FUJIFILM
Value from Innovation

FUJIFILM

FUJIFILM Healthcare Corporation
9-7-3 Akasaka, Minato-ku, Tokyo 107-0052, Japan
https://www.fujifilm.com/fhc/en

FCP-E531

Printed in Japan 2023-08-XK-(F)

Faster MRI ,
Excellent Image Quality

MRI examinations require a wide range of operations, MRI Examinations require a wide range of operations from selecting the protocol, coil selections, and positioning. FUJIFILM makes the workflow easier and more flexible. FUJIFILM Healthcare has created ECHELON Synergy with such a desire in mind.

Equipped with SynergyDrive,* which utilizes AI technology and has been further improved in terms of both hardware and software, ECHELON Synergy streamlines a series of examination workflows from setting up to scanning, image quality, and post-processing.

It makes MRI examinations smoother with higher image quality.

ECHELON Synergy

Shaped to scan patients comfortably

Designed with a spacious 70 cm diameter wide bore to allow for gentle wrapping, and a smooth surface design with few seams. The gantry monitors installed on both the right and left sides are flatly integrated with the operation panel, ensuring a simple shape that is easy to keep clean.

*SynergyDrive is a collective term for workflow improvement technologies. It includes functions developed using the AI technologies of machine learning and deep learning. The performance and accuracy of the system does not automatically change after installation.

SynergyDrive taking MRI to the next level

One tap is all it takes to operate the system!

Automated examination with One tap*1

One tap on the intuitively operable monitor automatically performs the series of processes from start to finish of an MRI examination*1. Gantry monitors are installed in two locations, left and right, allowing for a smooth approach from either side. Frequently used functions, such as UP, SET, and START, are always displayed in the center and can be selected with one tap.

One action

for easy setting

Quickly attachable coils are available, including the FlexFit Neuro coil, which can be attached with one action, and the FlexFit Wide coil, which can cover large areas, such as the abdomen and femur, all at once.

With Deep Learning,

Fast and clear

Combining high-speed imaging technology with Deep Learning reconstruction technology*2, Advanced Reconstruction with Deep Learning Synergy DLR, enables shorter exams and reduces image noise.

“Gentle examination” with a simple workflow

SynergyDrive reduces examination time translating to improved workflow. In addition, improving the workload on the healthcare professional. We aim to provide gentle examinations help ease anxiety and reduces stress.

REiLI, FUJIFILM’s medical AI technology brand, enables support for physicians in the diagnosis and streamlining of the workflow for diagnostic imaging by combining the image processing technology we have cultivated with the most advanced AI technology to realize improved medical care.

*1 Describes automatic execution of the MRI examination process. It does not mean that the diagnosis is executed automatically. It depends on the operator's discretion.
*2 Utilizes Deep Learning for development. The performance and accuracy of the device does not automatically change after installation.

One tap is all it takes to operate the system!

Automated examination with One tap

Once the patient is positioned on the table, tap the “START button” on the gantry monitor. Closing the door of the imaging room automatically starts an examination without positioning with the laser of the gantry. Since there is no need to perform multiple operations for each task, such as positioning the examinee from the operation table, the examination can be performed simply and smoothly*.

One tap

Coil setting

Tap START button!

Moves with the imaging position in the center

Closing the door starts an examination

Positioning

Imaging

Analysis

Post-processing

End of MRI examination
Examinee release

Clearly labeled action buttons in the center of gantry monitor.

One tap

Perform MR examination with one tap

One position

Buttons to be used are always in the center

All in **One**

Touch panel with integrated information

*One-tap operation may not be available depending on the region or operation.

One action

for easy setting

FlexFit Neuro coil can slide on and off easily

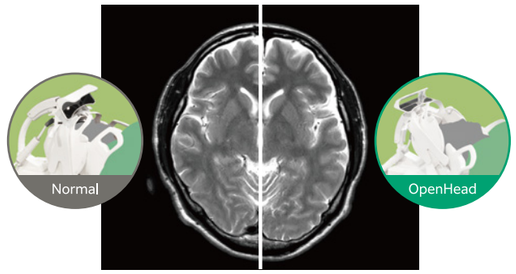
FlexFit Neuro coil

One action setting and high image quality

The unique-shaped coils for the head and neck allow the setting to be completed in one action: after the patient lies down, simply grasp the grip on the top of the head coil and lowering toward the head. One action for comfortable positioning resulting in excellent SNR.

