⊕ SHIMADZU

Excellence in Science

Tomosynthesis

Advanced Digital Multi-Slice Tomography Technology
making the invisible visible

Application Option

for

SONIALVISION G4

Tomosynthesis

Tomosynthesis is advanced imaging technology that integrates cone-beam CT reconstruction technology and digital image processing technology.

A single linear tomography acquisition movement of SONIALVISION G4 imaging chain provides multi-slice coronal tomographic images easily with only a very simple and quick workflow.

Linear scan

Tomosynthesis: Max. 40 deg.

FPD motion

Reconstruct multiple coronal section images
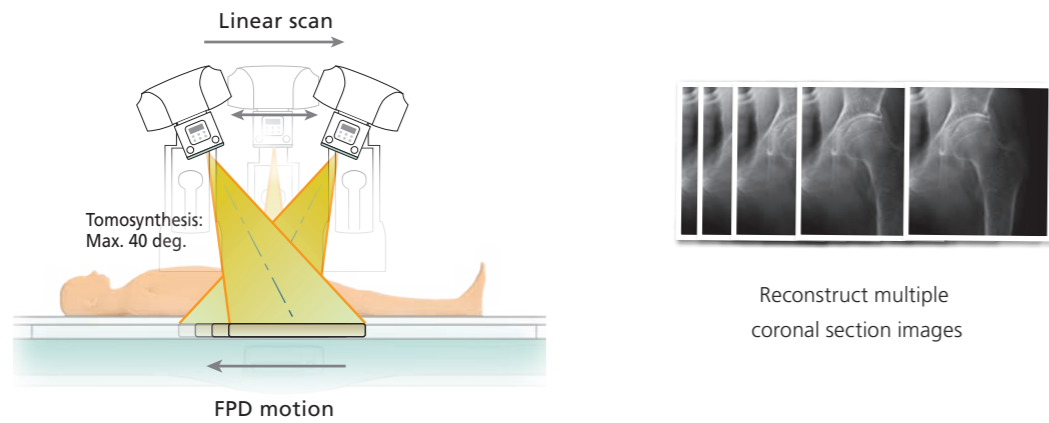
Imaging technology that fuses cone-beam CT reconstruction with digital image processing.

Dual Linear Drive Tomosynthesis

This tomosynthesis radiography method moves the FPD parallel to the X-ray tube focal point. Tomosynthesis can increase the amount of information provided in images by minimizing the truncation area of incident X-rays and reconstructing a larger effective area. The smaller truncation areas also result in less radiation exposure that does not contribute to diagnosis.

40-deg scan

Reconstructive area

Truncation area

40 (cm)
30
20
10
0
Table top

FPD motion
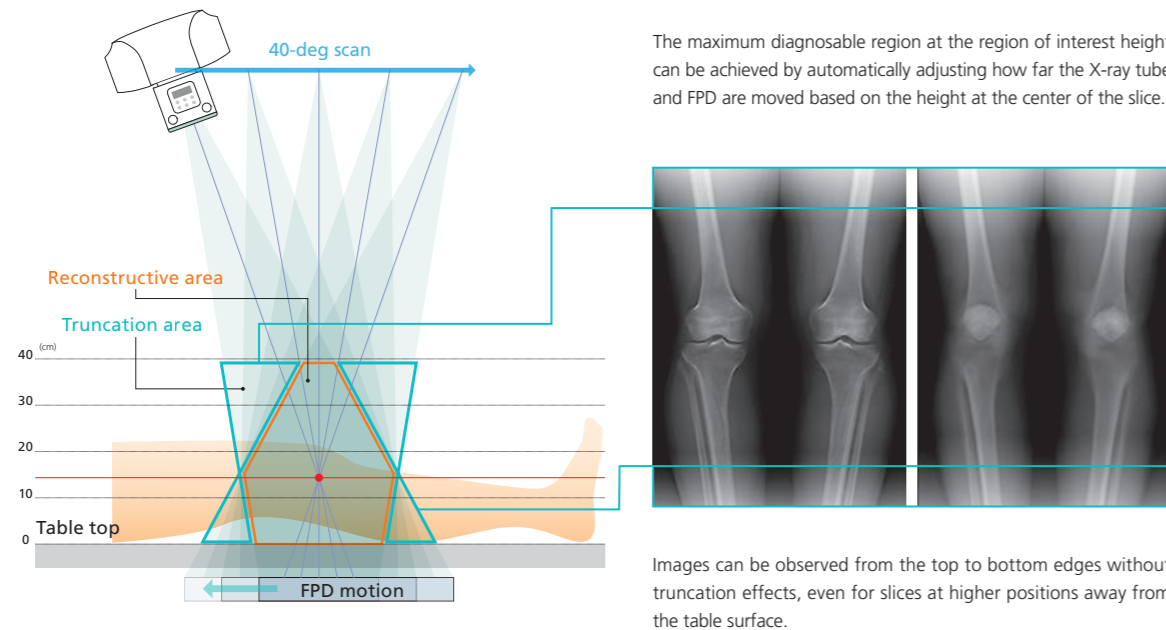
The maximum diagnosable region at the region of interest height can be achieved by automatically adjusting how far the X-ray tube and FPD are moved based on the height at the center of the slice.

