

High-Resolution Spine MRI with Advanced intelligent Clear-IQ Engine (AiCE) Deep Learning Reconstruction (DLR)

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Advanced intelligent Clear-IQ Engine (AiCE) is the world's first fully integrated Deep Learning-based Reconstruction (DLR) introduced by major MRI manufacturers. AiCE DLR is seamlessly integrated into the MR reconstruction pipeline to effectively remove noise from MR images, hence, improving Signal-to-Noise Ratio (SNR). Through the denoising process, image quality and SNR gain could assist clinicians in providing flexibility in scan parameters, improving resolution, and/or shortening scan times when used in combination with one of Canon's accelerated scanning features. In this case study, we demonstrate that AiCE in combination with parallel imaging and compressed sensing techniques such as SPEEDER, Exsper, and Compressed SPEEDER (CS) allows acquisition of high-resolution spine MRI in clinical relevant scan time, which in turn improves visualization of pathologies that otherwise might be difficult to detect.

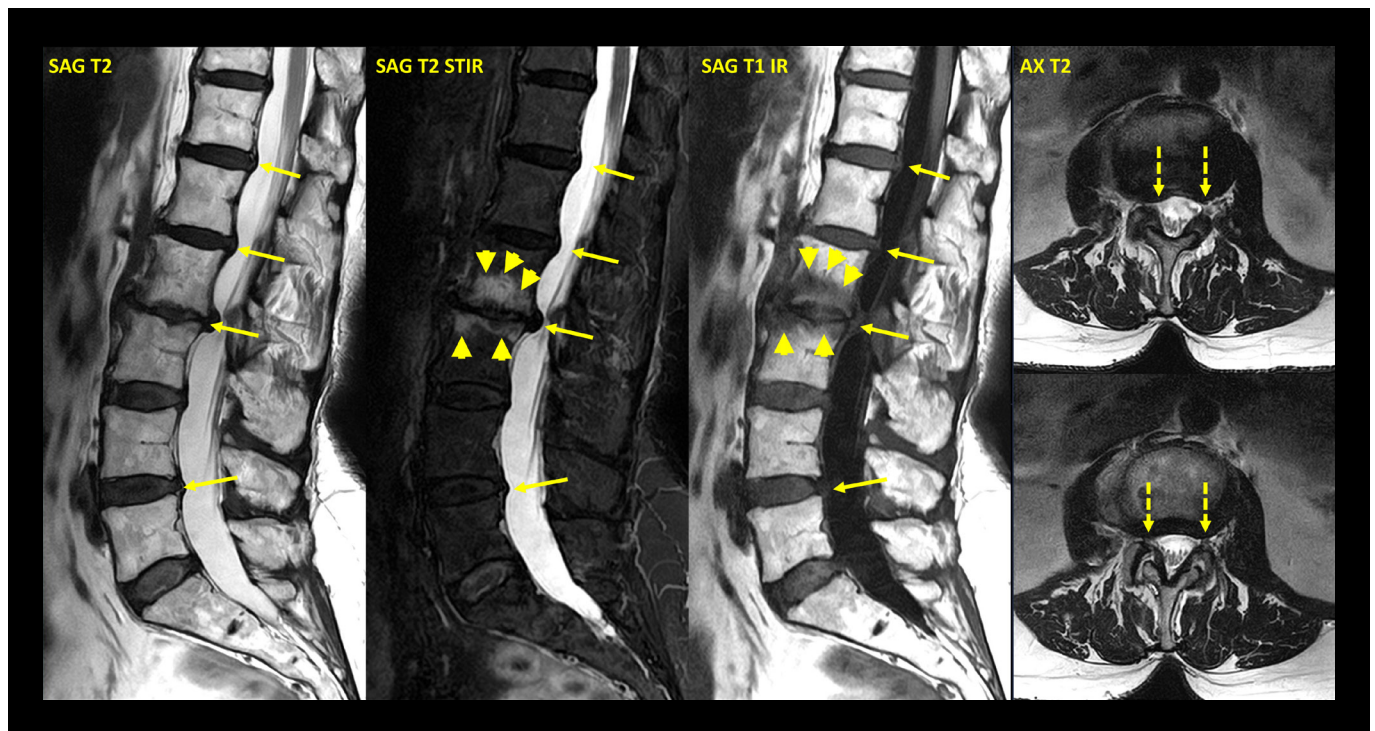


Figure 1: Lumbar spine imaging of a 79 y/o female patient with chronic lower back pain. Sagittal MR images demonstrate moderate multilevel degenerative disc disease (solid arrows). L2-3 level presents with the most extensive pathology (arrowheads). Axial T2 images through that level reveal foraminal stenosis and compression of the exiting L2 nerve roots (dashed arrows).

