Digital Breast Tomosynthesis

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One in every eight women will be diagnosed with breast cancer at some point in their lives. Mammography is one of the ways to screen for breast cancer today. It usually takes two X-rays of each breast from only two different angles: top to bottom, and side to side. Mammograms are done by the breast being pulled away from the body and compressed between two glass plates. Regular mammography records the pictures on film, whereas digital mammography records the pictures on the computer. There are three main problems with mammography. The first, being the compression of the breast that is required during a mammogram which is very uncomfortable for women, and most will deter from getting screened due to this discomfort. The second problem is due to the compression there can be an overlap in the breast tissue. This means breast cancer can be hidden in the overlapping tissue and could potentially not show up on the mammogram. The third problem with mammography is that it only takes one picture across the entire breast and only in those two directions. Another problem that surrounds mammography are false alarms, it has shown that 25% of the patients who are called back because their mammogram had shown something turned out after carefully examination revealed only normal tissue. Those three critical reasons are why Daniel Kopans, MD, the Director of Breast Imaging at Massachusetts General Hospital, decided to revive the technique for breast assessment in conjunction with the improvement of a digital detector for mammography. Tomosynthesis was conceived more than 30 years ago, so the idea of a revived technique was surely needed. The Digital Breast Tomosynthesis (DBT) is a new kind of test that is trying make up for the downfalls of conventional mammography. DBT creates a 3-dimensional picture of the breast using X-rays. DBT takes multiple X-ray pictures of each breast from many angles. The breast is positioned the same way it is in a traditional mammogram, but only a little pressure is applied. In doing so this provides a more comfortable experience and makes breast cancer more visible by reducing the overlapping of breast tissue. The X-ray tube moves in an arc around the breast and in a seven second examination, 11 images are taken. DBT combines the data from the 11 2-D images and creates a 3-D composite image. In other words the information is sent to a computer, where it is assembled to produce a clear, highly focused 3-D image throughout the breast. This is done by computers electronically lining up the images so that only the structures in a single plane of the breast line up on all of the images. Breast cancer looks denser than most healthy nearby breast tissue and appears as irregular white areas, and looks like a star with lines radiating out from that area. The benefits of DBT is possibility of reduction of breast compression, prevents the problem of cancer hiding within overlapping tissue, improves diagnostic and screening accuracy, contrast enhancing 3-D imaging and 3-D lesion localization. Researches believe that DBT will make patients more comfortable during screening while allowing breast cancers to be seen easier and earlier in dense breast tissue. Another benefit from DBT is the reduction of false alarms that can occur during traditional mammography which in turn reduces cost of screening, number of screenings, and any false anxiety in women. DBT has increased 60 fold and due to this, it had been brought out of the laboratory and into the clinic to provided women with better care. Even though DBT is not yet FDA approved, early results show that the technique is very promising and will potentially lead to broader clinical trials, which can then have a better stand against the battle of breast cancer.

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