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On the anatomy of the breast, by Sir Astley  
Paston Cooper, 1840

Rare Medical Books

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1840

## On the anatomy of the breast - On the breasts, or mammae

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ON  
THE BREASTS, OR MAMMÆ.

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GENERAL OBSERVATIONS.

WHILST the changes for the reproduction of the species are proceeding in the uterus, Nature is not unmindful or regardless of the wants of the offspring so soon as it shall be born ; but in all the class Mammalia she has provided glands to supply bountifully, by the secretion of milk, that nourishment which the young animal will require soon after it begins to breathe. The Breasts, or Mammæ, are formed for this purpose ; and soon after the commencement of utero-gestation, they begin to receive an additional supply of blood to prepare for the new secretion ; and thus, by an admirable foresight, when the link which united the offspring to the mother is broken, a new and entirely different mode of nutrition is substituted for that which it had previously received.

The mammary glands and the dugs of animals, in order to render them efficient for the above design, are necessarily

constituted of two sets of parts,—the internal and external. The first, which is concealed under the skin, is the glandular or secretory organ; the second, which appears externally, and which is called the mamilla, nipple, or teat, is formed to convey the secretion of the gland to the offspring. The former would be of no use without the latter; for, however abundant the secretion of milk, the infant would be unable to receive it, if the nipple, or mamilla, had not been added to the breast, or mamma.

In the human female, the breasts are placed upon the anterior and lateral parts of the chest, in what may be called the mammary region; and here the child, when sucking, is placed immediately under its mother's eye, as it receives the nourishment from her breast. Here it almost irresistibly solicits her tender and regular attention, and the demonstrations of that affection which ought to be, in future life, reciprocal between the parent and the offspring.

The breasts, from their prominence, their roundness, the white colour of their skin, and the red colour of the nipples, by which they are surmounted, add great beauty to the female form; for prior to the age of puberty, the girl and boy differ but little in the shape of the chest, or in its general appearance; but as the breasts develop, the female figure is established in all its elegance.

In age, these glands become in a great degree absorbed, and the flatness of the chest, before puberty, would return, but that in general a quantity of fat occupies the place which they previously held, and thus often preserves the general contour of the chest.

Although, in the human subject, they are placed upon the chest, and are therefore pectoral glands, in other animals their situation varies, for their protection from injury, and for the convenience of the offspring. In woman, in the monkey tribe, in the bat, &c., the mammary glands are placed upon the anterior and lateral parts of the chest; and in the two former at least, with the design that the mother shall conveniently support her offspring, whilst sucking, in her arms. The cow, the mare, the goat, the elephant, the deer, &c., have them placed between their hinder extremities, and then they may be said to be *inguinal*. In the whale, they are placed on the abdomen on each side of the anus, and may be called *abdominal*. But in a great number of animals, they are inguinal, abdominal, pectoral, and even cervical.

The size of the mammary glands is not always proportioned to that of the young: the gland in the cow is much larger in proportion than in the mare, and in the goat than in the sheep: the udder of the cow greatly exceeds in size that of the mare, and the quantity of milk produced is more

considerable than the young animal appears absolutely to require. A cow will secrete from fifteen to twenty quarts of milk in the day. Man has availed himself of this apparent superfluity, to take from the cow and the goat their superabundant milk, for his own and his children's nourishment; and after he has removed many quarts of the secretion, sufficient is left for the offspring, not only to nourish, but to fatten it. Nor is size of the gland a certain criterion of the extent of its secretion, as the very large is often more solid than secretory.

The number of glands also very considerably varies; and they are not always proportioned to that of the offspring. In woman there are two; in the cow, four perfect; in the bitch, ten; in the cat, eight; in the guinea-pig, two only: yet the cow has generally only one young, and the guinea-pig has several.

In so far as my examination of the structure of the mammary glands has gone, in different animals, I find that although there are differences in external character, in size, in number, and in situation, yet their true secretory organization is very similar in all, and that, however complicated they may at first sight appear, yet their intimate internal structure really exhibits a remarkable degree of simplicity.

