle tip probe.
 - c. Hemostat forceps.
 - d. Tissue forceps (without teeth).
 - e. Check with your anatomy instructor for other tools that may be used in your laboratory. These other tools include scissors and forceps with teeth.
2. Be sure to put your name on each instrument. Marks made with fingernail polish are resistant to most preserving fluids.
3. At the end of dissection, be sure to clean and dry your instruments. There should be no tissue left in your dissection kit.

Figure 0.1

“Tools of the trade.” Each of these dissection tools has a separate function. For example, not all dissection should be done with a scalpel. Refer to your dissection manual for specific instructions about when to use each one.



a b c d e f g

- a—Scalpel handle and blade (this image shows a #3 handle and #10 blade)
 b—Surgical forceps (hemostats)
 c—Sharp point scissors (note the nail polish markings on Ms. Finley’s scissors)
 d—Blunt nose scissors
 e—Tissue forceps without teeth
 f—Angle probe
 g—Dissection pin

Superficial Back and Posterior Axilla

Refer to DVD Disc 1



1

PROCEDURE: Place the cadaver prone.

This section describes dissection of the superficial back muscles and the posterior axilla. The deeper layers of the back muscles and the posterior neck are presented in Chapter 13.

1. Prior to beginning dissection, place a block under the chest of the cadaver so that the head falls into flexion. This will allow you access to the posterior neck region.

Palpate the following on the cadaver:

- a. external occipital protuberance (inion)
 - b. mastoid process of the temporal bone
 - c. acromion
 - d. spine of the scapulamedial border of the scapula
 - e. inferior angle of the scapula
 - f. spinous processes of thoracic vertebrae
 - g. crest of the ilium
2. Make a skin incision superficial to the spinous processes of the vertebrae from the external occipital protuberance (inion) to the level of the crest of the ilium **Figure 1.1a**. Continue the incision laterally along the iliac crest to the midaxillary line.
 3. A second incision should be made from the external occipital protuberance to the mastoid process of the temporal bone **Figure 1.1b**.
 4. Beginning at the spinous process of the seventh cervical vertebra, make an incision to the acromion and then along the lateral border of the shoulder and arm to the level of the axilla. Continue the incision medially until the axilla is encountered **Figure 1.1c**.
 5. A fourth incision should be made from the spinous processes in the midthoracic area to the midaxillary line. This will facilitate handling of the skin flaps **Figure 1.1d**.
 6. Using hemostat forceps, lift a corner at a site where two of these incision lines meet. Pull the skin so it is taut. With a scalpel held at an angle, slowly work through the superficial fascia until muscle fibers are encountered. This step will aid in judging the depth of dissection necessary for skin removal.

Figure 1.1

Skin incision lines on the back.

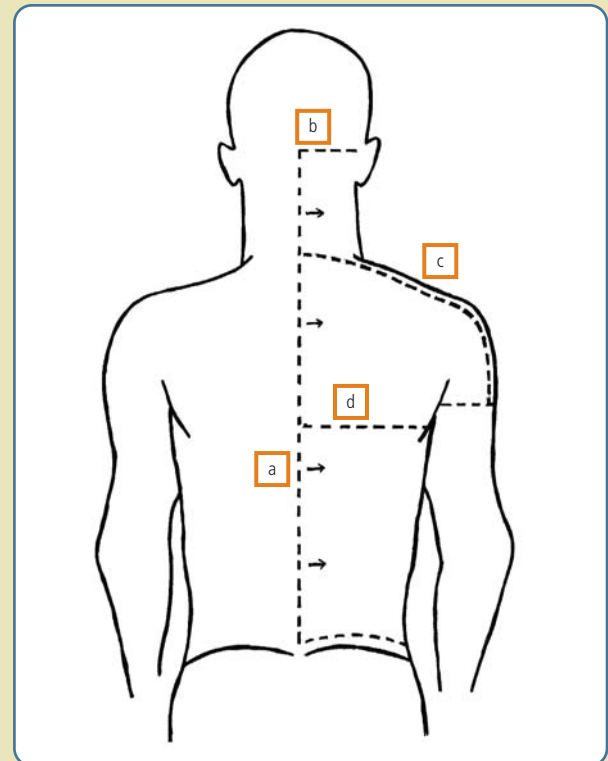
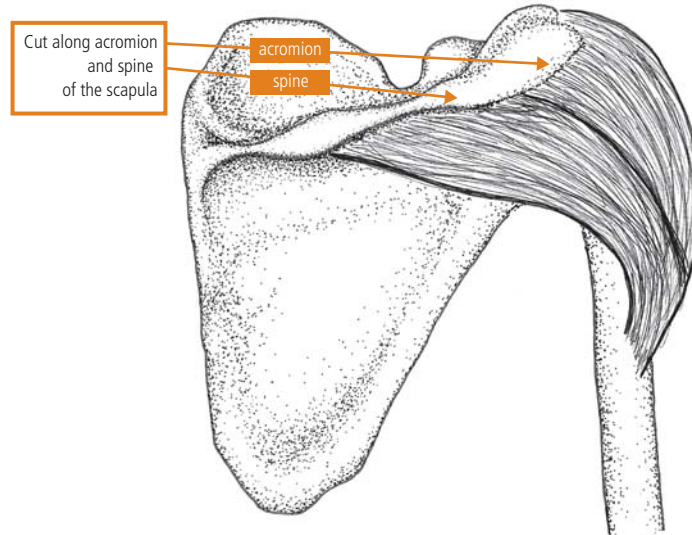
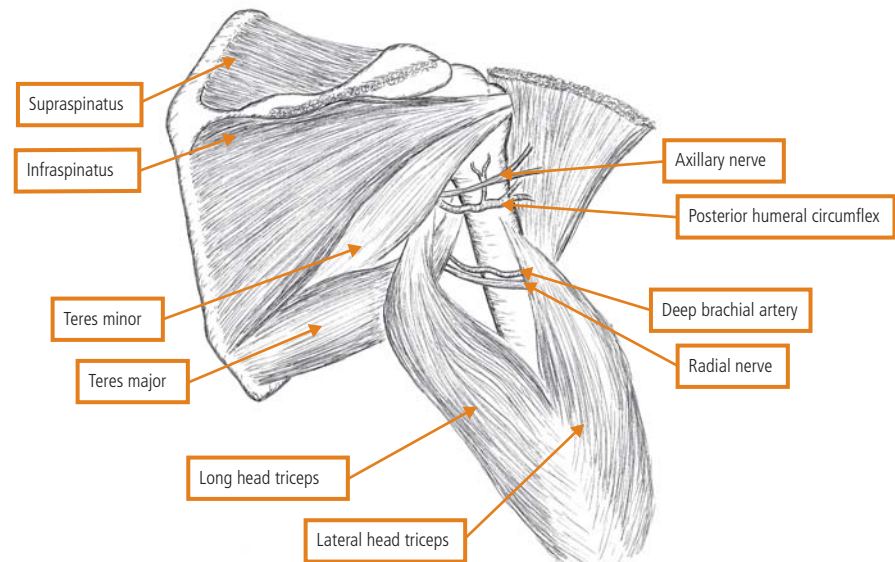


Figure 1.4

Posterior deltoid.

**Figure 1.5**

Posterior aspect of the scapula and arm.



Pectoral Region

Refer to DVD Disc 1



PROCEDURE: Place the cadaver supine.

The upper extremity should be moved into abduction gently and progressively so that muscle tissue is not torn and the humerus not broken. It may take **several days** to get the extremity out sufficiently. **Do not apply excessive force.** Rope should be furnished by the instructor for holding the extremity in abduction. (The rope should be at least 5 feet in length.) See **Figure 2.1**.

1. Prior to beginning dissection, palpate on the cadaver:
 - a. jugular notch
 - b. clavicle
 - c. manubrium sterni
 - d. body of the sternum
 - e. xiphoid process of the sternum
 - f. ribs 1 through 8

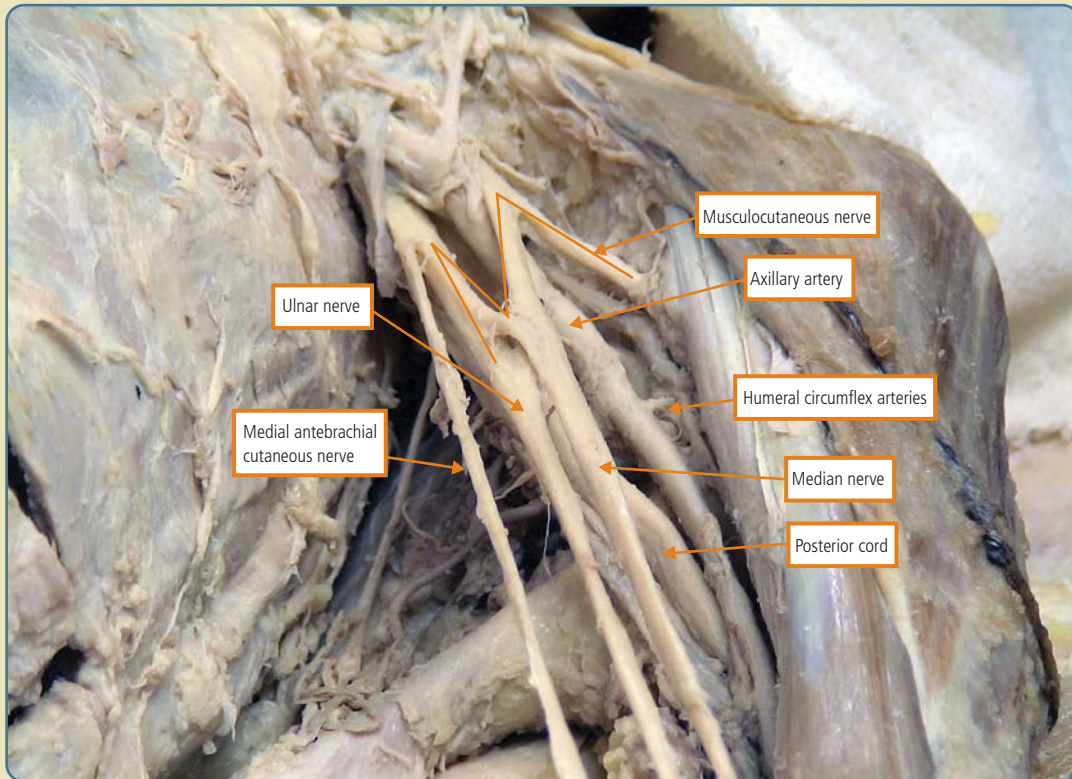
Figure 2.1

Arm abducted with rope to access axilla and anterior surface of arm. Rope is looped around the wrist and passed through the first web space. This rope is then tied to the table to maintain the arm in abduction while dissection proceeds.



