



Digital Breast Tomosynthesis: Time to think differently

Digital Breast Tomosynthesis (DBT) has been proven to increase the diagnostic performance in breast imaging ^(1, 2), both when applied as an adjunct or a replacement of Digital Mammography (FFDM). As a result of this, DBT can be considered nowadays as an essential functionality of modern digital mammography equipment.

Nevertheless, there are clear and significant differences among the technologies being available on the market: latest FFDM systems offer a wide range of tube travel (angular movement), number of exposures (raw projections) and spatial resolution (pixel size) ⁽³⁾.

Apart from this, there are numerous further factors influencing the performance of the equipment, namely acquisition- and compression time, exposure dose as well as vertical resolution. Hence, comparative evaluations are difficult to perform which is even aggravated by the fact that each manufacturer has defined a certain trade-off between clinical usability, productivity, patient dose and image quality considered to be the optimal balance between these factors.

In general, the try to accomplish an ideal trade-off between these different components is common to all medical imaging procedures: sensitivity and specificity are the two sides of a story which can also be described in terms of efficacy and accuracy.

But when it comes to breast imaging, this consideration might have more far-reaching effects.

BREAST SCREENING AND EFFICACY

In Europe, approximately 16 million women undergo breast screening mammography every year and an increasing number of countries decide on implementing DBT into breast screening due to a higher cancer detection rate as described in recent publications and clinical trials.

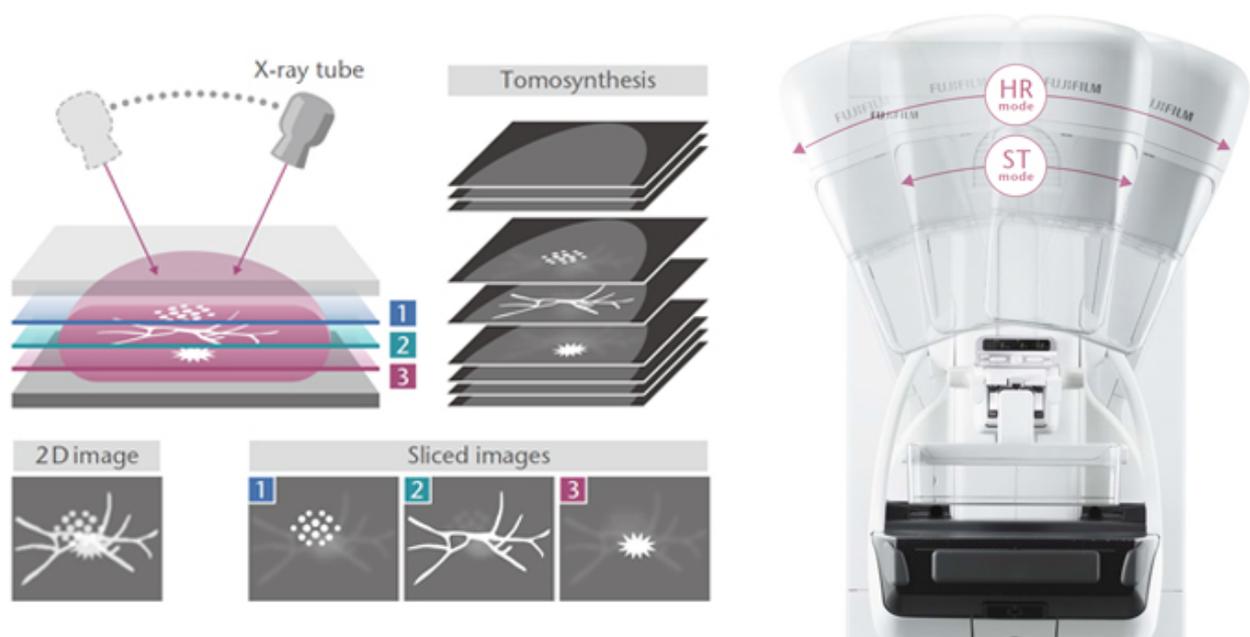
Nevertheless, an implementation of *screening DBT* could only be feasible over the long-term if certain requirements are fulfilled: (a) fast image acquisition allowing a smooth workflow (to involve and invite a vast part of the population), (b) stress-free environment for the patient (to keep a high participation percentage) and finally (c) maintenance of a reasonable dose constraint. Like in no other imaging procedure, *EFFICACY* is the most crucial point and therefore it must be of major interest to ensure an *EFFICACY* on its highest level.

DIAGNOSTIC MAMMOGRAPHY AND ACCURACY

Currently, DBT is heavily used as first assessment tool in case of positive screening examinations and is routinely applied to symptomatic or follow-up patients. Dissimilar from screening, the primary objective of *diagnostic DBT* is to either solve the doubtful interpretation of the basic screening examination or to guide any further assessment procedure in case of a malignant lesion and consequently it is the *ACCURACY* that matters most. It is essential to depict any lesion or other important finding independent of size or breast density and this is put into practice by providing an extremely high spatial and vertical resolution of the DBT system.

DUAL MODE TOMOSYNTHESIS, TO GO BEYOND THE DILEMMA

Since its release, AMULET Innovality has been the only system capable of covering two different clinical application scenarios, *breast screening* and *diagnostic mammography*, each equipped with various acquisition geometries designed to accomplish both clinical settings in the best way.



In *screening applications* (ST mode, 15° angular travel in 4" exposure time) the system guarantees an extremely effective acquisition: fast and seamless workflow with a patient dose which results to be well below the limiting values defined in specific guidelines ^(3, 4, 5).

In contrast, *diagnostic mammography* implies that AMULET Innovality operates at a higher spatial resolution by using an unsurpassed pixel size of 50 microns with the aim to yield an increased accuracy and significantly better overall performance (HR mode, 40° angular travel in 9" exposure time).

Visit the new mammography.fujifilm.eu/en to learn more about AMULET Innovality Dual Mode Tomosynthesis, and to experience FUJIFILM's unique digital mammography solution.

1. "Prospective trial comparing full-field digital mammography (FFDM) versus combined FFDM and tomosynthesis in a population-based screening programme using independent double reading with arbitration" (Skaane et al. – Eur Radiology 2013)
2. "Performance of one-view breast tomosynthesis as a stand-alone breast cancer screening modality: results from the Malmö Breast Tomosynthesis Screening Trial, a population-based study." (Lang et al. – EUR Radiology 2015)
3. "Protocol for the Quality Control of the Physical and Technical Aspects of Digital Breast Tomosynthesis Systems" (EUREF, version 1.03 – 2018)
4. "Diagnostic performance of digital breast tomosynthesis and full-field digital mammography with new reconstruction and new processing for dose reduction" (Endo et al. – Breast Cancer 2018)
5. "Technical evaluation of Fujifilm AMULET Innovality digital breast tomosynthesis system" (NHSBSP report – February 2018)