In other glands, as for example in the testis, the source and the serpentine direction of the *arteries* appears to be

quite essential to the performance of its functions, as the spermatic artery varies but little in those two respects; but the mammary arteries vary exceedingly in the human subject in their sources, as well as in their course, yet the function of the gland continues the same. Also, in the mammary glands of other animals, the sources of arterial supply are from the epigastric, the lumbar, the intercostal, and the axillary arteries, as in the pig, the hare, and the rabbit; and it therefore appears that if the gland receives its supply of arterial blood, it matters little, as to the secretion, from what source it is derived. The number of excretory ducts in each nipple seems to depend more upon the form of the gland, and the convenience of radiation and suckling, than upon the number of the young, for in general, when there are many teats, each teat contains several milk tubes.

The veins also vary in their course and terminations, as much as the arteries. The nerves which are distributed to these organs, although they arise from the spinal cord and grand sympathetic united, originate in woman from the dorsal nerves, in the pig from the dorsal and lumbar, and in the cow from the third lumbar nerve.

Although, as I have stated, the mammary glands are of simple construction when developed, yet to dissect and prepare their constituent parts and intimate structure for a clear

demonstration is a very difficult task ; so that I have heard a good anatomist say, “ the breast is so complicated that I can make nothing clear of it.” It is therefore right that I should state the different circumstances to which I have attended in making the numerous preparations I now possess.

First, then, it is necessary that the breast employed for the purpose should be that of a woman who has been for some time suckling: for the breasts of a woman who dies of puerperal fever, in the first few days or weeks from her confinement, are not in a fit state to be clearly developed, as the milk cells are not completely evolved, and the gland is so loaded with blood, that the ducts and glandules are obscured in it, not only at the time of injection and dissection, but when afterwards dried.

Secondly.—It is usual to inject the ducts with quicksilver ; but this injection, although it answers well in displaying the milk cells, yet does not succeed in distinguishing the various lactiferous tubes of the different parts of the gland ; and in the subsequent dissection, it is scarcely possible to avoid cutting the ducts, emptying the gland, and spoiling the preparation, however previously beautiful.

It is, therefore, better to inject the gland with size of different colours, or with coloured wax, by which at once each duct is distinctly shown, and even the cells will be displayed.

The various ducts are so interwoven and intermixed with each other, that they can by these means only be distinguished, or their distribution be clearly demonstrated. Quicksilver gives a general idea of the structure, but coloured injections a clear, distinct, and very intelligible view of the whole ; and the dissection may be readily conducted, without injury to the preparation.

Thirdly.—To ascertain the quantity of glandulous matter, at different periods of life, it is requisite that the breast be put for a short time in boiling water, when the skin and fat become detached, and the gland, like other albuminous compositions, is left extremely hardened, and perfectly insulated and separated from the surrounding parts. This process furnishes an opportunity of giving an estimate of the quantity of gland, at puberty, in the adult, and in old age ; as will be seen in one of my plates. Dried, after being boiled, the gland may be preserved for many years.

Fourthly.—To unravel the milk ducts, and to demonstrate the fibrous tissue of the gland, it is to be macerated in warm water, and dissected from day to day ; and its ducts and glandules will be separated and shown. A section of the breast should also be made, from the nipple to the pectoral muscle, and then macerated in warm water, and daily dissected, when the ducts, the secretory structure, and fibrous



suspensory tissue, will be shown, between the gland and the skin in the interior of the organ, and in its passage to the aponeurosis of the pectoral muscle.

Fifthly.—To show the connexion of the breast with the fascia of the thorax, the axilla must be carefully dissected in the adult, and its fascia traced.

Sixthly.—The arteries, veins, and absorbents, must be minutely injected. These vessels are large at the period of lactation, but small before and after that process, and are then injected with difficulty.

Lastly.—To trace the nerve in the mammary gland, and in the nipple, the arteries must be previously injected with a fine injection, properly coloured, for if this be not done, it is impossible to distinguish their minute divisions from the finer branches of the arteries.

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