

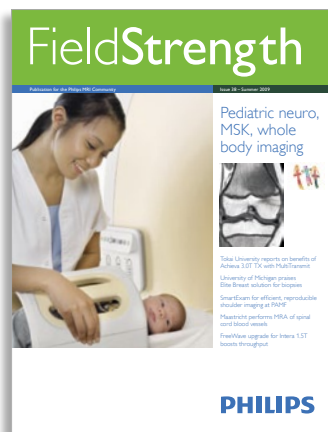
FieldStrength

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New MultiTransmit technology advances 3.0T imaging

Tokai University School of Medicine reports significant benefits for image quality and exam speed on the Achieva 3.0T TX



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PHILIPS

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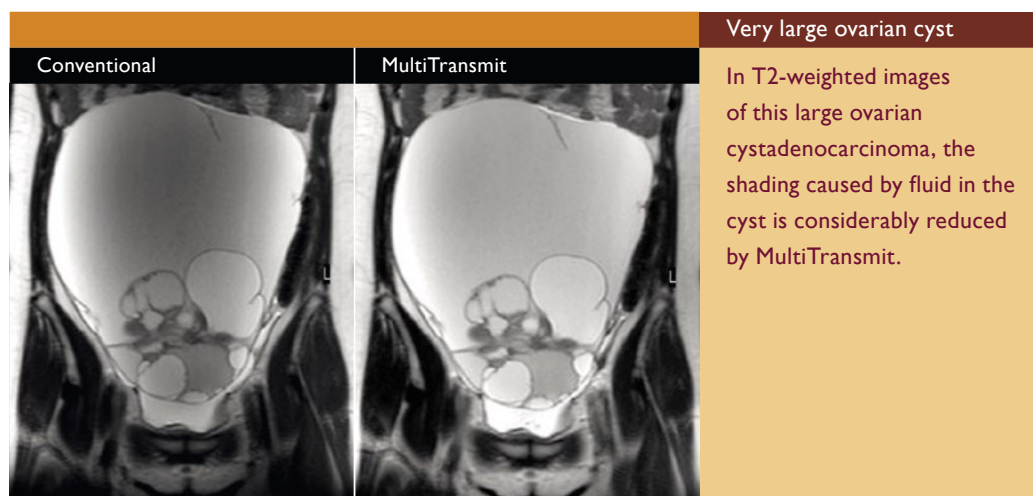


