



# Anatomy

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## Breast And Pectoral Region

FOR THE IMAGES REFER TO THE SLIDES.. (judoctor2011.wordpress.com)

### The Breast :

- The Pectoral Region is The Anterior Part of the chest .
- If we Look at any part of the human body we will see that the First Layer is The Skin : أول طبقة في جسم الانسان هو الجلد .
- After the Skin is The **Superficial Fascia** , then the **Deep Fascia** and **Muscles** (عضلات) .
- Muscles Have (بيجيا) Nerve Supply , Blood Supply and (بطلع منها) Venous Drainage and Lymphatic Drainage ; All of These are on the same Muscular Plane (على نفس مستوى العضلات) .
- If we look at the Pectoral Region , We will first See the Skin , then the superficial fascia .
- **Breast is Embedded in the Superficial Fascia of pectoral region.** (Repeated by the doctor twice **Important !**)
- The Breast also got a **Nipple** (الحلمة) , and (تفتح في الحلمة) **lactiferous duct** for the gland (**Lactiferous Gland**) .
- Around the Nipple We Found The **Areola** which is a colored area around the nipple
- Most of the Breast is Adipose Tissue or Fatty Tissue .
- Also the Breast is Divided into **Lobes** and Inside the Lobes there are **Lobules** .
- And What Divides the Breast into Lobes and Lobules is the **Septa** made of Connective Tissues (**Connective Tissue Septa**)
- This Septa Divides the Breast into **15-25 Lobes** , and every lobe has a lactiferous duct (which is a canal that carry Milk) .
- Now , if we look deep to the breast we find a space called **Retrosternal Space** and (بعدها نجد) Deep Fascia Surrounding the Muscle . The Muscles Deep to the Breast are **the Pectoralis Major , Pectoralis Minor** ( Superior to the Major) and **Serratus Anterior** .
- Advice From the Doctor : You Should Know and Memorize Every Muscle's **origin , insertion , nerve supply and Action** .
- Pectoral Region comes from the Above of Clavicle and extends to the Sixth Costal Cartilage or the sixth rib (الضلع السادس)
- The Ribs Starts from back to front . In the (back) the ribs articulates with the vertebrae as a bone , and when it reaches the front it forms the costal cartilage With the Sternum . The Spaces Between the Costal Cartilages are Called (**Intercostal Spaces**) , and these spaces take the number of the rib above it . **Example** : The Second Rib ( ايش في تحتي ؟ ) : Second Intercostal space .
- The breast lies between the **Second Costal Cartilage** and the **Sixth Costal Cartilage** and comes from **Edge of the Sternum** to the **Mid Axillary Line** ( Which is the line (التي نازل) from the apex of the axilla downward ) .
- The Breast is Considered to be a : specialized accessory gland of the skin that secretes Milk , present in both sexes , but the breast in male adult age ( Puberty Age) is **rudimental** (ضامر) ... But in girls – under the effect of sexual hormones , estrogen and progesterone – the breast (بيصير لولو) Enlargement because of **Deposition of Fat** . So , In males and immature females , the breast is similar in structure and the nipples are small and surrounded by a colored area called **areola** . And the Areola (بروزات) Tubercles (يكون عليها) .

- **Breast Tissue** : Consist of System of ducts Embedded in connective tissue and adipose tissue .
- The Breast is Considered To be **Spherical** especially in girls and the breast **lies over the pectoralis major** .

Ok , the doctor wants now to talk about some muscles , that we should know them :

### Pectoralis Major .

<b>Origins</b>	are two heads , one form the <b>sternum</b> and costal <b>cartilage</b> so it took from the half of the anterior surface of the sternum and the upper six costal cartilages ,, The second head (مأخدة) from the anterior border of the medial two third of the clavicle .
<b>Nerve Supply</b>	<b>The Lateral and Medial Pectoral Nerves</b>
<b>insertion</b>	it is the <b>lateral lip of the bicipital groove of the humerus</b>
<b>action</b>	, when a contraction occurs , we need to pull the clavicle and the sternum towards the humerus , but , which one of these is more movable ?!! of course the <b>Humerus</b> ! So Now , the <b>Action</b> is <b>Flexion, adduction and medial rotation of the arm</b> ! More Specific , the <b>clavicular head</b> is responsible for the Flexion and Medial Rotation .

