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Ben Kennedy, Chief MRI Technologist at Qscan Radiology Clinics in Queensland Australia, holds a Postgraduate Master's Degree in MRI from the University of Queensland Australia. Kennedy has been an invited speaker for the ISMRM/SMRT, the European Society of Magnetic Resonance and Micro Biology (ESMRMB), the Australian Institute of Radiography (AIR) and the Queensland Radiology training program.

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Qscan Radiology Clinics, headquartered in Brisbane, Australia, operates 14 imaging centers with five MRI systems, including two 3.0T systems. Its latest acquisition, an Ingenia 3.0T, was purchased in early 2012 for a clinic in Southport. Because Qscan is competing with five other imaging centers in a one-block radius, it chose to differentiate its offering with a wide bore 3.0T system.

"The thing that strikes me – over and over again – is just how robust the Ingenia 3.0T system is."



MultiTransmit is deciding factor

Ben Kennedy, chief MR technologist at Qscan, says that predictability and robustness were primary reasons for choosing Ingenia 3.0T. “We wanted a system that could give us exactly what we expected each time, with no surprises,” he says. “And now that we are using Ingenia 3.0T, the thing that strikes me – over and over again – is just how robust the system is.”

Because Kennedy highly values reproducibility and consistency, Philips MultiTransmit 4D technology was particularly attractive. MultiTransmit uses multiple RF sources to reduce dielectric shading effects, resulting in better image uniformity and reproducibility in follow-up exams and between patients.

“When we host site visits, we scan with adaptive shimming using MultiTransmit on and off to demonstrate how great the difference in image quality actually is,” Kennedy says. “MultiTransmit also makes scanning more time efficient.”

dStream benefits and throughput

The center scans up to 20 patients each day, and about 50% of the caseload is musculoskeletal imaging. Kennedy says that the high SNR provided by dStream makes it possible for him to achieve the image quality he wants without sacrificing throughput. “Even in musculoskeletal imaging, dStream brings an increase in signal. I see a genuine leap in image quality using dStream, with exactly the same coils. In all joints, I now run smaller voxel sizes than I used to, and we do it in reasonable time. Most of our sequences are around 3, sometimes 4 minutes,” he says.

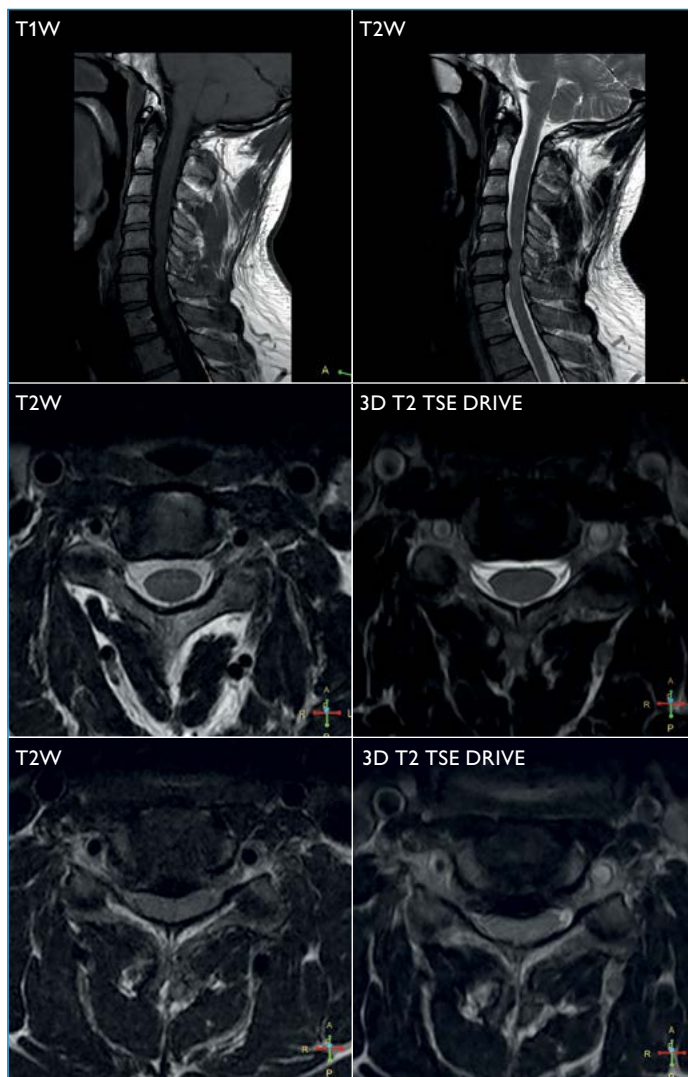
“Qscan’s Ingenia 3.0T system is not government-funded, and the price of an MR exam is under pressure, making it important to leverage dStream for speed, as well as image quality,” Kennedy notes. “We scan the most important views with the highest detail using thinner slices, and then run the others with our routine number of slices and shorter times.”