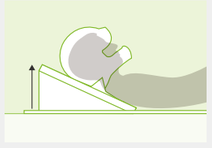
OpenHead mode

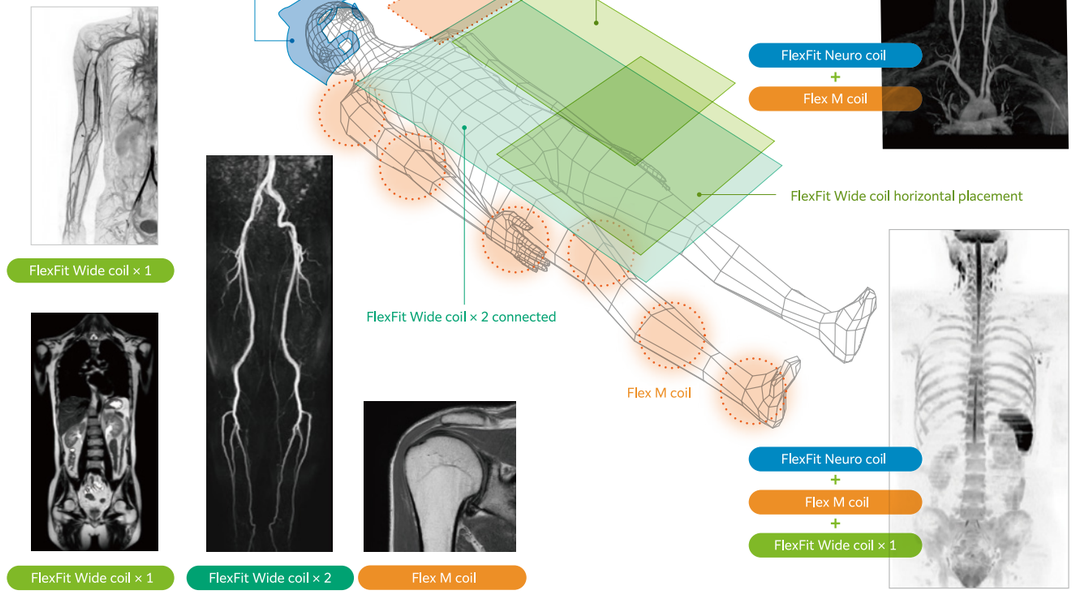
FlexFit Neuro coil is equipped with OpenHead mode allowing for the patients face to be unobstructed translating to reduces anxiety.

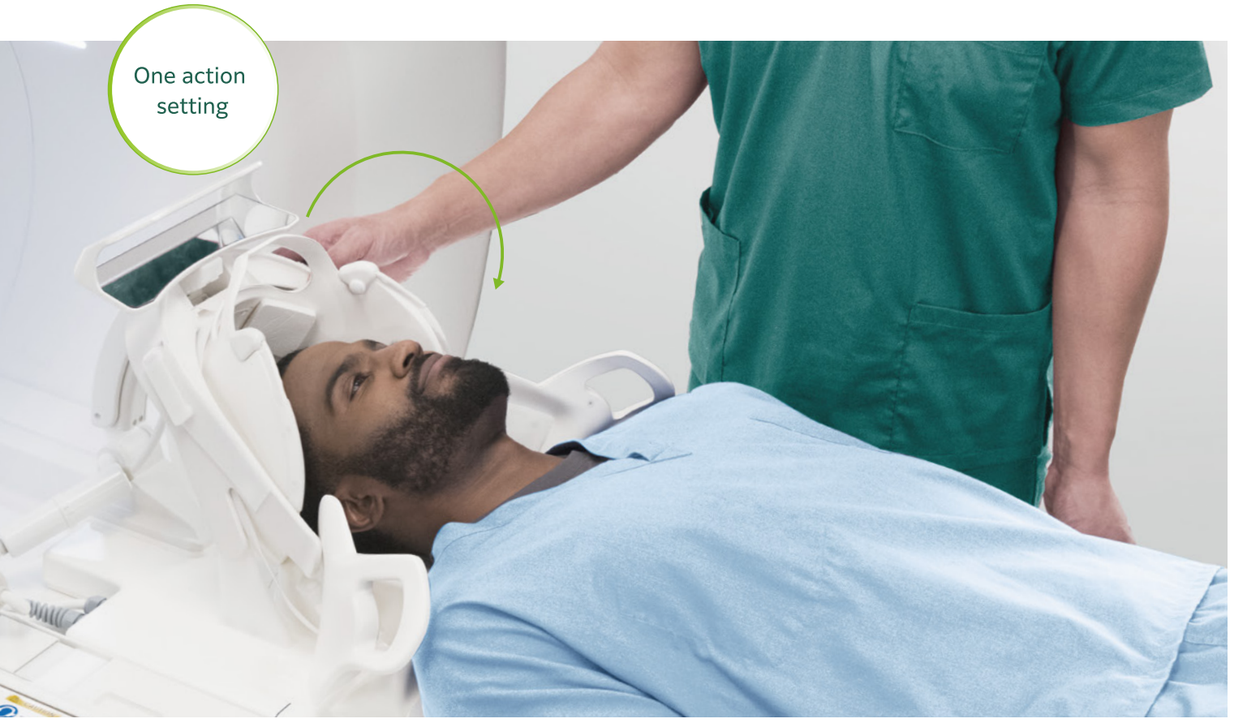


Tilt Mechanism

Patient positioning is smoother for rounded backs with the titling mechanism placed under the FlexFit Neuro coil.