Figure 3.2

Brachial plexus.



- d. **medial brachial cutaneous nerve** (This nerve is often removed when dissecting the axilla. It does not need to be saved.)

NOTE TO THE DISSECTOR If a nerve cannot be located, it is recommended that dissection be continued into the arm, as this will facilitate identification. To spend large amounts of time searching an area will frequently result in destruction of structures and frustration of the dissector.

8. With the lateral cord well in view, identify:
 - a. **musculocutaneous nerve** (This nerve pierces through the belly of the coracobrachialis.)
 - b. **lateral pectoral nerve** (This nerve comes from the lateral cord.)
9. Move the medial and lateral cords and the axillary artery aside to locate the posterior cord, which is deep to these structures.
10. Identify from the posterior cord:
 - a. **radial nerve** (This nerve may be located as it passes posteriorly through the axilla and then winds around the posterior aspect of the humerus to innervate the triceps brachii. The radial nerve is accompanied by the deep brachial artery [Figure 3.1].)

Anterior Surface of the Arm

Refer to DVD Disc 1

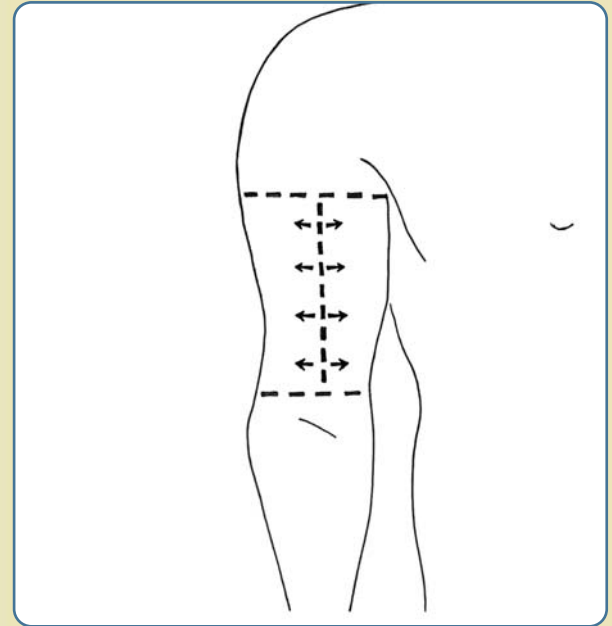


CHAPTER 4

1. On the skeleton, review the motions that occur at the elbow.
2. With the arm tied out to the side, make a vertical skin incision in the midline on the anterior surface of the arm (Figure 4.1). A transverse incision should be made across the anterior arm just above the elbow as shown in Figure 4.1.
3. The cephalic vein will be encountered as the skin is removed. This vein is superficial and easily cut. Continue to follow the cephalic vein into the arm. This vein should be preserved from the lateral border of the wrist to the pectoral region upon completion of dissection.
4. Remove the skin, working toward the sides of the arm in order to **keep the skin flaps in one piece** but completely free from the cadaver. The skin flaps should be used to rewrap the arm when dissection is completed.
5. Continue to trace the **medial antebrachial cutaneous nerve** into the arm.
6. Preserve branches of the posterior **antebrachial cutaneous nerve** (a branch of the radial nerve) as they emerge in the distal lateral arm. Trace branches into the dorsal forearm as dissection proceeds.
7. Identify:
 - a. biceps brachii
 - b. brachialis
 - c. coracobrachialis
 - d. ulnar nerve
 - e. median nerve
 - f. medial antebrachial cutaneous nerve
8. Follow the course of the tendons of the biceps brachii, and study the motions accomplished when this muscle contracts.
9. Study the actions of the brachialis and coracobrachialis, and observe their locations to understand why these actions occur.
10. Trace the branches of the **musculocutaneous nerve** as it innervates the coracobrachialis, biceps brachii, and brachialis.
11. The axillary artery becomes the brachial artery at the lower border of the teres major. Locate the brachial artery and the deep brachial artery (profunda brachii artery) in the

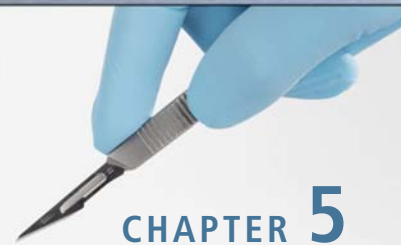
Figure 4.1

Incision lines for the anterior arm.



Flexor Surface of the Forearm

Refer to DVD Disc 1

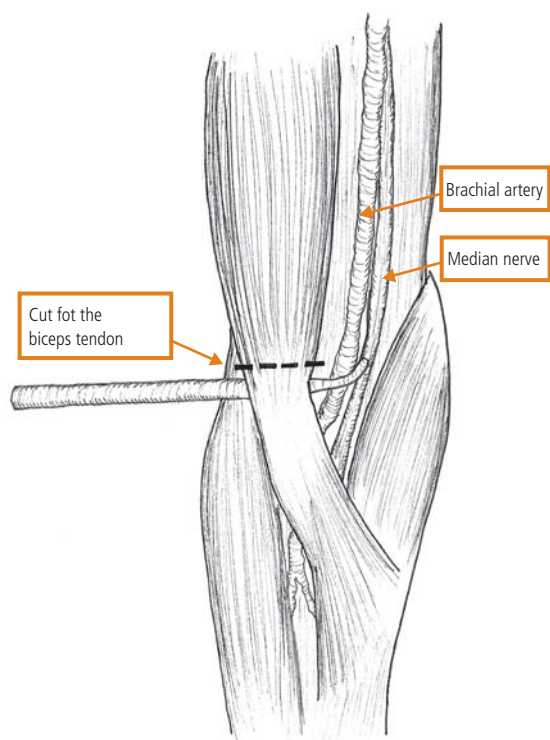


PROCEDURE: Tie the arm out to the side. Place a rope around the thumb to turn the forearm and hand into supination.

NOTE TO THE DISSECTOR Do not force the elbow into extension. This will result in tearing of muscle fibers. If the forearm cannot be extended sufficiently to dissect the proximal forearm, the tendon of insertion of the **brachialis** may be released by incising a few fibers at a time. This should aid in increasing elbow extension. In some cadavers, it may even be necessary to cut through the tendon of insertion of the biceps brachii to achieve a sufficient amount of extension. If this step is needed, cut through the tendon distally leaving approximately a 1- to 2-inch piece for repositioning. Be careful to protect the muscle belly of the brachioradialis from tearing. Occasionally the brachioradialis will also need to be cut. When cutting any of these muscles, it is necessary to **locate the sensory and motor nerves** in the area before cutting to avoid destruction of the nerves **Figure 5.1**.

Figure 5.1

Cubital fossa.

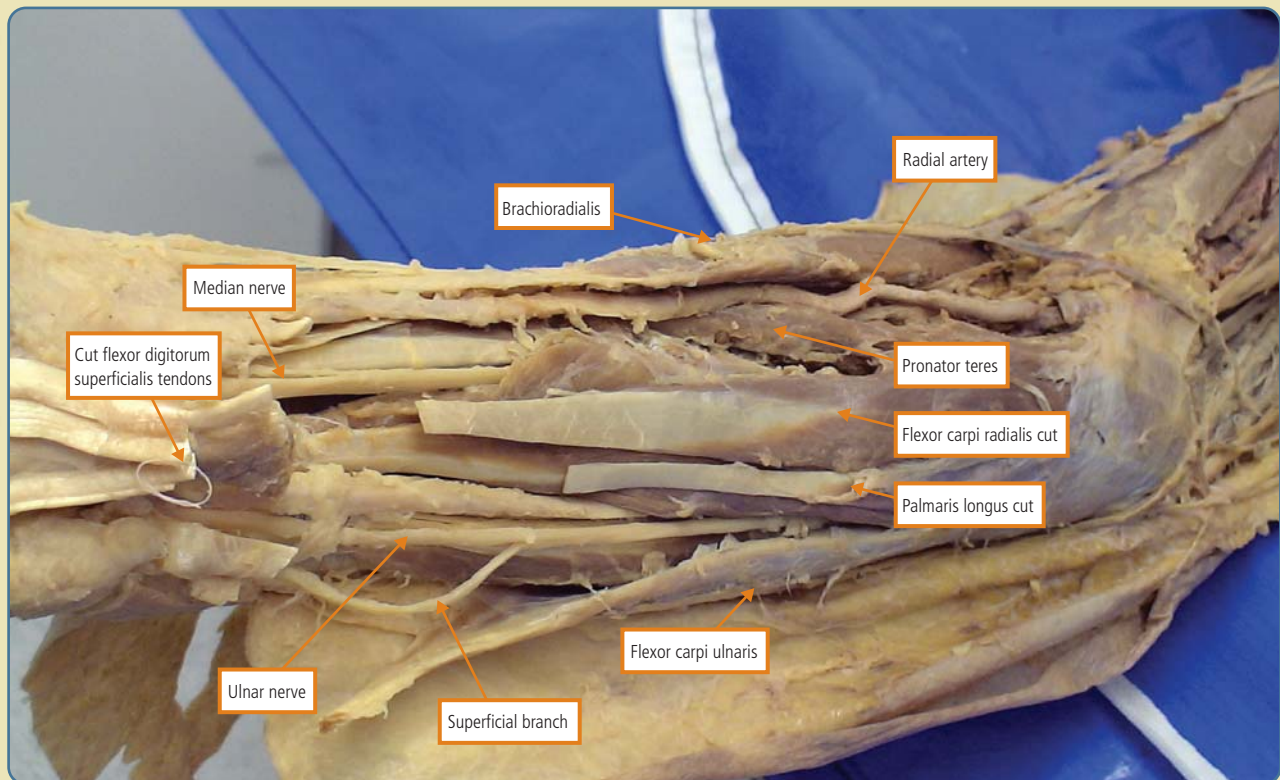


1. On a skeleton, review the motions that occur at the elbow and wrist.
2. Review in an atlas the location of the radial artery in the forearm to avoid severing this artery when removing the skin. Follow the brachial artery to its division into radial and ulnar arteries, then carefully trace the radial artery as dissection progresses distally. The radial artery will progress down the lateral side of the forearm.
3. Make a vertical incision in the midline on the anterior surface of the forearm using a probe to work under the skin, then cut on top of the probe with the scalpel. Continue from the elbow to the wrist **Figure 5.2**. Remove the skin, working toward the sides of the forearm in order to preserve the skin flap.
4. In the proximal forearm on the lateral side, continue to trace branches of the **lateral antebrachial cutaneous nerve** (musculocutaneous nerve) as it pierces the deep fascia lateral to the tendon of the biceps brachii. Preserve several of its branches in the forearm.
5. On the medial forearm, continue to trace the **medial antebrachial cutaneous nerve** and preserve several of its branches. Note the location of the **dorsal branch** of the **ulnar nerve** so that

- a. pronator teres
- b. flexor carpi radialis
- c. palmaris longus
- d. flexor digitorum superficialis
- e. flexor digitorum profundus
- f. pronator quadratus
- g. flexor pollicis longus

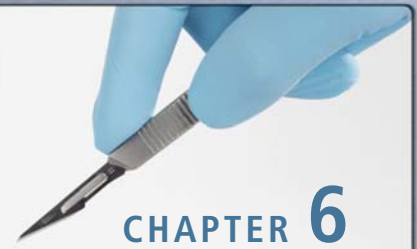
Figure 5.7

Flexor forearm.