### Pectoralis Minor .

<b>Origins</b>	is the <b>second , third , fourth ribs</b> . And the <b>Insertion</b> of this muscle is the <b>Coracoid Process</b> of the Scapula
<b>Nerve Supply</b>	is the <b>Medial Pectoral Nerve</b> , which penetrate the pectoralis minor and supplies the Pectoralis Major too
<b>insertion</b>	Coracoid process of the scapula & medial border of superior surface
<b>action</b>	: It <b>Pulls the Coracoid Process towards the ribs</b> (يعني انها بتنزّل) the coracoid process and the scapula towards the ribs .

### **Serratus Anterior** ( Part Of this Muscle Comes Deep to the Breast ..)

<b>Origins</b>	The <b>Upper Eight Ribs</b>
<b>Nerve Supply</b>	<b>Long thoracic Nerve</b>
<b>insertion</b>	On the Medial Border <b>of the Scapula Ventrally</b>
<b>action</b>	The Serratus Anterior is very <b>important</b> for the <b>elevation of the hand over the head ( Rotation of the Scapula)</b> .

الدكتور قال : كل الكلام اللى حكيتوا لازم ترجع على البيت و تفهمه كله من الكتاب .

Now the Doctor Returns to talk about the Breast Again !! :S ..... So the Nipple , the Areola ..etc ..

- At Puberty Age , the breast Gradually Enlarge and becomes Spherical in Shape Under the Influence of the **Ovarian Hormones** , the ducts elongate, but the increase in size of the glands comes from the **Deposition of fats** .

- The **Base** of the breast extends from the **second rib to the sixth rib** and fall from the lateral margin of the sternum to mid axillary line.

-Some Books Say that the breast lies on the superficial fascia... Like The Nipple and the areola with its tubercles

صرخ الدكتور هنا بعدم دخول الطلبة بعد هذه اللحظة و أنا بقول للطلاب هدول نْيالكُم :") ...

- What makes the Tubercles ?!!! Answer : When the lactiferous ducts reaches the areola ( بصير في ) Enlargement called **lactiferous sinus** ... Also when we see the image , we should now the **adipose tissues** and the glands + the lobes and the **lobules inside these lobes** . You should also know the duct which is called the **lactiferous duct** , in addition to the **ampulla** ( Enlargement ) . You should see the muscles also of the pectoral region (pectoralis major and minor + serratus anterior ) .. All the Above Features are a must see using a figure from this sheet or a book or a slide !!

- The Lactiferous Ducts Number is the same as the lobes which is between 15-25 lobes ( طالع منهم ) Lactiferous Ducts . Dr also repeated that the reason for the tubercles on the areola is the **lactiferous sinuses** , so it's Important !! We also said that the lobes of the glands are separated by the **fibrous septa** which is also called **Suspensory ligament** (لها اسم جراحي) **cooper's ligament!** And this ligament is located between the skin and the lobes , thus it builds the **Septa** .

-**Clinically Importance of the Suspensory Ligament** : If Someone had **abscess** (tumor) in the breast in one of the lobes , this ligament make an enlargement or swelling and pulls the ligament , therefore the skin will be depressed downward to fill the area where the ligament had been pulled .

- In Normal , when you look at the skin of the breast , you will find it to be smooth without (طيجات) and (طلعات) , but when an abscess(دمل) Occurs , or Carcinoma (Cancer) in the breast , the enlargement inside the lobe pulls the ligament and **depression of the skin** (انبعاث) occurs !