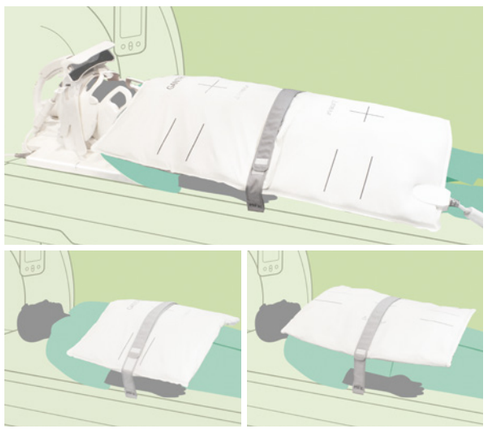


Flexibly covers a wide area of desired location

FlexFit Wide coil

Freely covers a wide area

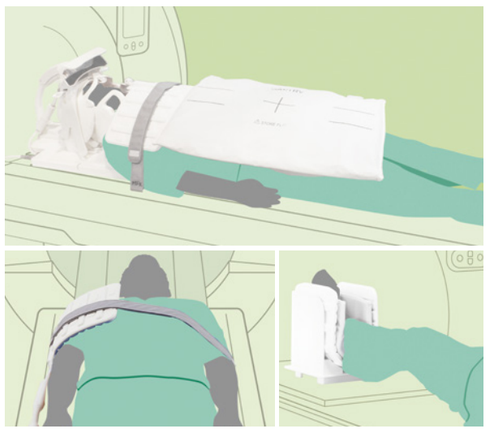
A flexible and lightweight coil with a size of 720 × 545 mm covers a wide imaging range. It can be used in either the vertical or horizontal orientation for various types of imaging. It can also be used by connecting two coils together, so that a wide range of areas can be imaged in a single setting.



Flex M coil

Applicable to various sites

This general-purpose coil is shaped to be easily attached to various anatomies. It can be wrapped around the shoulder or knee for imaging or combined with the FlexFit Neuro coil for imaging a wide range of areas at a time.

