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User experiences

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Qscan Radiology Clinic (Brisbane, Australia) has five MRI systems, including an Ingenia 3.0T while most of the other systems are 1.5T. The Ingenia 3.0T services all types of MR imaging, including neuro, MSK, cardiac, body, prostate, breast and sports injuries. Since Qscan received the 32-channel dS Head coil, this coil is being used for almost all head imaging, because of its robustness and excellent performance.

The 32-channel dS Head 32ch coil for Ingenia 3.0T is designed for advanced neuro applications including fMRI, spectroscopy, MRA. The coil includes both front and rear facing mirrors for visual stimuli and movie projection. It allows comprehensive high resolution coverage of the brain and allows dS SENSE parallel imaging in all three directions.
Ben Kennedy is Chief MRI Technologist at Qscan. “Before we had the 32-channel coil, we were already happy with our neuro imaging,” he says. “The standard dS Head coil is a very good coil. But we have a great interest in increasing the amount of work we do for neurosurgeons. The desire to implement advanced neuro imaging, such as fiber tracking and fMRI, was an important reason to get the 32-channel dS Head coil. Meanwhile, we use the 32-channel coil for all our brain imaging now.”

Exceptional resolution reveals tiny structures
“The 32-channel dS Head coil excels in visualizing tiny but important structures within the brain,” says Kennedy. “This coil is very robust in providing uniform signal distribution across the whole brain; we see less noisiness in the center of the brain. We are seeing structure within the pons and the midbrain, and within the brain stem, which I can’t remember ever seeing before. In the pons and the basal ganglia, the images are just so excellent. We’re seeing small vasculature and tiny vessels inside, and recognize areas of degenerative brain where the vasculature is slightly more obvious. It’s just so much clearer; our radiologists like what they see.”

“With the 32-channel dS Head coil we are using smaller voxel sizes than we used before, to visualize anatomy that we assumed is there but we couldn’t see nearly as well as we do with this coil. For instance, when we look at IACs (internal auditory meatus) or at the pituitary, we are able to use sub-half-millimeter voxel size, and we can easily see the structures within small structures, rather than just identifying structures.”
Follow up of MS progression

A 60-year-old male with a history of Multiple Sclerosis (MS) underwent an MRI exam on Ingenia 3.0T with 32-channel dS Head coil. On the sagittal 3D T1W image some hypointense MS plaques are seen. Plaques are also well visible on the high quality T2-weighted and FLAIR images. Note also the excellent quality of the pons and peduncle brain fibers and vascular structures on the T2-weighted and FLAIR images. The T1-weighted ProSet fat suppressed images show high quality brain anatomy and high detail fine vascular information in conjunction to the MS plaques.

The multiple pericallosal and subcortical white matter hyperintense foci with several small foci in the posterior fossa and a single focus at the craniocervical junction are consistent with the history of Multiple Sclerosis. Two of the foci were not seen in previous examinations. This has been thought to be likely due to the high SNR and high resolution demonstrated by the 32-channel dS Head coil, as there are no indications to suggest any acute lesions.
“After seeing the image quality we currently get, it’s hard to go backwards. We use the 32-channel coil for all our neuro imaging now.”

Robustness and diagnostic confidence
“I think it is quite amazing how we are able to use such small fields of view and really thin slices for small anatomy,” says Kennedy. “However, I think the biggest thing for us is just the robustness; we can trust the coil. We know the dStream benefits on top of the 32-channel coil’s architecture are really adding to the signal to noise and the quality of the signal that we’re getting. Obviously, the more pathology we see using the coil, the more we appreciate how diagnostically confident we can be with what we’re seeing.”

“The other great thing about this coil is that it’s quite roomy inside, so we can fit a large-sized head in if needed.” Kennedy adds.

Fine-tuning 3.0T neuro exams
“There are two ways you can go with this type of hardware: being fast and being really high detail. We have a good balance with this coil, in that we can go relatively fast and still have very good detail. Generally, instead of super-fast scans, we lean toward good image quality, which the neurosurgeons appreciate,” says Kennedy.

“One of the biggest challenges in 3.0T neuro imaging is the higher sensitivity to pulsatile CSF flow. Adjusting the TR to a lower range is one way to reduce this, as it leaves less time for CSF flow to affect the acquired dataset. In general, that makes a big difference for avoiding vascular artifacts, and for 3.0T it works as well.”

“Besides, using 3D acquisitions instead of 2D makes a big difference. The SNR and contrast that we get from the 3D FLAIR is higher than traditional 2D FLAIR – especially when looking for demyelination – and allows us to obtain really thin contiguous slices in the brain. Similarly, I’ve been able to get much thinner slices with sagittal 3D T1-weighted imaging. And because 3D provides much higher SNR than 2D, it allows a very nice in-plane resolution as well, in a relatively short time. We can do it in two minutes. With 2D FLAIR, we often spend as much time - if not longer – for the same sequence. The techniques that we’ve been using, we have hardly any artifacts at all.”

32-channel dS Head coil used for almost all head imaging
“The dS Head 32ch coil has basically replaced the standard dS Head coil for all our brain imaging. We only still use the standard head coil when we need to scan from the skull base and move downwards as, for instance, in oncology neck. From the cases where we’ve done one view through the brain and then went back to the standard head coil to go down through the neck, we’ve noticed a marked difference between coils; it’s just a jump in image quality.”

“Before we received the dS Head 32ch coil, the voxel size we were using was just a little bit larger and we were very happy with the SNR. But after seeing the image quality we currently get, it’s hard to go backwards. We use the 32-channel coil for all our neuro imaging now.”

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Visit the online NetForum community to download ExamCards developed by Ben Kennedy for use with the dS Head 32ch coil.