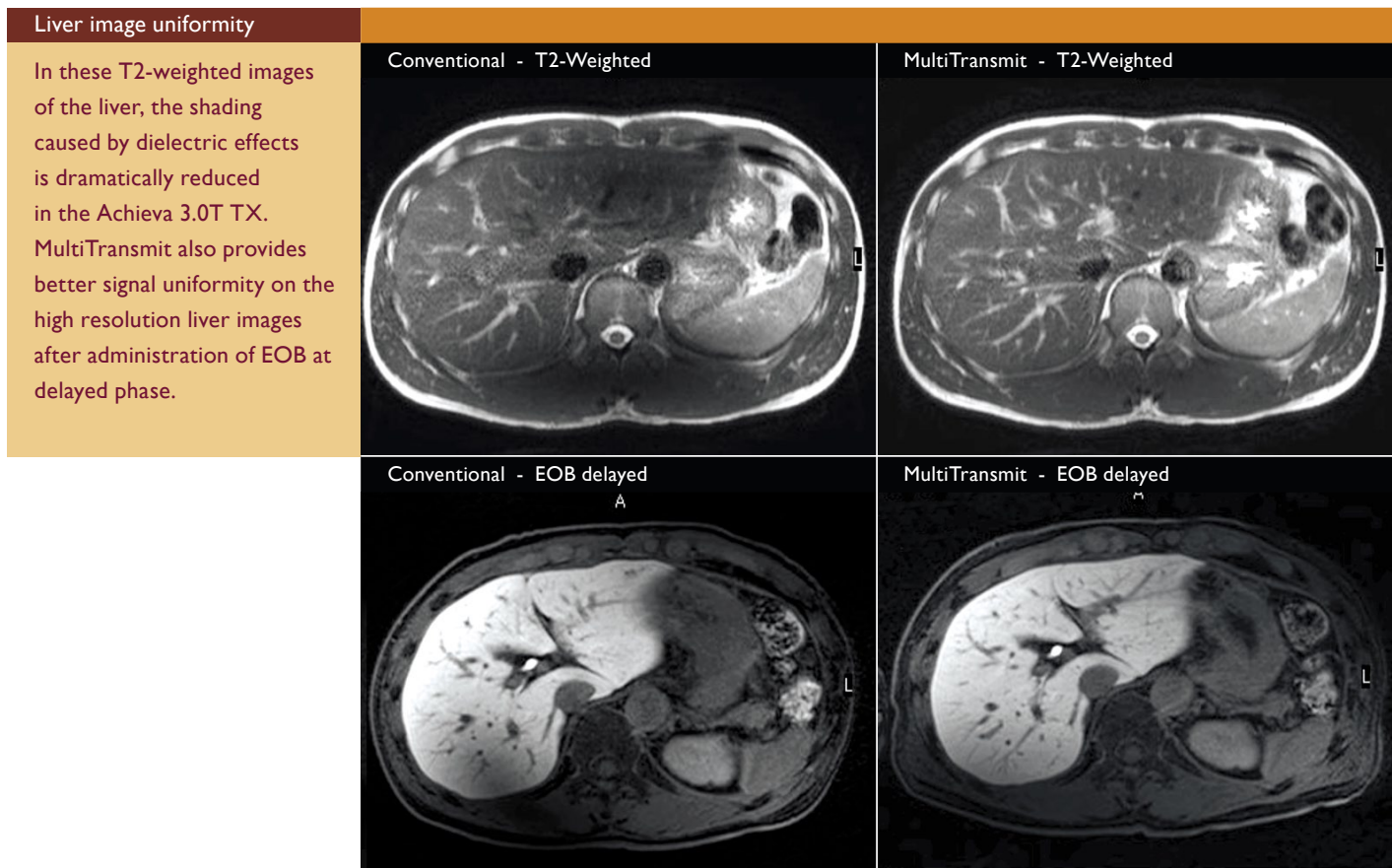
Prof. Yutaka Imai

Tokai University School of Medicine has been evaluating the Achieva 3.0T TX with Philips' new MultiTransmit technology since last February. Dr. Yutaka Imai, Professor of Radiology and Dean of Tokai University, believes MultiTransmit is an important advancement for 3.0T MRI. Even after just three months, he is committed to ensuring that his next MRI scanner will be another Achieva 3.0T TX, as he considers MultiTransmit essential for the future of 3.0T MRI.

MultiTransmit technology embodied in the new Achieva 3.0T TX was developed by Philips to overcome fundamental challenges associated with high-field MRI. The study reports that by using multiple RF sources, MultiTransmit dramatically reduces dielectric shading effects, resulting in significantly better image uniformity and consistency for each and every patient. The power, amplitude, phase and waveform of all RF sources are automatically adjusted for optimal uniformity in each patient's unique anatomy. In addition, local Specific Absorption Rate (SAR) can be reduced, allowing increases in scanning speed by up to 40%.

In the first two months after installation, the Department of Radiology at Tokai University School





of Medicine, Kanagawa, Japan scanned both healthy volunteers and patients on its new Achieva 3.0T TX scanner. Initially, Professor Imai and his colleagues made direct comparisons by scanning with and without MultiTransmit. “In these comparison studies, the MultiTransmit images were clearly superior,” he recalls. “The Achieva 3.0T TX has definitely come up to expectations. When imaging large volume masses, the shading that you can sometimes get with traditional high field systems is dramatically reduced. We noticed that consistently from the first scans we did.”