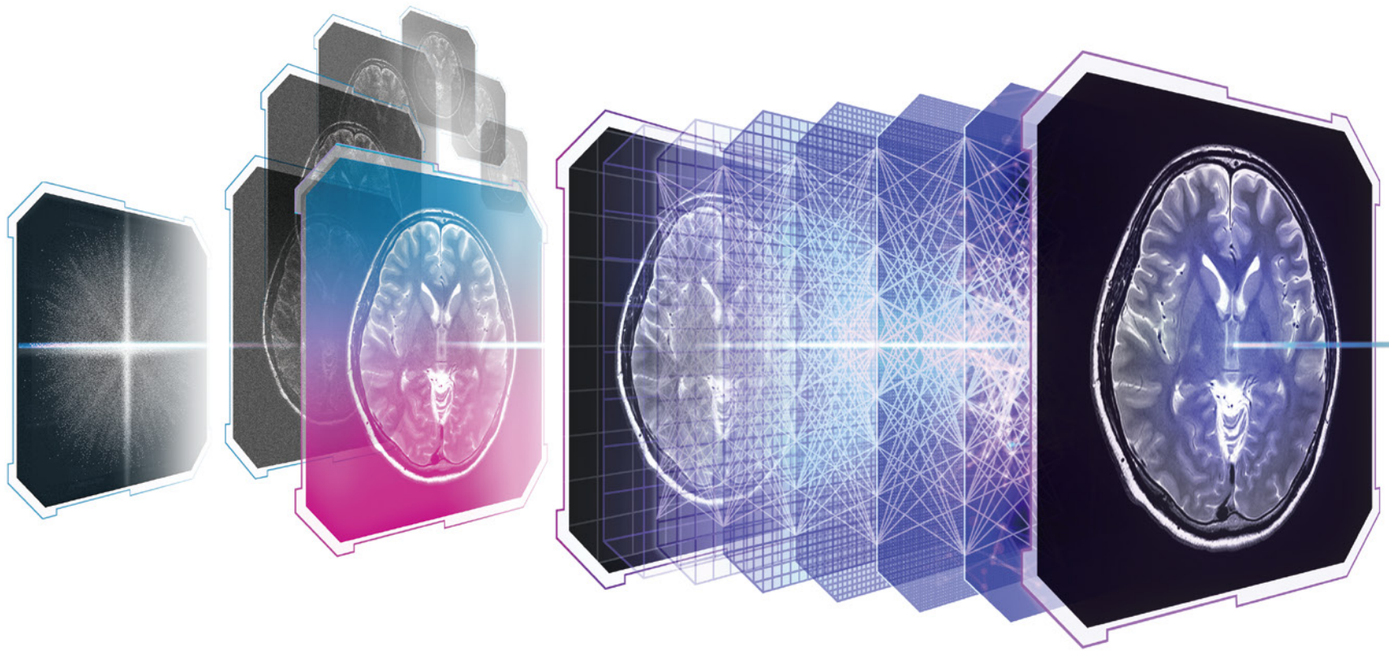


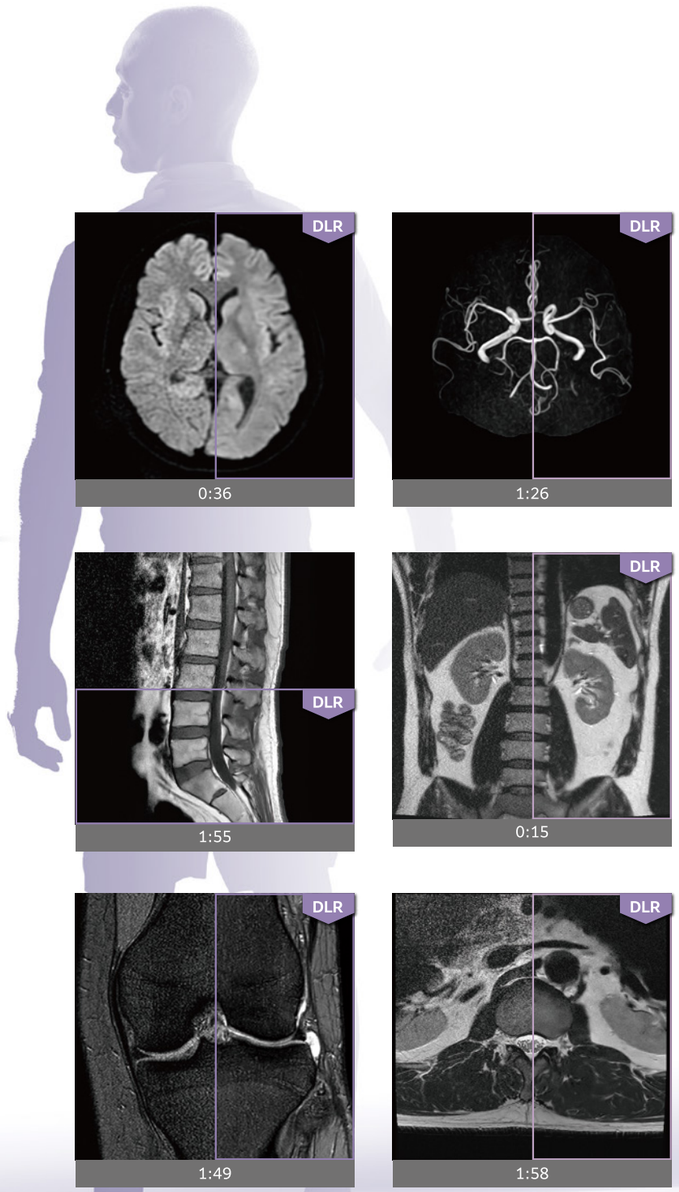
*Comparison with our products

With Deep Learning,

Fast and clear

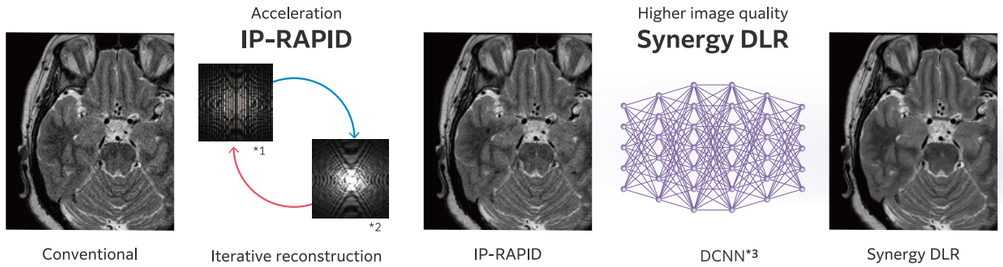
Images can be obtained at high speed by combining two proprietary technologies: IP-RAPID, which reduces imaging time while maintaining image quality, and Synergy DLR, which uses deep learning technology* to improve image quality





High speed and high image quality

Under-sampling reduces imaging time, and iterative reconstruction with IP-RAPID reduces noise and artifacts. In addition, Synergy DLR, an image reconstruction technology utilizing deep learning technology, further eliminates noise and produces images that are easier to use in making a diagnosis.



*1 Undersampling k-space *2 Interpolated k-space with iterative process *3 Deep Convolutional Neural Network

Utilizes deep learning for development. The performance and accuracy of the device does not automatically change after installation.