Flexor Surface of the Hand

Refer to DVD Disc 1



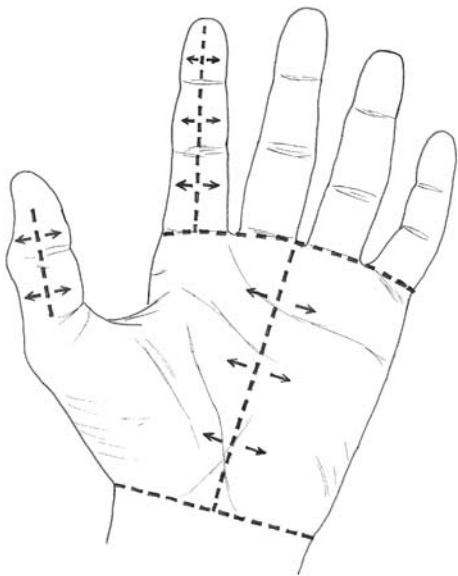
1. Review on a skeleton the motions that occur at each joint in the hand.
2. Palpate on the cadaver (locating small bones of the hand on the skeleton is encouraged):
 - a. pisiform bone
 - b. tuberosity of the scaphoid
 - c. metacarpal bones
 - d. heads of the metacarpals
 - e. carpometacarpal joint of the thumb
 - f. thumb web
 - g. thenar eminence
 - h. hypothenar eminence

NOTE TO THE DISSECTOR

It may be necessary to cut the tendon of the flexor pollicis longus in order to fully extend the thumb, allowing for dissection of the flexor thumb area. Release the tendon approximately 2 inches proximal to the wrist, so when the thumb is extended a portion of the tendon will still be visible.

Figure 6.1

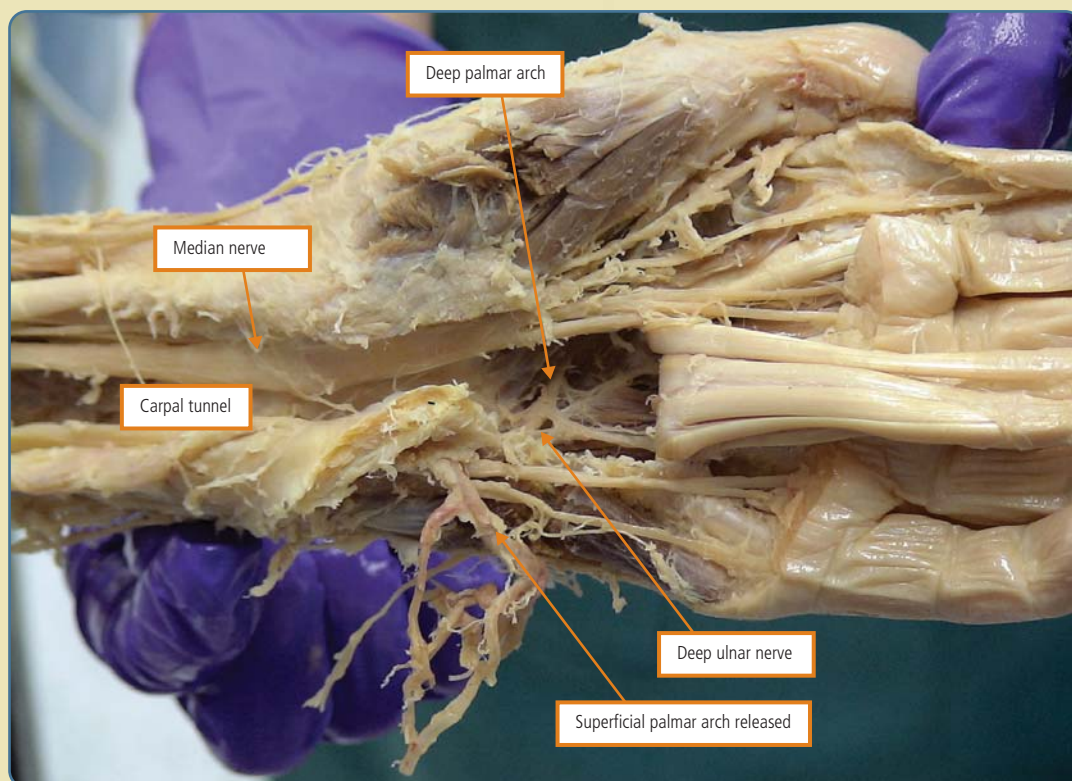
Skin incision lines for the palm and first digit.



3. In an anatomy atlas, review the location of the palmar cutaneous branch of the median nerve, the common palmar digital nerves and arteries, and the muscular (recurrent) branch of the median nerve on the thenar eminence. Preserve these structures as dissection proceeds in steps 4–16.
4. Make a vertical incision at the midline of the palm and a second incision across metacarpophalangeal joints **Figure 6.1**. Begin to remove the skin on the flexor surface of the hand, including the skin on the flexor surface of the thumb.
5. Removal of the skin is a very slow and tedious procedure. Keep the blade of the scalpel turned horizontally and angled up toward the skin flap to avoid piercing deeper structures. Remove the skin and superficial fascia in small pieces off the flexor surface of the hand until the palmar aponeurosis, thenar fascia, and hypothenar fascia are encountered.
6. Trace the palmar aponeurosis distally to the area of the metacarpophalangeal joints.

Figure 6.5

Deep palmar structures. Deep nerve and deep palmar arch.



Digital arteries and nerves on the medial and lateral aspects of this digit will need to be preserved if possible.

35. Locate the insertion of the tendon of the flexor digitorum superficialis on each side of the middle phalanx. Note where the tendon of the superficialis divides into two slips to permit passage of the tendon of the flexor digitorum profundus.
36. Identify:
 - a. digital tendon sheaths (attach to the palmar ligaments)
 - b. vincula longa and brevia (small folds of connective tissue through which blood vessels pass from the periosteum of the phalanges to the long flexor tendons and their sheaths; can be seen by gently lifting the long flexor tendons with a probe from the palmar plate)
 - c. palmar ligaments or plates (attach to the transverse metacarpal ligament and the hood)
 - d. proper palmar digital arteries and nerves
37. Remove skin from the flexor surface of the thumb. See Figure 6.1.
38. Identify on the medial aspect of the thumb:
 - a. insertion of the flexor pollicis brevis
 - b. insertion of the adductor pollicis