The center’s efficient patient management also aids throughput, as does having dedicated MSK radiologists. Kennedy explains, “When radiologists clearly know what they want, they don’t waste scanning time with sequences they don’t need, so we can spend more time keeping the quality high on the sequences that they do need.”

Another factor that aids workflow is patient comfort. “The way Philips integrated Ingenia’s dStream coil system is the best move they could have made,” he says. “The homogeneity and linearity of the system allow me to put patients in positions where they are comfortable, and we can still get a quality scan. For example, for wrist and elbow scanning, the patients lie with their hands at their sides. There are not many scanners where you can actually do that consistently, and get full field of view fat saturation.”

Coils bring flexibility, long field-of-views

Kennedy is pleased with the flexibility of Ingenia’s MSK coils. “The 16-channel dS Knee coil provides an extra-long field of view without signal drop-off, that can also be used to image other structures, such as imaging down the calf or into the Achilles tendon. Similarly, the 8-channel dS Small Extremity coil also provides a longer field of view, and works well for elbows, whole hands and biceps.”



Degenerative changes in cervical spine

Images of a 41-year-old male show degenerative changes at C5/6 and C6/7 with loss of disc space height and osteophytic ridging impressing on the anterior thecal sac. In addition, central spinal canal stenosis results in flattening of the spinal cord without cord edema or myelomalacia. Degenerative osteophytic narrowing of the right C5/6 and left C6/7 neural foramen can be seen at the sites of C5 and C6 nerve roots respectively. dStream’s high SNR allows exceptional resolution in images of the C-spine, e.g. ax 3D TSE DRIVE 0.45 × 0.5 × 1.5 mm at 8 cm FOV. Sensitized flow compensation is used in standard T1 spine imaging, and an optimized refocusing angle allows high contrast between spinal cord and dark CSF. This had been a challenge in early 3T spinal imaging, leading to the requirement of using T1 FLAIR for these images.