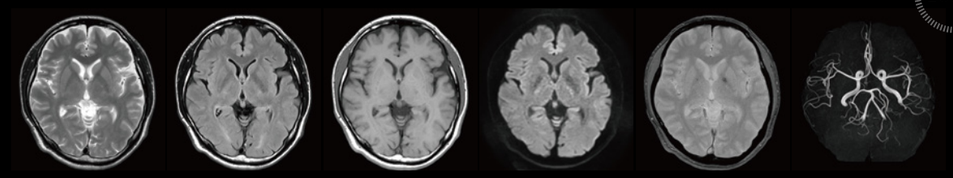
Image Gallery

Quality&Speed

Speed Scan

16 min

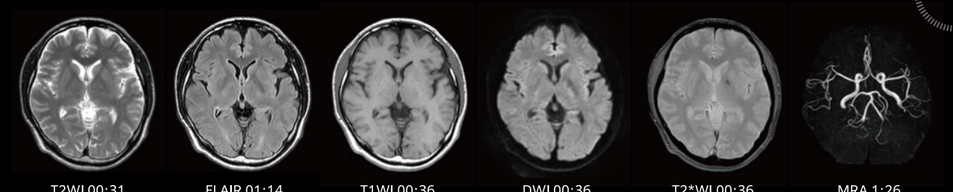
Total Scan Time 16:18



T2WI 2:40 | FLAIR 3:31 | T1WI 2:47 | DWI 1:02 | T2*WI 2:05 | MRA 4:13

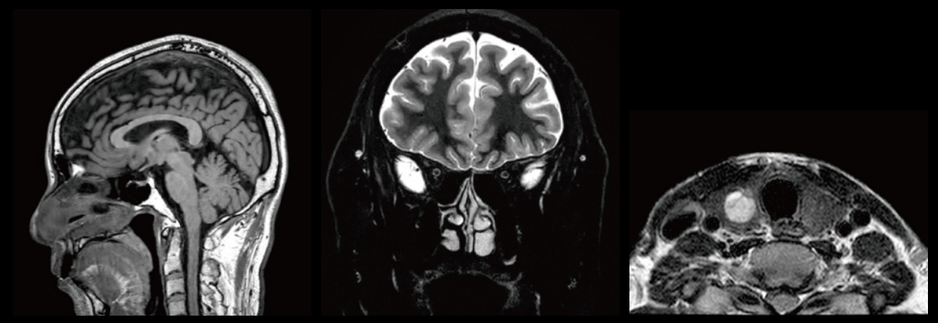
5 min

Total Scan Time 4:59



T2WI 00:31 | FLAIR 01:14 | T1WI 00:36 | DWI 00:36 | T2*WI 00:36 | MRA 1:26

Plus One Scan



3D T1WI FSE
1.0×1.0×1.1 (0.55) mm reso
340 slice, 3:10

STIR COR
0.8×0.7 mm reso, 3 mm
20 slice, 1:13

T2WI Ax
0.8×0.94×3 mm
24 slice, 0:34

Wide Scan

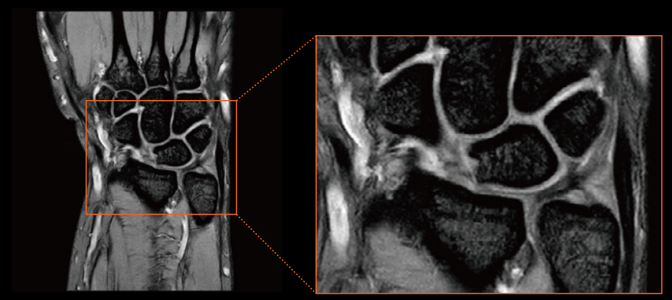
DWI AX (MIP)
3.7×3.1×5 mm reso
3 st total scan time 7:25

T1WI COR
2.2×2.5×1.5 mm reso
3 st total scan time 0:54

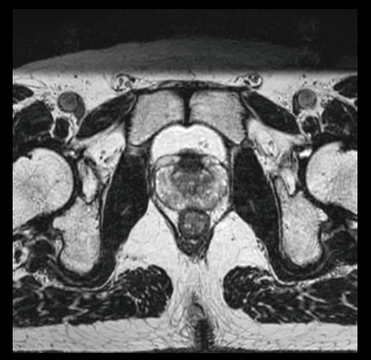
3D-MRCPA (SlidingMIP)

Lower extremity
non-contrast MRA (MIP)