Dorsum of the Hand

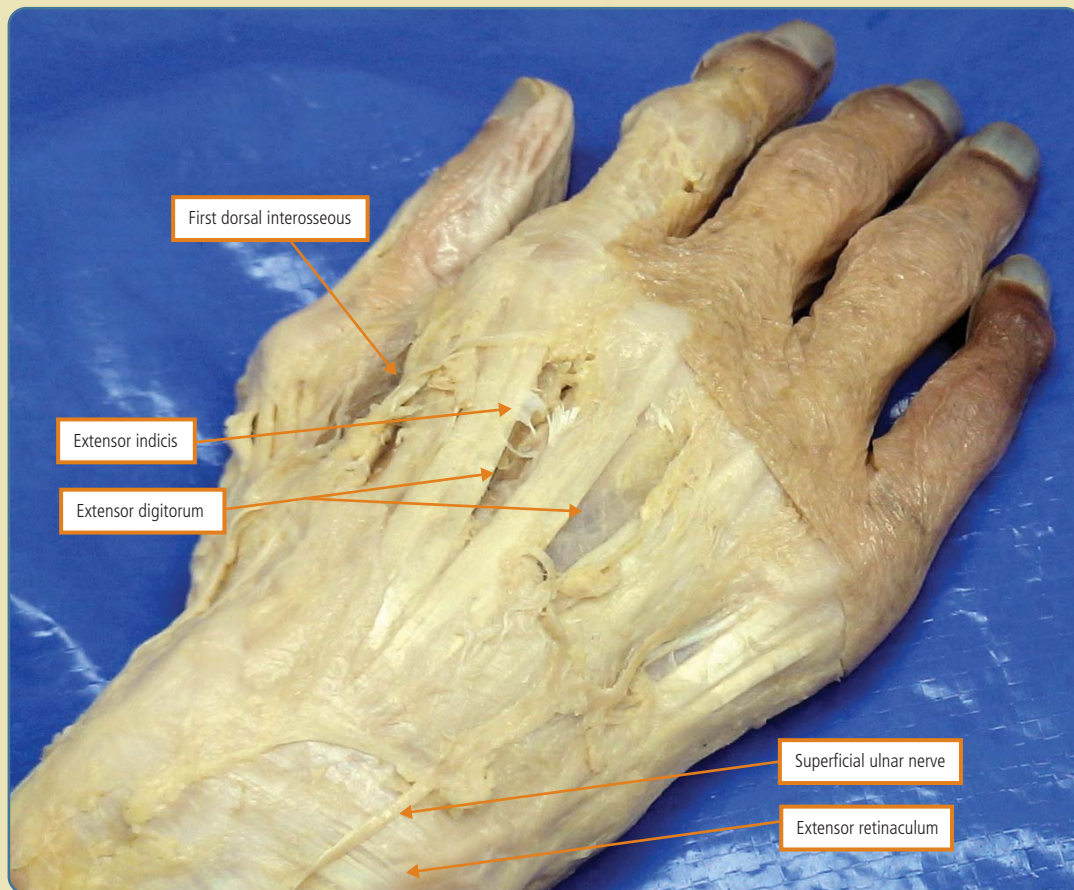
Refer to DVD Disc 1



1. Using forceps and a probe, work loose the skin from the underlying fascia on the dorsum of the hand. Remove skin from the dorsum of the hand and the ulnar border of the wrist. This skin will not be saved as a flap and should be disposed of properly. The hand should be covered with a white sock at the completion of each day's dissection to preserve the tissue in the area. The sock should be sprayed with preserving fluid to keep it moist.
2. Trace the superficial branch of the radial nerve and the dorsal branch of the ulnar nerve to the dorsum of the hand. Leave their terminal branches attached to fascia whenever possible.
3. Identify the cephalic vein and the basilic vein at the wrist. These veins branch from the dorsal venous arch found on the dorsum of the hand. In some cadavers, this arch may be clearly seen and should be dissected. Tributaries from the digits and from other areas of the hand do not need to be preserved.
4. Clear away any remaining fascia over the dorsal interossei so that these muscles can be studied. Review the muscle attachments and demonstrate the action of these muscles.
5. Note slips of tendons connecting adjoining tendons of the extensor digitorum. These slips are more prominent in tendons going to the third, fourth, and fifth digits. Explain how these slips influence digit extension.
6. Study the point of insertion for the following muscles:
 - a. extensor carpi radialis longus
 - b. extensor carpi radialis brevis
 - c. extensor carpi ulnaris
7. Review the structures of the dorsal (extensor) expansion in an atlas—i.e., hood, insertions of interossei and lumbricales, central slip, and retinacular ligaments (lateral bands).
8. Remove skin from the dorsum of the index finger. Locate the insertions of the tendons of the extensor digitorum and extensor indicis **Figure 9.1**. Note the relationship of the tendon of extensor indicis and extensor digiti minimi to the tendons of the extensor digitorum. The extensor indicis tendon is usually found on the ulnar side of the extensor digitorum to the index finger. The extensor digiti minimi tendon passes through a separate compartment of the extensor retinaculum and then the extensor digitorum tendons. It then divides into two slips, the lateral slip being joined by the tendon of extensor digitorum.
9. Identify on the cadaver:
 - a. dorsal expansion
 - b. hood (anchoring the expansion to the palmar ligaments)
 - c. insertion of interossei into the dorsal expansion (proximal to the lumbricales insertion)
 - d. insertion of lumbricales into the dorsal expansion (distal to the interossei insertion)
 - e. central slip
 - f. retinacular ligaments (lateral bands)

Figure 9.1

Dorsum of hand.



10. Continue to remove skin from the thumb so that the extensor surface can be viewed. Locate the insertions of the abductor pollicis longus and the abductor pollicis brevis.
11. Trace the extensor pollicis brevis and extensor pollicis longus to their insertions on the dorsum of the thumb.
12. Remove skin from the thumb web. The first dorsal interosseous muscle forms the dorsum of the thumb web, whereas the adductor pollicis forms the ventral surface of the thumb web. Locate these muscles.
13. Review the tendons that attach to the thenar side of the hand.
14. Use a white sock to cover the hand to prevent drying out of the structures.

Joints of the Upper Limb

Refer to DVD Disc 1



NOTE TO THE DISSECTOR The joints of the upper limb may be dissected on select cadavers. Your instructors will designate the cadavers to be used for joint dissection.

STERNOCLAVICULAR JOINT

PROCEDURE: Position the cadaver supine. Remove skin from the area covering the anterior surface of the joint.

1. Locate the articulation of the sternal end of the clavicle with the manubrium sterni.
2. Identify the anterior sternoclavicular ligament and the interclavicular ligament.
3. Remove, with a bone saw, a piece of bone approximately 1 inch long from the mid-shaft of the clavicle. This will allow the sternal and acromial ends of the clavicle to be moved about for better viewing of joint surfaces. Save the cut piece of bone for replacing when the study is completed.
4. With the scalpel blade turned horizontally, gently shave off the anterior sternoclavicular ligament until both joint surfaces and the articular disc can be seen.
5. Move the sternal end of the clavicle around in order to view both joint cavities. A few underlying soft tissues may need to be released from the sternal end of the clavicle to allow more flexibility. Leave the posterior sternoclavicular ligament intact.
6. Identify the articular disc and note that it divides the sternoclavicular joint into two cavities. The articular disc can be easily moved with your probe.
7. The costoclavicular ligament is found deep to the subclavius muscle at its costal attachment. Remove portions of this muscle medially to locate the costoclavicular ligament **Figure 11.1**.
8. Read a description of the movements occurring at this articulation relative to shoulder girdle motion.

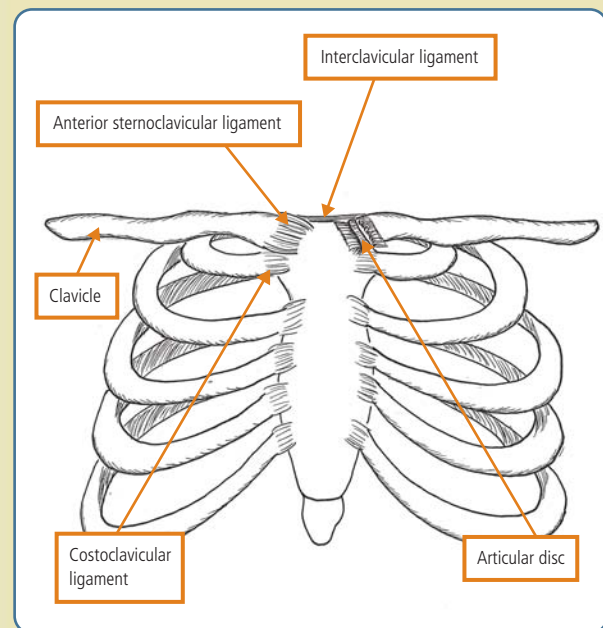
ACROMIOCLAVICULAR JOINT

PROCEDURE: Position the cadaver supine.

1. Release fibers of the anterior and middle deltoid from the lateral end of the clavicle; turn the deltoid distally. Identify the acromioclavicular ligament between the acromial end of the clavicle and the acromion. Read an account

Figure 11.1

Sternoclavicular joint with ligaments and articular disc.



5. Rotate the humerus medially until the anterior wall of the joint capsule can be seen.
6. Identify:
 - a. articular cartilage in the glenoid cavity (folds of synovium at its edge)
 - b. glenoid labrum (the inferior glenohumeral ligament blends into this labrum)
 - c. synovial tissue forming bursa
 - d. tendon of the long head of the biceps brachii (It passes through the joint cavity and is enclosed in a tubular synovial sheath formed by the synovial capsule **Figure 11.4**).
 - e. glenohumeral ligaments (superior, middle, and inferior).
7. Trace the course of the tendon of the long head of the biceps brachii (Figure 11.4). Note its passage through the intertubercular groove (bicipital groove) deep to the transverse humeral ligament.
8. Review the motions that occur at the shoulder joint, and observe the movement of the head of the humerus in the glenoid cavity throughout the range of each motion.

Figure 11.4

Shoulder joint. Long head of the biceps and glenohumeral ligament.

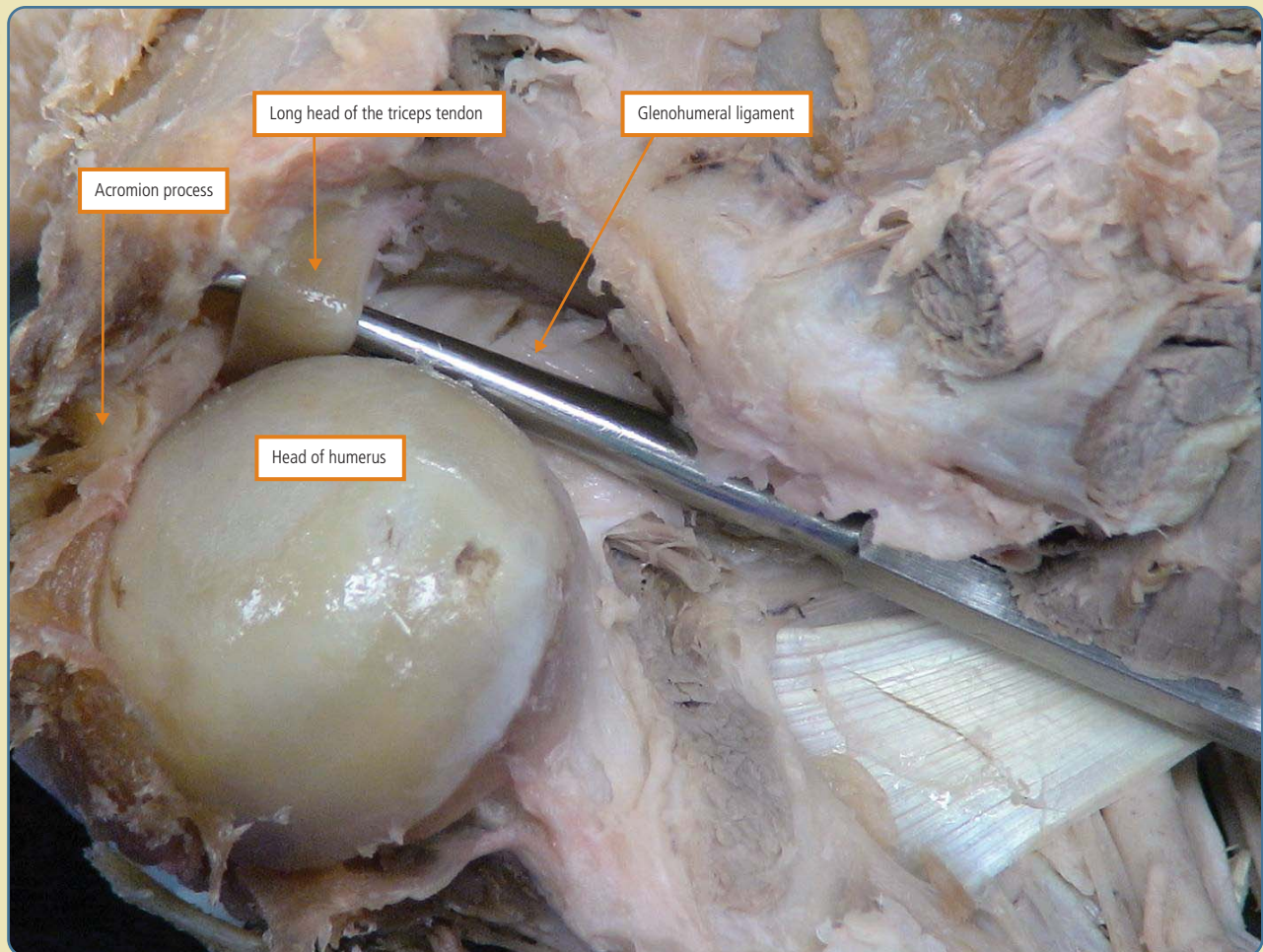
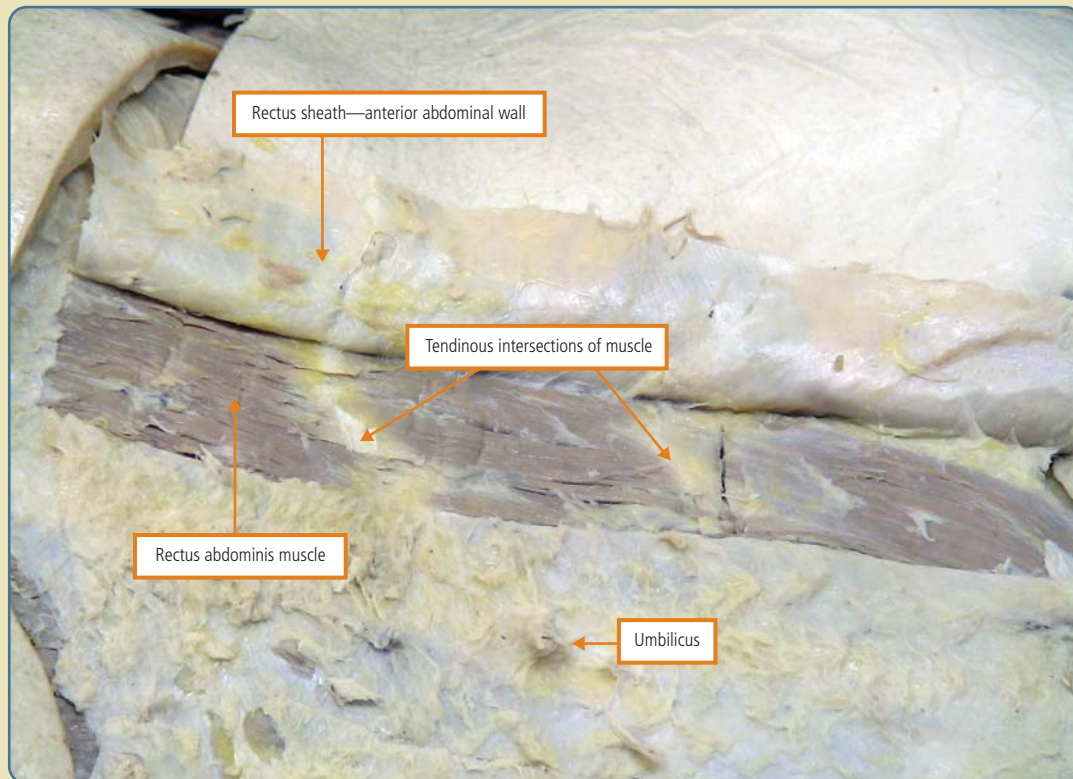


