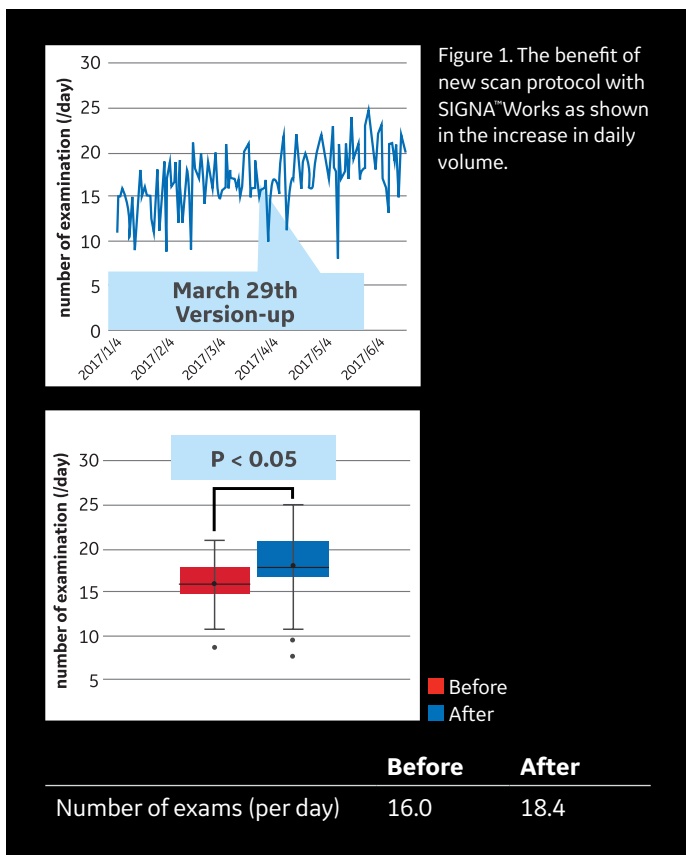


**Koji Uchida, RT**  
 PICTORU Izumo Imaging Center  
 Eda Clinic Orthopedics Surgery  
 and Rehabilitation in Japan

# A boost in productivity

SIGNA™Works helps imaging center increase both productivity by up to 15% and daily patient throughput

By Koji Uchida, RT, Assistant Director, PICTORU Izumo Imaging Center, Eda Clinic Orthopedics Surgery and Rehabilitation in Japan



At the end of March 2017, our SIGNA™ Pioneer 3.0T MR system at PICTORU Izumo Imaging Center was upgraded to the SIGNA™Works productivity platform. After upgrading, this platform has helped dramatically increase patient throughput without impacting image quality. We also have the option to increase spatial resolution and maintain prior scan times. As a result, we are receiving excellent feedback from radiologists, referring physicians, patients and C-level-suite administrators regarding the SIGNA™Works upgrade.

Prior to having SIGNA™Works on SIGNA Pioneer, we were scanning 16 patients each day on average. Figure 1 shows the number of patients before and after implementation.

With the addition of new sequences and techniques, such as HyperSense and HyperCube, we have increased patient throughput by 2.4 patients each day.

Before			After		
	Sequence	Scan time (min)	Sequence	scan time (min)	Advantage
	SSFSE 3P	0:06	SSFSE 3P	0:09	
1	DWI Axial	1:30	HB DWI Axial	0:45	50% scan time reduction by HyperBand
2	Head TOF-MRA	5:04	Head HS TOF-MRA	3:13	40% scan time reduction by HyperSense
3	FLAIR Axial	2:44	FLAIR Axial	2:44	
4	T2*w Axial	3:25	T2*w Axial	3:25	
5	T1w Axial	3:21	T1w Axial	3:21	
6	T2w Axial	2:30	T2w Axial	2:30	
7 (opt.)	Neck TOF-MRA	9:01	Neck HS TOF-MRA	4:51	45% scan time reduction by HyperSense
Total		27:40		20:58	

Figure 2. Routine head protocol before and after implementation of SIGNA™Works.

