


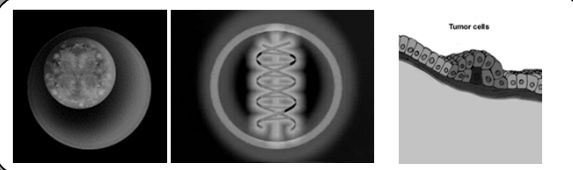
Digital Breast Tomosynthesis (DBT)

Pathology Findings: Case Studies and Beyond




Advanced Health Education Center
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For cancer to occur, something must damage nucleus of the cell.



FACT:

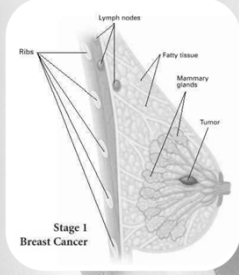
- There are 15 different types of breast cancer
- Each type can vary greatly in aggressiveness of growth
- There is no longer a cookie-cutter approach to treatment as there was years ago



Breast Cancer Staging


Stage I

- Less than 2 centimeters (about 1")
- Has not spread outside the breast.



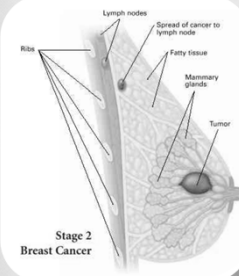
FACT:

- Every woman's cancer is uniquely unique
- Treatments are designed from careful study of:
 - Tumor type
 - Size
 - Spread of cancer to other sites
 - Individual characteristics of cancer
 - Age and general health



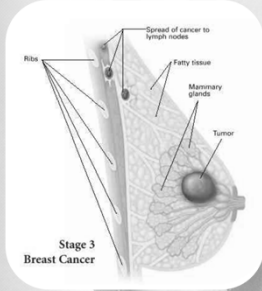
Stage II

- Cancer is no larger than 2 centimeters but has spread to the lymph nodes in the armpit (the axillary lymph nodes)
- Cancer is between 2 and 5 centimeters (from 1" to 2") and may have spread to the lymph nodes in the armpit
- Cancer is larger than 5 centimeters (larger than 2") but has not spread to the lymph nodes in the armpit.



Stage IIIA

- The cancer is smaller than 5 centimeters and has spread to the lymph nodes under the arm and surrounding tissue.
- The cancer is larger than 5 centimeters and has spread to the lymph nodes under the arm.

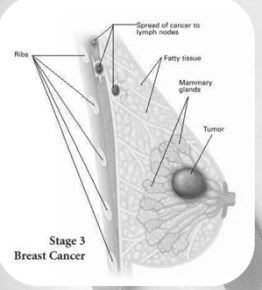


How Breast Cancer Happens



Stage IIIB

- The cancer has spread to near the chest (skin, chest wall, including the ribs and the muscles in the chest)
- The cancer has spread to lymph nodes inside the chest wall along the breast bone.



How Breast Cancer Happens

- Breast cancer is an uncontrolled growth in breast cells.
- Only 5-10% of all cancers are inherited.
- No one's fault.



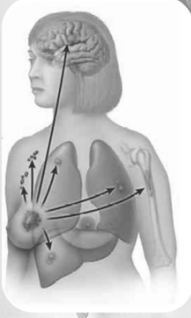
Who Gets Breast Cancer?

- Mostly females, but some males.

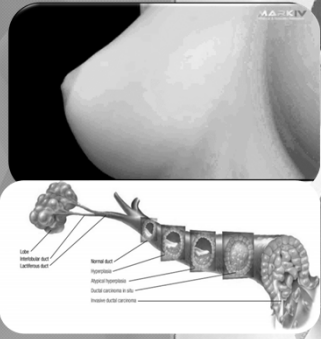


Stage IV

- Cancer has spread to other organs of the body, most often the bones, lungs, liver, or brain
- Or cancer has spread locally to the skin and lymph nodes inside the neck near the collarbone.