Figure 12.3

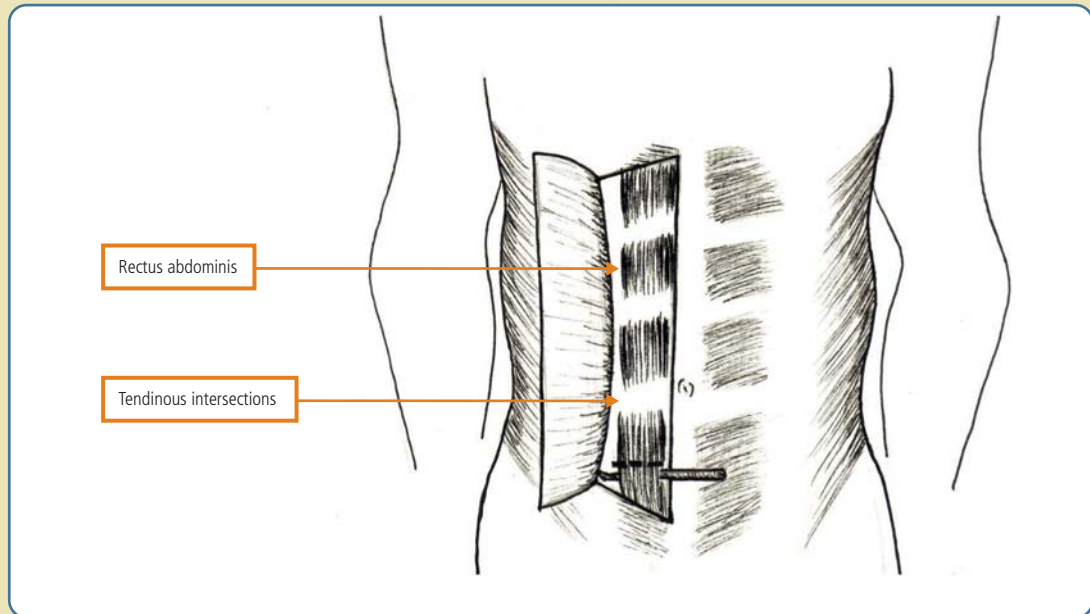
Exposure of the rectus abdominis muscle.



8. Gently work your fingers under the lateral edge of the rectus abdominis between this muscle and the posterior abdominal wall. You will be separating the rectus abdominis muscle from the posterior wall of the rectus sheath. Branches of the lower six thoracic nerves innervating this muscle can be felt.
9. With a probe placed under one section of the rectus abdominis (the lower quarter of the muscle), make a horizontal incision through this muscle **Figure 12.4**.
10. Use your finger to probe under the cut section of the rectus abdominis to be able to pull back the muscle and locate the arcuate line (semicircular line) on the posterior wall of the rectus sheath. Use your blade only as necessary because the area deep to the posterior abdominal wall is **very delicate**. Some fat may need to be carefully removed to clearly view the arcuate line. Locate on the posterior wall of the rectus sheath the arcuate line. The aponeurotic layer of the external oblique and the superficial aponeurotic layer of the internal oblique form the anterior wall of the rectus sheath above the umbilicus. The deep aponeurotic layer of the internal oblique and the layers of the transversus abdominis aponeurosis form the posterior wall of the rectus sheath. Midway between the umbilicus and the symphysis pubis, the aponeuroses of all three muscles pass anterior to the rectus abdominis muscle. The arcuate line marks the lower border of the posterior rectus sheath. See **Figure 12.5**.

Figure 12.4

The lower rectus abdominis cut to reveal the posterior abdominal wall and arcuate line.

**Figure 12.5**

Anterior and posterior abdominal wall. (a) The **anterior abdominal wall** "above" the umbilicus with the entire aponeurotic layer of EO (external oblique) and half of IO (internal oblique) going above RA (rectus abdominis muscle). The **posterior abdominal wall** "above" the umbilicus is made up of half of the aponeurotic layer of IO and the entire aponeurotic layer of TA (transversus abdominis). (b) The **anterior abdominal wall** "below" the umbilicus with all of the aponeurotic layers of EO, IO, TA going above RA. The **posterior abdominal wall** "below" the umbilicus is made up of peritoneum. The **arcuate line** is the point of demarcation where the aponeurotic layers change.

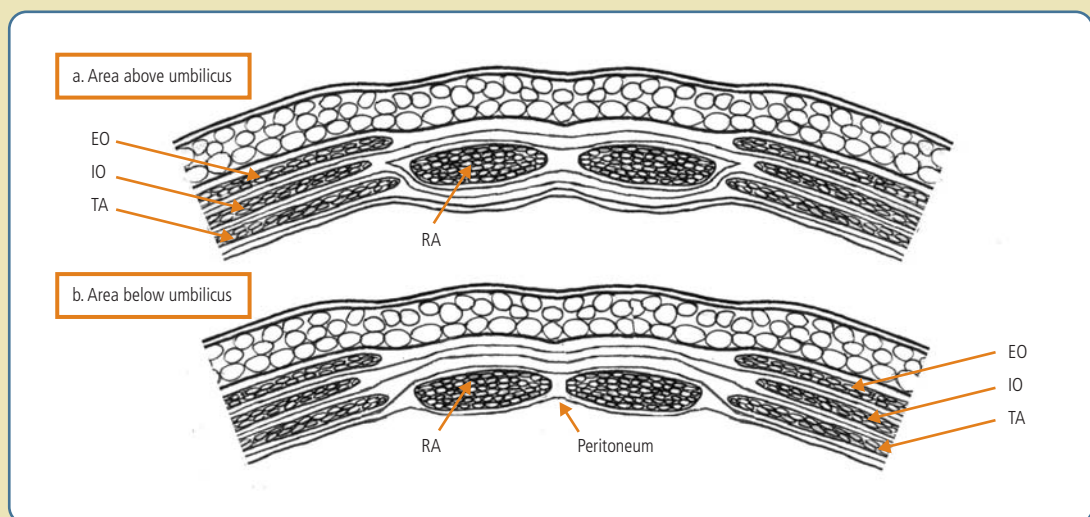
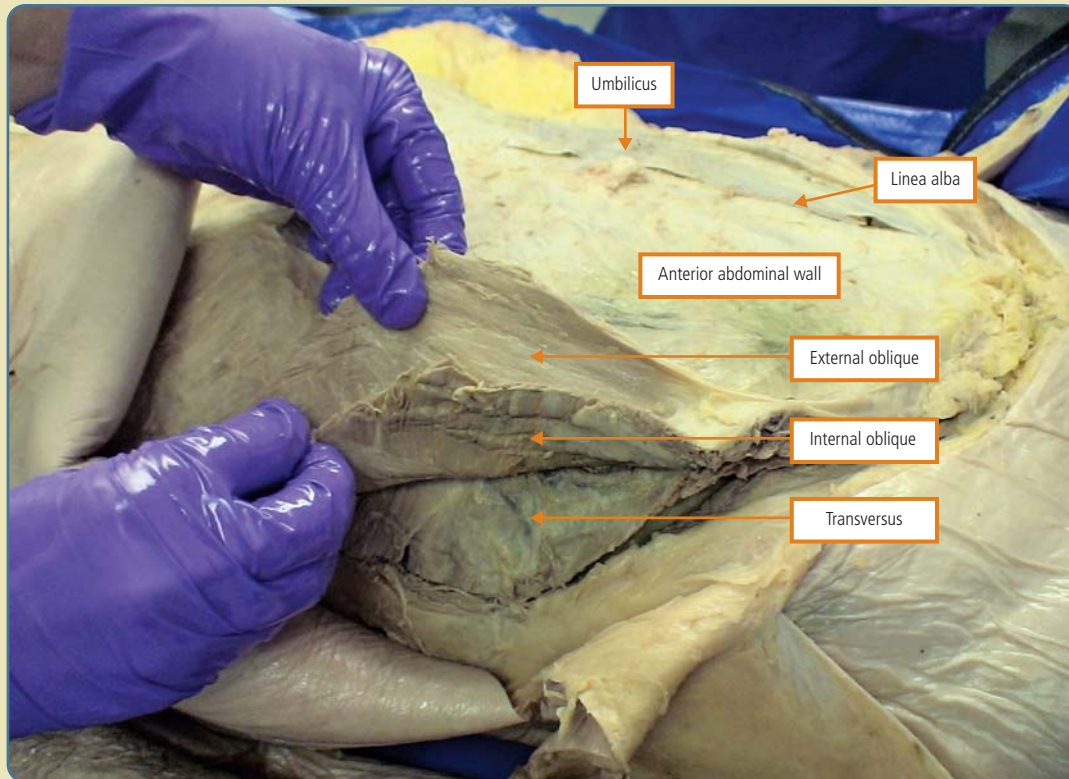


Figure 12.8

Layers of abdominal muscles.

