brighton and sussex medical school

BSMS MODULE: **102, FOUNDATIONS OF HEALTH AND DISEASE**

THEME: **THE HUMAN BODY**

DR SESSION: **1. EXAMINATION OF THE THORACIC WALL AND PECTORAL MUSCLES**

Welcome to Anatomy Laboratory

The anatomy team is excited to welcome you to the anatomy laboratory and to your first dissection session as part of the human body theme of module 102. Each dissection session in this and all modules in Phase 1 has a number of component parts and objectives to be achieved:

1. Introductory demonstration from the faculty lead
2. Dissection and investigation of the cadaver
3. Answering of the handout questions
4. Exploration of the models, prosected specimens and other demonstration materials
5. Completion of the checklist with anatomy staff

LEARNING OUTCOMES

By the end of the practical session students should be able to:

1. Identify and demonstrate the named landmarks of the chest wall on a skeleton and cadaver
2. Describe the concept of investing fascia
3. Identify pectoralis major, its parameters and indicate its function
4. Identify pectoralis minor, its parameters and indicate its function
5. Describe the anatomy of the breast

Time to designate your team leader

Before you start you must designate a team leader from your group for this particular anatomy session. The team leader will leader will act as the guide using this handout and will ensure each member of the group is able to participate in all aspects of the session including dissecting. There will be a new team leader for each dissection session.

Task 1. Cadaver Care

Your first task is to uncover your cadaver using the techniques demonstrated to you by the Head of Anatomy. To aid you in the dissection process, the skin overlying the pectoral region has already been cut. These incisions reveal the underlying muscles and tissues which you are going to examine today. Each member of the group should take a few moments to examine the skin and underlying muscles and to feel the consistency of each tissue.

Question 1.

What does the structure of the skin layer feel like? Is it the same on a neighbouring cadaver?

Task 2. Skeletal Landmarks

The second task is to work with a demonstrator to inspect one of the laboratory skeletons and within your team to identify as many of the boney structures making up the thoracic cage including the:

- **clavicles**
- **sternum**
- **scapula**
- **ribs**
- **costal cartilages**
- **thoracic vertebrae**

To aid you in the dissection, it is important for you to also identify a number of landmark features:

- **jugular notch**
- **xiphoid process**
- **lower costal margin**
- **acromium process**
- **coracoid process**

Question 2.
The acromium process is part of which bone?

Task 3. Incisions

On your cadaver the skin incisions that have been made are:

1. a midline incision extending from the jugular notch to the xiphoid process
2. a perpendicular incision from the xiphoid process towards the lateral wall of the thoracic cage.
3. an incision along the clavicle from the jugular notch to the acromion

As there are two identical sides to the thorax, you can work in two groups around the cadaver to identify the structures.

You need to reflect the incised skin laterally to reveal the underlying muscles. The demonstrators will show each group how to load a scalpel handle with its blade safely. It is very important that you follow this technique to avoid injury to you and others. Each member of the group should take turns in carefully cutting away a small piece of fat from the skin with the scalpel in order to see what technique is necessary. Your demonstrator will help guide you.

Question 3.
Of which bone is the xiphoid process part of?

Task 4. Fascia

All muscles of the body are invested and surrounded by connective tissue – this connective tissue is called the ***investing fascia***. Some of the cadavers have the investing fascia removed from the underlying muscle whereas in others the investing fascia has been retained or is naturally extensive. By examining a neighbouring body ensure that you have seen the investing fascia if it has been removed from the cadaver on which you are working. If the cadaver you are working on has the investing fascia intact, carefully remove the fascia from the muscles of the chest wall. Your demonstrator will help you with this task and you should take turns in completing this.

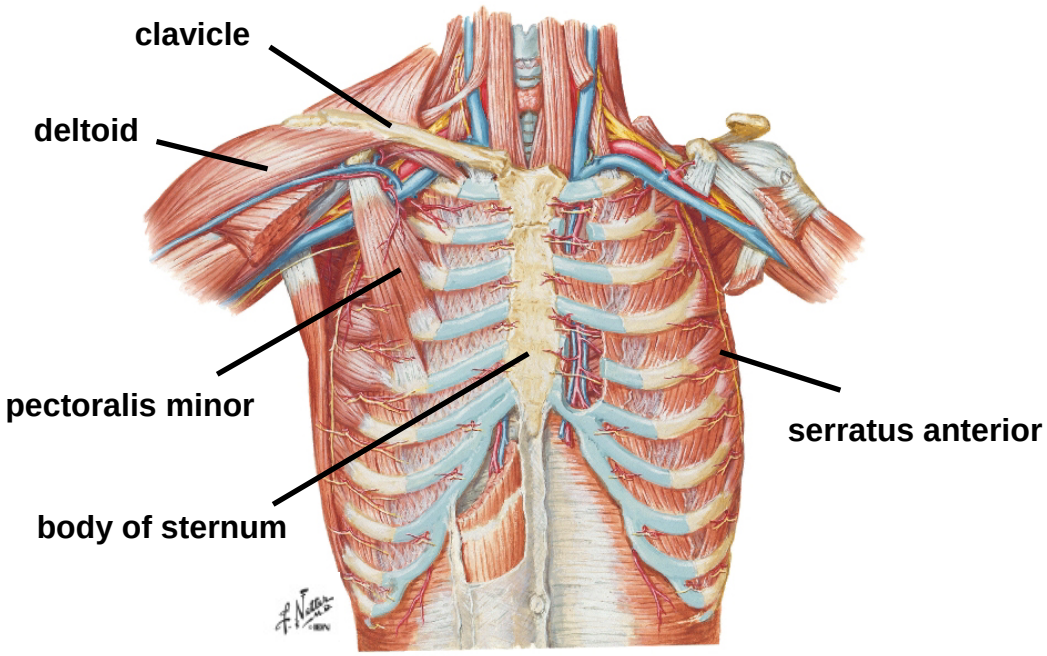
The exposed muscle is ***pectoralis major***. This large 'convergent' muscle covers much of the anterior aspect of the chest wall and has two 'heads' – the ***clavicular head*** which originates from the clavicle and the ***sternocostal head*** which originates from the ***sternum*** and the ***costal cartilages***.

