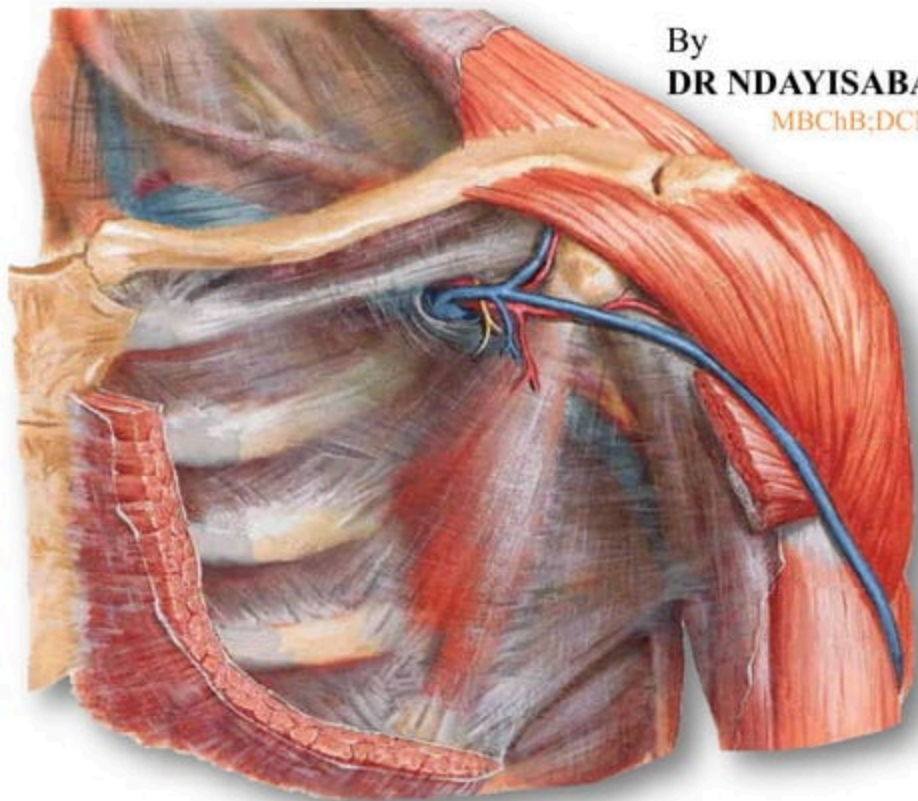


The Breast and Pectoral region

By

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Presentation objectives

- To outline the structure, blood supply and lymphatic drainage of the breast.
- To describe the embryological development and congenital anomalies associated with development of the breast.
- To outline the etiology, clinical presentation and management of cancer of the breast.
- To outline the muscles of the pectoral region indicating their attachments, nerve supply and action.

Outline of presentation

- Introduction
- The breast: description, developmental changes, blood supply, lymphatic drainage, congenital anomalies
- Muscles of the pectoral region
- Neurovascular bundles in the pectoral region

Introduction

- The upper limb is the upper extremity of the body.
- It has a great degree of mobility and is functionally adapted to grasp, strike and manipulate. In primates, it is also important in locomotion
- Most of the functions of the upper limb depend on the integrity of the hand (especially the thumb)

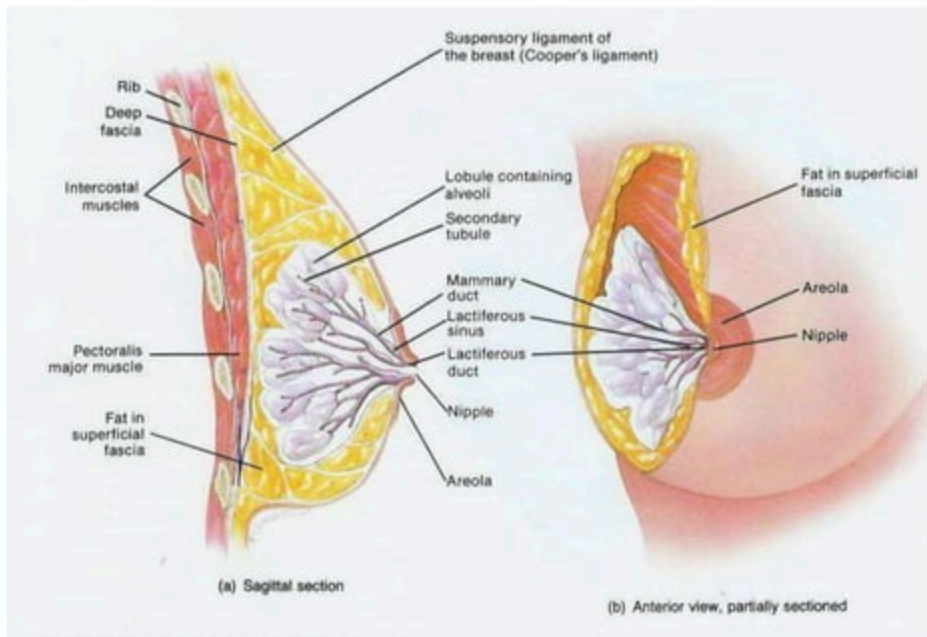
Introduction contd...

