First Impression and Experience on the MAGNETOM Sola – New Zealand

Sandra Winsor, MMRT, DCR(R)

Pacific Radiology, Nelson, New Zealand

The first MAGNETOM Sola 1.5T with BioMatrix technology to be installed in New Zealand (NZ), arrived at Pacific Radiology Nelson in December 2018.

Pacific Radiology provides MRI services to the Nelson and Tasman region covering a geographical area of 10,000 km^2 and a population of 104,000.

Located at the top of the South Island, Nelson is renowned for having the most sunshine hours per year across NZ, and is home to many who enjoy an outdoors lifestyle. The favorite pastime of Nelsonians is mountain biking, hence the MAGNETOM Sola is kept busy by those unfortunate enough to suffer a 'mountain bike' injury. Consequently, the primary workload is musculoskeletal, but has a portion of neuro, abdominal, pelvic, and vascular cases to create variety over the course of our daily schedule.

The configuration of the Nelson MAGNETOM Sola features the 70 cm bore and the large 50 cm FOV in the z-direction. The 48-channel system was selected to ensure availability of high density 20-channel head neck, body 18 and spine 32 coils. XJ gradients with an amplitude 33 mT and a slew rate 125 T/m/s ensures adequate performance for the needs of private practice imaging.

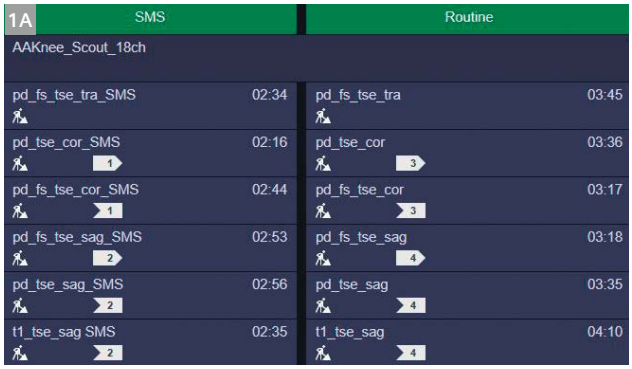
Additional options purchased include the 18-channel Large UltraFlex Coil and Simultaneous Multi Slice (SMS) TSE.

First impression

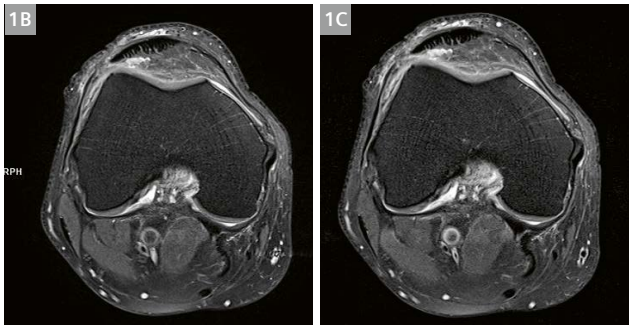
The MAGNETOM Sola presents itself in a gorgeous, smoothly curvaceous, glossy white finish, declaring a myriad of new design features waiting to be discovered.

The iPad like touch screen BioMatrix Interfaces on each side of the scanner, allow one touch positioning without the need for laser light localization. This is a great feature for improving turn around times between patients. Simpler controls on the BioMatrix Interface allow easy volume, lighting and air adjustments, which are replicated at a handy location within the new *syngo* XA11 software environment.

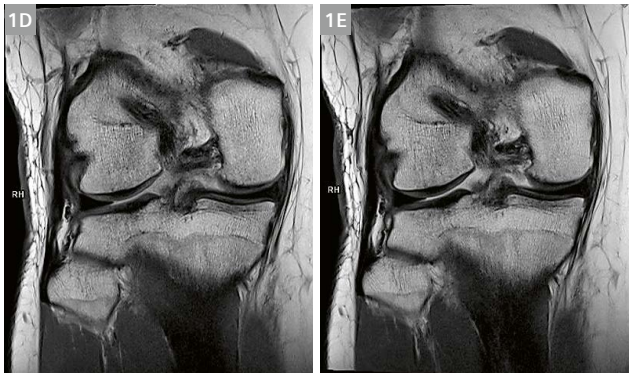
In the control room it is exciting to see the much longed for, large screen monitor which houses the new *syngo* XA11 software. The new interface has a completely fresh appearance, and while it initially presents as an unknown, it exudes a familiarity to beckon you in. Once



1A Comparison of SMS vs. routine sequences while maintaining the same image quality.



1B, C Transverse PD fat sat:
SMS **(1B)** 2.34 minutes vs. Routine **(1C)** 3.45 minutes vs.



