Canon


# Vantage Galan 3T

Quiet Intelligence


Vantage Galan 3T
Canon
Patient Name

# Delivering quiet intelligence and reimagined workflow to the MRI Suite

Vantage Galan 3T delivers reimagined workflow with quiet and intelligent imaging technology to optimize the MRI experience for patients and staff.
With new workflow solutions, many processes are now automated to help you move seamlessly through your day. And powered by Altivity, sharp, de-noised images are combined with a range of accelerated scanning techniques to produce enhanced diagnostic capability. Delivering intelligent MR performance every day,
Vantage Galan 3T is truly a quiet achiever.

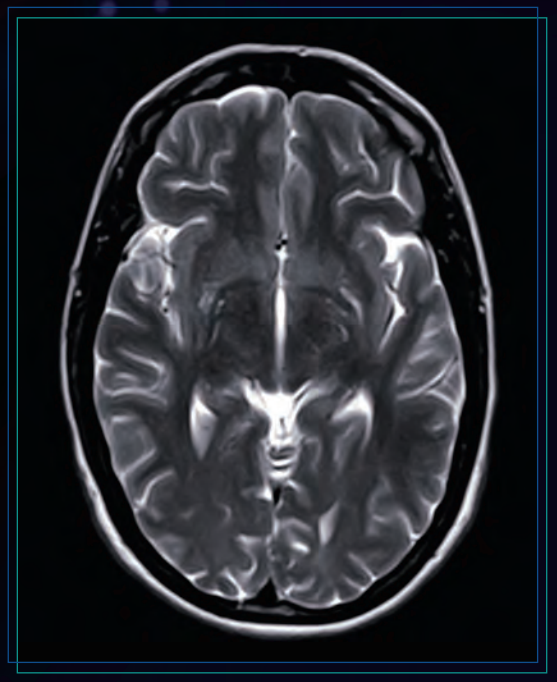
**Vantage Galan 3T**

# Precise IQ Engine (PIQE)

Precise IQ Engine (PIQE) is Canon Medical's high resolution Deep Learning Reconstruction for MRI. PIQE increases matrix size, removes noise, and delivers sharp anatomical images to take MR imaging to the next level.

## Deep Learning Reconstruction for MR PIQE

**Low Resolution Data**

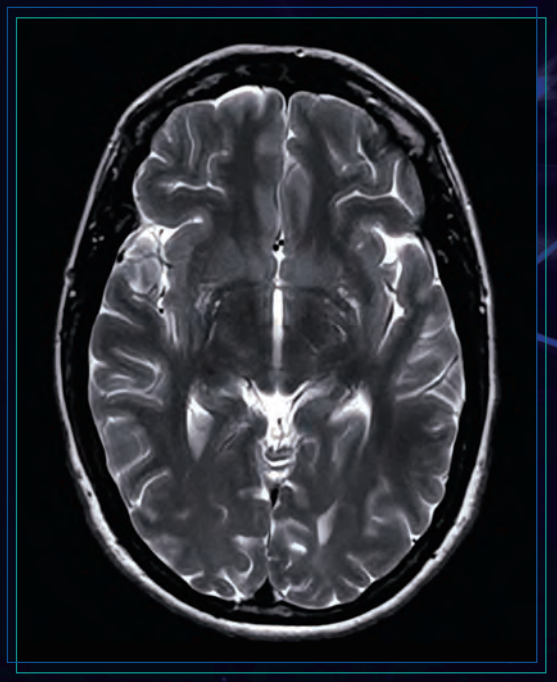


Deep Learning Reconstruction

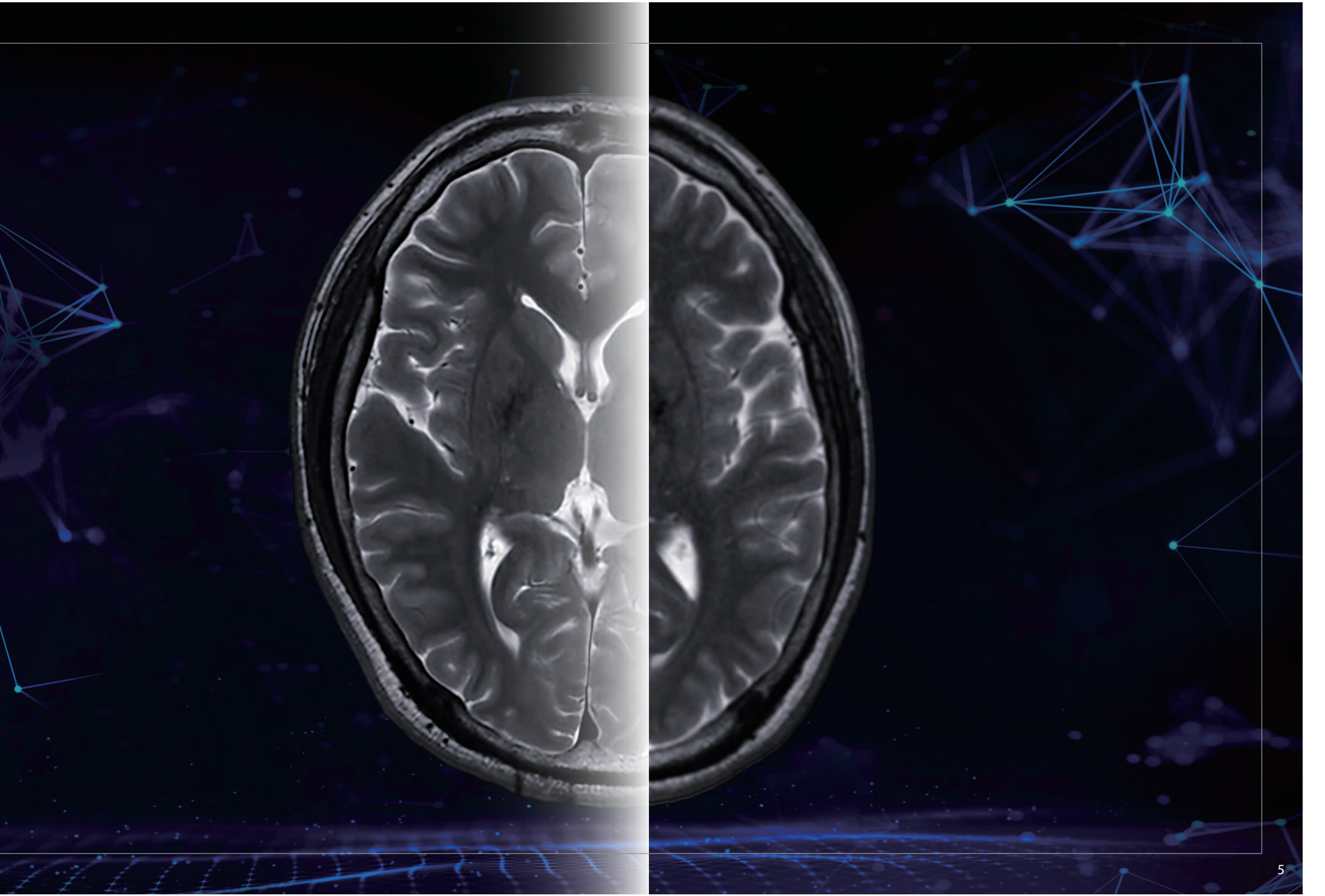
***Denoising***
***k-Space Upsampling***
***Ringing Reduction***

Deep Learning Reconstruction

**High Resolution Data**



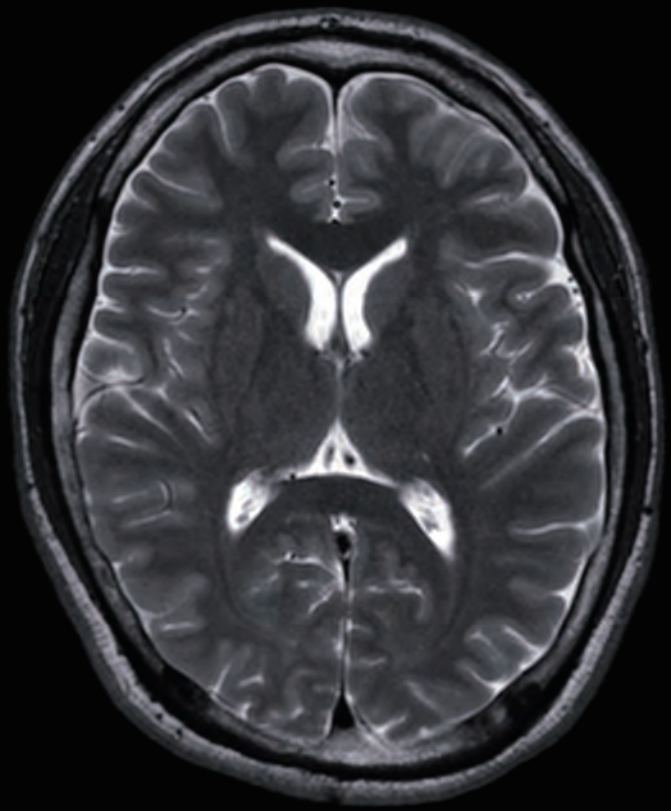
*PIQE is 510(k) Cleared for Brain and Knee regions.



