

Mammary gland: anatomy

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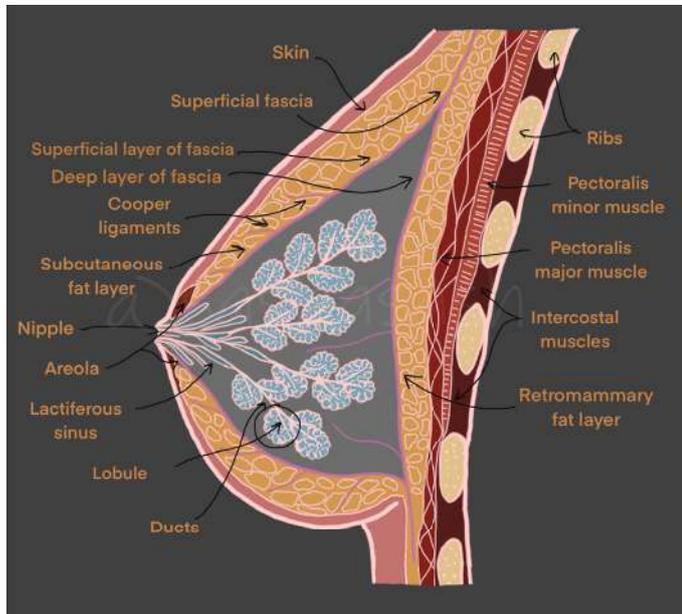
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The mammary gland (MG) is a compound tubuloalveolar organ. MG is derived from a sweat gland and made up of 15–20 lobes. Extent: from the II rib to the VII rib.

Medial border of the gland - lateral border of the sternum.

Lateral border of the gland - anterior axillary line. [1] (picture 1)



Picture 1

There are three main components of the gland:

1. Connective tissue
2. Adipose tissue
3. Glandular tissue

MG is surrounded by superficial and deep layers of the superficial fascia of the anterior thoracic wall. These layers form the mammary gland capsule.

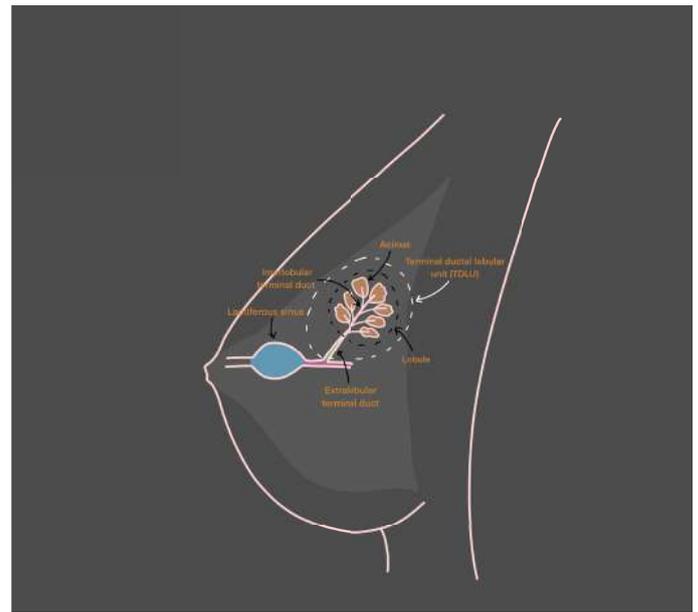
The superficial fascia is attached to the clavicle and forms suspensory ligament of the mammary gland.

The superficial and deep layers are linked by the connective tissue – Cooper's ligaments [1].

Adipose component include premammary fat, retromammary fat as well as adipose tissue located between the gland lobes.

Glandular tissue forms the mammary lobes (picture 2). Their amount correlates with the gland size. The MG lobe is comparable to a small branch of grape consisting of lobules (grapes). Lobe and lobule do not have capsule and considered to be functional units of the mammary gland. [2]

The distribution of glandular tissue in the MG is irregular. Most of the tissue is located within the upper outer quadrant where the pathological changes are most commonly found.



Picture 2

The ductal system of MG consists of galactophores and lactiferous sinuses. Every lobule has size 1 galactophore, when confluent they form size 2 and 3 galactophores. Size 3 galactophore has a dilation near the nipple - lactiferous sinus.