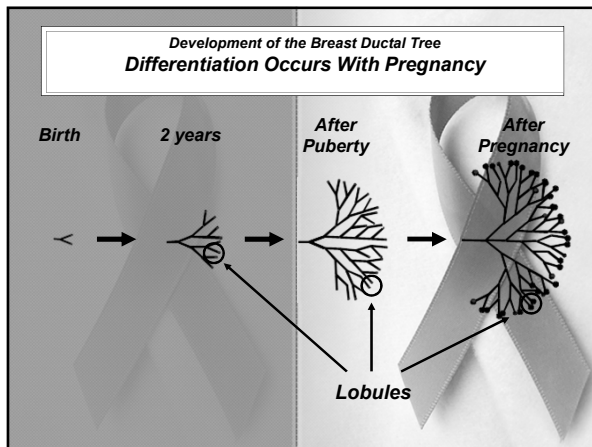
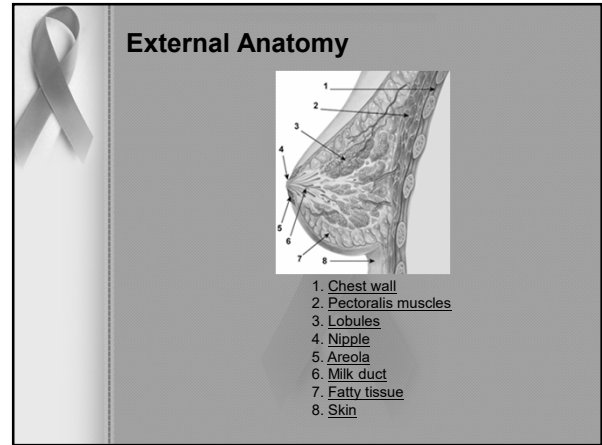
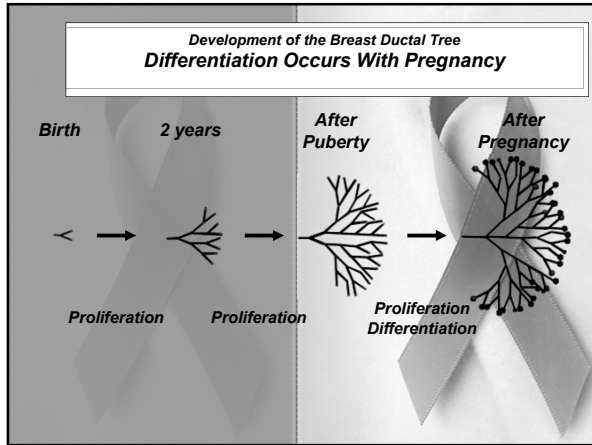
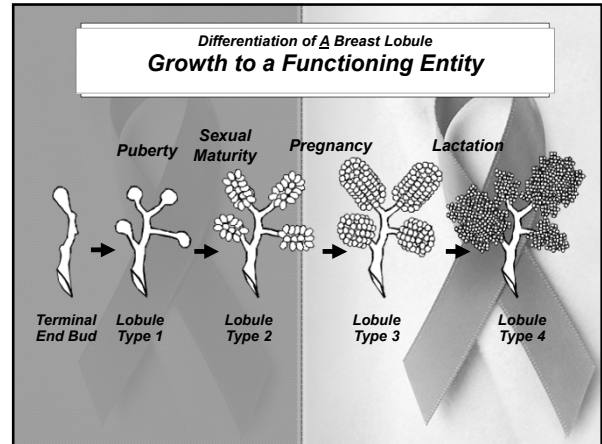
Progression to Breast Cancer