# Deep Learning technology delivers clear, sharp and distinct images

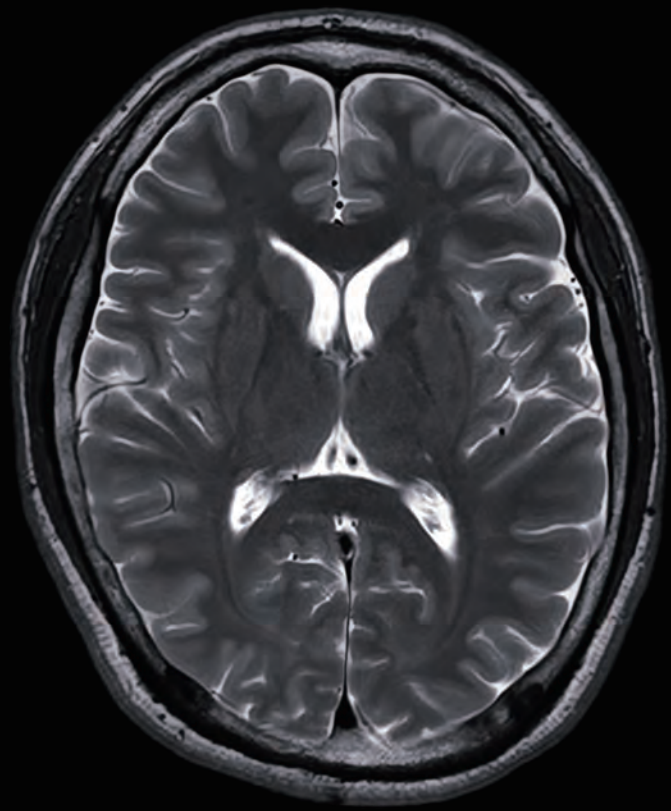
Acquiring high-resolution images traditionally required long scan time. However with PIQE, high-resolution images are obtained with the same scan time as conventional scans.

**Original**



matrix size 320×320

***PIQE*** **3×3**



matrix size 960×960

Axial T2w, 0.7×0.7 mm resolution, 4 mm, 1:18*

*Actual scan times may vary

*Volunteer*

**Original**

matrix size 256×256

***PIQE*** **3×3**

matrix size 768×768

Sagittal PDw WFS, 0.58×0.58 mm resolution, 2.5 mm, 3:23*

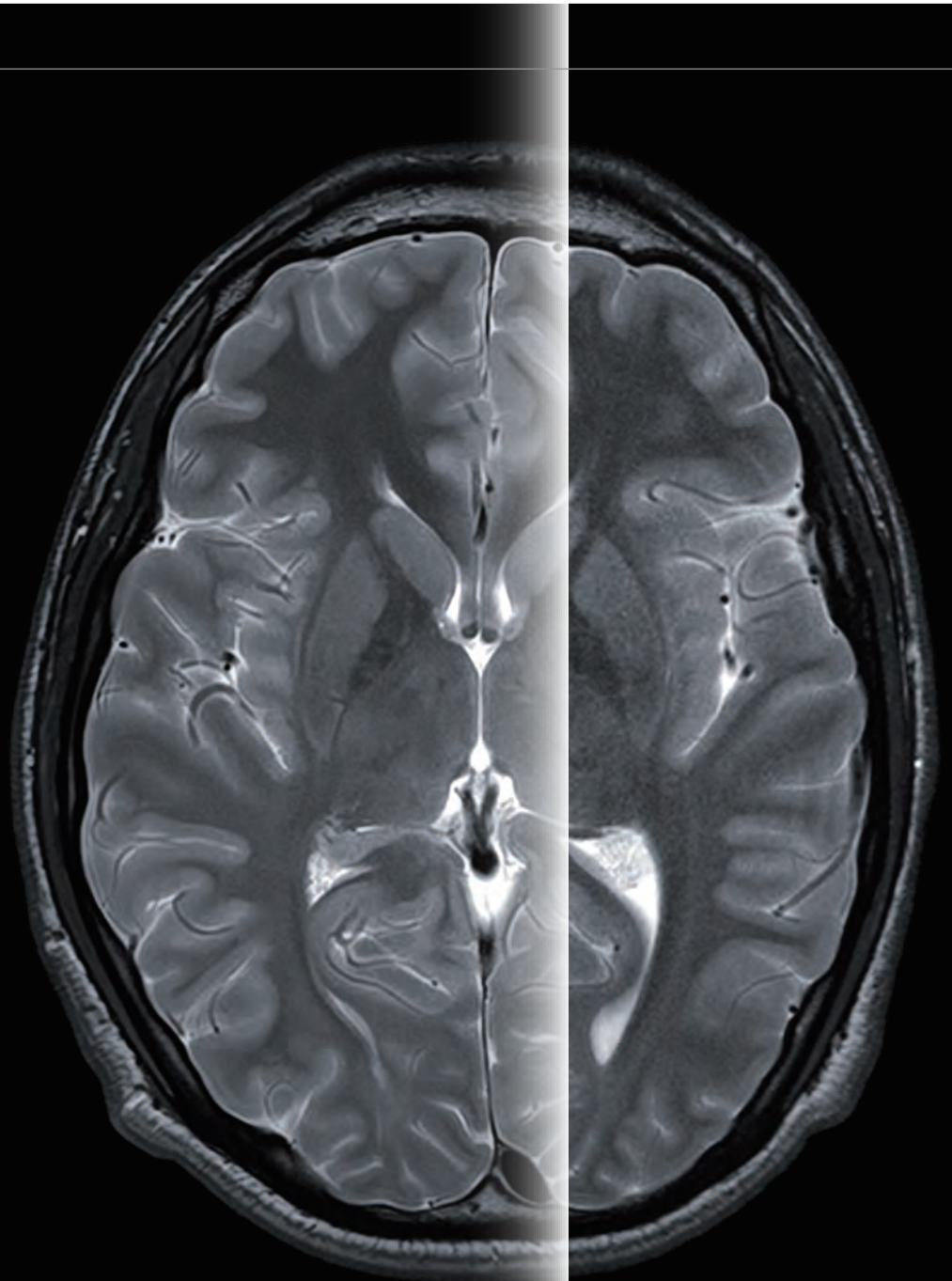
*Actual scan times may vary

*Volunteer*

Achieving quick and high SNR images is now possible with Canon's intelligent new technologies

AiCE Integrated Intelligence

Compressed SPEEDER

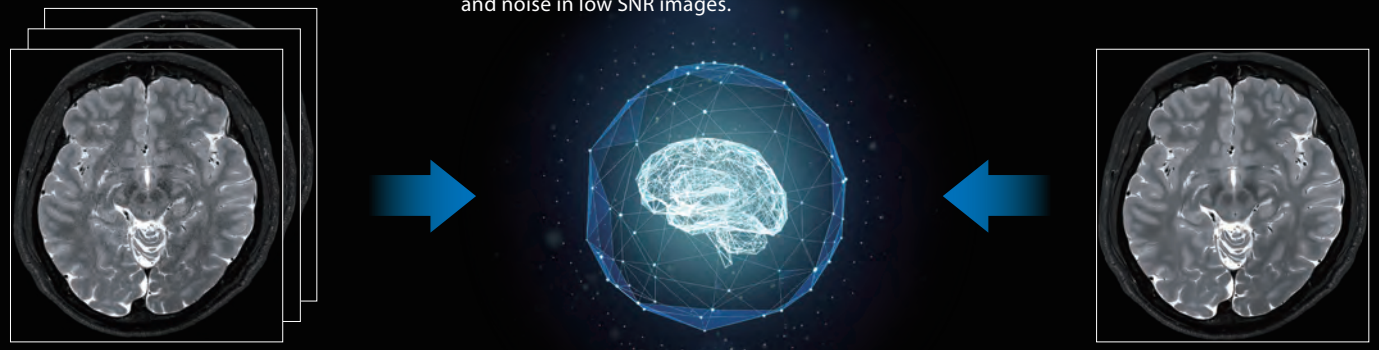


# See through the noise. This is intelligence.

Advanced intelligent Clear-IQ Engine (AiCE) is the world's first fully integrated Deep Learning Reconstruction technology for MRI, producing stunning MR images that are exceptionally detailed. Harnessing the enormous computational power of a Deep Convolutional Neural Network (DCNN), AiCE is trained to increase low SNR[1] MR data to match the properties of high SNR images.

## Training Phase in factory

Using high SNR images, Advanced intelligent Clear-IQ Engine (AiCE) learns to differentiate between signal and noise in low SNR images.



Low SNR | Deep Learning | High SNR

## Operational Phase

Using the intelligence from the Training Phase, AiCE removes noise from images which results in higher SNR.

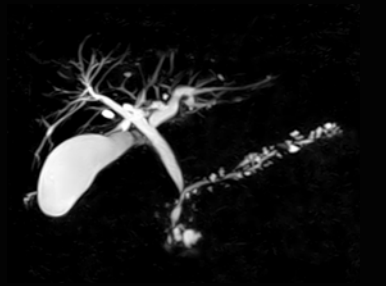
Data Acquisition | Deep Convolutional Neural Network | High SNR

[1]*AiCE provides higher SNR compared to typical low pass filters*

## Conventional

3:04
T2w, 1.3×0.8 mm resolution, 2 mm, MIP

SPEEDER + AiCE



0:28
T2w, 1.3×0.8 mm resolution, 3 mm, SPEEDER ×2.5, MIP

*Courtesy of Fujita Health University Hospital, Japan*

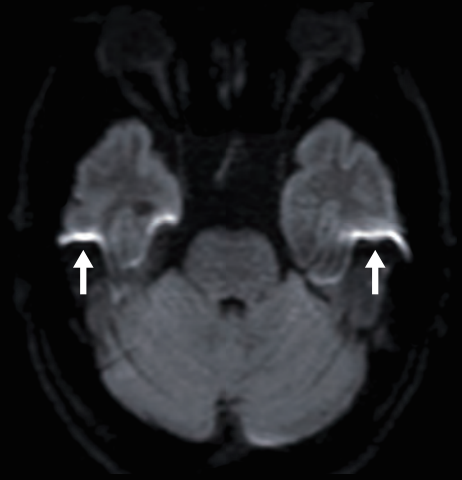
# Improving imaging robustness to enhance diagnostic capability

Many scan and patient situations present challenges with motion artifacts and distortion. With clever approaches to these issues, distortion and motion correction technology delivers diagnostically relevant images to help you avoid re-scans.