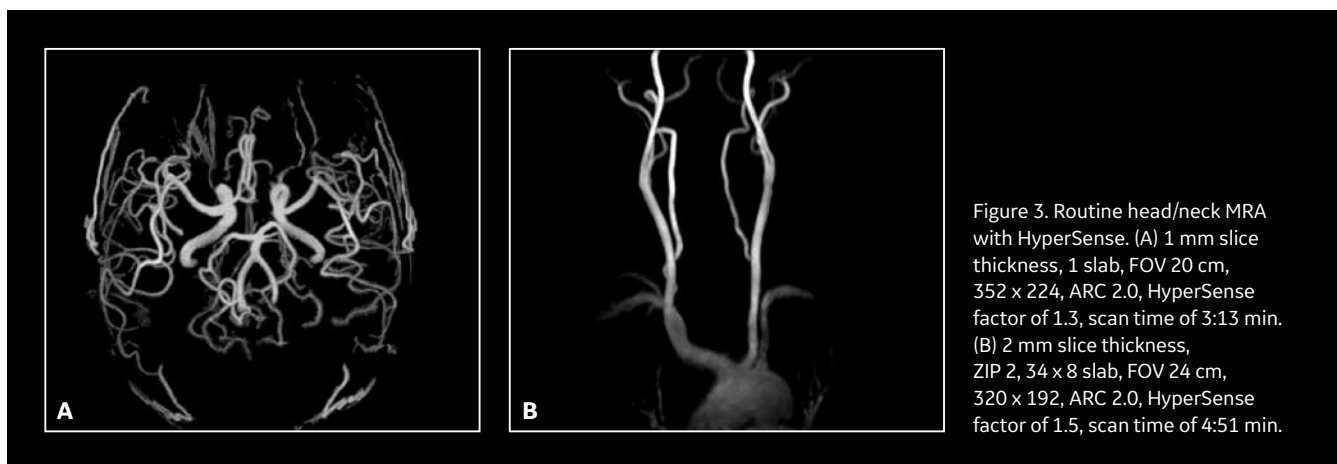


Figure 3. Routine head/neck MRA with HyperSense. (A) 1 mm slice thickness, 1 slab, FOV 20 cm, 352 x 224, ARC 2.0, HyperSense factor of 1.3, scan time of 3:13 min. (B) 2 mm slice thickness, ZIP 2, 34 x 8 slab, FOV 24 cm, 320 x 192, ARC 2.0, HyperSense factor of 1.5, scan time of 4:51 min.

### Neuro imaging

In a routine neuro exam, head and neck MR angiography (MRA) with HyperSense and head DWI with HyperBand have made significant contributions in reducing scan time.

As shown in Figure 2, the scan time for a neck MRA has been reduced by 4 minutes, from 9 minutes to 5 minutes, representing a 45% reduction in scan time. Further, HyperBand can be applied to diffusion sequences, such as diffusion-weighted imaging (DWI) and diffusion-tensor imaging (DTI), and we've seen up to a 50% scan time reduction. The result is now a head exam that can be completed in 20 minutes, including two MRA (head and neck) sequences. (Figure 2).

### Spine imaging

We are most impressed by SIGNA™Works' increase in image quality for spine exams. The signal-to-noise ratio (SNR) of spine imaging is enhanced without increasing scan time. This is primarily due to SIGNA Pioneer's Digital Surround Technology (DST) which is compatible with ARC, a parallel imaging method.

Coronal STIR PROPELLER gives us good fat-suppressed images and MR myelography, which is robust even in the presence of patient movement. Patients in severe pain may often inadvertently move, degrading image quality. Now, for these patients, we apply PROPELLER at the beginning of the examination. Prior to the

SIGNA™Works upgrade, an Axial T2 acquisition covering only the intervertebral foramen would take more than 4 minutes. Now, we can achieve wider coverage with an Axial T2 of the spine in thin slices using HyperCube with HyperSense in a scan time that is less than 4 minutes.