The Breast

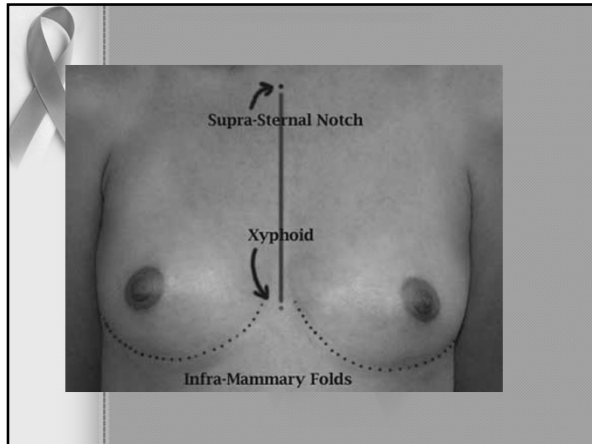
- The breast is a gland designed to make milk.
- The lobules in the breast make the milk, which then drains through the ducts to the nipple.
- When your genes are in good working order, they keep cell growth under control.
- When your genes develop an abnormality, they sometimes lose their ability to control the cycle of cell growth and rest.

Breast cancer is an uncontrolled growth of breast cells.....



Breast Margins

- In women, the breasts overlay the pectoralis major muscles and usually extend from the level of the second rib to the level of the sixth rib in the front of the human rib cage; thus, the breasts cover much of the chest area and the chest walls. At the front of the chest, the breast tissue can extend from the clavicle (collarbone) to the middle of the sternum (breastbone). At the sides of the chest, the breast tissue can extend into the axilla (armpit), and can reach as far to the back as the latissimus dorsi muscle, extending from the lower back to the humerus bone (the longest bone of the upper arm).



Mammographic signs of malignancy

- **Calcifications**
- **Masses with spiculated margins**
- **Architectural distortion**
- **Asymmetry**

Glandular tissue is found beyond the breast. It often extends into the axilla, and its thin layer can reach the clavicle, the sternum, and the edge of the trapezius.


Looking at Tumors & Calcifications with Tomosynthesis

Tomosynthesis is simply an aid for detection of breast cancer. There are a number of imaging modalities designed to locate breast cancer and tomosynthesis is an adjunct methodology for projection radiography.

Projection Radiography

Projectional radiography or plain film radiography is the practice of producing two-dimensional images using x-ray radiation. Projectional radiography is the cornerstone of modern medical imaging, and can be used to image almost every part of the human body. Mammography is considered to be specialized variant of projectional radiography.


Sectional Images allow for better contrast & detail at specific areas of interest.



Images are two-dimensional.
People are three dimensional.

PolyTomography

Poly tomography: This was a complex form of tomography. With this technique, a number of geometrical movements were programmed, such as hypocycloidal, circular, figure 8, and elliptical. Philips Medical Systems produced one such device called the 'Polytome.' This unit was still in use into the 1990s, as its resulting images for small or difficult physiology, such as the inner ear, was still difficult to image with CTs at that time. As the resolution of CTs got better, this procedure was phased out.



Tomography

Tomography from the Greek Tomo, slice or section, and graph, delineation, means the creation of slice images. **synthesis** refers to a combination of two or more entities that together form something new;

Tomography, produces slice images, which have the effect of eliminating blurring caused by overlying tissues in conventional planar imaging.

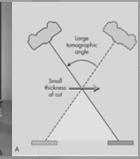
It improves contrast by blurring non focal plane structures.

It improves contrast by reducing scatter radiation.

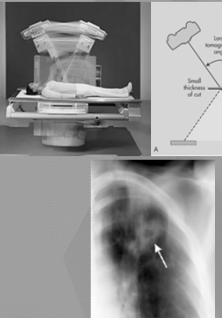
DBT

What do you see?

Linear Tomography



Linear tomography: This is the most basic form of tomography. The X-ray tube moved from point "A" to point "B" above the patient, while the cassette holder (or "bucky") moves simultaneously under the patient from point "B" to point "A." The fulcrum, or pivot point, is set to the area of interest. In this manner, the points above and below the focal plane are blurred out, just as the background is blurred when panning a camera during exposure



Comparison of screening mammography with breast tomosynthesis in a 57-year-old woman.