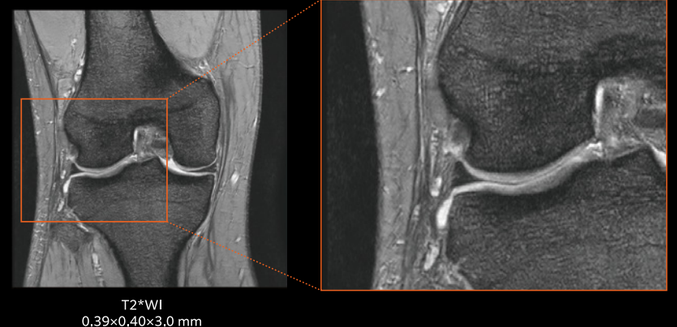
High Resolution



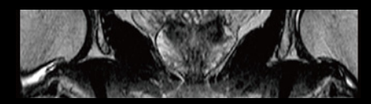
T2*WI
0.38×0.38×2.0 mm



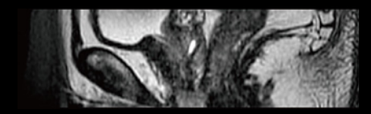
3D T2WI
0.75×0.75×1.1(0.55) mm reso



T2*WI
0.39×0.40×3.0 mm

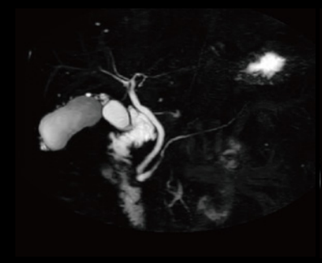


MPR COR

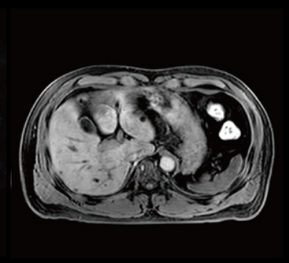


MPR SAG

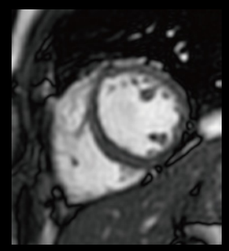
Body



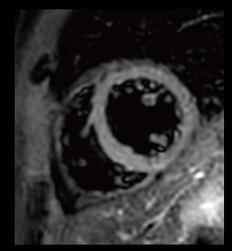
3D MRCP breath hold
0:19



TIGRE breath hold
0:17

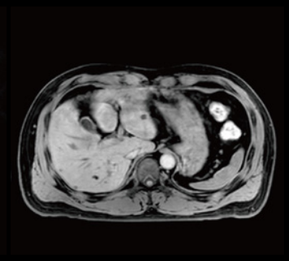


Cine
0:20

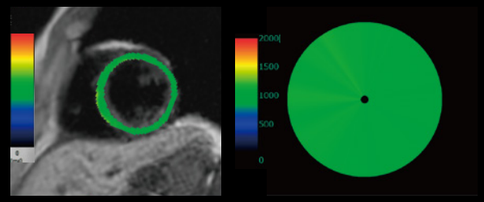


T2 Black Blood
0:11

3D MRCP respiratory gating
3:09



TIGRE diaphragm gating (Navi)
2:19



T1Map 0:16
Cardiac

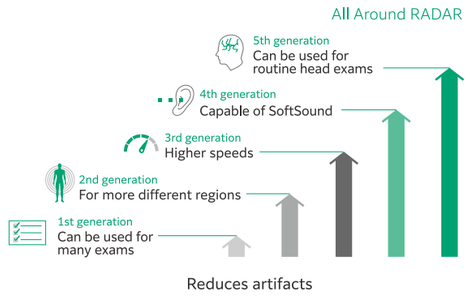
Application

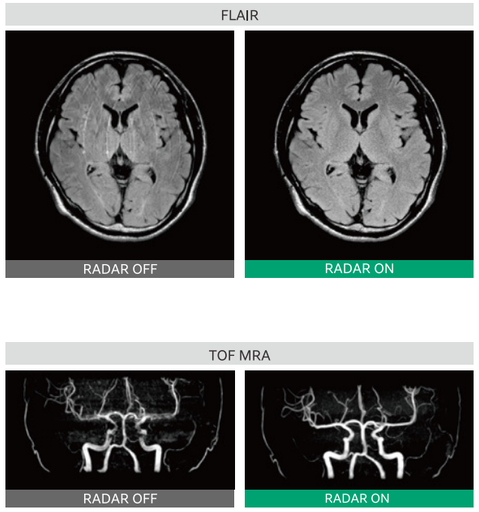
Various applications to enhance the usefulness of examinations

Motion artifact reduction function

All Around RADAR

RADAR is a motion artifact reduction function designed for ease of use that supports multiple sequences, all receiving coils, and any cross-sectional imaging and can be used in combination with the RAPID high-speed imaging technology. ECHELON Synergy supports TOF sequences and GrE sequences and is now an All Around RADAR that can be used in conjunction with RADAR for almost all sequences required for routine head examinations.

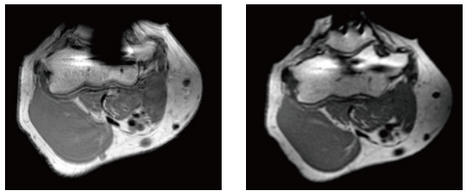




Metal artifact reduction function

HiMAR Plus

Artifacts caused by metals are reduced by combining a slab-selective gradient magnetic field with VAT pulses and by synthesizing multiple 3D images taken at different frequency bands. In addition, a 3DisoFSE sequence is adopted with VRFA to increase the flexibility of parameter setting. Application to various contrasts is now possible.