## RDC DWI

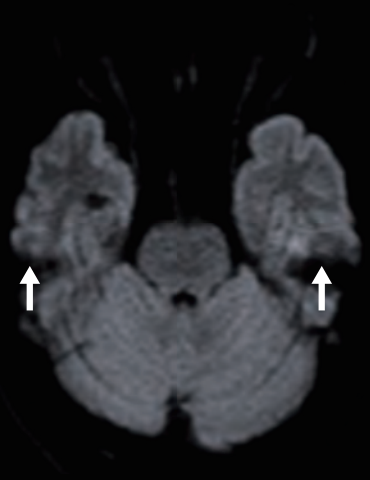
RDC DWI (Reverse encoding Distortion Correction DWI) is intended to reduce distortion in phase encoding direction due to B0 field inhomogeneity or eddy current, in DWI sequence.

**Conventional**



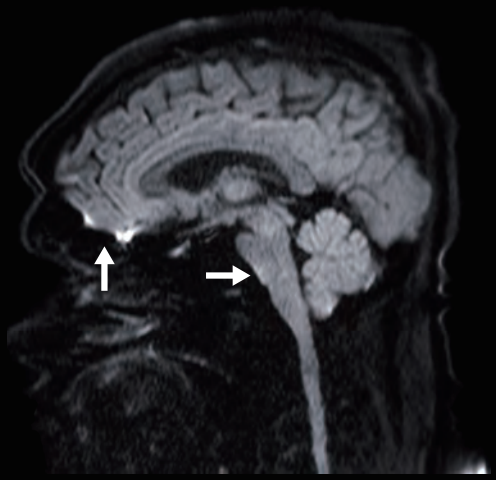
Axial DWI / b1000,
1.1×1.1 mm resolution, 3 mm

**RDC DWI**



Axial DWI / b1000,
1.1×1.1 mm resolution, 4 mm

**Conventional**



Sagittal DWI / b1000,
1.0×1.0 mm resolution, 4 mm

**RDC DWI**

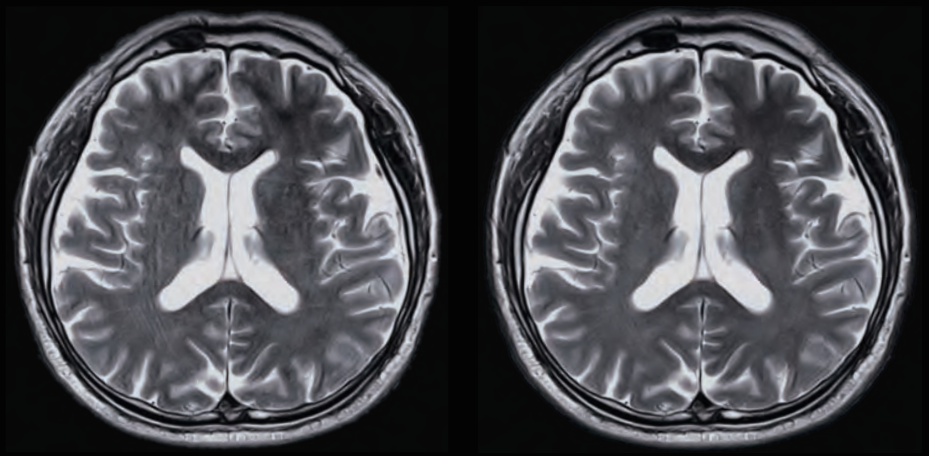
Sagittal DWI / b1000,
1.0×1.0 mm resolution, 4 mm

*Volunteer*

# Iterative Motion Correction (IMC)

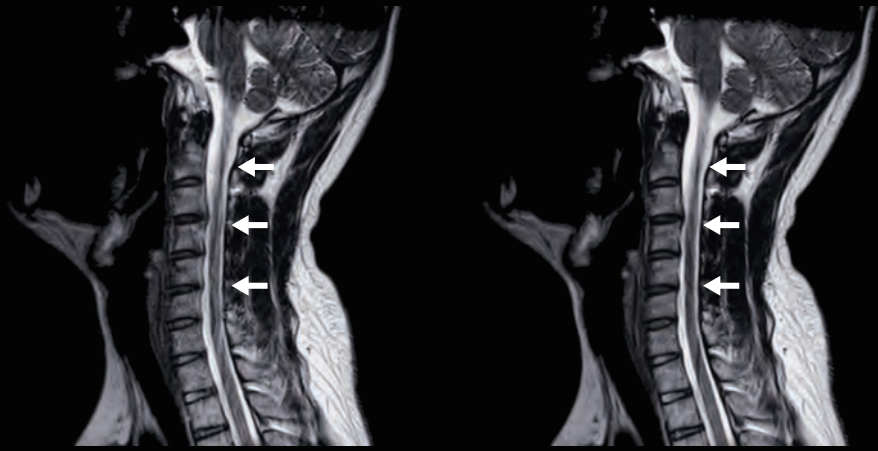
IMC is a motion correction technology for reducing motion artifacts caused by sporadic movements. Powered by Altivity, IMC utilizes Deep Learning based methods for motion correction in addition to traditional model-based correction.

**Conventional** **IMC**



Axial T2w, 0.56×0.56 mm resolution, 4 mm, 1:44*

**Conventional** **IMC**



Sagittal T2w, 0.78×0.78 mm resolution, 3 mm, 2:38*

*Actual scan times may vary

*Volunteer*

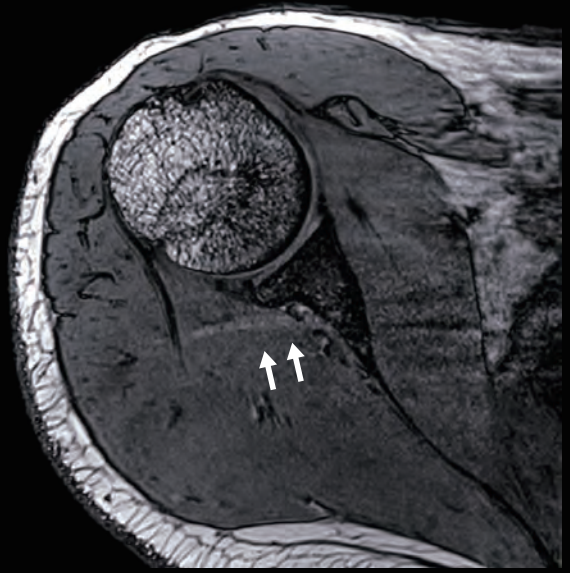
# Accelerated scan techniques to reduce procedure time and increase efficiency

Accelerated imaging techniques to reduce scan time benefit the patient and staff alike. Techniques like Exsper provide a robust approach to parallel imaging and Accelerated UTE which enables ultrashort imaging for new applications like lung and bone.

## Accelerate scans with unique Exsper parallel imaging

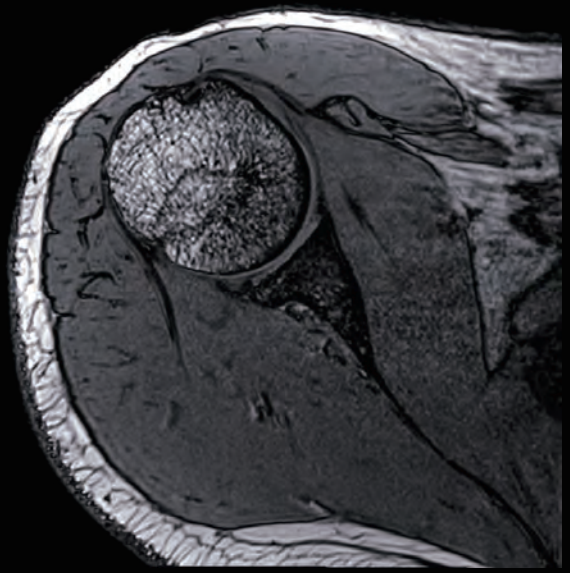
Exsper is a unique parallel imaging scan acceleration technique enabling reduced scan time for a broad range of sequences. Robust imaging capability is expanded to increase scan resolution, while reducing the chance for aliasing artifacts (white arrow).

**SPEEDER 2×1**



Axial 3D T2*w, 0.48×0.48 mm resolution, 1 mm, 2:44*

**Exsper 2×1**



Axial 3D T2*w, 0.48×0.48 mm resolution, 1 mm, 2:34*

Small FOV 150 mm

*Actual scan times may vary

*Volunteer*

# UTE multi-echo

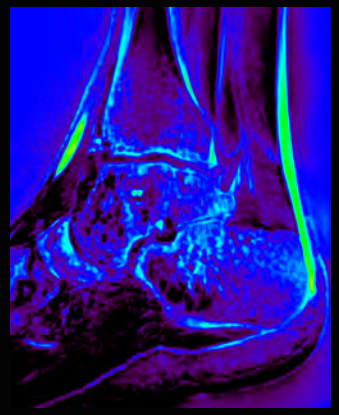
UTE multi-echo utilizes a unique sampling pattern which enables the ability to acquire a very short TE in one scan, with the benefit of obtaining signals with short T2* values. Multiple data with different short TE values are also expected to see the variance in short T2* range or to create T2* mapping of tissues.