- The upper limb is anatomically divided into different regions namely: the pectoral region, the shoulder, the scapular region, the axilla, the arm, the elbow joint, the cubital fossa, the fore arm, the wrist and the hand.
- Each region contains important anatomical and clinical structures.
- Knowledge of these regions is important in the diagnosis and management of lesions of the upper limb.

The Pectoral region

- It contains the following structures
 - 1) The breast
 - 2) Pectoralis Major muscle
 - 3) Pectoralis minor muscle
 - 4) Serratus anterior muscle
 - 5) Subclavius muscle
 - 6) Neurovascular bundles

The Breast



The Breast

- The breasts are specialised accessory glands whose function is to produce milk and sexual arousal.
- They are normally found in the pectoral region though abnormal breasts can be found anywhere from the inguinal region to the axilla.
- They are present in both sexes and are normally two in number.(left usually larger than right)
- They vary in size and shape depending on sex, age, race and even tribe.

Breast contd...

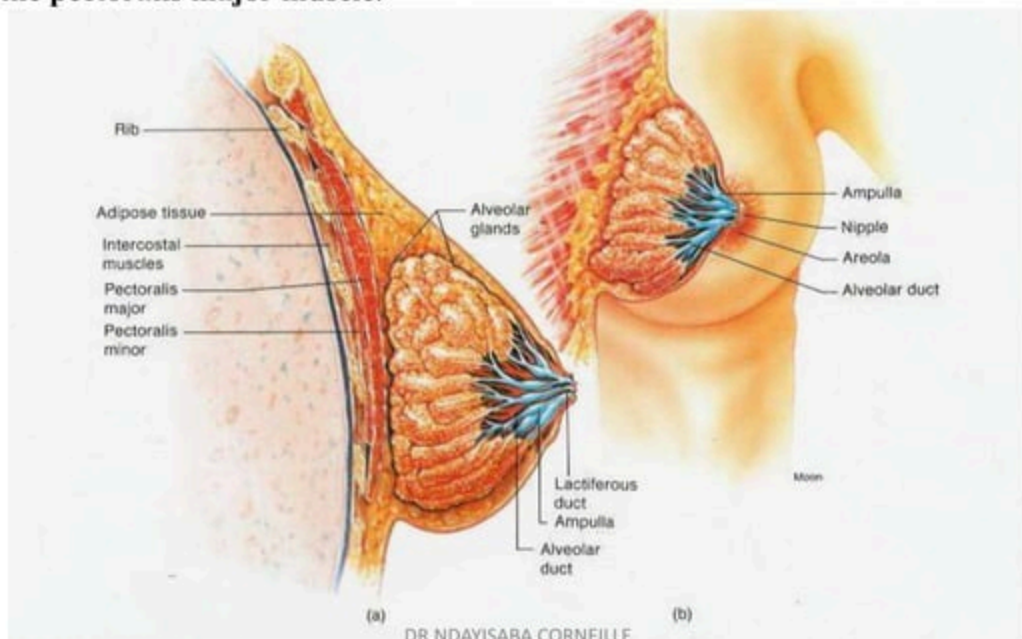
- In males and prepubertal females, they are similar in size and shape.
- Such breasts are composed of the nipple surrounded by a hyperpigmented area known as the areolar. The breast doesn't extend beyond the areolar.
- Such breasts are composed of a system of ducts embedded in connective tissue.

Breast contd...

- At puberty, the female breast enlarges and extends from the 2nd to 6th rib, and from the sternum to the midaxillary line.
- The breast is protuberant and is mainly composed of fat. It is subcutaneous and lies between skin and the muscles of the pectoral region(breast bed).
- A small part of the breast(breast tail) extends upwards and laterally, pierces the deep fascia near the lower border of *P. Major* and enters the axilla.