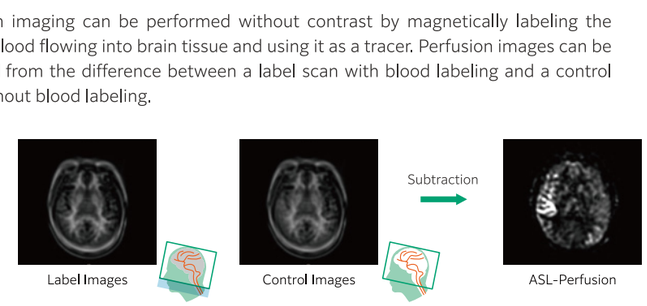


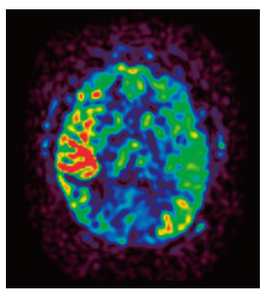
FSE　　HiMAR Plus

Non-contrast perfusion imaging function

ASL-Perfusion

Perfusion imaging can be performed without contrast by magnetically labeling the arterial blood flowing into brain tissue and using it as a tracer. Perfusion images can be obtained from the difference between a label scan with blood labeling and a control scan without blood labeling.





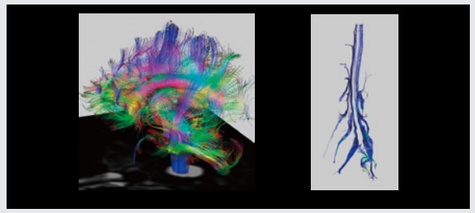
ASL-Perfusion

Applications for advanced image visualization and analysis

SYNAPSE® 3D

Craniotomy/Tensor Analysis

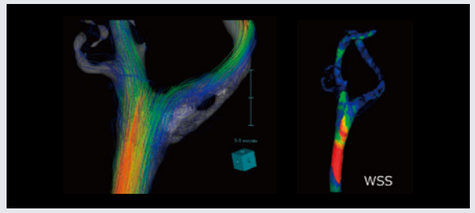
Enables tensor analysis from diffusion-weighted MR images, tractography-based extraction, and observation of white matter tractography pathways. It can load additional images (mainly CT images) and extract skin, bone, brain parenchyma, tumor, and cerebral vessels in craniotomy simulations.
Main functions include:
- Display of fractional anisotropy (FA) and diffusion color map images
- Ability to extract and observe white matter tractography
- Ability to calculate FA value, number of fibers, area, and volume in the specified ROI
- Simultaneous display of white matter tractography, skin, bone, brain parenchyma, tumor, artery, vein, and other regions
- Craniotomy simulations involving cutting of skin and bone regions, brain surface clipping by depth, and tumor plane clipping
- Automatic and manual data registration options



Tensor Analysis

4D Flow

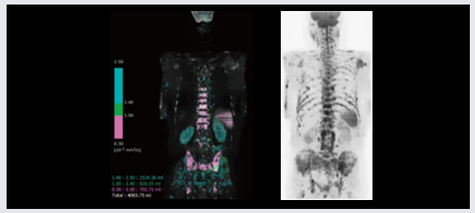
Calculates the blood flow volume, velocity, and vector of a designated ROI and overlays the results onto the extracted region.
Main functions include:
- The parameters of an arranged ROI can be shown in a graph and a summary table
- Display of axial, sagittal, and coronal images overlaid with maximum velocity vector
- Overlay of flow velocity vectors, streamlines, and pathlines on an extracted region
- Display 4D cine of flow velocity vectors, streamlines, and pathlines on an extracted region



4D Flow

ADC Viewer

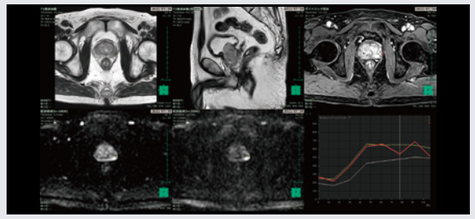
Calculates and visualizes apparent diffusion coefficients from information about signal values of diffusion-weighted images collected with MR.
Main functions include:
- Observation stage for diffusion-weighted whole-body imaging with background suppression.
- Display of ADC map and EADC map images
- Measurement of ADC values in ROIs
- Pseudo-color display of ADC map images
- Blending display of ADC map images and background images
- Automatic/manual registration of ADC map images and background images
- Ability to adjust b-value dynamically for computed DWI



ADC Viewer

Prostate Viewer MR

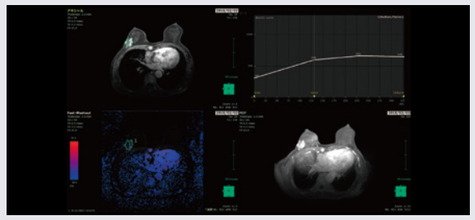
Enables the analysis of prostate gland tumors. It facilitates diameter and volume measurements of the prostate gland and its lesions. Viewing tools include comparative observation of multiple series, T2, ADC, DWI, DCE, and time-intensity curves. Observation and acquired measurements can be used to generate a PI-RADS™ report.



Prostate Viewer MR

Breast Analysis MR

Enables the analysis of tumors in the breast and generates a BI-RADS® report. Tools in this application include kinetic curves for wash-in and washout and subtraction of pre- and post-contrast. Measurements include distance from the nipple, distance from the skin, distance from the chest wall, and tumor volume. Color overlays can be used to display the differences respectively between the different phases such as initial phase and delayed phase, initial phase enhancement, delayed phase enhancement with washout, and kinetic curve threshold.



