

FieldStrength

Publication for the
Philips MRI Community

ISSUE 48 - 2013/1

High performance 3.0T spine imaging with Ingenia

AZ St.-Jan moves all spine MRI to Ingenia 3.0T because of consistent high quality.



This article is part of FieldStrength issue 48

2013/1



User experiences

AZ St.-Jan Brugge-Oostende



Jan Casselman, MD, PhD, is a radiologist and Chairman of the Department of Radiology at AZ St.-Jan Brugge-Oostende AV. His special interests include MR Head and Neck radiology and MR neuroradiology.

High performance 3.0T spine imaging with Ingenia

AZ St.-Jan moves all cervical, thoracic, lumbar and total spine MRI to [Ingenia 3.0T](#) because of consistent high quality

AZ St.-Jan Brugge-Oostende AV (Belgium) is now doing all its spine work at 3.0T. With Ingenia's dStream architecture for digitized high performance, efficient workflow and excellent image quality, 3.0T spine imaging is no longer a challenge.



Spinal vascular malformation

A nidus is seen in the cauda equina at level L3 and feeding and draining vessels can be seen along the surface of the conus up to level Th11. The nidus has a lower signal intensity than the CSF on the T2W image and is hyperintense on the T1W image. The Ingenia 3.0T system and its high SNR allow high spatial and contrast resolution imaging (thin slices) in a short time.

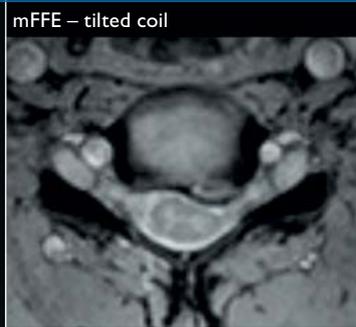
High resolution and excellent fat suppression

Jan W. Casselman, MD, PhD, says, "Spine work used to be one of the weakest points of 3.0T in the past, but currently all our spine MRI is done on Ingenia 3.0T and we get excellent examinations. We get very good fat suppression from the cervical spine down to the lumbar spine. Also total spine imaging is outstanding; we get very homogeneous images with few artifacts over these large fields of view. We also obtain good results in patients who have metal implants from previous surgery."

"We use the high signal-to-noise ratio (SNR) provided by the 3.0T field strength and dStream for improving image quality and resolution in order to see more detail than was possible on 1.5T in a similar examination time. Therefore, since we have Ingenia 3.0T, we confidently moved all our spine MRI exams from 1.5T to Ingenia 3.0T."

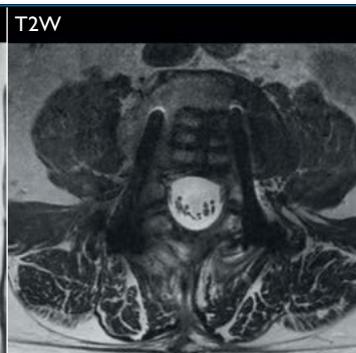
"We can also easily perform good quality diffusion weighted imaging (DWI) in the spine. We add that when we see suspicious lesions in the spine, in case of medullar compression or for patients with potential medullar infarctions. In the latter, axial DWI is used with good results although it is known that this is difficult in the neck and thoracic area due to motion of the nearby structures."

"We can acquire very beautiful MR angiography of the spine. We use the power of Ingenia 3.0T to make thinner slices or more slices in the same time, giving us better resolution."



Hernia patient with tiltable dS HeadNeckSpine coil

The patient was unable to extend the cervical spine. Therefore the posterior part of the dS HeadNeckSpine coil was tilted, resulting in excellent signal intensity at C1-C2 level on the sagittal T2W image even though these structures are several centimeters away from the tabletop. A hernia is seen at level C5-C6 and the high signal intensity of the hernia, the narrowing of the entrance of the left neuroforamen and the medullar compression on the left side with distortion of the grey matter inside the medulla can be appreciated on this transverse mFFE image.



Post-surgery MR with metal fixation of L3-L4

Metal screws can be seen in the pedicles of L3 and L4 and a metal cage is visible in the intervertebral space L3-L4 on the sagittal T2W image. Note that the roots inside the neuroforamina L3-L4 and L4-L5 are still visible despite the presence of metal screws. The screws and cage are also visible on the transverse T2W image and do not disturb the visualization of the dural sac. Although artifacts produced by the fixation material may be expected to be higher on 3.0T than on 1.5T, the metal artifacts are limited in this Ingenia 3.0T case.

Disclaimer: Metal implants are a contraindication for MRI, unless the MR compatibility for the implant is stated by the implant manufacturer. MR healthcare professionals are advised to contact the respective implant manufacturer in order to obtain the latest safety information to ensure patient safety relative to the use of an MR procedure.



Tuberculous spondylitis

Two-stage spinal T2W and T1W image with fat suppression in a patient with tuberculous spondylitis and involvement and collapse of vertebra Th11 and Th12. Note the homogeneous signal intensity throughout the images without any signal drop at the upper or lower end of the images and at the interface between the upper and lower image. Also notice that this could be achieved without the use of anterior saturation slabs and that the fat saturation remains perfect throughout the image. Enhancing subcutaneous soft tissues are seen at the level of the spondylitis.

“We use the high SNR provided by the 3.0T field strength and dStream for improving image quality and resolution in order to see more detail.”

Dr. Casselman is also performing spine angiography now, which was problematic on other systems. “We were never satisfied with the results,” he says. “But now with Ingenia 3.0T we can acquire very beautiful MR angiography of the spine. We use the power of 3.0T to make thinner slices or more slices in the same time, giving us better resolution. And together with fewer artifacts, that opens the door to excellent MR angiography.”

dStream coils streamline workflow

“In terms of workflow, Ingenia’s integrated Posterior coil provides a huge improvement,” says Dr. Casselman. “This coil is integrated in the table, so it’s always there for spine and abdomen. The techs love it, as they don’t have to change coils all the time, and the system automatically uses the right part of the coil. It makes life so much easier for them. We can now do all of our spine scans in high resolution using this integrated Posterior coil. We do not add the Anterior coils as the little extra signal does not outweigh the extra effort to put on these extra coils. For cervical spine, we just add the dS HeadNeckSpine coil.”

“The tiltable dS HeadNeckSpine coil is very helpful, especially for patients with thoracic kyphosis who cannot lie down flat. In elderly patients we see that regularly. This coil enables such patients to comfortably stay close to the coil. If routine non-tiltable coils are used, the coil stays down and when the neck goes up, farther away from the coil, this will cause a drop in SNR, resulting in longer sequences and exam times in order to recover some of the lost signal.”

High performance spine imaging becomes simple

SmartSelect automatically chooses which elements to use for highest signal intensity, which enhances workflow and benefits quality. “In the past, if the techs didn’t specify the proper coil elements, images became dark at the edge, or at the interface between the thoracic and lumbar spine segments due to too low signal,” says Dr. Casselman. “Now it’s automatic, which speeds up the examination, and that means our patients aren’t on the table for as long.”

“For us, Ingenia 3.0T is crucial,” concludes Dr. Casselman. “Our spine work can be done in the same way, but better or faster than we did at 1.5T. As in many institutions, spine constitutes 30% to 40% of the workload, and we could not afford to move that to a 3.0T system if the spine is not consistently good. And that is where Ingenia has really made a difference.” ■

“We get very homogeneous spine images with few artifacts.”