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PHILIPS

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Tom Chenevert, PhD

Philips Elite Breast, a complete solution for breast MRI includes the dockable MammoTrak patient support, the 16-channel and 7-channel SENSE Breast coils for imaging and biopsy, and DynaCAD Enterprise for MR analysis and for planning biopsies on the MR console. The University of Michigan Health System (UMHS, Ann Arbor, Michigan, USA) is the first in the world with the Elite Breast clinical solution on Achieva 3.0T.

The University of Michigan Department of Radiology provides radiology services for the University of Michigan Health System, the University Health Service and the VA Ann Arbor Healthcare System, and provides more than 500,000 examinations every year. UHMS is performing 20-25 breast exams and 3-4 breast biopsies each month. UMHS was first in the world to combine Achieva 3.0T with the MammoTrak dockable patient support. The department completed its first 3.0T biopsies with the Achieva 3.0T scanner and the Elite Breast Clinical Solution in late March 2009.

Caroline Daly, MD, Assistant Professor, University of Michigan Health System Department of Radiology, says the first and subsequent biopsies have gone very smoothly. "We've done three wire localizations and seven needle biopsies so far with the Breast Elite package."

"The fact that the patient enters the scanner feet-first is a huge advantage."

MammoTrak's patient comfort is a major benefit

According to Dr. Daly, the biggest advantage of the Elite Breast solution is the patient comfort provided by the MammoTrak patient support. MammoTrak is designed with the patient in mind, with features such as an adjustable headrest and patient-friendly construction materials. "It's hard to biopsy patients who are uncomfortable. The fact that the patient enters the scanner feet-first is a huge advantage."

Tom Chenevert, PhD, Professor, University of Michigan Health System Department of Radiology, agrees with Dr. Daly. "In biopsies in particular, with the cables and IV lines that are required for a vacuum-assisted biopsy, communication with the patient is sometimes difficult. The feet-first position makes this much easier."

The dockability of MammoTrak is another advantage. "For localization accuracy, the fact that you're docking the trolley with the integrated coil in a known location in the middle of the magnet is very important, particularly at 3.0T," says Dr. Chenevert. "In the head-first position, with a potentially moving table, you could have inaccuracies. From a precision point of view, this is the right way to do it. And the MammoTrak slides over the patient table, so as soon as the patient is removed, another patient can be scanned."

“We have very high quality diagnostic images, and we’ve been very pleased with the set of cases that we’ve done so far.”



Achieva 3.0T with MammoTrak at UMHS.

Dr. Daly says that having the patient farther out of the magnet is much easier on the staff, as well as the patient. “It’s easier to monitor the patient and the cabling that we need to use for the vacuum-assisted device – you’re not on a tether quite as much, because her head is out of the magnet, whereas before, if you biopsied on the opposite side of the gantry, you needed every inch of cabling to get the needle to the patient.” In addition, she says the new lighting feature, which is built into the 7-channel coil, enables better visualization of the breast for biopsy.

Coils enable high image quality

MammoTrak comes with two versions of a dedicated breast coil. The open design 7-channel SENSE Breast coil with its integrated lighting allows imaging and biopsy. The 16-channel SENSE Breast coil facilitates superb temporal and spatial resolution for improved visualization of small lesions, important for early diagnosis and personalized treatment plans. Both allow visualization of a large area that includes the axilla.

“The image quality is lovely,” says Dr. Daly. “We have optimized our diagnostic scans, and now we’re producing very good quality images.” In addition, she says the compression paddles allow more compression from the lateral aspect of the breast than the stand-alone 7-channel Breast coil. “The new coil facilitates better

compression of the breast and less alteration of patient positioning for biopsy.”

Needle placement system aids biopsy work

Dr. Daly uses both the grid system and the pillar system to perform biopsies, because each has its own advantages. “I believe the pillar system has more accurate targeting than the grid system in many cases, but the grid is easier and faster to learn and teach to others. There’s a smaller chance of making an error with the targeting when using the grid system because there are fewer moving parts.”

“One of the advantages of the pillar system is the ability to angulate. This provides a greater range of accessible lesions,” Dr. Chenevert adds. “This is especially important in the case of larger women.”

Efficient biopsy planning with Invivo DynaCAD shows the optimal trajectory to the breast lesion. After needle placement an additional scan is done to monitor the needle placement and position. MR-guided biopsies can be performed with lateral, medial or cranial access.

“We’ve used DynaCAD from the very start for all our biopsies,” says Dr. Daly. “It’s a very easy to use system, and very straightforward. The biopsy planning software is especially well thought out.”



“DynaCAD is a very easy to use system. The biopsy planning software is especially well thought out.”

First a sagittal scan is performed for detection of the fiducial markers that DynaCAD uses to calculate the lesion coordinates for performing the biopsy. Then an axial dynamic e-THRIVE scan is used to visualize the lesion that will be biopsied. Performed on Achieva 3.0T and MammoTrak with 7-channel SENSE Breast coil.

Advantages of 3.0T in breast MR

Breast imaging at 3.0T presents many advantages compared to 1.5T, including higher signal-to-noise ratio and better spatial resolution for improved lesion conspicuity. “The scans are really beautiful,” says Dr. Daly. “We have very high quality diagnostic images, and we’ve been very pleased with the set of cases that we’ve done so far.”

“Many of our patients are post-surgical, so that means they could have clips in place, implanted devices or even breast implants,” says Dr. Daly. “With the higher magnetic field strength, artifacts due to clips may be stronger, which may make 3.0T imaging more challenging.

“In our opinion the advantages of 3.0T outweigh the challenges.”

“We have encountered some challenges with scanning large breasts, particularly with combined fat and water saturation in the posterior tissues and chest wall, and some pulsation artifact that particularly affects subtracted images. But I’m hopeful that we can overcome these challenges in the near future.”

“The dielectric effect can be challenging at 3.0T,” agrees Dr. Chenevert, “particularly in large breasts where we desire uniformity over a large field-of-view. That said, in our opinion the advantages of 3.0T outweigh these challenges. In addition, now there are technical solutions to these non-uniformities, since fat suppression has been improved significantly by advanced shim routines and the dielectric effect is greatly mitigated by MultiTransmit and the improved magnet design of Achieva 3.0T.”

Philips ahead of the curve

The features of the Achieva 3.0T system, combined with the superb image quality and workflow benefits of the Elite Breast solution are driving the market toward more effective and efficient means of providing breast MRI at 3.0T. Considering the new American Cancer Society recommendations for breast MRI for women at higher risk for breast cancer, Philips is once again ahead of the curve.