Imaging challenging anatomies

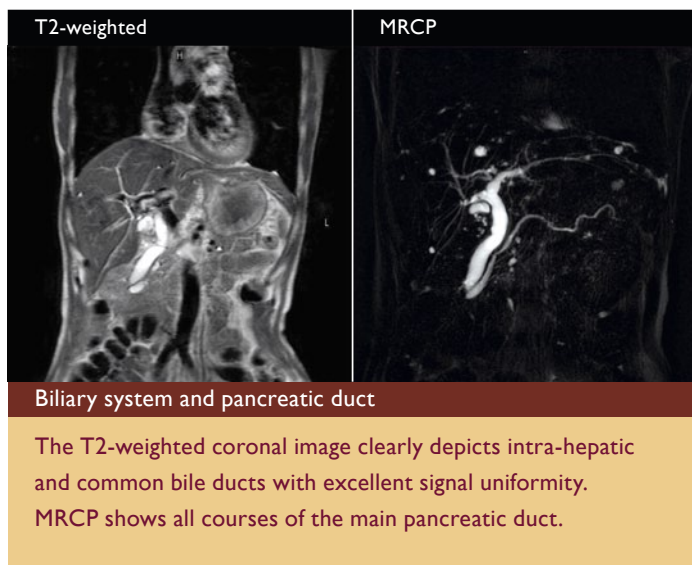
Professor Imai particularly sees benefits for liver imaging and patients with a large amount of fluid in the abdominal cavity. “For patients with hepatocellular carcinoma, an MR exam is essential to exclude the possibility of other small lesions being present before surgery. But these are some of the most challenging MR exams, especially at high field strengths due to shading caused by the large amount of ascites surrounding the liver. The same effect is observed with fluid surrounding large ovarian cysts. With MultiTransmit, the dielectric shading is dramatically

reduced and the enhanced image quality helps us significantly in diagnosis. Fat suppression is also far more homogeneous than with traditional 3.0T systems,” he says.

The Tokai radiologists are also using the Achieva 3.0T TX in other areas that have traditionally been challenging at 3.0T, for instance spine, breast, upper abdomen and pelvis. “In all application areas we see dramatic improvements in imaging quality and uniformity,” says Professor Imai.

“In the case of cervical spondylosis, for example, we are able to use a 180° refocusing pulse instead of 120° because local SAR is well controlled in the Achieva 3.0T TX. This means that contrast in the cerebrospinal fluid and the spinal cord is markedly improved.”

“In breast imaging too, the RF signal can be adapted on a patient-by-patient basis, leading to greater signal uniformity of bilateral breast tissues and more accurate evaluation of the tumor vessels. We also routinely obtain excellent T2-weighted images of the biliary system and, using MRCP with the Achieva 3.0T TX, we



can clearly depict the main pancreatic duct. In general, we find that MultiTransmit also provides far greater contrast between enhanced and unenhanced tissues on T1-weighted post-contrast images.”

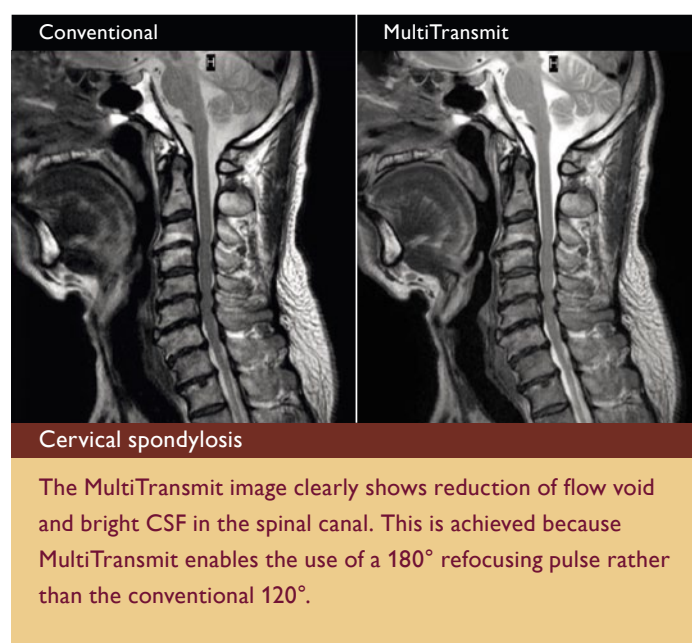
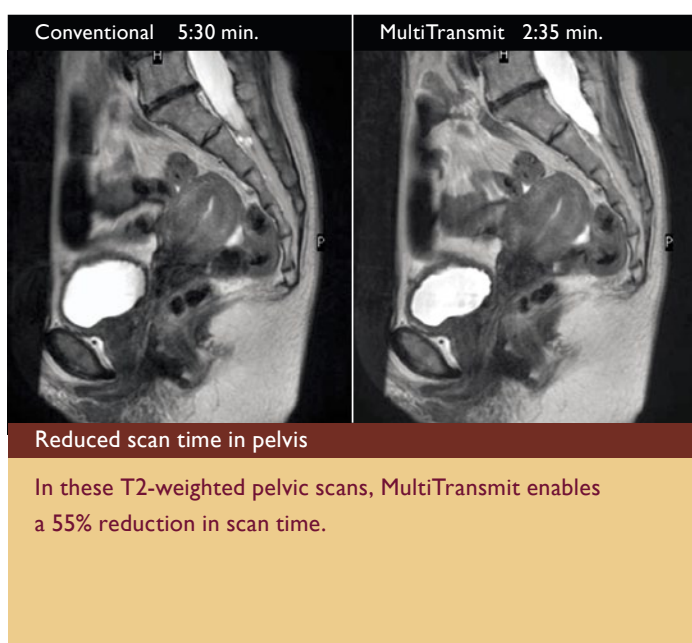
Faster spine and pelvic exams