1D, E Coronal PD:
SMS **(1D)** 2.16 minutes vs. Routine **(1E)** 3.36 minutes vs.

introduced to some of the new features of *syngo* XA11, you find yourself automatically reverting to some old traits, which have reassuringly been ported across to the new interface. Functions such as series +/- and image +/- on the keyboard remain the same.

There are three components to the latest software, Exam, View&Go, and the Dot Cockpit. Users of previous versions of *syngo* will most likely have come across the Dot Cockpit before now. Much has stayed the same in the Cockpit, although a practical new feature is the 'replace sequence' option. Depending on where a new sequence is dragged and released into a protocol, there is the option to replace an existing obsolete sequence, or add it to the protocol.

View&Go is quite a different kettle of fish compared to the Viewing and Post Processing tabs in the VE software. Those who have had *syngo*.via experience will find it an easy transition to master View&Go.

This leaves the Exam and Browser interface to be conquered. Again, previous experience with *syngo*.via assists in the transition, and over time and experimentation, some superb new elements emerge.

A redesigned intercom guarantees quality com-mu-nication with the patient, where a new feature allows you to hear patient responses before releasing the speak button. Previously patient responses were missed if the speak button was not released quickly enough.

The official handover of the system was the beginning of January 2019, where the brief was to develop standard protocols with the best image quality in a reasonable time frame. As the radiologists were familiar with images from another vendors system, it was important that they were comfortable with the look of the new Siemens images. Now that this has been established, the next step is to embark on acceleration techniques, starting with SMS in the knee. Small steps lead to robust protocols and to date we have made significant time changes in the knee protocol with SMS (Fig. 1).

While the scan times of these SMS protocols are not ground breaking, it is important to observe the possibilities of acceleration between a routine sequence and SMS. When six minutes or more can be shaved from a single study, the possibility of scanning one extra patient per day is feasible.

As we further explore this technique, more time savings in the knee protocol are envisaged.

For the current ankle protocol, it is anticipated that eight minutes will be shaved form the standard protocol. What is really exciting, is that there is the potential to achieve scan times on the 1.5T MAGNETOM Sola, that are more in line with 3T systems.

Radiologists impressions

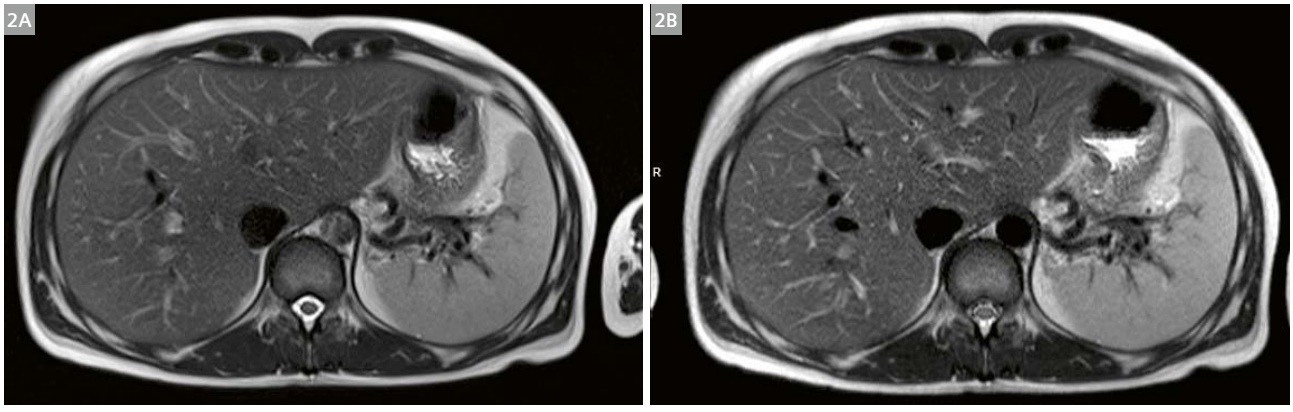
The radiologists are equally impressed with the MAGNETOM Sola, and are observing improved image quality. SMS is seeing a lot of excitement, as time savings will translate to higher throughput.

Indeed, there are a multitude of new attributes on the Sola that are exciting and begging to be explored, so in summary, here is a selection of favorites so far from Nelson.