MG duct sizes:

- Size 3 galactophore ≤ 3 mm
- Size 2 galactophore ≤ 2 mm
- Size 1 galactophore ≤ 1 mm

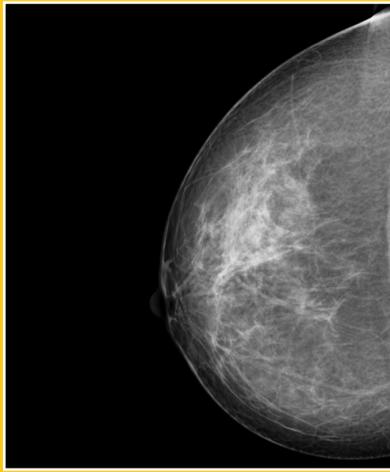
Mammary gland anatomy is not constant and depends on age and endocrine profile. Proliferation of lobular and ductal epithelium begins after menarche and becomes active a few days before ovulation every month. The newly formed structures undergo atrophy if pregnancy does not occur. Proliferation slows and MG tissue involution begins in postmenopausal period [2].

Radiological anatomy of the mammary gland

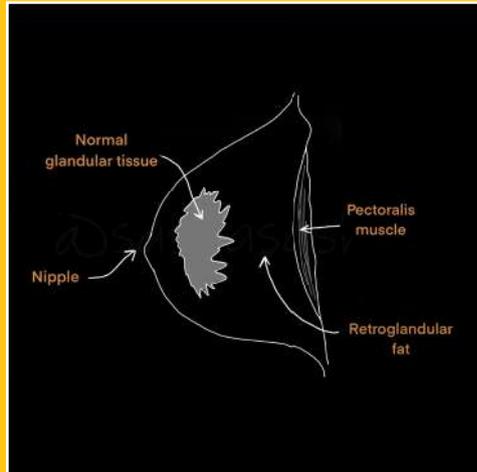
There is no common radiological standard for the mammary gland due to the fact that every woman has a different ratio of fibroglandular and adipose components.

There are several types of gland density according to this ratio.

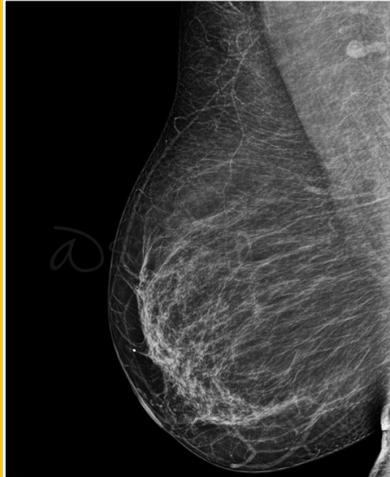
The mammograms clearly show skin, premammary fat, areola, nipple, Cooper's ligaments, glandular tissue, and retromammary space. [2] (pictures 3–6)



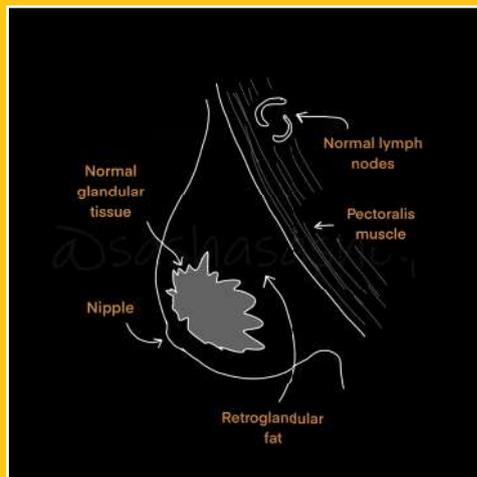
Picture 3



Picture 4



Picture 5



Picture 6

The skin on mammograms looks like a straight line 1–2 mm thick. Subcutaneous fat is straight behind the skin. Normally, it looks more transparent than the skin and glandular tissue. [4]

Glandular tissue looks like a cone the base of which is attached to pectoral fascia and the top ends with a nipple. Structural elements of glandular tissue cannot be differentiated on non-contrast enhanced mammograms. [3]

The retromammar space is located between glandular tissue and the great pectoral muscle. Normally, this space contains only adipose tissue. [2]

Normal lymph nodes can also be identified on mammograms. More often they are visualized on the medio-lateral oblique projection in the axillary region and in some cases in the mammary gland tissue itself. [4]

References:

1. Островерхов Г. Е., Бомаш Ю. М., Лубоцкий Д. Н. Оперативная хирургия и топографическая анатомия. – Издательство «Медицинское информационное агентство», 2015. – С. 736-736.
2. Корженкова Г. П. Комплексная рентгено-сонографическая диагностика заболеваний молочной железы. – Фирма Стром, 2004.
3. Терновой С. К. Лучевая маммология: руководство для врачей. – ГЭОТАР-Медиа, 2007.
4. Ikeda D., Miyake K. K. Breast imaging: the requisites. – Elsevier Health Sciences, 2016.