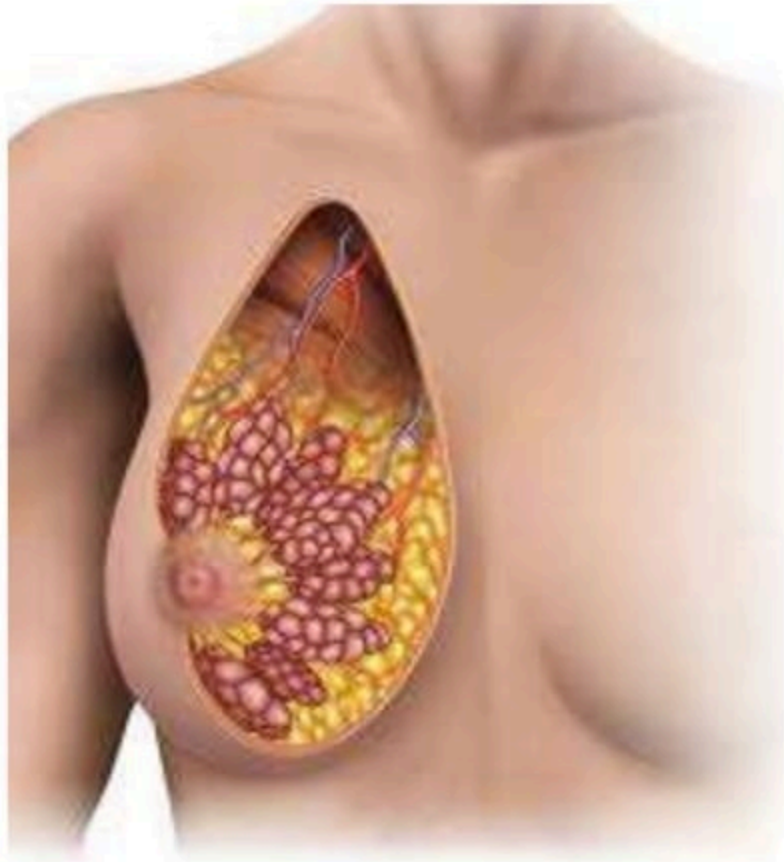
Retromammary space

Retromammary space is a loose areolar tissue that separates the breast from the pectoralis major muscle.



Breast contd...

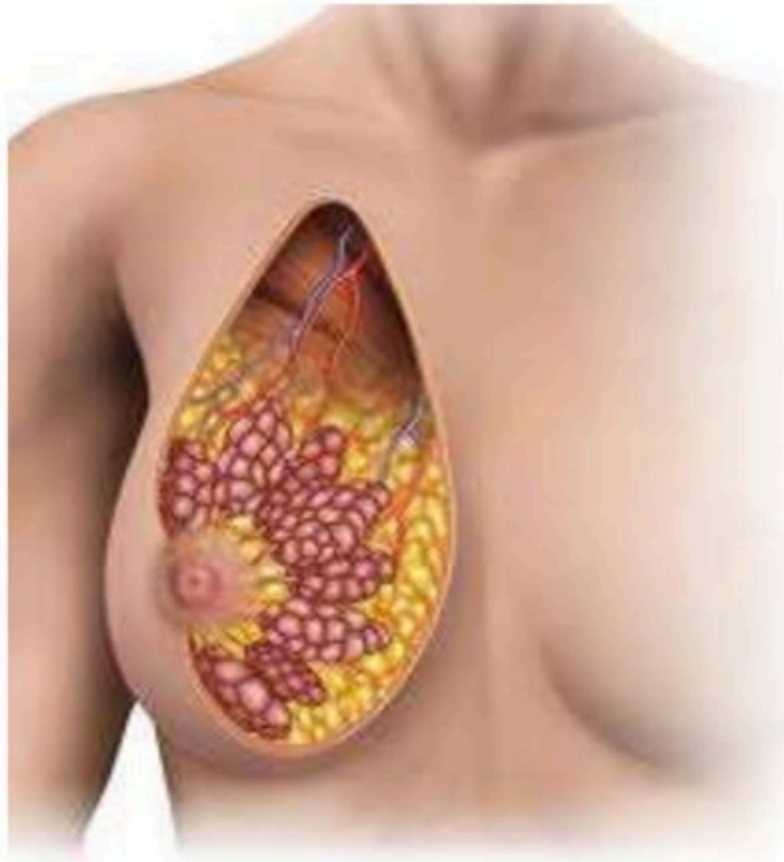
- The breast is divided into 15 – 25 lobules by fibrous septa(suspensory ligaments or coopers ligaments). The lobules radiate out from the nipple and their ducts open in the areolar.
- The changes at puberty are a result of influence of female sex hormones.