MPR Axial

Coronal FFE3D, 1.0×1.0 mm resolution, 1 mm,
1st Echo TE 0.096 ms, 10:57*

UTE acquisition

TE acquisition



Subtraction

Sagittal FFE3D, 0.64×0.64 mm resolution, 1 mm,
1st Echo TE 0.096 ms, 5:59*

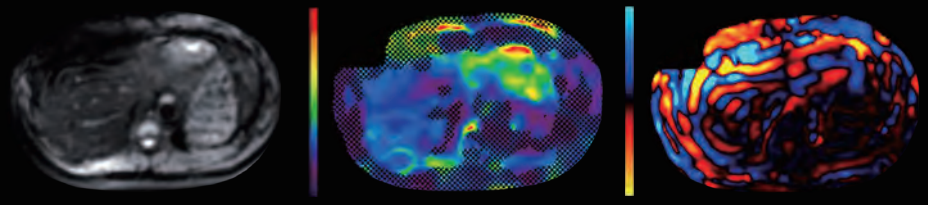
*Actual scan times may vary

# Quantitative imaging to enhance diagnostic capability

Quantitative imaging techniques provide a wide range of options for referring physicians and staff. New techniques like MR Elastography and Fat Fraction Quantification (FFQ) for liver staging and quantification, and contrast free Arterial Spin Labeling increase the imaging tools available for imaging various disease sets that were previously handled in other imaging modalities.

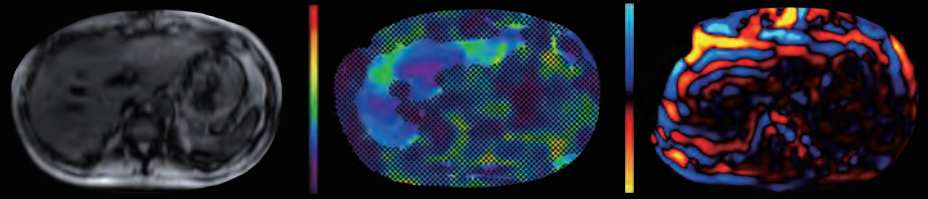
## MR Elastography (MRE)

The role of MRE has been increasingly recognized in multidisciplinary clinical guidelines for noninvasive liver fibrosis assessment, particularly in suspected cases of non-alcoholic fatty liver disease (NAFLD).



Magnitude image | Stiffness map | Wave images

SE-EPI scan time 0:11*



Magnitude image | Stiffness map | Wave images

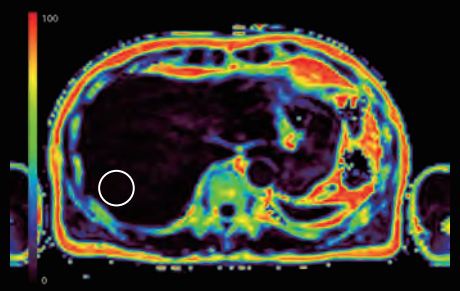
FE2D scan time 0:13×4 slices

*Actual scan times may vary

## Non-invasive fat imaging and quantification

Imaging is rapidly becoming the standard for fat quantification. Canon's fat imaging and quantification can simultaneously, in a single breath held exam, provide quantitative maps of the liver to measure proton density fat fraction (PDFF) and R2*.

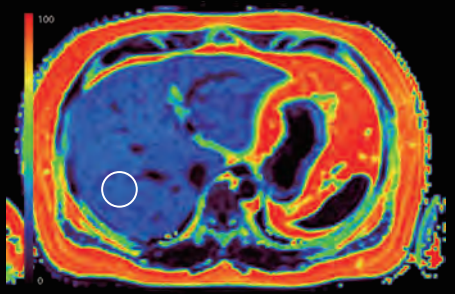
**Normal**




Fat Fraction 1.4 %

Axial FE3D, 2.7×2.8 mm resolution, 6 mm, 0:19*

**Obesity**




Fat Fraction 26.6 %

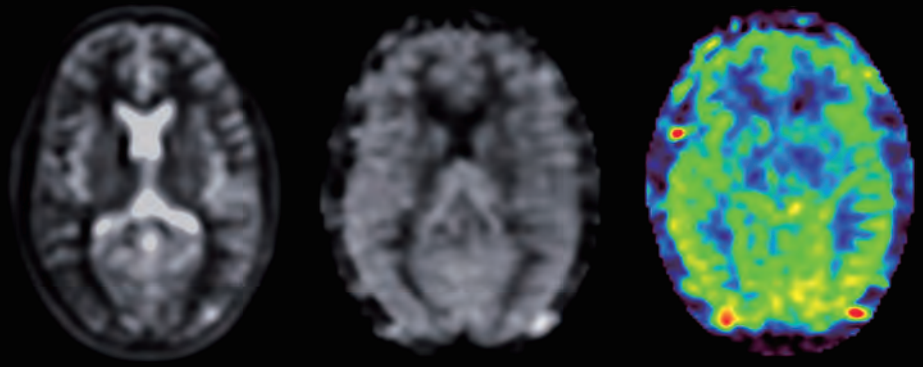
Axial FE3D, 3.1×3.1 mm resolution, 6 mm, 0:21*

# pseudo-Continuous Arterial Spin Labeling (pCASL)

Arterial Spin Labeling (ASL) MRI provides non-invasive methods to measure tissue perfusion without the use of external contrast agents. pCASL utilizes a fast spin echo (FSE) readout which makes it less sensitive to susceptibility artifacts and provides better image quality than other solutions.

## Volunteer images

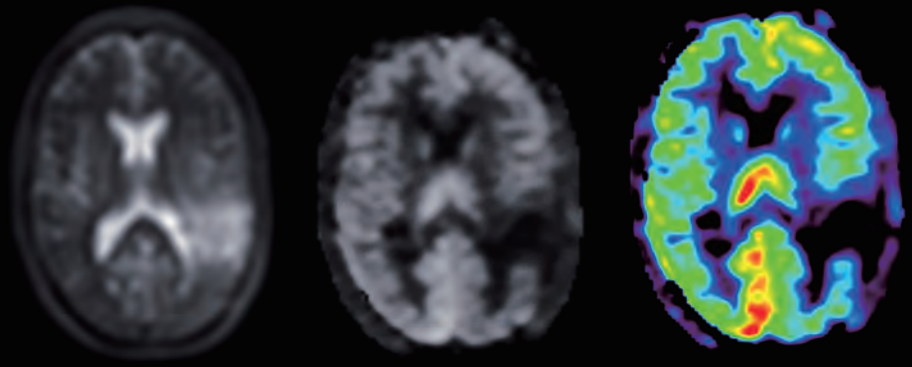
Label image | Perfusion weighted | Cerebral Blood Flow



Axial pCASL, 2.0×2.0 mm resolution, 6 mm, TI 1800 ms, 4:33*

## Post surgery follow-up of a patient with a left parietal glioblastoma

Label image | Perfusion weighted | Cerebral Blood Flow



Axial pCASL, 2.0×2.0 mm resolution, 6 mm, TI 2000 ms, 4:47*

*Actual scan times may vary

*Courtesy of GHU Sainte Anne, Paris, France*

# Canon Advanced Workflow Solutions

## Wherever, Whenever, Whoever

Powered by Altivity, Canon automated workflow solutions simplify the flow of MR procedures from when the patient first arrives through to the final reports. Assure IQ consistency across different patients and operators with procedures that are simplified by anyone.

***Let's move!***

Move to scan room after check-in


Exam prep via Tablet UX

*Tablet should not enter the scan room

Auto Position with Ceiling Camera, the scan starts when door closes


The AI technology was trained during the development phase. When implemented into the product, the AI function no longer self-learns.

## Automate procedures from start to finish

All done


Start preparing the next patient…



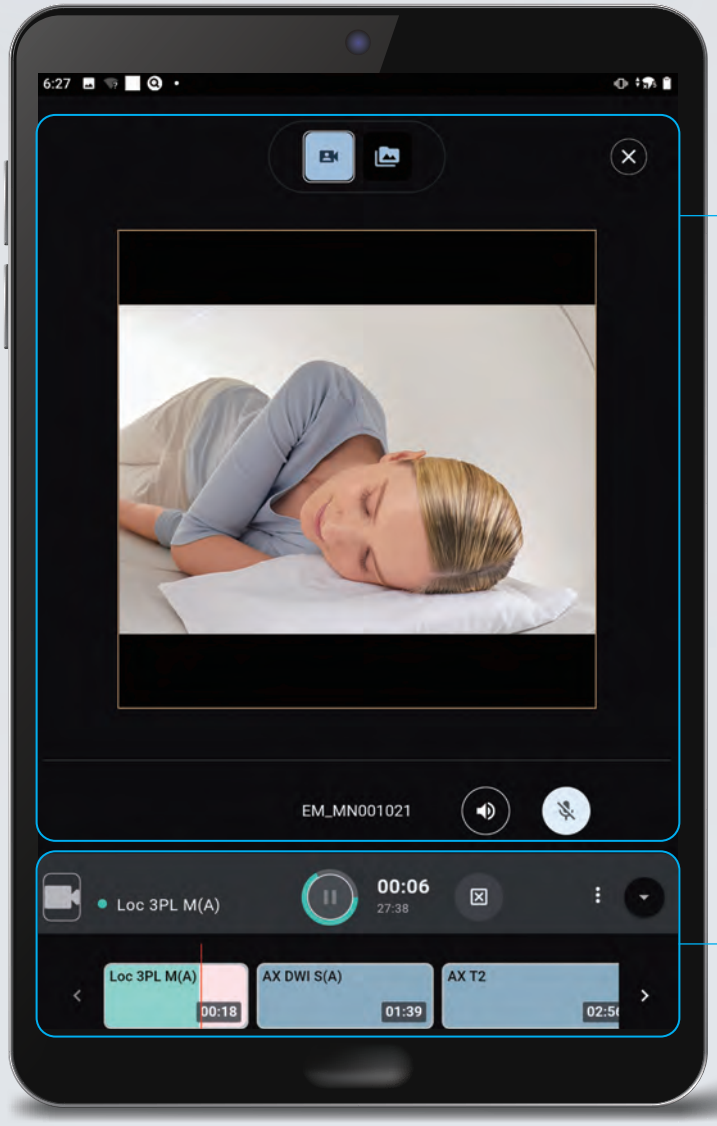

…while keeping an eye on the ongoing exam

# Tablet UX enables safe and efficient MR exams for patients, operators, and facilities


## Guided Worklist:

Quickly and easily set-up the patient exam by pre-populating coil and scan protocol settings in from the waiting room.