-Moreover , Ladies who feed their babies milk and don't clean after the milk-feeding and don't have their breasts clean , Infections May occur if they inters the lactiferous ducts and Abscess Develops ! And if that happened , the breast will be reddish in color and swelling and will be tender and very harmful !! The Lady Should Go to the Doctor and he will find redness in the breast and when he puts his finger on it he will find Severe Pain ! **Abscess = Surgery** !In this case , an incision should be made and the breast should be emptied from the **Pus** (صديد) .

-**Q:** Should the Incision be radially or horizontally ?! **A** : The Incision should **be Radially** made (يعني ماشي مع) the Lactiferous Duct , why ? Because if it is made horizontally , cutting of the ducts will occur and this is a problem !! When Incision is made , the breast should remain opened (علشان بصير) evacuation of the pus .

كllllللل شي قرأته بال ۳ فقرات الي فوق على الاغلب ۹۹% مش مطلوب !!

- Behind the Breast , There is a space filled with loose areolar connective tissue and it's called **Retromammary space** , which is deep to the areolar connective tissue . Again the doctor refers to his holy slides and points at the **nipple** , **areola** , **adipose tissues** and the **fat** , **lobes** , **suspensory ligament** (Cooper's Ligament), which is situated between the skin and the septa ... breast also has 15-25 lobes .

- The **Type** of the gland in the breast is **Compound tubuloalveolar gland** . الله .. طبعاً هون ساق فيها الدكتور انو اخدنا هيستولوجي . This gland Secretes Milk and nourishment for the New Born , this gland is also separated from others by dense connective tissue and adipose tissue ! excretory lactiferous duct (بتكون طالعاً) from the lobes , the size of this duct is from (2 - 4.5 cm) long and about 0.5 mm in diameter , and theses ducts (بتفتح) in the nipple (Separate Openings) !

## Mammary Gland :

طبعاً هون الدكتور مقتنع ١٠٠% انو احنا ماخدين Histology .. نسيو يحكوله قبل ما بيعتوه لعنا انو نحن طلاب سنة اولي !!

- Histological structure of the mammary gland varies according to **sex age** and **physiological status** ! Gland and the ducts , Inactive duct system in girls before the girl gets pregnant and before any enlargement occurs , يعني before the gland which is called alveoli , **We Find** that the ducts ended (They have blind ends) .

- When the girl gets pregnant , the alveoli (بصيريلها) **Proliferation** at the end of the duct ( **It makes alveolar cells or lactiferous cells responsible for the secretion** ) , then the milk secretion (بصيرلُو) **accumulation** in the **alveolar lumen** . In the beginning , the cells of the gland are **simple cuboidal** (وبصيرلها) Enlargement so that it can be transformed into **Simple Columnar cells**. Then the Secretion occurs in these cells to the lumen , and from the lumen to the duct .

- And the Duct after it has been **simple cuboidal** (بتصير) **Stratified Cuboidal** .. And in the end when **the duct opens** , the cells become **Stratified Squamous Epithelium** !

- **Mammary gland is** Composed of Lactiferous sinuses and several branches of these sinuses the lactiferous duct .

- The characteristic structures of the gland and the lobe of the adult woman is developed at the **tips of the smallest ducts**.

-Lobe consists of **several ducts** that empty into **terminal duct** , each lobe is embedded in **loose connective tissue** , denser or less cellular connective tissue separates the lobes .

- The Glands (تتكون) in the pregnant woman and (بتزيد) the **Enlargement** before the delivery (أي قبل الولادة) and a little secretion of milk .

-The Epithelium very quickly changes to stratified columnar or stratified cuboidal epithelium and **In the End** , The duct transforms from **cuboidal** into **stratified squamous** .

-**Note** : Deep to the gland , we find **myoepithelial cells** ( myo means muscles) , (يعني) the cells (بصير فيها) contraction to increase the secretion of milk from the gland .