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Breast during pregnancy

- The breast greatly increases in size due to formation of milk glands and increased blood supply.
- The pigmentation around the areolar increases in darkness due to deposition of melanin. It also becomes more extensive.
- The areolar glands become more active.
- In late pregnancy, milk can be ejected out of the nipples.



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Non-lactating

Engorged



Milk glands

ADAM

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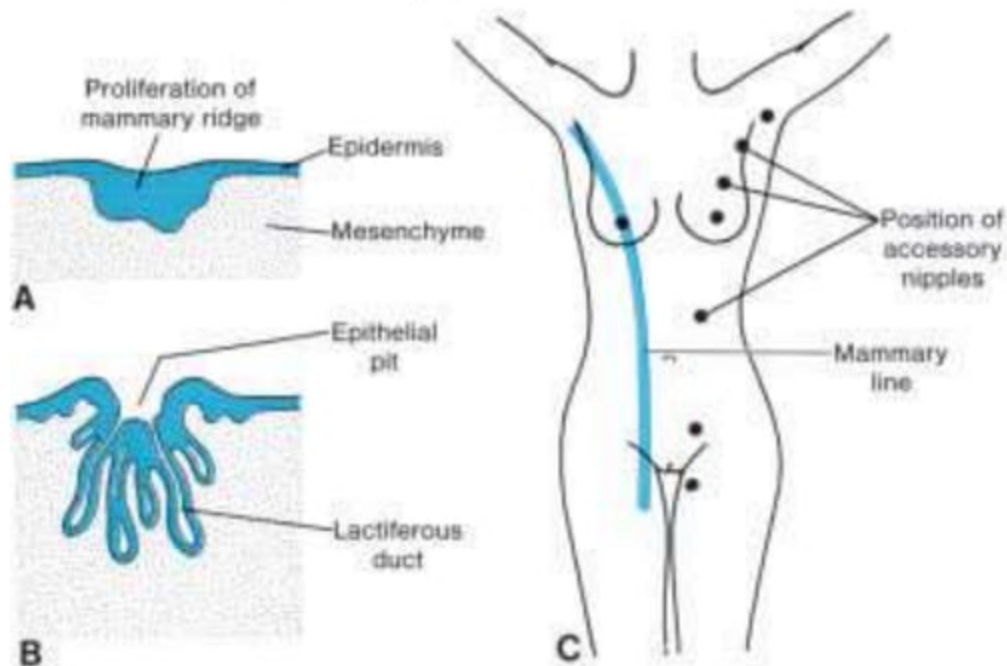
Post menopausal breast

- The breast becomes pendulous due to loss of collagen in the suspensory ligaments.
- The fatty tissue and glandular tissue become atrophic and are replaced by fibrous tissue.
- These changes are due to absence of female sex hormones and can be prevented by hormonal replacement therapy during menopause.



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Embryological development



- Develops as an ectodermal thickening known as the mammary ridge during the 3rd week of intrauterine life.
- In a 7th week embryo, the ridge extends from the groin to the axilla on either side of the body.
- In humans, the ridge disappears except for a small portion in the pectoral region which proliferates and penetrates the underlying mesenchyme. Here it forms 16 to 24 sprouts, which in turn give rise to small, solid buds.

- By the end of prenatal life, the epithelial sprouts are canalized and form the **lactiferous ducts, and the buds form small ducts and alveoli of the gland. Initially, the lactiferous ducts open into a small epithelial pit. Shortly after** birth, this pit is transformed into the **nipple by proliferation of the underlying mesenchyme.**

