

CADAVER DISSECTION – THROAX

All of the terms indicated below in **BOLD** print should be identified during the student's oral presentation on this region.

PROCEDURE:

I. SURFACE ANATOMICAL LANDMARKS – Prior to dissection, identify the following surface anatomical landmarks of the thorax: **suprasternal (jugular) notch, sternal angle, infrasternal angle (costal cartilage), xiphoid process, palpate clavicle from sternum to acromion process.**

II. SUPERFICIAL VESSELS – Determine the location of any major superficial veins or nerves in your area of dissection to avoid damaging these structures as you dissect.

III. REMOVAL OF SKIN – Using the following steps to remove the skin from the median line of the thorax laterally to the midaxillary line.

A. Incision Lines – Use a marking pencil to outline the incision lines (illustrated on the handout). Use a scalpel blade to cut through the skin. Insert a smooth probe under the skin along the remaining incision lines (instructor will demonstrate). When making your remaining incision, only cut to the smooth probe to avoid damaging superficial structures deep to the skin.

Median Incision Line – Cut the skin along the median line from the suprasternal angle to the xiphoid process.

Lateral Incision Lines

- 1) Cut along the superior margin of the clavicle to the acromion process.
- 2) Cut along the border of the infrasternal angle from the xiphoid process to the midaxillary line.

B. Removal of the skin – Locate the deep fascia or epimysium of the pectoralis major muscle. Use a smooth probe to locate the junction of the superficial fascia and the deep fascia. Using the smooth probe (and your fingers) remove the skin from the median line to the midaxillary line of the thorax. Avoid using the scalpel blade unless absolutely necessary.

IV. MUSCLE IDENTIFICATION AND SEPARATION:

A **Pectoralis major** – Identify the pectoralis major muscle covering most of the superior portion of the anterior thorax.

B. **Serratus anterior** – Identify the serratus anterior muscle inferior and lateral to the pectoralis major muscle on the lateral surface of the thorax.

C. **External oblique** – Identify the superior fibers of the external oblique muscle as it originates from the inferior portion of the ribcage.

Use a smooth probe to separate the pectoralis muscle from the deeper pectoralis minor muscle. Cut through the pectoralis major muscle from the midpoint of its inferior boundary, in a superior and medial direction to the midpoint of the muscle's clavicular attachment.

* Avoid damaging the deeper pectoralis minor muscle.

D. Pectoralis minor – Identify the pectoralis minor muscle deep to the pectoralis major muscle. Palpate the attachment of this muscle to the coracoid process of the scapula. After exposing the pectoralis minor muscle, use the scissors to cut through the midpoint of the muscle approximately two inches from its attachment to the coracoid process.

E. External intercostal – Identify the external intercostal muscles located between the ribs. These muscles are located within the intercostal space, extending from the vertebrae in the back to the beginning of the costal cartilage in the front. Their fibers run downward and medial on the anterior side of the thorax (like putting your hands in your pockets).

F. Internal intercostal – Identify the internal intercostal muscles located between the ribs. These muscles are located within the intercostal space, extending from the sternum in the front to the angle of the ribs in the back. Their fibers run upward and medial on the anterior side of the thorax. Note that the external intercostal muscles will cover the internal intercostal muscles except on the anterior surface of the thorax, between the sternum and the lateral portions of the costal cartilages.

V. REMOVAL OF THE ANTERIOR PORTION OF THE THORAX

A. After the pectoralis major and pectoralis minor muscles have been cut, use the bone saw to cut through the ribcage beginning with the most inferior ribs. Make your cut approximately 1 inch medial to the midaxillary line. Make an incision on the line of your cut with scalpel blade so that the bone saw will be able to make direct contact with bone tissue. Cut the ribs with the bone saw and use the scissors to cut any intervening intercostal muscles. Cut all ribs up through the second rib.

* When cutting through the ribs and sternum, avoid damaging the organs (lungs and brachiocephalic veins) of the thoracic cavity deep to your cut.

B. Cut the clavicle lateral to the attachment of the sternocleidomastoid muscle using the bone saw. Cut through the middle of the manubrium of the sternum using the bone saw.