# New Tablet UX features to further speed your day




## Remote monitoring

Patient and scan monitoring can be performed remotely, meaning staff can stay on the move to maximize productivity. The operator can communicate remotely with the patient in the scan room, providing an enhanced level of comfort.

## Scan management

Procedures settings and protocols can be fully managed with the Tablet UX. Scan progress can be monitored, halted and restarted from the tablet as required ensuring simple and safe operation is always prioritized.

*Tablet should not enter the scan room

# Advanced imaging by anyone with Auto Consult

By automating steps in the diagnostic pathway, Auto Consult Brain minimizes interaction with the scanner to allow ultimate focus on the patient. Connected with the mobile Tablet UX, automated workflow can be monitored and controlled, robust images can be reviewed as acquired, and two-way patient communication can be maintained remotely from the MR console.


**Auto Populate**

Previous scan parameters are easily retrieved and populated if a patient has been scanned before

**Auto Position**

Patient is automatically moved to the iso-center utilizing position detection from the ceiling camera

**Auto Planning**

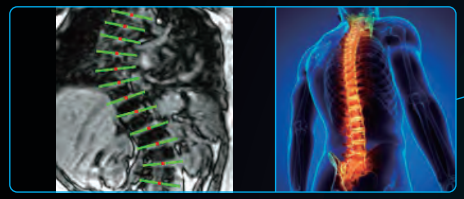
Boosted by artificial intelligence, Auto scan planning reduces unnecessary steps and enhances consistent operation


Protocols Setting
Scan
Image Check
Auto Protocol
Apply post-processing or Auto Scan Assist analysis results to imaging parameters
Robust Imaging
Noise free, robust imaging solutions like motion correction and high-resolution imaging are reproducible and operator independent

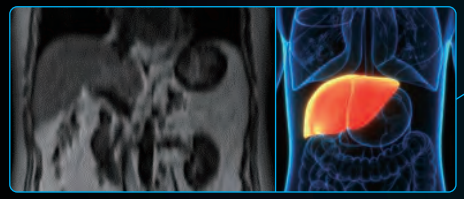
# Auto Scan Assist

Auto Scan Assist standardizes your workflow with automated slice alignment for a range of exams including liver, prostate and whole spine. Utilizing Deep Learning[1] and Machine Learning[2] based automatic recognition, productivity is advanced to enhance procedural efficiency.

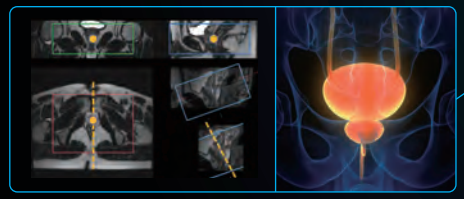
**W-SpineLine+**



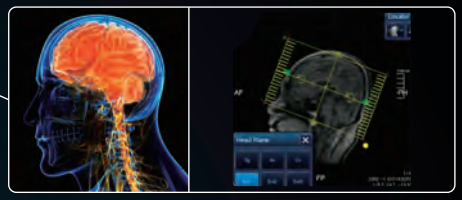
**LiverLine+ and SUREVOI Liver**



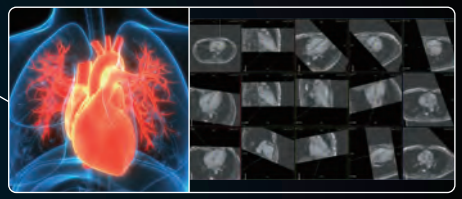
**ProstateLine+**



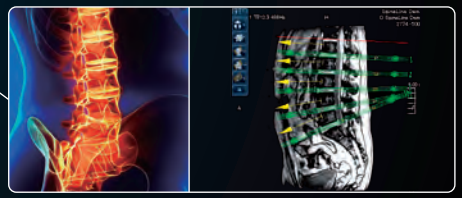
**NeuroLine+**



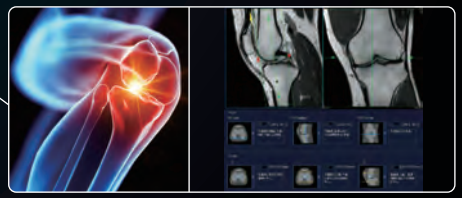
**CardioLine+ and SUREVOI Cardiac**



**SpineLine+**



**KneeLine+ and SUREVOI Knee**



1 Deep Learning is applicable to SUREVOI Liver
2 Machine Learning is applicable to Neuroline+, ProstateLine+, LiverLine+, W-SpineLine+, and SpineLine+ applications.

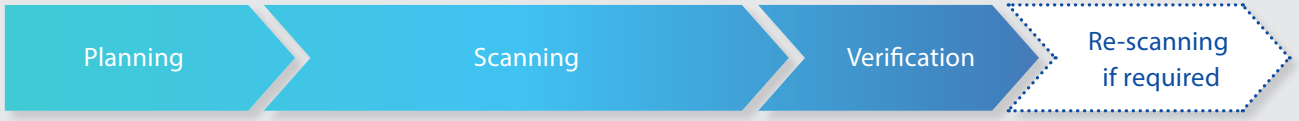
Auto Scan Assist AI technology is trained in the factory. It does not continue to learn once installed at the facility.

# Productivity focused technology for prioritizing workflow and image consistency

## ForeSee View

ForeSee View is an essential scan planning tool allowing you to preview slice planning in real time to help avoid time consuming re-scans. Enabling planning from edge to edge in the region you wish to image, ForeSee View is particularly useful in anatomies that can be difficult to plan such as the pancreas, the heart, orthopedic joints, tortuous vessels and ligaments, and complex post-surgery vessels and arteries.

Normal




***ForeSee View***


The desired cross section is displayed in real time in conjunction with the positioning operation.

# Deliver a quieter, more comfortable MR exam with Vantage Galan 3T's patient-centered design

A successful exam begins with a comfortable patient. Vantage Galan 3T is designed to maximize patient comfort without compromising image quality. Vantage Galan 3T's 71 cm wide bore and short magnet creates an open feeling, and the MR theater helps to relax the patient. Combined with Canon's uniquely quiet Pianissimo, Pianissimo Zen, and mUTE 4D MRA technology, and you have the most patient friendly MR system available today.

## MR Theater

Along with a 71 cm bore opening, Vantage Galan 3T offers an immersive in-bore MR Theater option which creates a unique environment where patients hardly notice they are moving into the bore, helping to maximize comfort and put the patient at ease.

## Quiet exams with Pianissimo and Pianissimo Zen

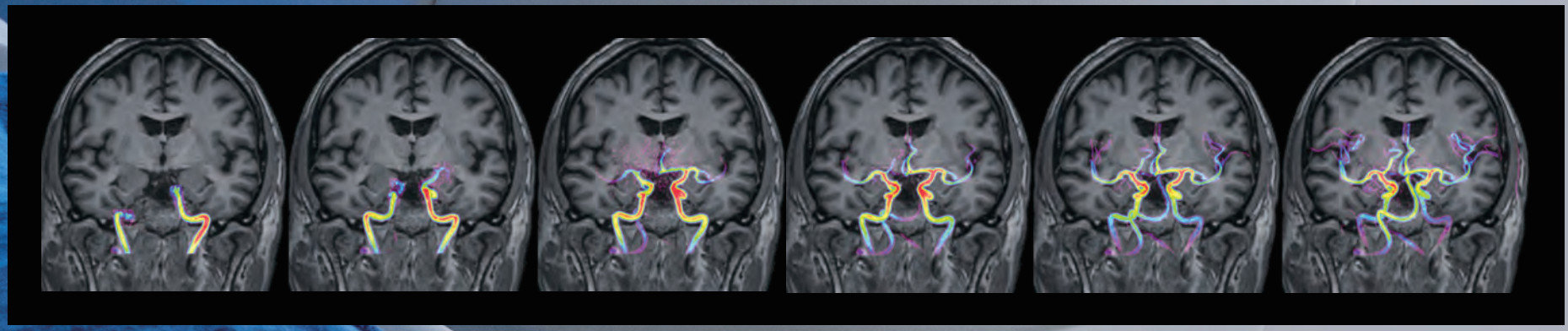
Pianissimo technology significantly reduces the noise in and around the MRI environment for every patient, every sequence, every time thanks to the vacuum chamber encasing the super slim gradient coil which suppresses acoustic noise. And Pianissimo Zen quiet sequences further reduce noise by up to 99%, making exams even more comfortable and easier to complete.