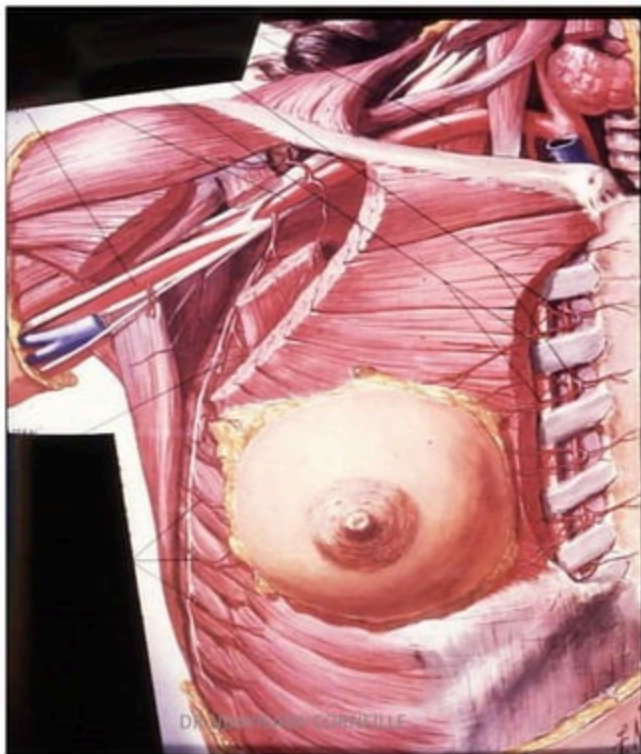
Witch's Milk in the Newborn

- While the fetus is in the uterus, the maternal and placental hormones cross the placental barrier and cause proliferation of the duct epithelium and the surrounding connective tissue.
- This may cause swelling of the mammary glands in both sexes during the first week of life; in some cases a milky fluid, called witch's milk, may be expressed from the nipples. The condition is resolved spontaneously as the maternal hormone levels in the child fall.

Disorders of development

- Polythelia: presence of accessory nipples.
- Athelia: absence of one or both nipples.
- Polymastia: more than 2 breasts.
- Amastia: Absence of one or both breasts.
- Inverted nipples.
- Micromastia: very small breasts.
- Macromastia: very big breasts.

Blood supply of the breast



Arterial blood supply

- derived from thoracic branches of three pairs of arteries

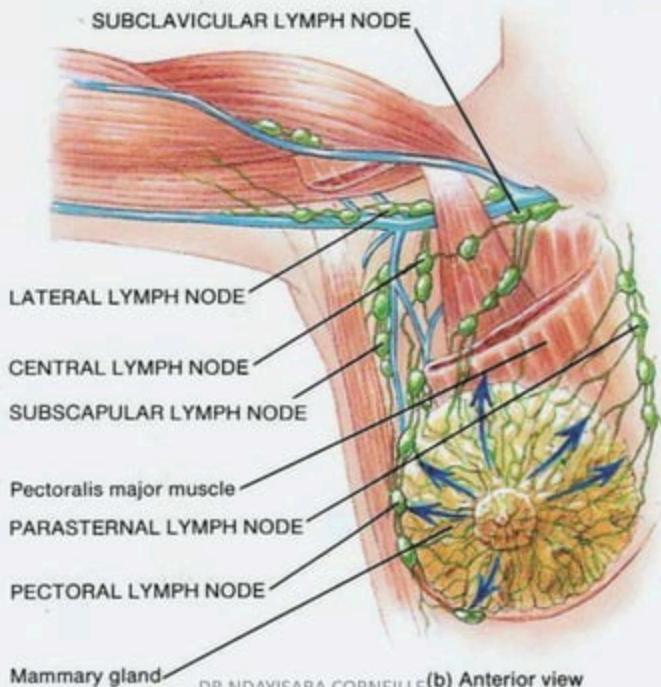
Axillary arteries : a continuation of subclavian artery.
gives rise to external mammary artery which in turn
gives off the lateral thoracic artery.

- Internal mammary (thoracic) arteries
 - first descending branch of subclavian artery
 - supply intercostal spaces & breast
 - used for coronary bypass surgery
- Intercostal arteries:
 - numerous branches from internal & external mammary arteries
 - supply intercostal spaces & breast

Venous drainage

- Venous drainage follows corresponding arteries
- Drain into lateral thoracic vein, perforating branches of internal thoracic vein and posterior intercostal veins.

Lymphatic drainage



Lymphatic drainage

- Divided into four quadrants
- Upper and lower lateral quadrants drain into pectoral group of axillary lymphnodes (pectoral group).
- Upper and lower medial quadrants drain into internal thoracic nodes. Some lymphatics from these quadrants drain into the opposite breast.
- Lymphatic drainage important in spread of cancer of the breast.

Cancer of the breast

- 3rd commonest cancer in females(1: ca cervix, 2: endometrial cancer)
- One of the cancers whose prevalence has not increased with HIV.
- 1% of all cases are males.
- Has a good prognosis if diagnosed early.

Aetiology

- Unknown but associated factors include
- Early menarche
- Genetics
- Smoking
- Hormonal contraceptives
- Uninterrupted menses
- Failure to breast feed

Physical signs

- a. Slowly growing, painless mass
- b. May demonstrate retracted nipple
- c. May be bleeding from nipple

(pathognomonic)

- d. May be distorted areola, or breast contour
- e. Skin dimpling in more advanced stages with retraction of Cooper's ligaments

f. Attachment of mass

g. Edema of skin

1) with “orange skin” appearance
(peau d’orange)