C. Use scissors to separate the remaining muscular and connective attachments between the second rib and manubrium.

D. After both sides of the thorax and the sternum have been cut, lift up the anterior portion of the thorax to observe the organs of the thoracic cavity. You will probably need to cut the inferior attachment of the ribcage to the diaphragm so the anterior portion of the thorax may remove.

VII. INTERNAL VIEW OF ANTERIOR THORAX

A. **Parietal pleura** – Identify the parietal pleura lining the internal surface of the thorax.

B. **Bony Thorax** – Identify the individual bones of the sternum (**manubrium, body, xiphoid process**) deep to the parietal pleura. Identify the sternal angle.

MUSCLES

C. **Transversus thoracis** – Identify the transversus thoracis muscle located internally on the anterior portion of the ribcage.

D. **Diaphragm** – Identify the anterior portion of the diaphragm muscle.

VESSELS

E. **Internal Thoracic Artery and Internal Thoracic Vein** – Identify the internal thoracic artery and internal thoracic vein located internally on the anterior thorax, lateral to the sternum.

VII. DEEP DISSECTION OF THE THORAX – THORACIC CAVITY

A. Organ Identification – Prior to dissection of the thoracic cavity, identify the following structures and organs visible on the anterior view of the thoracic cavity. In the superior mediastinum, identify the **thymus gland** (this decreases in size with age and may be difficult to identify). In the middle mediastinum, identify the **pericardium**. Identify the **lobes** of the **right** and **left lungs**.

B. **Phrenic nerves** – Identify the phrenic nerves on the lateral side of the pericardium of the heart. Accompanying the nerves are the **pericardiophrenic artery** and vein. Separate the nerves from their attachment to the pericardium in a superior direction to the thoracic inlet and in an inferior direction to the diaphragm.

C. **Brachiocephalic Veins** and **Superior Vena Cava** – Identify the right and left brachiocephalic veins as they join to form the superior vena cava. Expose these veins from their entrance through the thoracic inlet toward the right atrium of the heart. Identify the **azygos vein** as it enters the superior vena cava on the posterior surface of the superior vena cava superior to the right atrium.

D. **Aortic arch** – Identify the aortic arch and its three branches: first branch – **brachiocephalic trunk**, second branch – **left common carotid artery**, and third branch – **left subclavian artery**. These branches arise from the superior portion of the arch and supply the head, neck, and upper limbs. Follow the aortic arch in an inferolateral direction to the right to locate the **ascending aorta**.

E. **Pulmonary trunk** – Identify the pulmonary trunk located.

F. **Vagus nerves** – Identify the right and left vagus nerves medial and posterior to the brachiocephalic veins. The right vagus nerve gives off a **recurrent laryngeal nerve** which passes under the right subclavian artery. The left vagus nerve, near the left common carotid artery, gives off a **recurrent laryngeal nerve** which passes under the aortic arch.

G. **Pericardium** – Make a median longitudinal incision through the pericardium. Cut laterally from this incision at the top and bottom to expose the heart.

H. Removal of the Heart – Remove the heart by cutting the following great vessels. Cut the pulmonary trunk two centimeters above its origin. Cut the ascending aorta two centimeters above its origin. Cut the superior vena cava inferior to the entrance of the azygos vein. Locate the **inferior vena cava** as it passes through the diaphragm. Cut the inferior vena cava near its entrance into the thoracic cavity. Locate the **two right** and **two left pulmonary veins** as they enter the left atrium on the posterior surface of the heart. Cut the right and left pulmonary veins near their attachment to the heart. You should now be able to remove the heart from the thoracic cavity.

I. Lungs – Remove the right and left lungs by cutting through the roots of each lung. Avoid damaging the phrenic nerves and the azygos vein on the right side of the thoracic.

K. Expose the contents of the posterior mediastinum by cutting through the posterior portion of the pericardium. *Avoid damaging the structures posterior to the pericardium.

L. **Esophagus** – Identify the esophagus located posterior to the trachea (in the superior mediastinum) and the pericardium (in the posterior mediastinum).

M. **Thoracic duct** – Identify the thoracic duct on the anterior surface of the vertebral column.

N. **Sympathetic trunk** (chain of sympathetic ganglia) – Try to locate the sympathetic trunks located on their side of the bodies of the vertebral column under the parietal pleura.