Up To **99%**[1] Noise Reduction

1 Depending on the condition of usage and examination.

## Silently capturing hemodynamics with mUTE[2] 4D MRA

Vantage Galan 3T's UTE sequences allow for less dephasing and more homogeneous vessel signals. At the same time, the use of multiple inversion times (TIs) allows the generation of dynamic images (4D) visualizing the blood flow without the need for contrast agents.



2 mUTE : minimized acoustic noise utilizing UTE

# Easy to clean surfaces

As procedure numbers increase so does the time required for cleaning. Easy to clean surfaces and reduced system touch points help you to simplify the cleaning process. With easy to clean and comfortable pads for the patient and hands-free table operation you have a modern system. In addition, the convenient utility paper holder makes it quick and easy to change the paper on the table between patients.

Patient pads

Utility paper holder

Foot operation


Canon
Patient Name
1990/12/20
170.0cm / 60.0kg
ID : EM_ID000001
Connected Coil
L1
L2
A1
A2
A3 A4 A5 A6 A7
Patient
Coil
Wave
Table
Environment
Setting
0

# Make a smart investment choice with Vantage Galan 3T

Every inch on Vantage Galan 3T has been considered for efficient use of space while minimizing energy consumption. The system's zero boil-off magnet can often fit into the same space as a 1.5T system, while simultaneously providing a comfortable, open environment for your patients.

## Minimize energy use in a compact space

Vantage Galan 3T's power-saving ECO Mode is automatically triggered when you lower the patient couch to help you minimize your running costs. At only 70 kVA[4] Vantage Galan 3T has one of the lowest rated power requirement in its class.

ECO Mode


Power Requirement

4 For Saturn X Gradient, 90 kVA is required.

## Save space

Small size, big performance. The system's short and compact bore minimizes patient anxiety and at the same time allows a 3T scanner to be installed in a room originally designed to hold a 1.5T system. The eco-friendly cabinet design simplifies and shortens installation time.


Total Installation Space [5]

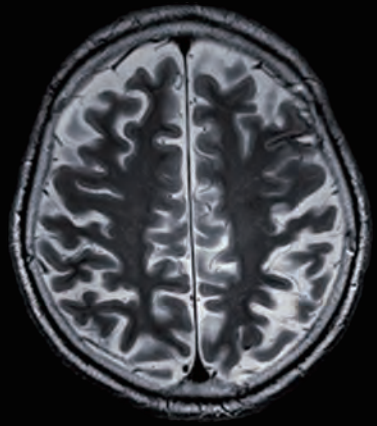

Scan Room Space

5 The 5 Gauss line is not confined within the scan room. Controlled access area should be taken into account by the facility when preparing for installation. The above specifications may not meet the local requirements such as for access as is required by the Americans with Disabilities Act in the United States. Please consult with your architectural and/or electric consultant for coding requirements. Some power equipment may be required to be placed in a dedicated electrical room.

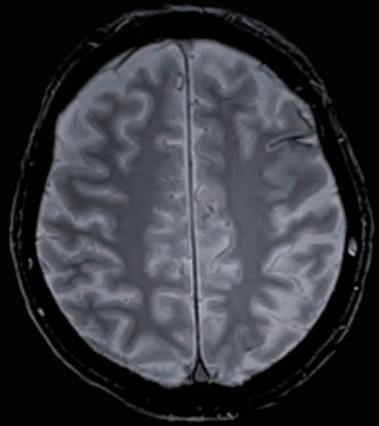
# AiCE for Brain

Acute cerebral infarction / Left internal carotid artery aneurysm

T1w
0.9×0.7 mm resolution, 4 mm, 1:40*

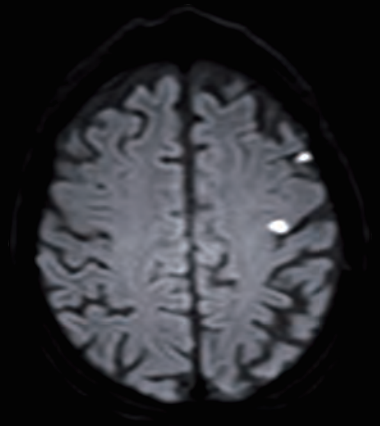


T2w
0.6×0.6 mm resolution, 4 mm, 1:12*

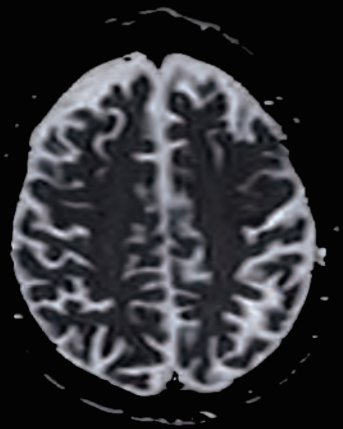


T2*w
1.0×0.6 mm resolution, 4 mm, 1:20*

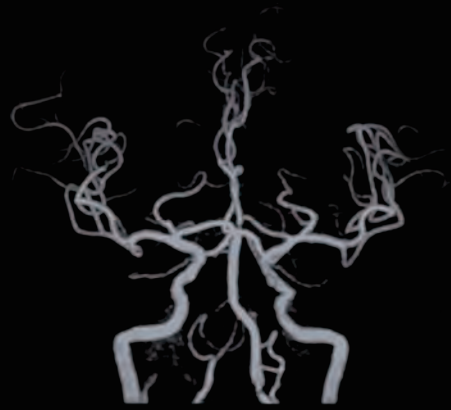
FLAIR
0.9×0.7 mm resolution, 4 mm, 2:30*



IsoDWI
0.9×2.1 mm resolution, 4 mm, 1:40*



IsoADC



TOF
0.8×0.5 mm resolution, 0.8 mm, 3:40*

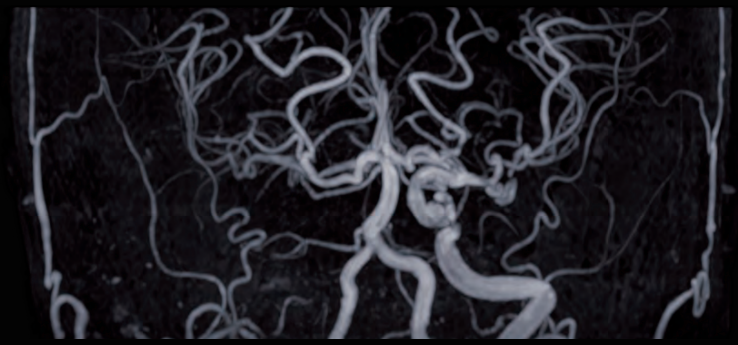
*Actual scan times may vary

*Images provided by Japanese facility*

# Fast 3D mode for MRA

Rt ICA occlusion

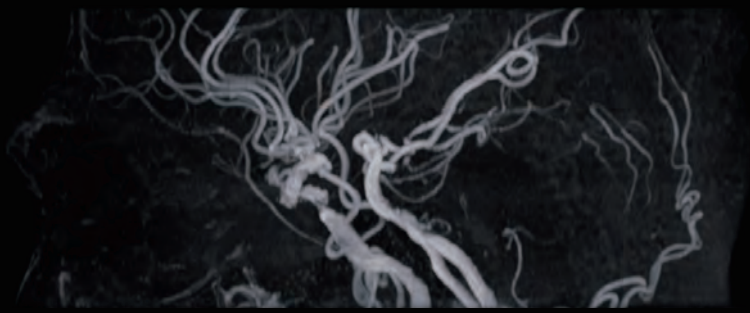
**Original**

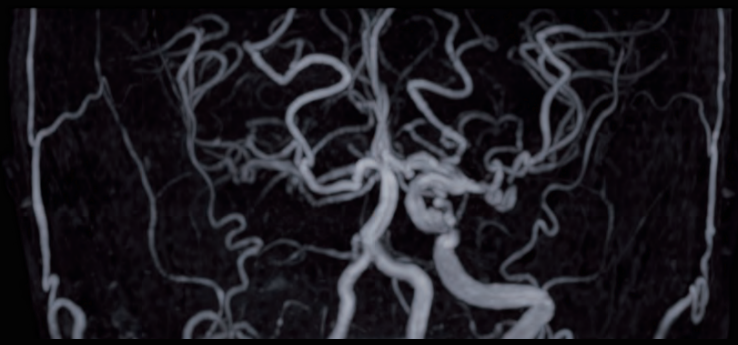


FFE3D, 0.4×0.4 mm resolution, 1 mm, 2:56*

**57%**
Reduction*

**Fast 3D mode**





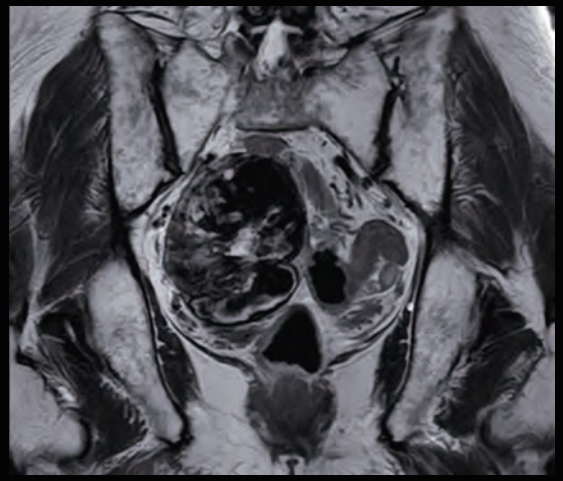
FFE3D, 0.4×0.4 mm resolution, 1 mm, 1:16*