Breast Analysis MR

This page is the SYNAPSE 3D catalog.

Friendly design to support comfortable examinations

Wide bore and wide patient table

The 70 cm diameter wide bore improves comfort for patients. To match the wide bore, we also paid close attention to the size of the patient table to ensure a space of 62 cm for the moving part of the patient table.

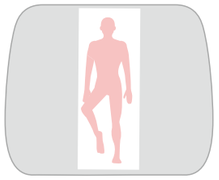
Gantry monitor antibacterial processing

The surface of parts likely to be in contact with the hands is designed to be easily cleanable by minimizing unevenness as much as possible. Antimicrobial films using FUJIFILM's antimicrobial technology Hydro Ag+ are used for the gantry monitors, which are frequently touched. This ensures hygienic operation.

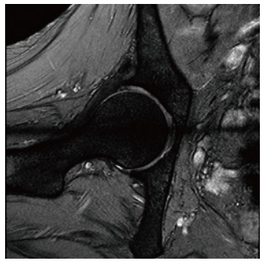
Flexibly adaptable to a variety of body positions

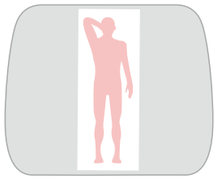
The wide bore with a diameter of 70 cm and the wide patient table with a width of 62 cm allow for quick adaptation to imaging in a variety of body positions.

*Not applicable to all body positions and patients.

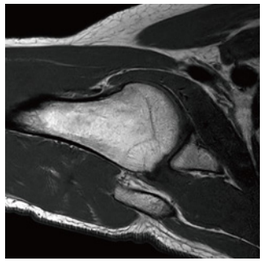


Hip joint,
abduction external rotation



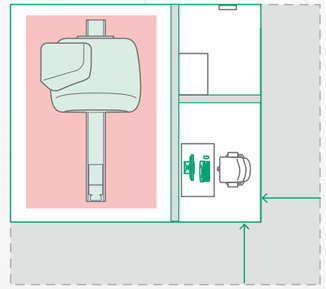


Shoulder joint,
abduction external rotation



Layout of Synergy

The space of an imaging room is determined by the size of the patient table length, bed stroke, and gantry width. ECHELON Synergy is a wide-bore device, yet is designed to provide the same imaging room footprint as ECHELON Smart Plus,* which is a standard-bore device.



*ECHELON Smart Plus is the name of the model installed with the new system software version of ECHELON Smart.
Trade name: MR Imaging System ECHELON Smart Medical device certification number: 229ABBZX00028000

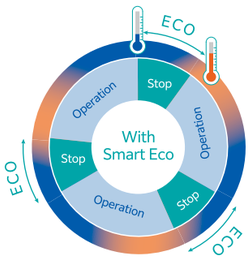
Comprehensive support system for MRI operations

Smart Eco

Effective reduction of power consumption by intermittent operation of the refrigerator.

The running cost for superconductive MRI systems is generally considered to be expensive. Part of the reason is the high-power consumption of the refrigerator to maintain the superconducting state of the magnets and the continuous operation of the refrigerator 24 hours a day. To address this issue, an energy-saving mechanism (Smart Eco) is installed to monitor the temperature inside the magnets and stop the operation of the refrigerator while the temperature is sufficiently low and stable. This effectively reduces power consumption while maintaining zero boiling off with no helium consumption. With Smart Eco, ECHELON Synergy reduces power consumption by up to 28% during the standby period for examinations, which contributes to a reduction in running costs.

Refrigeration unit is always running



Refrigerator properly stops for a certain period of time
zero boiling off with no liquid helium consumption

Sentinel Analytics

Improves uptime by predictive failure diagnosis.

Sentinel Analytics, a predictive failure diagnosis service for superconducting MRI systems developed by utilizing the analysis of accumulated big data focusing on system operating status and FUJIFILM's Predictive Failure Diagnosis Service

Utilizing 24-hour monitoring of the system status and predictive diagnosis by Sentinel Analytics allowed us to optimize inspection and parts replacement cycles and improve system uptime.

Continuous system monitoring

Monitors the status of your system 24 hours a day to detect abnormalities immediately.

Direct connection function

This function provides a direct connection between the service site and your system to provide service. In order to track down the cause of the failure, it checks the artifacts and abnormal images as well as the data before image reconstruction (raw data) and runs a test program on the system.

Sentinel Analytics
Main functions and benefits

Automatic reporting function

Alerts are automatically transmitted to our service site when the Sentinel server detects abnormalities in the system as well as when it detects poor performance. This prevents failures before they occur. In the event of a failure, an immediate response will be provided.

Security

Information on patients is protected by encryption of the communication data and mutual authentication communication. In addition, personal information (e.g., examinee's name, gender, weight, age, and date of birth) on the patient list and images is not recognized by the Sentinel server or service site.

Sentinel Analytics conceptual diagram