**NOTE TO THE DISSECTOR**

The abdominal cavity will be full of fluid from the embalming process. If the peritoneum is accidentally pierced, fluid and possible fecal matter from the intestines (if the intestines are pierced) may be encountered. Notify the instructor so the intestines may be tied off to prevent fecal matter from entering the abdominal cavity.

18. Locate on the cadaver muscle attachments of the transversus abdominis. Note the direction of the muscle fibers and the action accomplished by this muscle.
19. The incision lines required in Figure 12.6c and Figure 12.6d severed the iliohypogastric and ilioinguinal nerves as they enter the anterior abdominal wall muscles laterally. Branches of the iliohypogastric nerve and the ilioinguinal nerve may be seen on the lateral aspect of the transversus abdominis muscle and piercing through the internal oblique. It is not necessary to trace these branches.
20. Muscular branches from the lower six thoracic nerves innervate the anterior abdominal wall muscles. The cutaneous branches of these nerves are found on the superficial surface of the external oblique. Find several of the thoracic branches and preserve them.
21. The inguinal ligament is formed by the lower border of the aponeurosis of the external oblique. This ligament is found from the anterior superior iliac spine to the pubic

tubercle. At the medial end of the inguinal ligament, locate the superficial inguinal ring, most easily found in the male **Figure 12.9**.

22. On a male cadaver, locate the spermatic cord as it emerges from the superficial inguinal ring. Branches of the ilioinguinal nerve may pass through the superficial inguinal ring along with the spermatic cord. Leave these structures intact. The contents of the spermatic cord will be dissected in more detail when the male pelvis is studied in a later section (Chapter 37).
23. On a female cadaver, the superficial inguinal ring may or may not be discernible. The ilioinguinal nerve and strands of the round ligament of the uterus are sometimes seen in the inguinal canal. These will be studied in more detail in a later section.

Figure 12.9

Inguinal ligament.

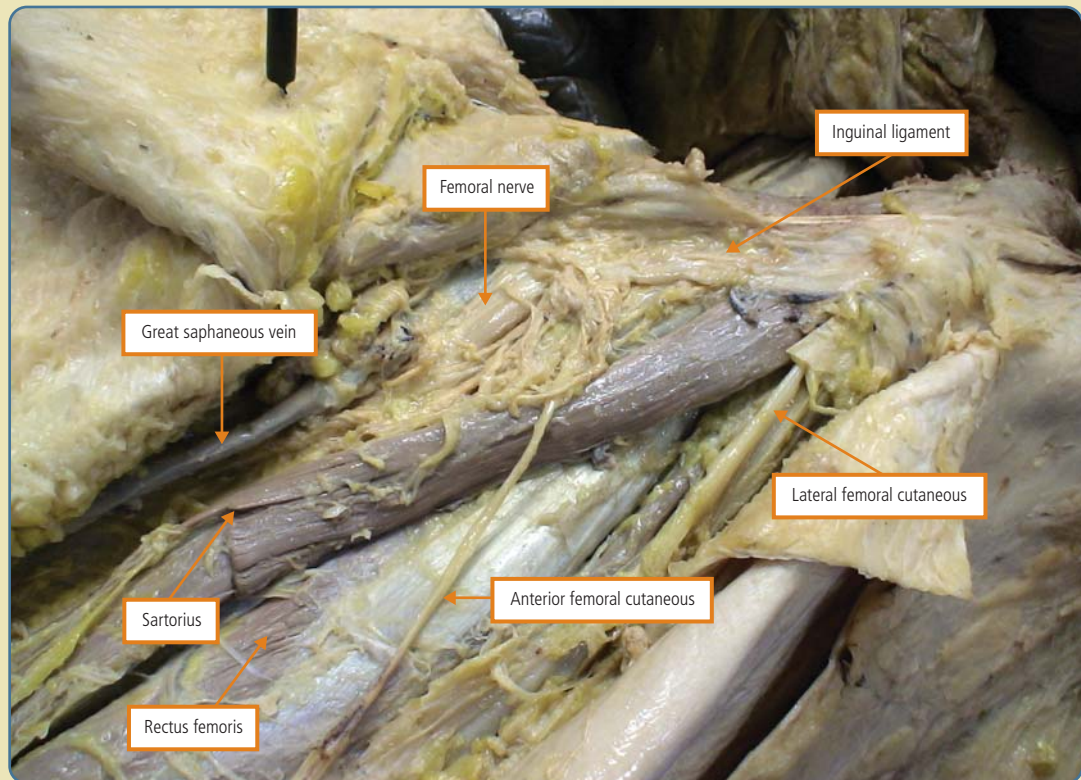
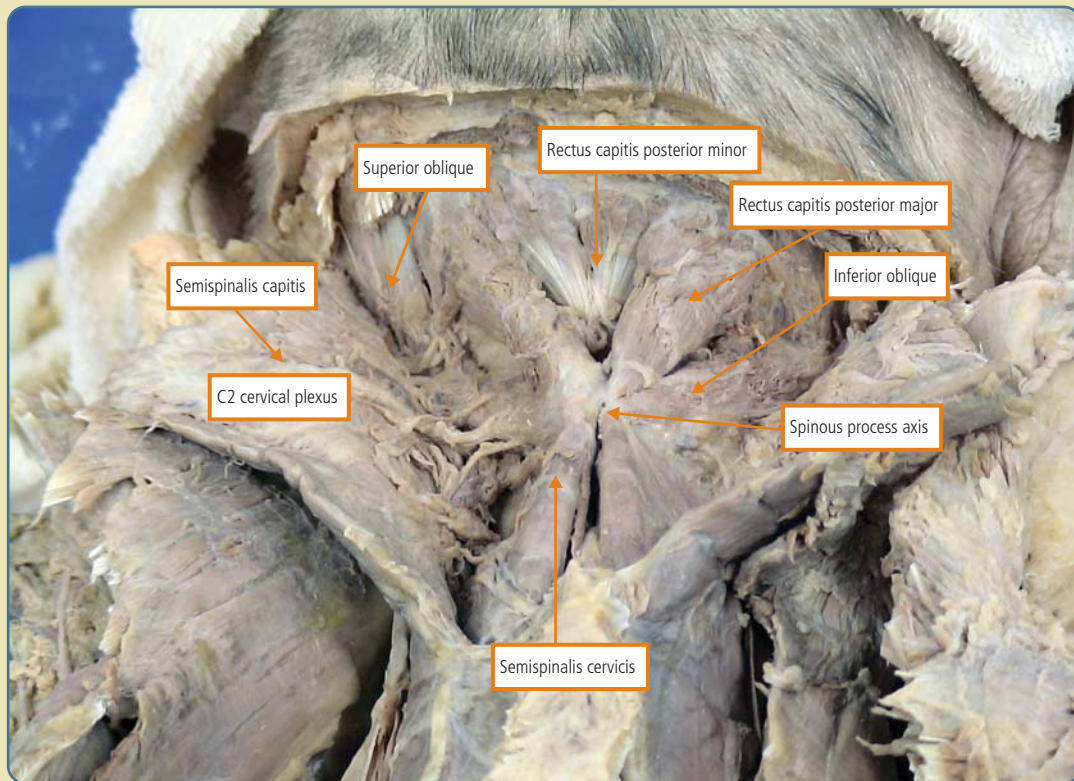


Figure 14.2

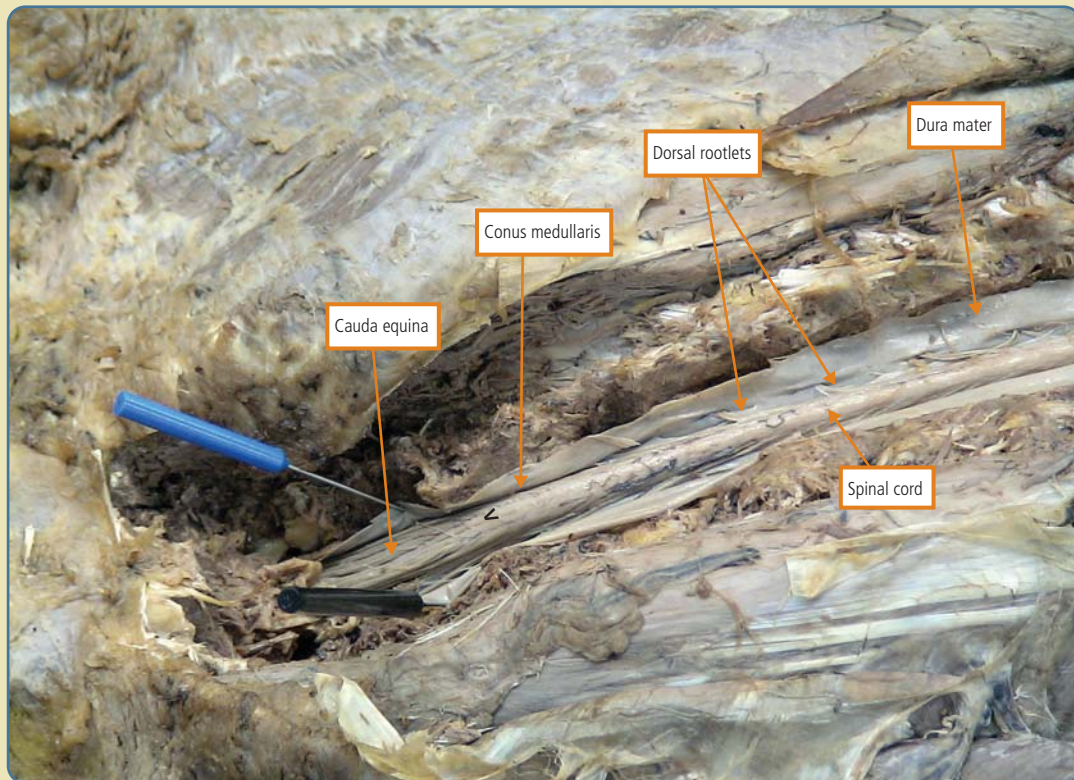
Suboccipital muscles.



10. Trace dorsal and ventral roots into an intervertebral foramen where these roots join to form a spinal nerve.
11. Lift the cut portion of the dura mater to reveal the posterior longitudinal ligament, which is located on the posterior surface of the vertebral body in the vertebral foramen.
12. Note the increase in size of the spinal cord in the cervical area and the lumbar regions where plexi emerge.

Figure 15.2

Laminectomy.