Question 4.

Trace the pectoralis major muscle to its point of insertion. Where does this muscle insert?

Task 5. Thoracic Muscles

An annotated illustration has been provided in this handout to give you some guidance in locating the pectoralis major muscle. Make sure you can then identify these features on your cadaver.



Remember that the ***origin*** of the muscle is the 'fixed point' and it is the ***insertion*** that moves to allow the muscle to carry out its specific action.

Question 5.

Work out the *action* of pectoralis major and demonstrate them within your team.

Task 6. Pectoralis Major

Reflect the muscle laterally by cutting through the muscle fibres close to the origin of the muscle. This is made easier by first using the handle of the forceps or your fingers to separate the muscle from the underlying thoracic wall. Do this slowly and carefully to ensure you do not damage deeper structures. On the deeper surface of the muscle closer to the insertion, can you identify the nerves and blood vessels supplying the pectoralis major muscle? They may be embedded in connective tissue. If they are try and carefully expose them using the open scissor technique.
Beneath the pectoralis major, identify the much smaller ***pectoralis minor*** muscle. Trace its points of attachments (origin and insertion). Once again the illustration on the next page should assist you in its identification. Identify the ***serratus anterior*** muscle.

Question 6.
What might the blood vessels and nerves be called?

Task 7. Pectoralis Minor

Reflect the pectoralis minor muscle superiorly by cutting its attachments to the ribs. Finally identify the deltoid muscle. Trace the origin and insertion of the deltoid.

Question 6.
Using the knowledge you have just gained that the insertion is the moveable attachment of the muscle, can you determine the action of the deltoid muscle?

Task 8. Breast

Breasts lie within the superficial fascia of the chest wall. They are formed in the embryo by an ingrowth of ectodermal cells and they consist largely of fatty fibrous tissue. The breasts are normally located on the anterior chest wall, between ribs 2 to 6. When viewed anteriorly, each breast has an almost circular profile with a prolongation, the axillary tail, which extends up into the axilla. The nipples lie in the centre of the pigmented areola, locate the areola on the model.

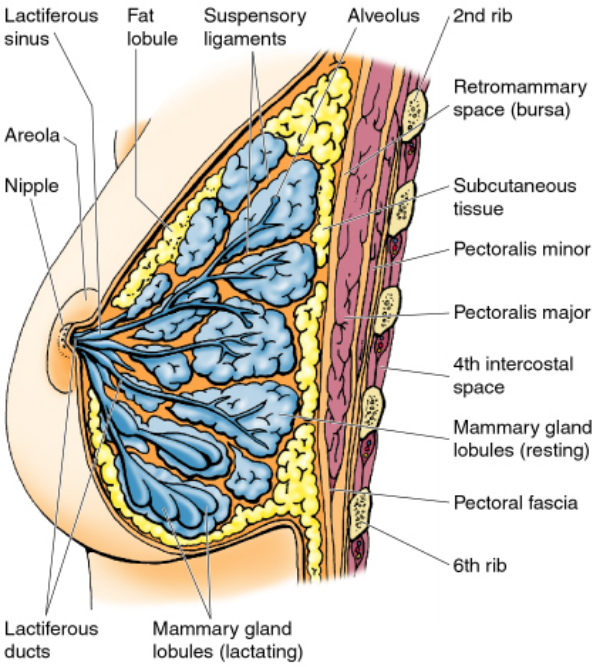
In females at puberty, under the influence of oestrogen, there is deposition of fat (white adipose cells) in the connective tissue of the breast and growth in length and branching of the duct system. Fat also covers the superficial surface of the gland, beneath the skin, and gives the smooth contour of the breasts.

Each breast, in the adult female (before the menopause) is subdivided into about 20 lobes by fibrous connective tissue which contains deposits of fat. Fibrous connective tissue helps attach the breast to pectoralis major. The duct system of each lobe drains through a single lactiferous duct to the nipple. Up to about 20 lactiferous ducts open

separately through each nipple. Using the breast models identify the pectoralis major muscles, lobes and lactiferous ducts.

The breast has a rich arterial blood supply which arises mainly from branches of the internal thoracic artery. However, it is also supplied by branches from the lateral thoracic artery and thoraco-acromial artery, examine these on the prosection (branches of the axillary artery) and by the lateral and anterior cutaneous branches of the intercostal arteries (3rd to 5th intercostal spaces). It is not important to know all of various arteries that supply the breast, but be aware that lymphatic vessels which drain the breast often accompany the distribution of the arteries.

1.10. Sagittal section of the breast and anterior thoracic wall.



This completes the first dissection session for this module.

Checklist

Review all the structures you have examined today and ensure that your demonstrator is satisfied that you have completed the check list below before you leave the dissecting room:

Identify and demonstrate the named landmarks of the chest wall on a skeleton and your cadaver

Understand the concept of investing fascia

Identify pectoralis major, its parameters and indicate its function

Identify pectoralis minor, its parameters and indicate its function

Describe the anatomy of the breast