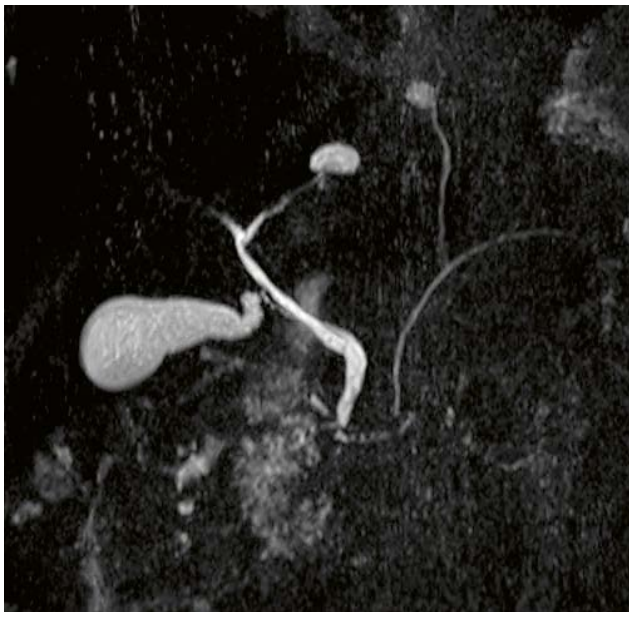
Favorite feature

Start Timer

The Start Timer is a clear winner, as the system is programmed to switch on at 7.45 am Monday to Friday. This means that when walking through the door just prior to 8.00 am, the large screen monitor presents with a big green tick indicating the system is up and running and ready to go. At a glance, the green tick reassures that the helium and cooling are in specification, leaving a quick QA on a coil of choice to complete the morning QA process. Auto positioning is not new, but has been enhanced to a superior version where the Select&GO at the BioMatrix Interface, allows selecting the body region to be scanned,



2 Transverse HASTE breath-hold **(2A)** BioMatrix triggered **(2B)**, with the advantage of slices being consistently ordered from the dome of the liver to the apex with the triggering technique.



3 CAIPI SPACE 3D MRCP acquired in 20 s breath-hold.

and the patient is transported to isocenter. No longer does a specific protocol with associated body region need to be in the Exam Queue ready to go.

Favorite acceleration technique

SMS TSE or CAIPIRINHA SPACE
SMS TSE is the most exciting new acceleration technique to emerge, as it can be used in so many MSK protocols. Entire protocols can be adapted to reach scan times previously seen only at 3T, while maintaining beautiful image quality (Fig. 1A–E).

CAIPIRINHA SPACE provides some incredible examples with great time savings, for example whole brain 3D T1 SPACE can be achieved in 2.30 mins. As 3D SPACE is not a work horse sequence, SMS takes the number one spot.

Favorite hardware

Large monitor vs. BioMatrix Sensors
The large monitor is a sight for sore eyes and really transports the whole system into a modern era. Double mouse clicks enlarge images from the GSP for easier planning, and right mouse push/pull scrolls through images quickly.
Keyboard shortcuts are plentiful and crucial to swift navigation of tools and commands. To name a few:

Control G: Couples or uncouples graphics
H: Turns reference lines on/off
Esc: Deselects any tool selected
O: Allows images to be rotated in postprocessing
P: Activates the punch tool in 3D MIP

BioMatrix Sensors for respiratory navigation, what a revolution. The respiratory cycle and breathing pattern can be seen throughout any examination, and abdominal sequence strategies can be planned ahead at a glance. Respiratory triggered sequences are quickly and easily set up with robust results (Fig. 2).

First equal placing for these two in the hardware category.

Favorite coil

Tiltable head coil vs. Ultra Flex Large 18
How uncomfortable is it for a kyphotic patient to endure a brain MRI? The patient ends up with pillows under their buttocks to tip them back so that they fit into a standard head coil, but still the head can be teetering in the breeze and the anterior coil does not fit. Now we have a fabulous solution, the head coil can be tilted 9°–18°, the anterior coil fits and the patient is comfortable for the duration of the scan.

The Ultra Flex Large 18 has so many areas of application, shoulders, elbows, brachial plexus, prostate, but the favorite area is single hip imaging. The coil is more flexible, slimmer and has more coil elements than any predecessor.
It reaches across the hip anteriorly and posteriorly in most patients and the image quality is noticeably improved.

Tiltable head coil is the favorite in this category.

Favorite sequence

The champion of sequences on the *syngo* XA11 software is CAIPI SPACE MRCP 3D.

3D MRCP SPACE sequences can be a laborious sequence where scan times varied from around 4 minutes to an incredible 8 minutes in a certain type of patient. Often after the long wait, the outcome was less than agreeable and single breath-hold sequences were required at different degrees of angulation.

The CAIPI SPACE MRCP 3D is a revolution as it is acquired in a 20 second breath-hold with a resolution of 0.6 x 0.6 x 1.1 mm covering the entire biliary tree (Fig. 3).

The DICOM files are available for download at

www.siemens.com/magnetom-world
> Clinical Corner > Protocols > DICOM Images

Contact

Sandra Winsor MMRT, DCR(R)
Charge MRI Technologist
Pacific Radiology
Nelson
New Zealand
sandra.winsor@pacificradiology.com