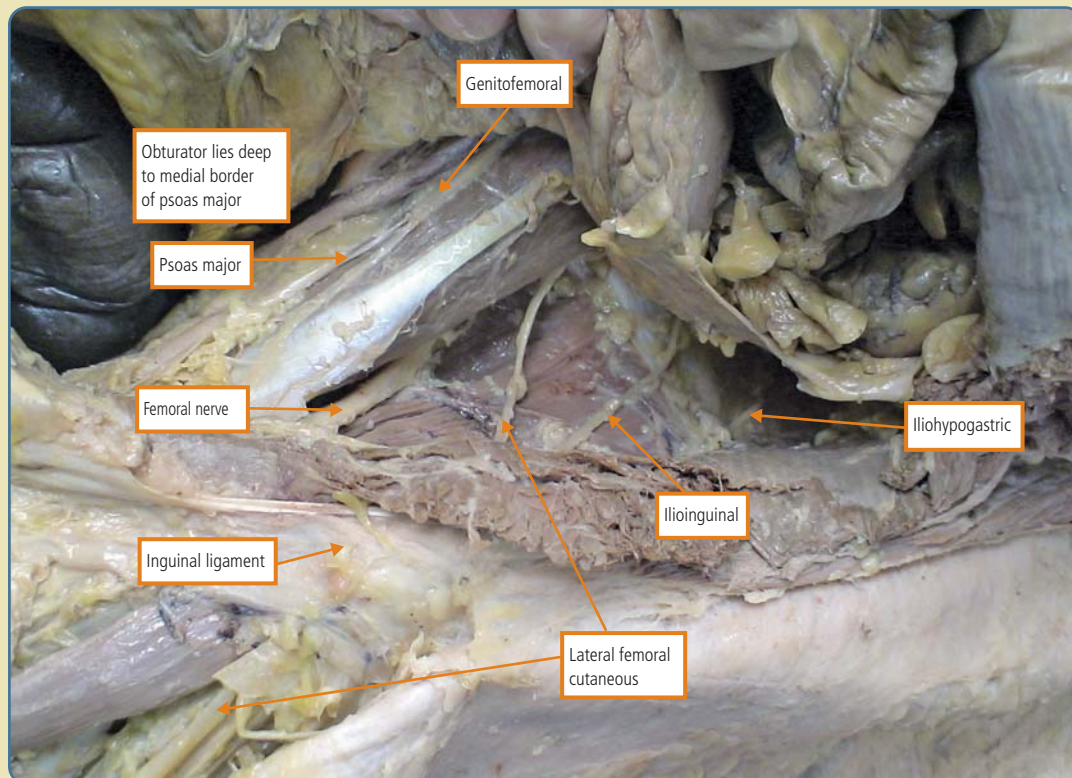


NOTE TO THE DISSECTOR A considerable amount of fluid may be found in the abdominal area. **DO NOT** use the vacuum to suck up the fluid! Use paper towels to soak up and remove excess fluid.

6. Take time to study the lumbar plexus in an atlas to become familiar with the location of each nerve of this plexus before proceeding with dissection. It is very easy to destroy these nerves when performing steps 8 and 9. Look **carefully** to see if the nerves are visible under the psoas and iliac fasciae **Figure 16.2**.
7. The intestines will need to be held aside while dissection of the lumbar plexus proceeds. Secure them with a rope tied to each side of the dissection table.
8. Work loose the psoas fascia, being careful not to injure the anterior surface of the psoas major where some of the nerves lie. This is best done by lifting the fascia with your forceps and clipping it open so as not to injure the nerves that lie underneath the fascia.
9. Cautiously remove the iliac fascia on the surface of the iliacus muscle, being careful not to injure the nerves of the lumbar plexus below. Lifting the fascia as in step 8 will assist with the removal of the iliac fascia and prevent injury to nerves that lie under it.
10. Locate the quadratus lumborum. This muscle lies proximal to the iliac crest.

Figure 16.2

Lumbar plexus.

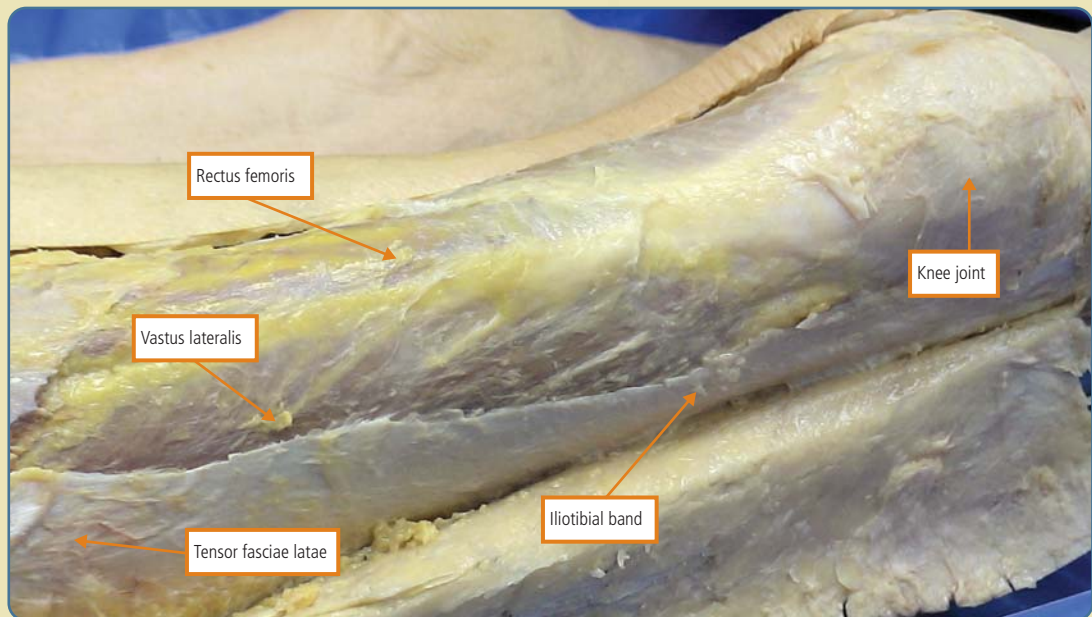


distal end (lying superficial on the thigh) and observing it move in the pelvis as it comes off the lumbar plexus. Save branches of this nerve for later study.

7. Trace the great saphenous vein to where it enters the femoral vein. The femoral sheath is located in this area and contains the femoral artery and femoral vein. Cut open the femoral sheath and identify the femoral artery and vein.
8. Continue to remove fascia lata and the deeper fascia lateral to the femoral sheath until the femoral nerve is reached. Locate the femoral nerve at the lateral border of the psoas major. Note that the femoral nerve passes deep to the inguinal ligament to enter the anterior thigh. Structures within the femoral sheath lateral to medial are the femoral nerve, femoral artery, and femoral vein.
9. Read a description of the relationship of the tensor fasciae latae and the iliotibial tract to the fascia lata.
10. Cut through the fascia lata using the incision lines shown in (Figure 17.1). As the fascia lata is turned laterally, preserve a 1-inch strip from the distal portion of the tensor fasciae latae muscle to the lateral condyle of the tibia. This strip is referred to as the iliotibial tract (IT band) **Figure 17.2**. The remaining fascia lata may now be removed.
11. Identify:
 - a. sartorius (Anterior intermediate femoral cutaneous branches pierce through this muscle in many cadavers. These cutaneous nerves come off the femoral nerve.)
 - b. rectus femoris
 - c. pectineus
 - d. adductor longus
 - e. gracilis

Figure 17.2

Iliotibial band.



Posterior Hip

Refer to DVD Disc 1



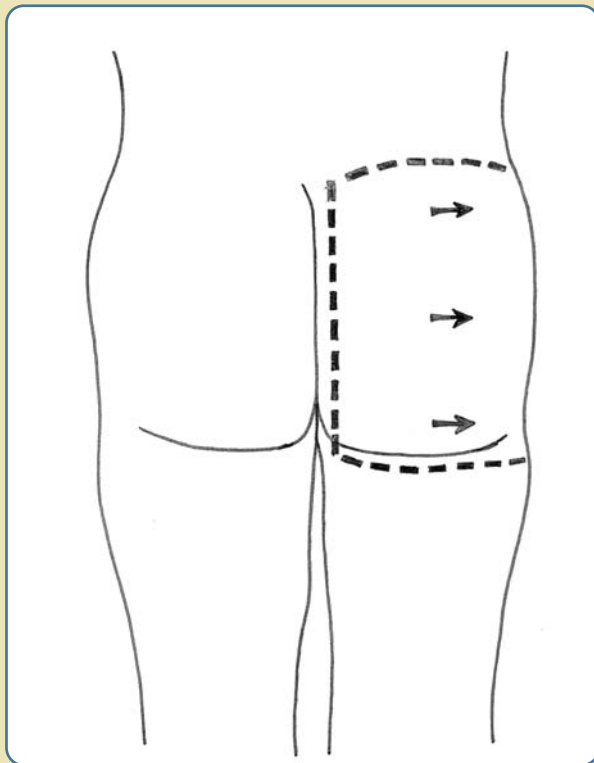
PROCEDURE: Position the cadaver prone.

1. Palpate on the cadaver:
 - a. crest of the ilium
 - b. sacrum
 - c. ischial tuberosity
 - d. greater trochanter
2. Review in an atlas the location of cutaneous branches of dorsal rami of the upper three lumbar and sacral nerves (cluneal nerves).

NOTE TO THE DISSECTOR The posterior cutaneous nerve of the thigh emerges from under the gluteus maximus at the gluteal fold and then pierces the deep fascia in the posterior thigh. As dissection proceeds in the upper thigh, be aware of this nerve, which will need to be preserved.