Cube is suitable for imaging lateral cervical disk herniation and hyperostosis of Luschka's joints because we can apply thin slices compared to a 2D sequence. Flow void often occurs on 2D FSE and impacts the clinician's diagnosis. However, it does not occur on Cube because of the optimized flow compensation technique. For lumbar spine imaging

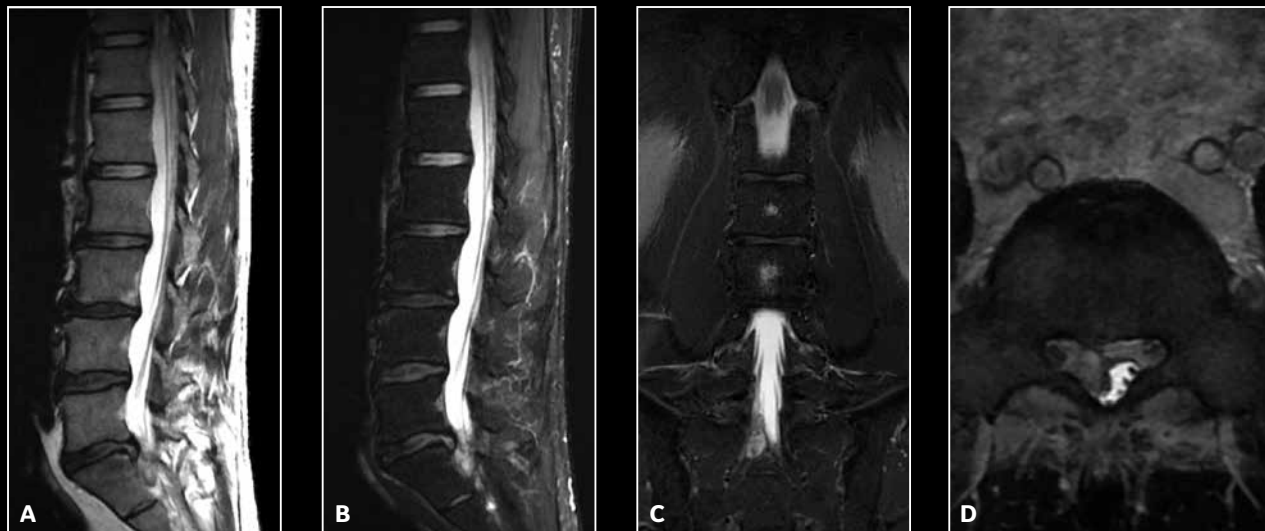


Figure 4. Routine spine examination. (A) T2w Flex of the spine; (B) DST with ARC; (C) PROPELLER STIR; (D) T2w HyperCube with HyperSense.



Figure 5. 3D MRCP with HyperSense. 1.2 mm slice thickness, 384 x 260, ARC 2.0, HyperSense factor of 2.0, scan time of 3:27 min.

Cube is effective for scanning the entire vertebrae and herniated disc, which is difficult to perform when using a 2D sequence. Total scan time reduction for routine spine imaging is 21%.

### Abdomen imaging

3D MRCP with HyperSense delivers high image quality with 1.2 mm slice thickness and a 384 x 260 matrix in a shorter scan time for routine imaging. Before the upgrade to SIGNA™Works, a thin slice 3D MRCP sequence would take approximately 7 minutes to acquire. Now 3D MRCP with HyperSense takes less than 3.5 minutes, so we have built it into our routine abdomen protocols (Figure 5).

### Orthopedic imaging

In some clinical scenarios, our clinicians request additional sequences that tap into the exceptional image quality that SIGNA Pioneer with SIGNA™Works together deliver. An example is in our routine knee exam. We've added Sagittal PD-weighted scans with HyperCube and HyperSense because it provides high-quality meniscal and cartilage images and excellent reformat images. These reformatted images contribute detailed image data to assist our clinicians in their diagnosis and identification of anteromedial/posterolateral bundle on the anterior cruciate ligament. This valuable

information is obtained in a scan time of only 3 minutes.

### Summary

SIGNA™Works can make a significant impact on routine examinations. From technologists to radiologists to referring clinicians, we all strongly believe in the clinical benefits of SIGNA™Works, especially with HyperSense and HyperCube. By implementing this productivity platform in our facility, we have increased patient throughput as well as enhanced image quality. **S**