*Actual scan time reductions vary by case

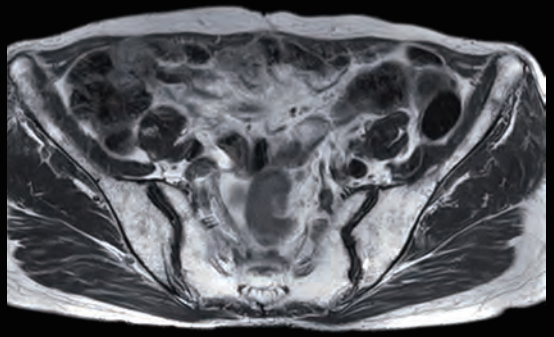
*Courtesy of Juntendo University Hospital, Japan*

# AiCE for Pelvis

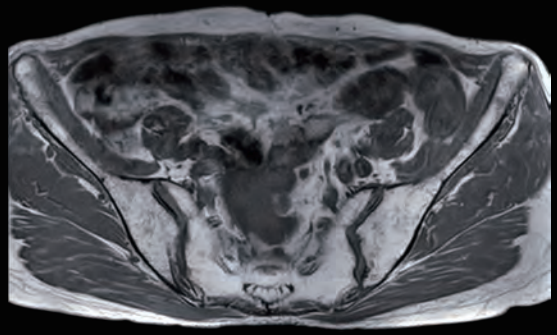
KIT (CD117) positive Postoperative recurrence of stromal tumor of the small intestine



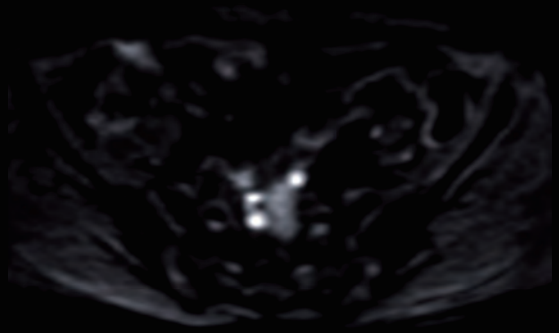
Coronal T2w, 0.8×0.8 mm resolution, 4 mm, 1:48*



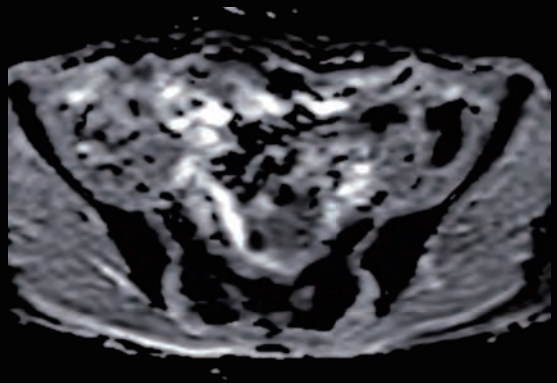
Axial T2w, 0.76×0.76 mm resolution, 5 mm, 1:18*



Axial T1w, 0.76×0.76 mm resolution, 5 mm, 1:38*



Axial DWI / b1000, 1.6×1.6 mm resolution, 5 mm, 3:02*



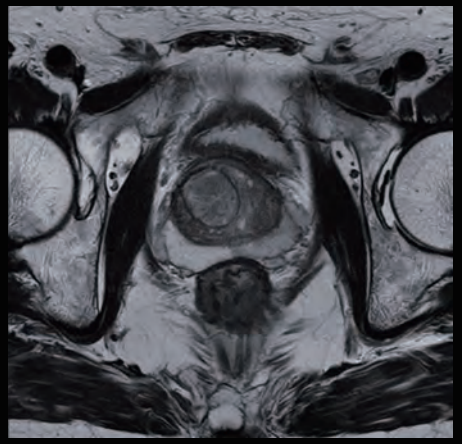
ADC

*Actual scan times may vary

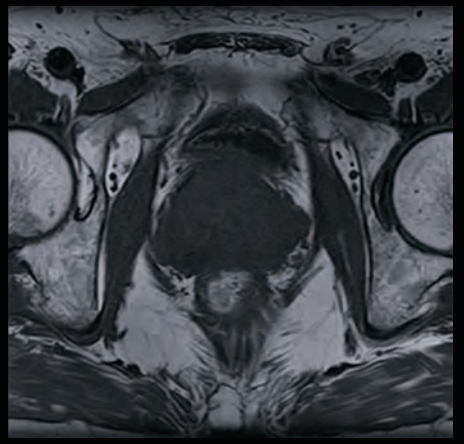
*Images provided by Japanese facility*

# AiCE for Prostate

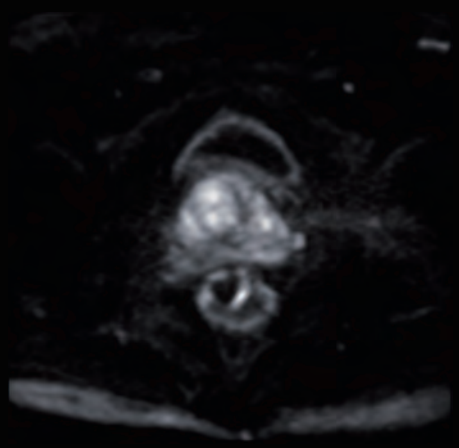
Prostate Cancer



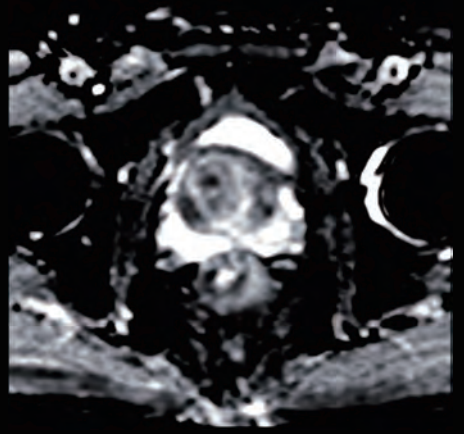
Axial T2w, 0.5×0.5 mm resolution, 4 mm, 1:54*



Axial T1w, 0.7×0.7 mm resolution, 4 mm, 1:02*



Axial DWI / b1500, 1.6×1.6 mm resolution, 4 mm, 4:12*, Exsper ×2



ADC

*Actual scan times may vary

*Images provided by Japanese facility*

# Hand / Comparison with and without AiCE

Intraosseous chondroma of 3rd finger PIP

**Original**

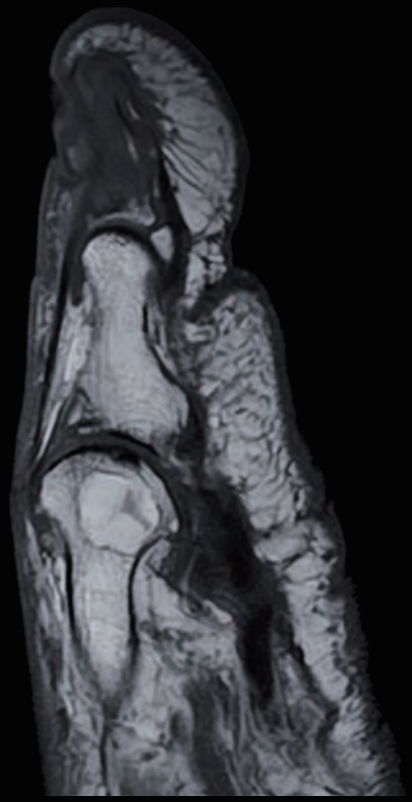
Coronal PDw, 0.24×0.24 resolution, 1 mm 1:09*