One of the important benefits of MultiTransmit is that it leads to a reduction of local SAR, allowing the system to be driven harder. This allows significant increases in scanning speed without compromising image quality – a fact readily appreciated by Professor Imai: “We found that scan times could be cut, on average by around 30%, which makes the exams much easier for patients, especially those with painful back or pelvic conditions who may be unable to lie still for too long.”

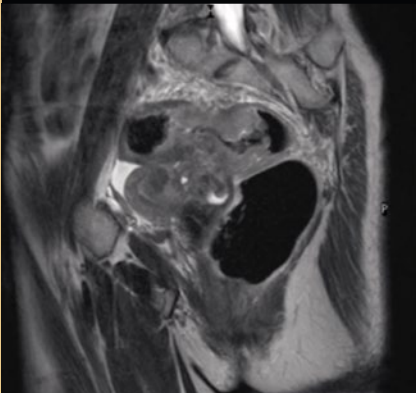
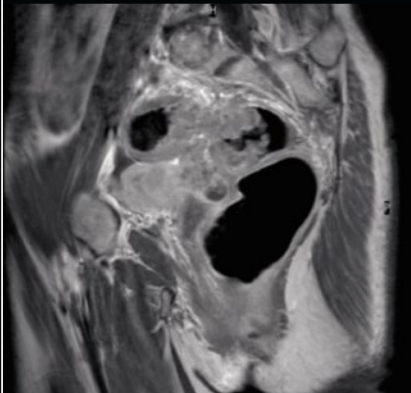
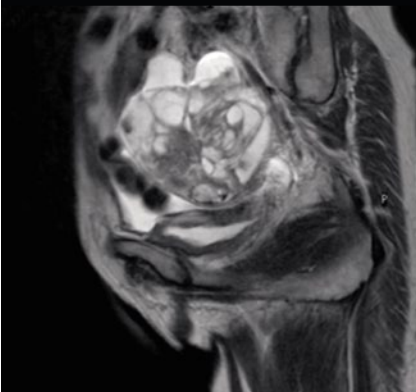
The future of 3.0T imaging

Professor Imai’s first experiences with the new Achieva 3.0T TX system demonstrate the clinical benefits of the MultiTransmit technology. “The enhanced image uniformity and consistency over a broad range of applications will enable us to employ the benefits of high-field diagnostic MRI in a wider patient population. I believe that this MultiTransmit technology is absolutely essential for the future development of 3.0T imaging,” he says. “In fact, at Tokai University we are so impressed with MultiTransmit technology that we have no doubt that the next MRI system we invest in will be another Achieva 3.0T TX.”

“In all application areas we see dramatic improvements in imaging quality and uniformity.”



Benign prostatic hypertrophy	Conventional	MultiTransmit
<p>In the T2-weighted images of the enlarged prostate, multiple bright nodules are visualized in the transition zone.</p> <p>MultiTransmit images provide better T1 contrast in the prostate after administration of Gd-DTPA.</p>	<p>T2-Weighted</p> 	<p>T2-Weighted</p> 
	<p>Post contrast</p> 	<p>Post contrast</p> 

Rectal and ovarian cancer		
<p>In this patient with double cancer, rectal cancer is clearly visualized as a bulky mass.</p> <p>The cystadenocarcinoma of the ovary is shown as both cystic and solid components in the tumor.</p>	<p>T2-weighted</p> 	<p>Post contrast</p> 
	<p>T2-weighted</p> 	<p>Post contrast</p> 