-Connective Tissue Surrounding the alveoli contains many **lymphocytes** and **plasma cells** , why ?! It's Important for the **anti-body formation** , and this is important for the Baby ! cause the baby takes his/her immunity from the mother in the beginning . plasma cell population increases significantly toward the end of pregnancy , it's responsible for the secretion for **immunoglobulin** especially **immunoglobulin A** (which gives passive immunity to the New Born) .

-The Liquid which the lady secretes in the first week after birth is called **Colostrum** .

-Colostrum is Rich in **immunoglobulin A** and **Anti-bodies** that gives the strong immunity to the baby , also the Colostrum is **rich in protein** and contains **less fat** , and that helps the immunity .

## Blood Supply For the Breast :

- First , we have the **perforating arteries(1)** which comes from **anterior intercostals arteries** which comes from **internal thoracic or internal mammary artery** .
- we see that under the clavicle is the **subclavian artery** , and the **subclavian artery** which gave the **internal mammary artery** (deep to the sternum) one on the right and one on the left and it's longitudinal . and the Internal mammary artery gave the **anterior intercostals arteries** between the ribs and (منهم بطلع) **perforating arteries** (رايحين) to the breast ...
- Now we have the **axillary artery** .. the **subclavian artery** in the outer border of the first rib (شو بصير اسمو؟) the **Axillary artery** ! The Axillary artery (بعطينا) Branch named **Lateral Thoracic Artery(2) : Which is a branch that feeds the breast !** ..... Then comes (3)branches from the **Thoracoacromial artery** (اللي هو) Branch from the **Axillary Artery** !
- Now , The **Venus Drainage** are corresponding to the **Arteries Above** ( The Same Naming ) . (ولكن في النهاية أين بنتهوا؟) . in the **internal mammary vein** (اللي بينتهي) in the **subclavian vein** .. and the subclavian vein (بيروح) to the **right atrium**

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## Important Subject : Lymphatic Drainage of the Breast !! موضوع في غاية الأهمية !!

- Why it's Important ?!! Because the Breast Cancer (سرطان الثدي) , the most thing that transfer **Metastasis (Secondary Cancer Cells)** ..
- كيف تنتقل ؟ .. It is **transferred by the lymph** !! This is why the doctor when he is suspicious about the presence of lump ( mass ) in the breast , he then feels the lymph node which is in the axilla !! If the lymph node is enlarged (hard in consistency صلابة) , then the cancer spread to the lymph nodes (**Lymphatic Spread**) ... خطير جداً ... it means that the cancer (انتشر) ... !!! ... لهذا الفحص المبكر للثدي مهم جداً !!! ... and every girl should know how to test their breasts always so that they prevent the cancer from spreading . If the Cancer is recognized early , it will be cured easily as if there weren't any cancer at all !!! , some people discovered it soon and they live the upcoming 20-25 years normally ! and if the cancer was recognized late after it had reached the lymph nodes , it will be a serious problem !! cause sometimes they have to remove the breast and be treated by chemo and radiotherapy !!

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## Anatomy of Lymphatic Drainage of the breast :

- In Mid-line of the edge of the sternum we have **Internal thoracic lymph nodes**, also we have **anterior axillary or pectoral lymph nodes** (Located in the anterior fold of the axilla and deep to the pectoralis major) .
- also we have in the **posterior fold of the axilla** (same as the anterior) .
- Also, **Subscapular lymph nodes** . There is a muscle in this region posteriorly located called subscapularis.
- There are also lateral axillary lymph nodes near the humerus ! All the lymph nodes in the end (بيروحو) to the **central lymph nodes** and the central (بتروح) to the **apical lymph nodes** (وبعدها) to the **deep cervical lymph nodes** in the neck ( منطقة الرقبة ) .. ومن ثم .. (منطقة الرقبة) to the thoracic lymphatic duct and ends in the veins then to the heart ! ... Venus Drainage to the Heart ..
- We Should Know the groups of lymph nodes , and how lymphatic drainage occurs in the breast which is explained above.