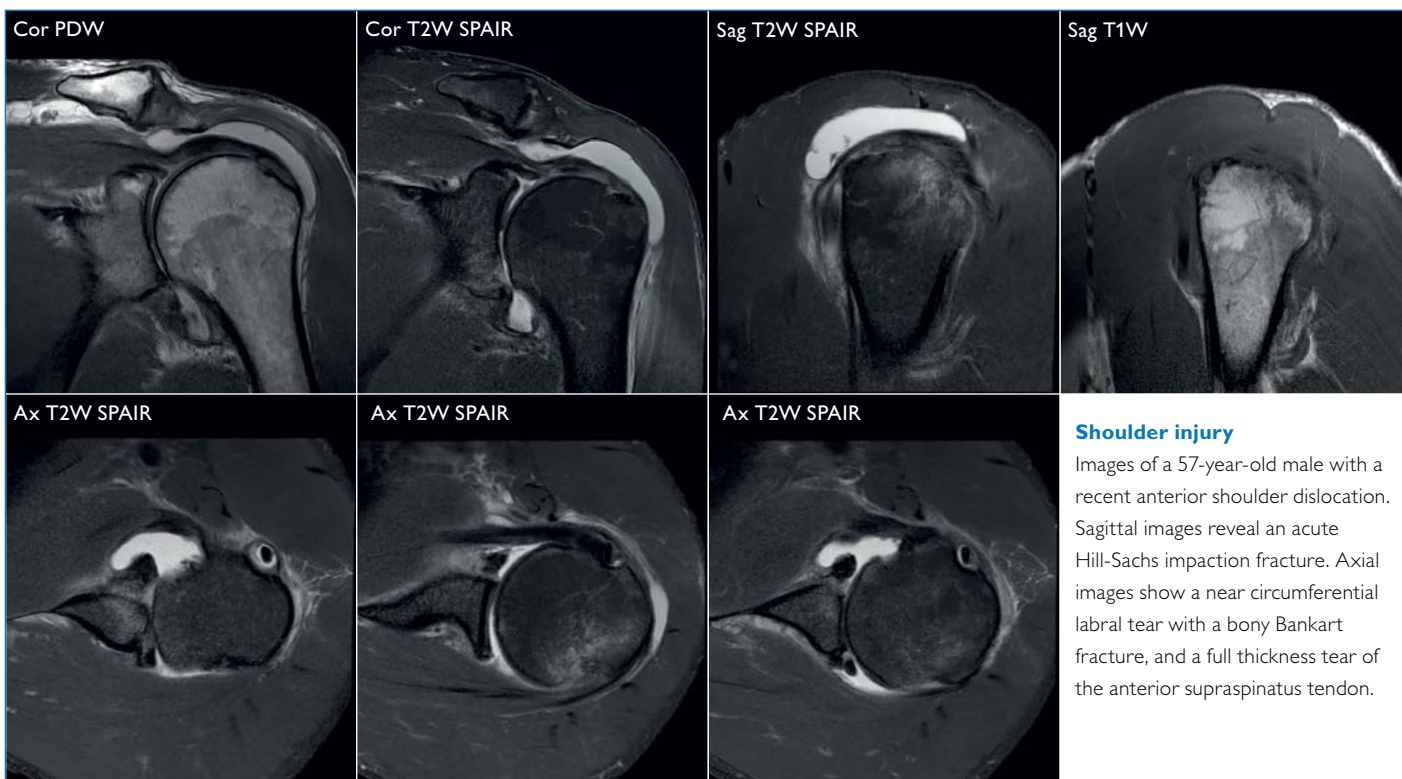
“The posterior spine coil is phenomenal. The T1 contrast is so good that we don’t need to use T1 FLAIR.”



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Olecranon bursitis

A 35-year-old presented with swelling and pain in the elbow. MR imaging revealed a 33x16 mm olecranon bursitis. The imaging was performed with the patient in a supine position with arms by the sides, using the 8-channel dS Small Extremity coil. This patient position, which offers greater comfort, is possible because of the high quality fat saturation throughout the region, even during off-center imaging, due to outstanding homogeneity and linearity of the Ingenia 3.0T.



Shoulder injury

Images of a 57-year-old male with a recent anterior shoulder dislocation. Sagittal images reveal an acute Hill-Sachs impaction fracture. Axial images show a near circumferential labral tear with a bony Bankart fracture, and a full thickness tear of the anterior supraspinatus tendon.

“The integrated posterior spine coil is phenomenal,” he adds. “The T1 contrast is so good that we don’t need to use T1 FLAIR, which may otherwise be a popular choice at 3T. The sensitized flow compensation is excellent for CSF suppression. Also, the ability to accurately optimize the refocusing pulse is very useful. The field of view that we are using for axial C-spine is about 8 cm, with 0.5 mm in-plane resolution. We use a 2D TSE and a 3D TSE DRIVE sequence, which we find to be exceptionally high quality.”

Achieving consistency across systems

In addition to performing patient exams, Kennedy is responsible for developing protocols for all five MR systems at Qscan. “My goal is to obtain reproducibility not just on a single system, but also across field strengths and manufacturers. Anyone who has an exam on any of our systems at any site should expect the same imaging result for the same body part: the same sequences, the same quality, the same orientation. So if I change the parameters on one system, we change it across the fleet. That can be tricky, because it depends on the capabilities of the systems.”

Kennedy notes that this task is made easier because he has worked on systems from three major manufacturers, and understands what the differences are. “I keep a constant eye on how we can improve protocols. For general use, I don’t expect the other radiographers to tinker with sequences. The user interface on the Philips system, in particular, is conveniently designed to be able to drag and drop an ExamCard and run it.”