*Actual scan times may vary

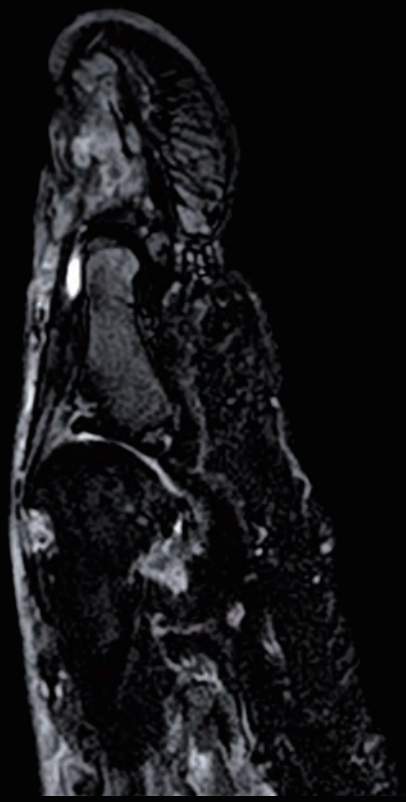
*Images provided by Japanese facility*

# AiCE for Foot

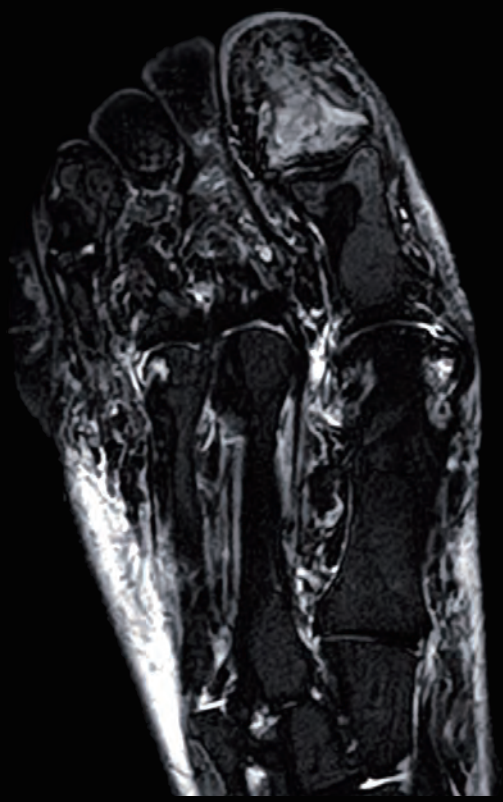
Osteomyelitis



Sagittal T1w 0.34×0.34 resolution, 3 mm 0:27*



Sagittal STIR 0.4×0.4 resolution, 3 mm 0:38*



Coronal STIR 0.46×0.46 resolution, 3 mm 0:42*

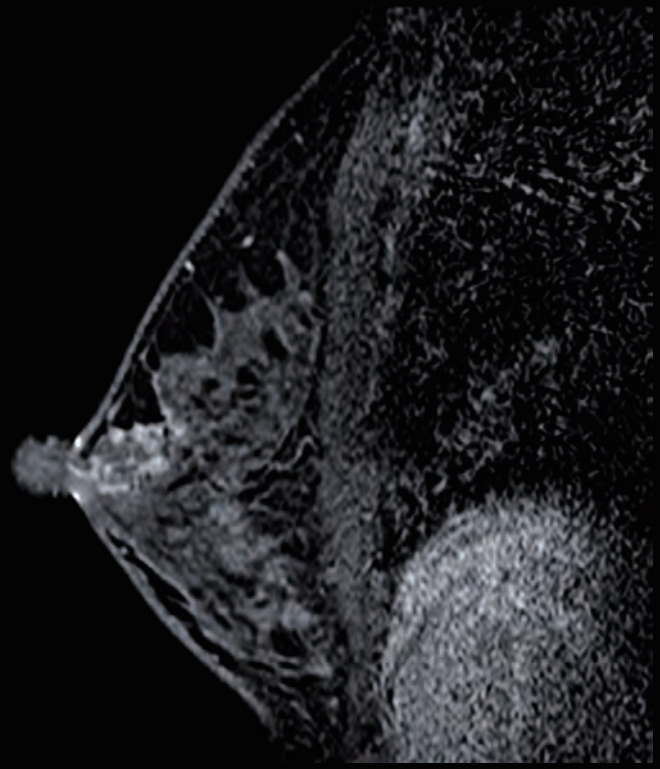
*Actual scan times may vary

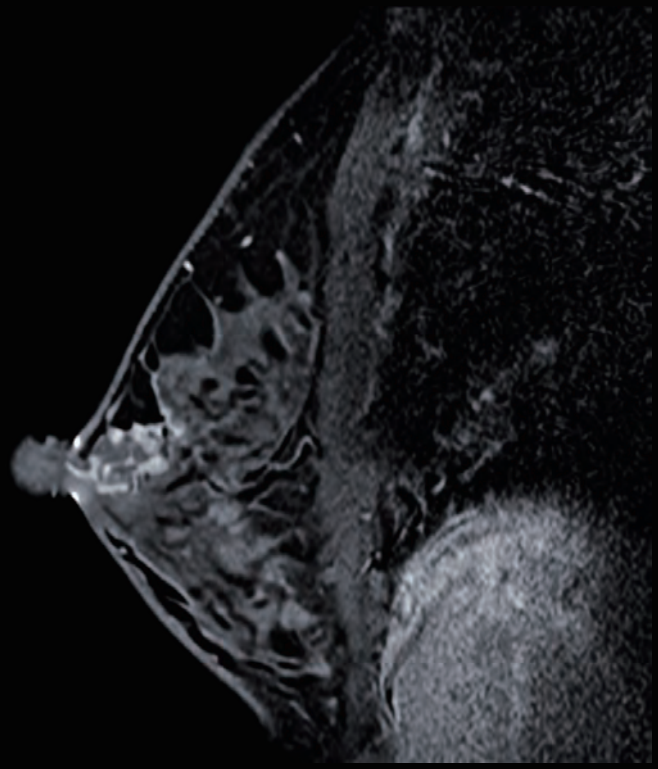
*Courtesy of Fukuoka Orthopedic Hospital, Japan*

# AiCE for Breast

Breast Ca Microinvasive carcinoma

**Original**





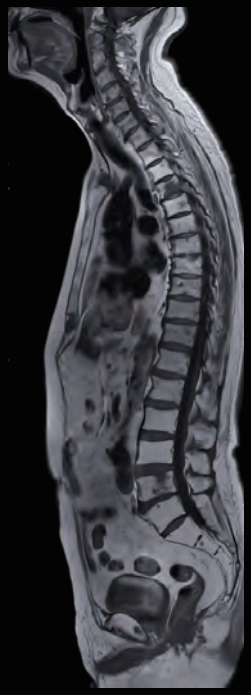
Sagittal CE FatSat T1w, 0.24×0.24 resolution, 1.2 mm 0:59*

*Actual scan times may vary

*Courtesy of Kameda Medical Center, Japan*

# AiCE for Whole body

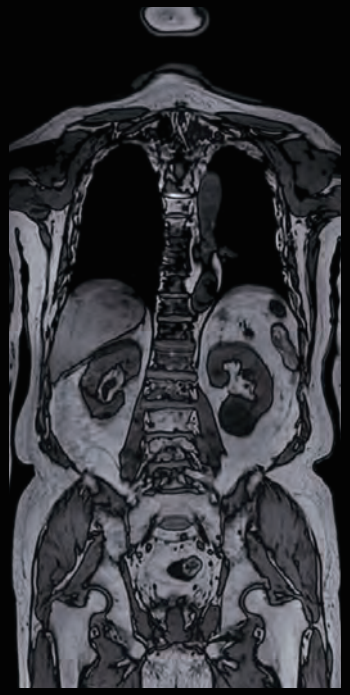
Multiple bone metastases



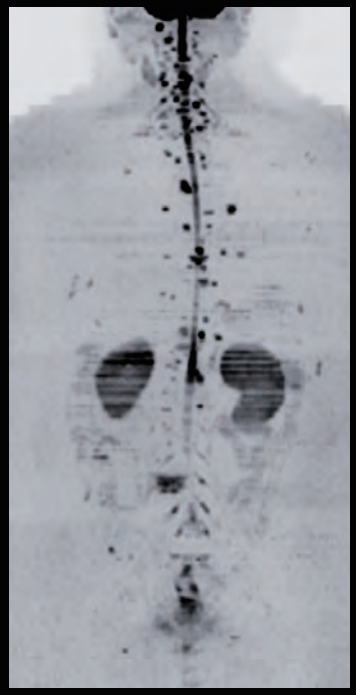
Sagittal T1w,
1.6×1.6 mm resolution,
4 mm, 4:56*

Sagittal STIR,
1.6×1.6 mm resolution,
4 mm, 4:00*

Axial DWI / b1000,
3.0×3.0 mm resolution,
4 mm, 4:45*



Coronal T1w, outof phase / in phase,
1.6×1.6 mm resolution, 4 mm,
6:32*



Axial DWI / b1000, 3.0×3.0 mm resolution,
4 mm, 4:45

*Actual scan times may vary

*Images provided by Japanese facility*

# Quiet Intelligence

# Vantage Galan 3T delivers patient focused MRI with intelligent images and workflow

Vantage Galan 3T uses quiet intelligence that prioritizes sharp and distinct images with automated productivity and patient comfort. Utilize Deep Learning Technology, Advanced Intelligent Clear-IQ Engine (AiCE) to remove noise and enhance SNR[1] and Precise IQ Engine (PiQE) increase resolution.[2] Combined with accelerated scan technologies like Compressed SPEEDER, Exsper and Fast 3D mode, you can achieve perfect harmony in your imaging capability.

Boasting whisper quiet scan sequences, a 71 cm bore opening and MR Theater, Vantage Galan 3T is optimized to put your patients at ease. And by being able to address challenging patient sets with distortion and motion correction, free-breathing and contrast free applications, your facilities imaging performance will meet the needs of referrers, staff and patients alike.

With time-saving automated processes for brain exams, a mobile Tablet UX for remote operation and monitoring and AI enhanced Ceiling Camera that simplifies patient set-up, Vantage Galan 3T raises operational efficiency further than ever before. Vantage Galan 3T also addresses the need for efficiency and throughput amongst the environment of ever increasing case loads with one-click Auto Scan Assist.

Combining intelligent technologies with energy efficient and space saving 3T MRI, Vantage Galan 3T offers you and your patients the ultimate in a quiet and intelligent MRI experience.

**Intelligent**

- AiCE and PIQE utilize Deep Learning techniques to remove noise and enhance SNR to deliver clear, sharp and distinct images
- A suite of accelerated scan technologies like Compressed SPEEDER, Exsper and Fast 3D mode reduce scan time to shorten procedures
- Advanced imaging techniques like MR Elastography, FFQ and Accelerated UTE increase referral options
- Advanced post processing capability with Olea/Vitrea technologies enhance diagnostic decision making

**Efficient**

- Auto Consult simplifies brain exams by automating many processes in the diagnostic pathway
- Mobile patient monitoring and operation with mobile Tablet UX
- Efficient planning with ForeSee View and automated sequences with Auto Scan Assist
- Easy to clean surfaces and reduced system touch points help you to simplify the cleaning process

**Quiet**

- Short magnet and 71 cm bore offers an open MRI scanning environment
- Pianissimo technology delivers whisper quiet scanning
- MR Theater relaxes patients with a virtual immersive experience
- Address challenging patients with motion and distortion correction, free-breathing and contrast free applications

1 AiCE provides higher SNR compared to typical low pass filters
2 PiQE is 510(k) Cleared for Brain and Knee regions on the Vantage Galan 3T

CANON MEDICAL SYSTEMS USA, INC.

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2441 Michelle Drive, Tustin CA 92780 | 800.421.1968



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