- Lymphatic Drainage of the mammary gland have great clinical importance because of the frequent development of cancer in the glands .
  - Let us continue the Lymphatic Drainage : The **Lateral Quadrant** (بيروح) to the **anterior axillary or pectoral lymph nodes**. The Pectoral Group is situated posterior to the lower border of pectoralis major . أما **Medial Quadrant** Drains with the vessels peeres the intercostals spaces and inter internal thoracic group. So far We divided the breast into **Lateral quadrant** and **medial quadrant** . and each part (بيروح) to one of the groups explained above !
  - Few Lymph vessels follow the posterior intercostals arteries and drain posteriorly into posterior intercostals which is situated on the posterior intercostals arteries . It is on spaces between posterior ribs !
  - Some Vessels Communicate with lymph vessels on the opposite breast , with those on the anterior abdominal wall , so some of the lymphatic moves from the right breast to the left for example ! The Doctor therefore must examine both breasts !!! because the cancer can be transferred from the right to the left breast and vice versa مع the anterior abdominal wall ! Also the doctor sometimes finds out that the cancer cells or metastasis spread with rectus sheaths of the abdomen (anterior abdominal wall) to the liver !!
  - If the breast have to be removed , all the lymphatic nodes should be removed !! From a question from one of the students ,!!!
- The Breast also has a tail (**Axillary Tail** ) extends to the axilla .

## Muscles !!

- **Muscles That we should know for now** : Subclavius Muscle ( **Origin** : first and second costal cartilage and the **Insertion** : lower surface of clavicle ) and it helps in the stability of the clavicle .
- Muscles in the Human body are of three types : Skeletal , Smooth and Cardiac .. And we are now talking about the skeletal muscles
- Skeletal Muscles have origin and insertion , the origin is from the bone and the insertion also in the bone , But the origin is usually **fleshy fibers** ( muscle fibers ) but the insertion is (على شكل) Tendon or **aponeurosis** (flat) and it's very strong and its type is **connective tissue regular (Dense Connective Tissue)** !
- This Striated muscle is Voluntary Muscle ... Sometimes We Find that the bulk of the muscle (عامل) belly !! Example the Gastrocnemius in the lower limb .
- The muscles have nerve supply and action also ; (علشان هيك يمكن تعدّي) One joint or two joints .. As for the gastrocnemius (عدت) Knee joint and ankle joint !! But most of the muscles work on one joint . if the muscle (عدت من أمام) joint , flexion occurs . (و اذا عدت من خلف) joint , extension occurs !
- Ex . The Anterior abdominal muscle ends as **aponeurosis in the linea alba** . and the muscle could ends as **tendon** as like the gastrocnemius which ends as **tendocalcanius** . The Muscle could also ends as **raphe** ( خصوصاً اذا العضلة جاي من جهتين و ) (تلتقي) in the mid line called **mylohyoid raphe** !!..so the insertion here is **raphe** ..
- Muscle Fibers ( Shape) Can be **rhomboid** (معيّنة) , **Quadrilateral** ( مرّبعة ) , **Strap** (طولية) , or (يكون فيها) **tendinous intersection** like (عضلة البطن) when it contracts (بتبين على شكل مربعات) ... or **Fusiform** , **Triangular** like the deltoids and the trapizius , or ( لها ) **2 bellies** like the **digastrics** muscle which has a tendon (جاي في النص) , or has **2 heads** like the **biceps** ,

or **3 heads** like the **triceps** , or **4 heads** as the **quadriceps** , it can be also **unipennate**(one side of the insertion) or **bipennate** ( two side of insertion) , or **multipennate** ( many sides of insertion but ends in one tendon ) .

أساسيات للعضلات لازم نقرأها من الكتاب ..... الدكتور أكيد بحلم !

**Naming of skeletal muscles** : depends on the shape of the muscle , or the origin , attachment , insertion , action , or the location or site of the muscle.