Figure 18.1

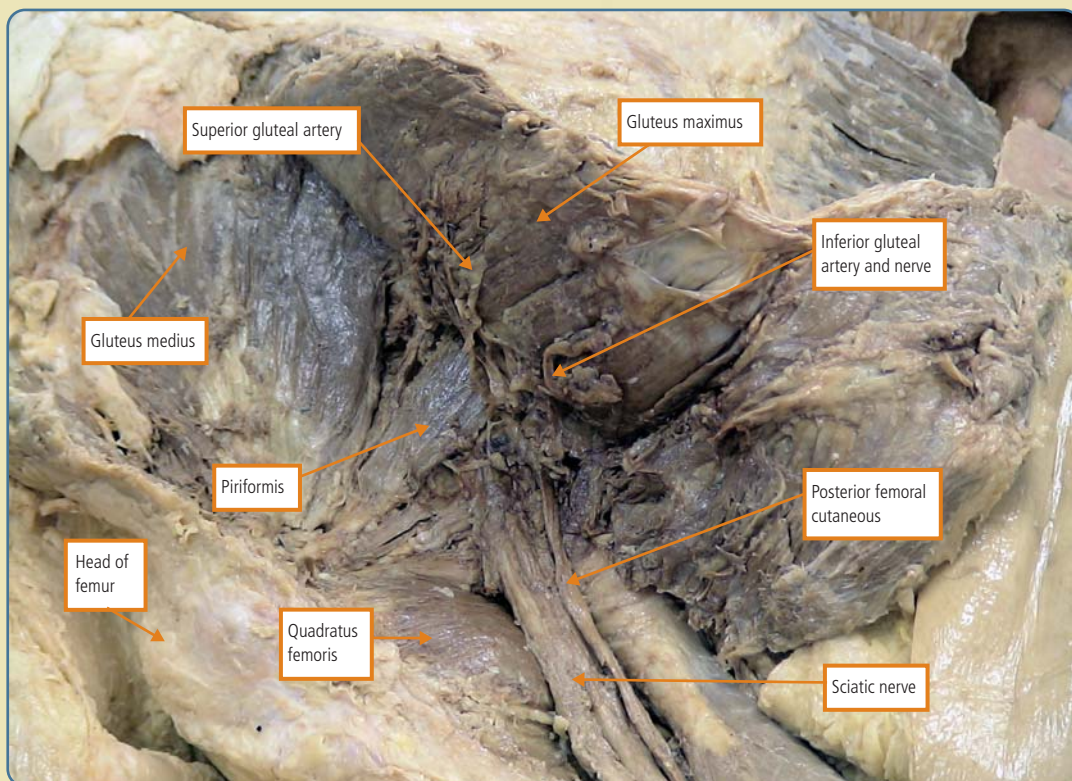
Skin incision lines on the posterior gluteal region.



3. Make an incision laterally along the crest of the ilium until the skin flap from the anterior trunk is encountered (Figure 18.1). A vertical incision should be made on the midline of the sacrum. Continue the incision line across the posterior thigh several inches inferior to the gluteal fold. Note that when taking the skin flap laterally from the sacrum, you will encounter less subcutaneous fat medially as compared to laterally.
4. Identify the gluteus maximus. Find each attachment of this muscle. Look at the direction of the muscle fibers and explain the actions of this muscle.
5. The sciatic nerve is located deep to the gluteus maximus. With your probe, gently work your way through the belly of the gluteus maximus, running parallel with the fibers of the muscle. Cautiously work deeper until the sciatic nerve is reached, being careful not to tear the muscle unnecessarily. Be sure to locate this nerve in the atlas prior to looking for it on the cadaver.
6. Place a probe under this nerve in order to be well aware of its location.
7. Release the gluteus maximus from the iliotibial tract (Figure 18.2). Turn the muscle medially

Figure 18.3

Gluteal region.



erally so the superior and inferior gluteal arteries and nerves are protected and carefully preserved. These arteries and nerves are seen just lateral to the sacrotuberous ligament.

10. Lift the gluteus maximus, working it loose with the fingers. Trace branches of the inferior gluteal nerve and artery into the belly of the gluteus maximus. Leave these branches intact where they enter on the deep surface of this muscle, because the inferior gluteal nerve and artery will now be the only structures holding the gluteus maximus to the cadaver.
11. Numerous veins will be encountered in the gluteal area. The veins may be removed.
12. With the gluteus maximus held aside, identify:
 - a. piriformis
 - b. gemellus superior
 - c. tendon of the obturator internus (lying between the gemellus muscles)
 - d. gemellus inferior
 - e. quadratus femoris

Study the insertions for each of these and demonstrate the action achieved by this group of muscles.

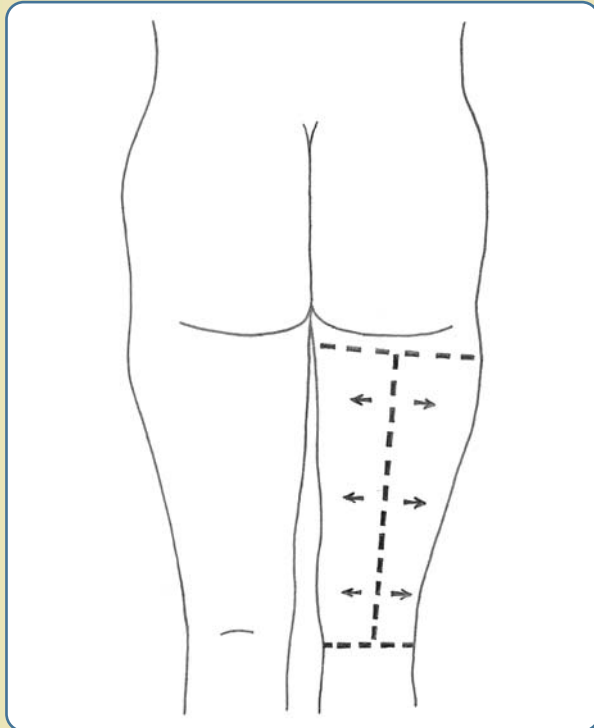
Posterior Thigh

Refer to DVD Disc 1



Figure 19.1

Skin incision lines of the posterior thigh.



1. Just inferior to the piriformis, find the posterior cutaneous nerve of the thigh located between the sciatic nerve and the inferior gluteal artery. It often runs with the sciatic nerve. Continue to trace the posterior femoral cutaneous nerve to the inferior border of the gluteus maximus where it enters the posterior thigh. Preserve cutaneous branches in the posterior thigh as the skin is removed.
2. Make a midline incision on the posterior thigh through the popliteal fossa to the area just distal to the knee (Figure 19.1). A horizontal incision should also be made to meet the incision line on the anterior leg. Avoid severing the common peroneal nerve posterior to the head of the fibula. Work the skin loose until the flap from the anterior thigh is encountered.
3. As superficial and deep fascia are removed, preserve branches of the posterior cutaneous nerve of the thigh that pierce through the deep fascia.
4. Identify:
 - a. long head of the biceps femoris
 - b. semitendinosus
 - c. semimembranosus

Note the common origin of these “hamstring” muscles on the ischial tuberosity. Find the ori-

gin of the short head of the biceps femoris on the lateral lip of the linea aspera. Pull on the tendons of each of these muscles to demonstrate their actions.

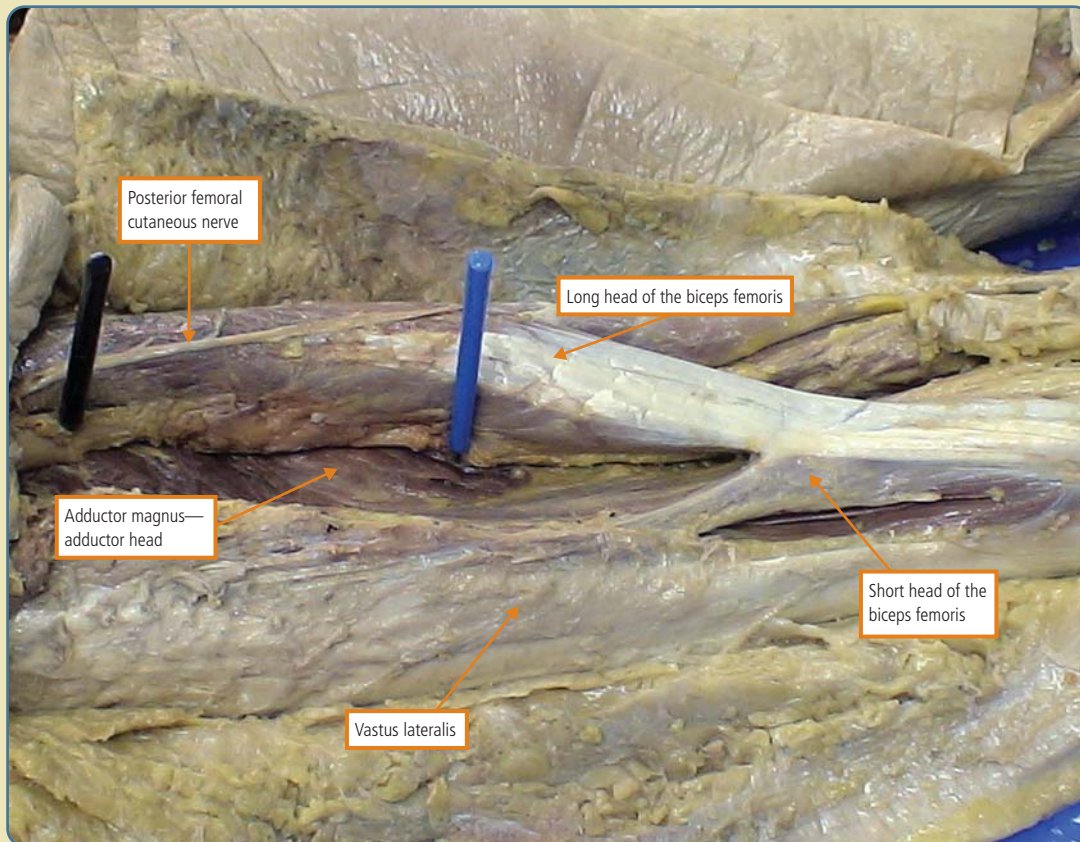
NOTE TO THE DISSECTOR The insertions of these muscles will be observed when the posterior leg and popliteal fossa are dissected.

5. Move aside the “hamstring” muscles to view the deeper adductor magnus. Identify the extensor head and the adductor head of this muscle. Refer to an atlas to determine the difference in these two heads (Figure 19.2).
6. Trace the course of the sciatic nerve through the posterior thigh.

NOTE TO THE DISSECTOR If the sciatic nerve is manipulated (handled) a lot, it will begin to separate in the mid thigh. Be careful to preserve this nerve as you locate the various innervations to the following muscles.

Figure 19.2

Adductus magnus adductor head.



- a. Locate a branch of the tibial portion of the sciatic nerve to the long head of the biceps femoris, semitendinosus, semimembranosus, and extensor head of the adductor magnus. These nerves arise from the medial side of the sciatic nerve in the upper thigh several inches below the ischial tuberosity. The nerves to the semimembranosus and adductor magnus are often from the same branch.
 - b. Trace the branch of the peroneal portion of the sciatic nerve to the short head of the biceps femoris. It arises from the lateral side of the sciatic nerve in the upper thigh and may have a long course distally before entering the muscle.
 - c. After sending branches to the “hamstring” muscles, the sciatic divides into a common peroneal nerve and a tibial nerve in the lower thigh. Follow these two divisions to where they enter the leg. Note that the common peroneal nerve passes along the medial border of the biceps femoris, then winds around the neck of the fibula. At this point, the common peroneal nerve is *superficial* in its location.
7. Perforating branches of the deep femoral artery are seen piercing through the adductor magnus. These branches are a major source of blood supply for the posterior thigh muscles. It is important that branches from the sciatic nerve be located first in step 6 before clipping any of the arteries or veins for better viewing of the area.
 8. Veins may now be removed in the posterior thigh.