Parameter options appreciated

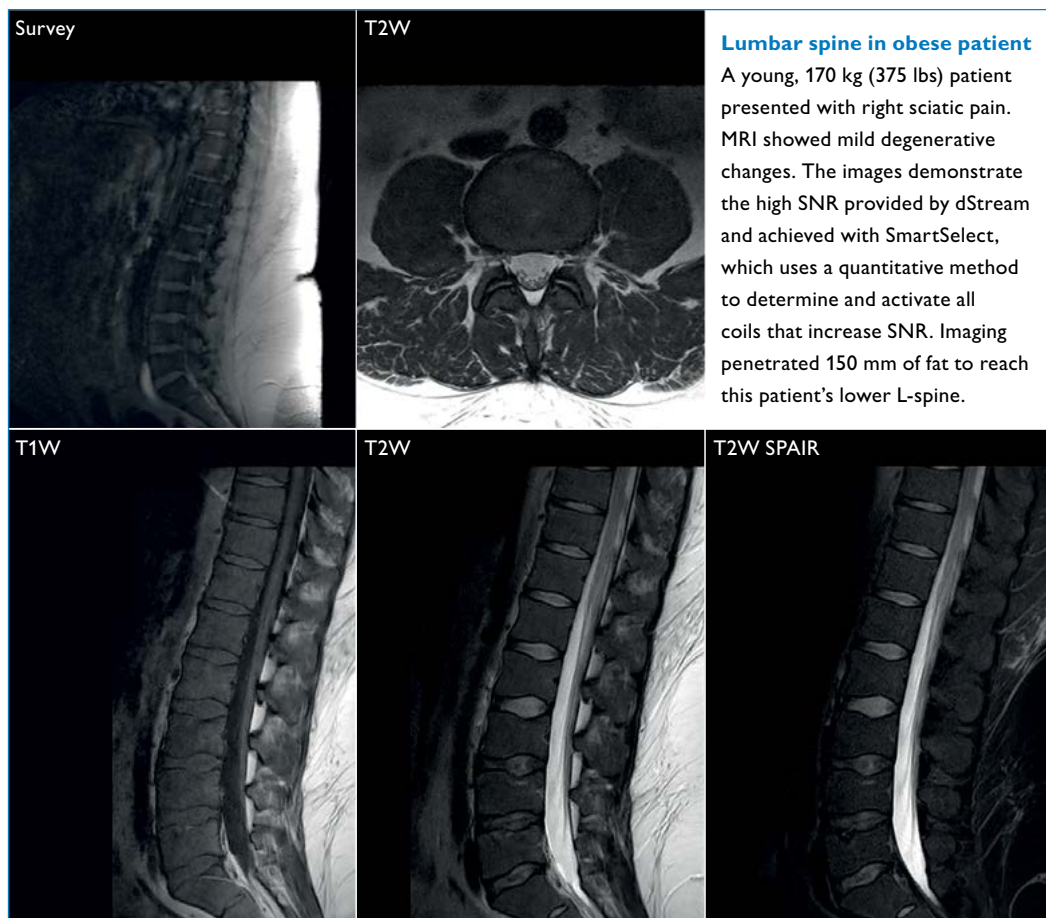
Kennedy calls himself an “MR enthusiast,” and as such, he particularly appreciates the many parameters that he can fine tune on the Philips Ingenia 3.0T. “These all have a balance in each sequence type to maximize the image quality and accuracy of the data, and to allow your voxel size to demonstrate its true potential.”

“While I like having control over many aspects of the system, I have confidence in SmartSelect, which automatically determines which coil elements to activate to produce the highest SNR for the selected area,” he says. “SmartSelect has never let me down in regards to choosing elements.”

High resolution and fine detail

Kennedy strives to take full advantage of what 3.0T offers for MSK imaging. “3.0T offers the possibility of higher resolution and finer detail. When imaging fine structures like fingers, toes, hands and shoulders, you are looking at very subtle areas where there is a lot of debate. You need higher detail, finer cuts, and fewer gaps to give the radiologists a lot more confidence in what they are looking at.”

“I see it like this,” he concludes. “I have been handed the keys to a Formula One racecar, rather than a stock car. Why not drive it the way it should be driven?” ■



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