- Contraction of the Muscle , (منقرب) origin من Insertion !! General rule .... The Size of the muscle (بصغر) when it contracts , because of the fibers shortening (Sliding of Actin over Myosin) .. Histology إنو أخذنا الدكتور إنو أخذنا !!

- Some Characteristics of Muscle , We can find **Excitability** or **Irritability** (Cause of nerve Supply excitation) for any muscle ! Also **Conductivity** , **Spreading of the Impulse** , **Contractility** , **Extensibility** , **Elasticity** ( After the contraction comes relaxation ) .

-Action of Muscles : **Prime Mover (Agonist)** : عضلة أساسية : for the contraction .. Ex .. When someone shoots the ball , which main muscle contracts ?! Answer is **Quadriceps** .

- **Antagonist** : العضلة المعاكسة .. when I say that biceps flexes ! which muscle is the antagonist ?! It's the **Triceps** that extends ! Also the **Quadriceps** عكسها **Biceps Femoris** In the Lower Limb (Flexion for the knee joint) !

- In Any Movement , we have fixator Muscles , Muscles بتعمل fixation for the movement around the joint ! So when I make flexion of the shoulder joint , I found that there are muscles around that joint fixing the movement of the joint ( **Stabilization** of the joint ) .

- The Body Prime mover Muscle crosses several joints before it reaches the joint at which its main action takes place , to prevent unwanted movement , intermediate joint groups of muscles called **synergist muscles** contracts and stabilize the intermediate joint ...

- **Extensor Digitorum Longus** , **Flexor Digitorum superficialis** , **Flexor Digitorum Profundus** , These muscles work on the distal phalanx .. Intermediate Joint نحافظ عليهم we find that there are **synergistic muscles** موجودة ex . **lumbricals** and **Interossei muscles** ... These muscles could contract **paradoxically** (Alternative Contraction) ..

- The Muscles من ناحية Mechanism of contraction على نقطة ارتكاز called focal poing (F) .. we find also كمان there is a weight (وزن) that make pressure and عكسه weight or action بطلع upwards !!

- Lever Class one : نقطة الارتكاز in the middle and the pressure is on one side and the weight يرتفع on the other side ! example : !! حديقة المنزل السعيدة !! Also : This is an example of the **Trapezius Muscle** (on the back of the neck) ..on you make trapezius contraction , you find elevation of the head ..! the trapezius press downward and the head elevates ! and the F Point here is the **Cervical Vertebrae** in the middle .. (lever one contraction)...

-Lever Class Two : Ex . Gastrocnemius Muscle , على المقدمة , و الارتكاز يكون على المقدمة , ex : ... عرباية الورش : ... بحيث يكون الوزن في الوسط ... عرباية الورش : ... بحيث يكون الوزن في الوسط ... Another Example , when someone wants to run , he will يستعد and then ينطلق and when he is in the ready position تكون نقطة الإرتكاز مشط القدم في المقدمة !!

-Lever Class Three : Example : الكريك ... الوزن في المقدمة ... الكريك and نقطة الارتكاز في الوسط and انتا بتشد في آخر الكريك .... Ex . The Biceps Muscle When Someone Lifts Weights ...



### **Naming of the Muscles :**

- **Shape of the Muscle** : teres ( round)
- **Size** : Ex. gluteus maximus .. or pectoralis Major ..
- **Position** : Supraspinatus and Infraspinatus ... Subscapularis
- **Depth** : Profundus (عميق) , Superficialis (سطحي)
- **Attachment** : sternocleidomastoid (moving from the strnum and clavicle and ends at the mastoid process )
- **Action** : Flexor , Extensor ... Supinator , Pronator ...
- **Site** : pectoralis ... Subclavius ..

### **End Of The Sheet ...**

تم بحمد الله ،

### **A quote I Love to Share with you guys :**

“ Success is the ability to move from one failure to the next with enthusiasm “

Ahmad Almusa ....