2) due to blocked lymphatics

h. Enlarged axillary or deep cervical
lymph nodes

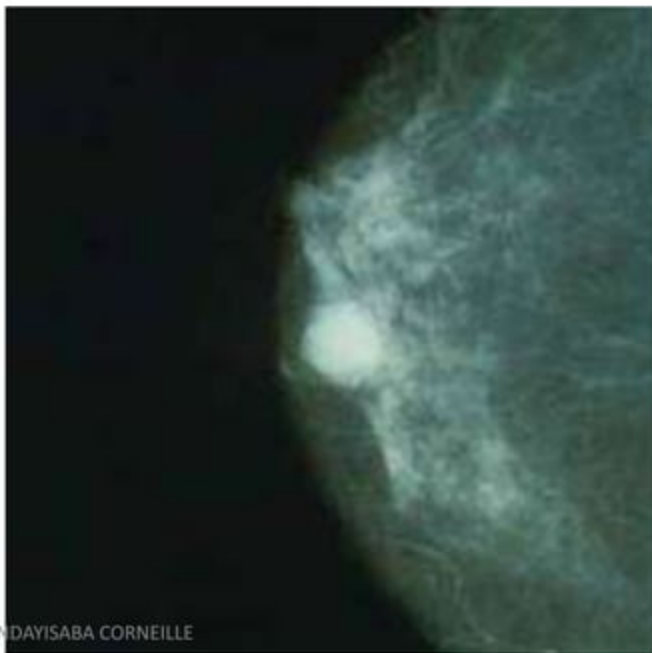
Common sites for metastases

- a. Lungs & pleura
- b. Skeleton system (skull, vertebral column, pelvis)
- c. Liver

Diagnosis

- Fine Needle Aspiration Cytology
- Biopsies
- Mammography

Mammography



Management

- Depends on stage
- May involve chemotherapy, surgery, radiotherapy or a combination of all those treatments.
- To be covered in surgery and pathology

Mastectomy



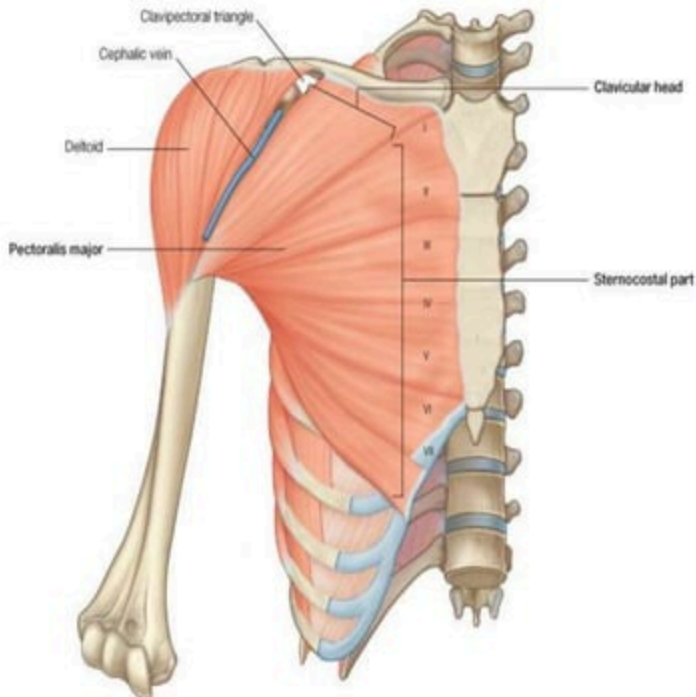
Muscles of the pectoral region

They include from superficial to deep

- Pectoralis major
- Pectoralis minor and subclavius
- Serratus anterior

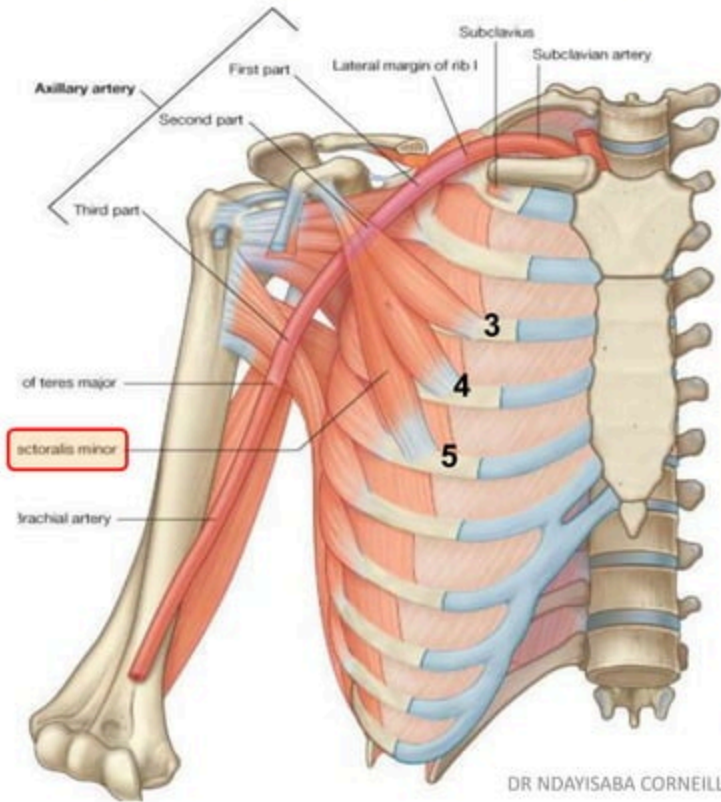
The important notes about any muscle in the body is its origin, Insertion, nerve supply and action