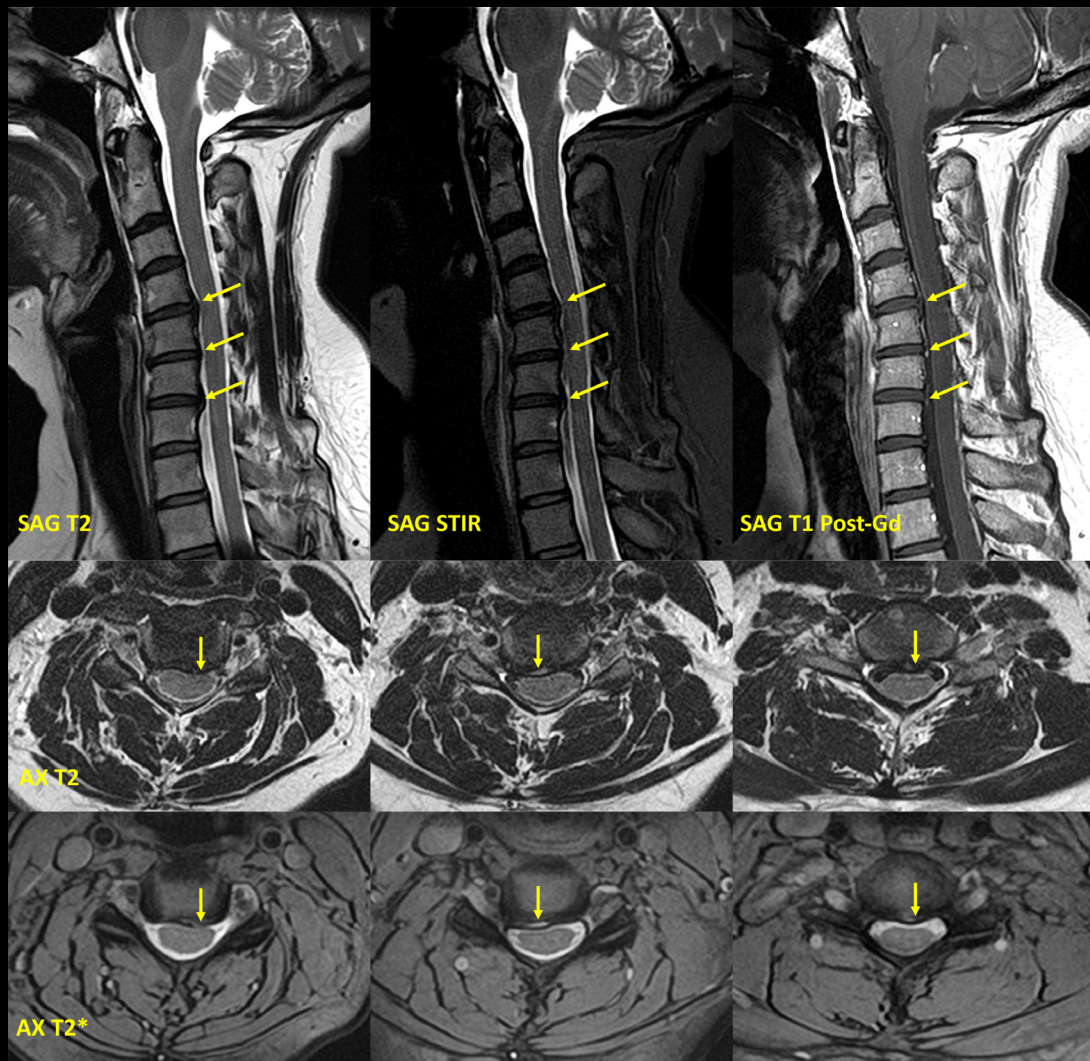


Figure 2: Cervical spine images from a patient with a history of multiple sclerosis. Sagittal and Axial images reveal mild to moderate spinal canal narrowing at the levels of C4-5, C5-6, and C6-7 (arrows).



Figure 3: Thoracic spine images in a patient presenting with severe intermittent thoracic pain. Sagittal and axial MR images reveal minimal degenerative changes of the thoracic spine with minimal disc bulges. There is no significant canal or foraminal stenosis present.

AiCE provides higher SNR compared to typical low pass filters

The clinical results, performance and views described in this paper are the experience of the author. Actual results and performance of Canon Medical's product may be different due to clinical setting, patient presentation and other factors.



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