Pectoralis Major



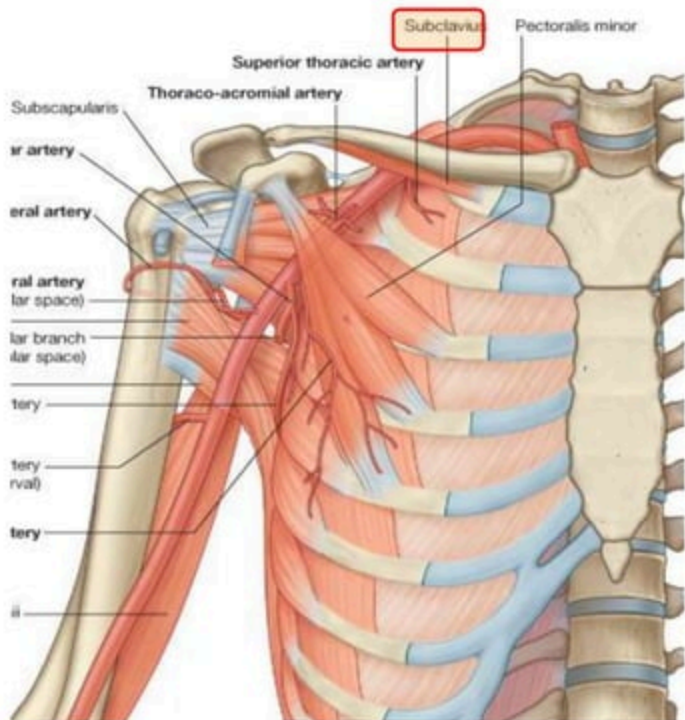
- **Origin :** 2 heads;
- **Clavicular head:** From;
- Medial $\frac{1}{2}$ of the front of the clavicle.
- **Sternocostal head:** From;
- Sternum.
- Upper 6 costal cartilages.
- Aponeurosis of the external oblique muscle.
- **Insertion :**
- Lateral lip of bicipital groove.
- **Nerve supply :**
- Medial & lateral pectoral nerves.
- **Action :**
- **Adduction and medial rotation of the arm.**
- Clavicular head helps in **flexion of arm (shoulder).**

Pectoralis Minor



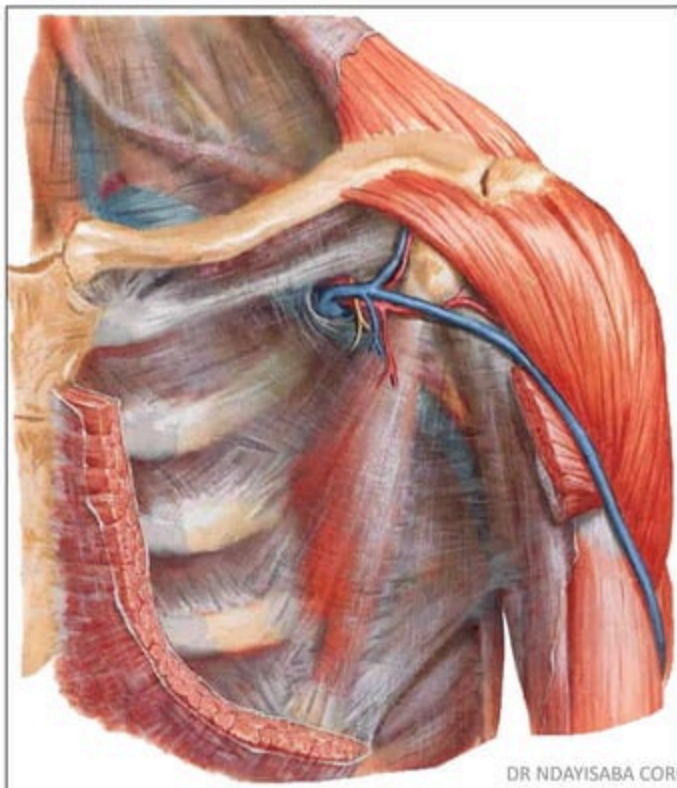
- **Origin:**
- From 3rd, 4th, & 5th ribs close to their costal cartilages.
- **Insertion:**
- Coracoid process.
- **Nerve supply:**
- Medial pectoral nerve.
- **Action:**
- Depression of the shoulder.
- Draw the ribs upward and outwards during deep inspiration.

Subclavius



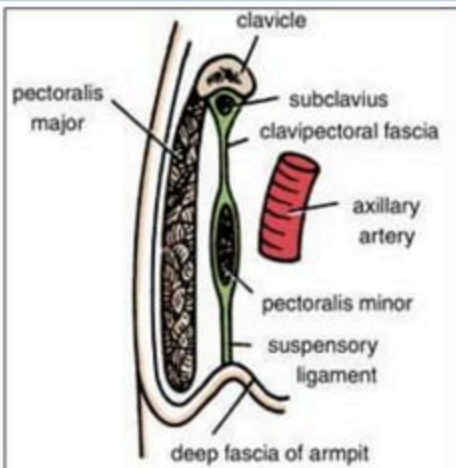
- **Origin:**
- From 1st rib at its costal cartilage.
- **Insertion:**
- Subclavian groove in the middle 1/3 of the inferior surface of clavicle.
- **Nerve supply:**
- Nerve to subclavius from upper trunk of brachial plexus.
- **Action:**
- Fixes the clavicle during movement of shoulder joint.

Clavipectoral Fascia



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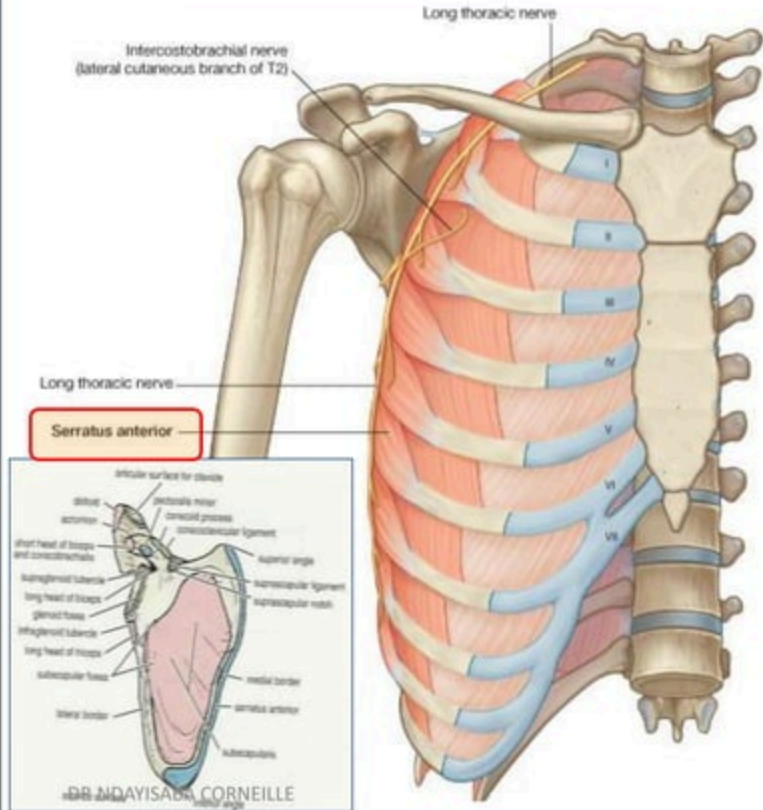
- It is a thickened membrane of deep fascia between the subclavius and pectoralis minor.
- It is pierced by :
 - Lateral pectoral nerve.
 - **Thoraco- acromial artery**
 - Cephalic vein.
 - Few lymph vessels.



Origin:

- Upper eight ribs.
- Insertion:
- anterior aspect of the medial border and inferior angle of scapula.
- Nerve supply:
- Long thoracic nerve.
- Action:
- Draws the scapula forward in boxing, (protrusion).
- Rotates scapula outwards in raising the arm above 90 degree.

Serratus anterior



Clinical notes

- Absent Pectoralis Major

Occasionally, parts of the pectoralis major muscle may be absent. The sternocostal origin is the most commonly missing part, and this causes weakness in adduction and medial rotation of the shoulder joint.

THE END