Images can be observed from the top to bottom edges without truncation effects, even for slices at higher positions away from the table surface.

High resolution images with little overlap

SONIALVISION G4 Tomosynthesis / Tomography images are reconstructed from high-resolution projection images on the superfine resolution Flat Panel Detector (FPD), so that, fine fracture lines and trabeculae can be clearly observed unlike conventional tomographic images. Multiple digital tomographic images are very useful to understanding the front-rear relationship of the observed area and the direction of the fracture line progression.
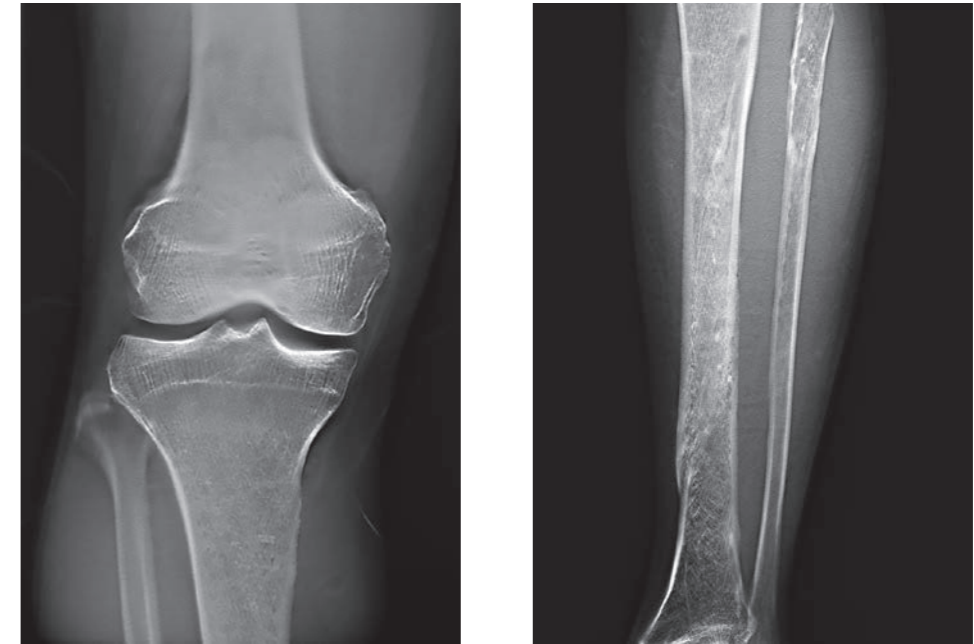
Tomography at any patient position

SONIALVISION G4 enables performing Tomosynthesis freely at any patient position, such as standing for weight-loaded examinations or lying horizontally on the table. It can also easily examine the elbow or knee in a bended position, which is difficult with a CT scanner.

Perform Tomosynthesis freely at any patient position
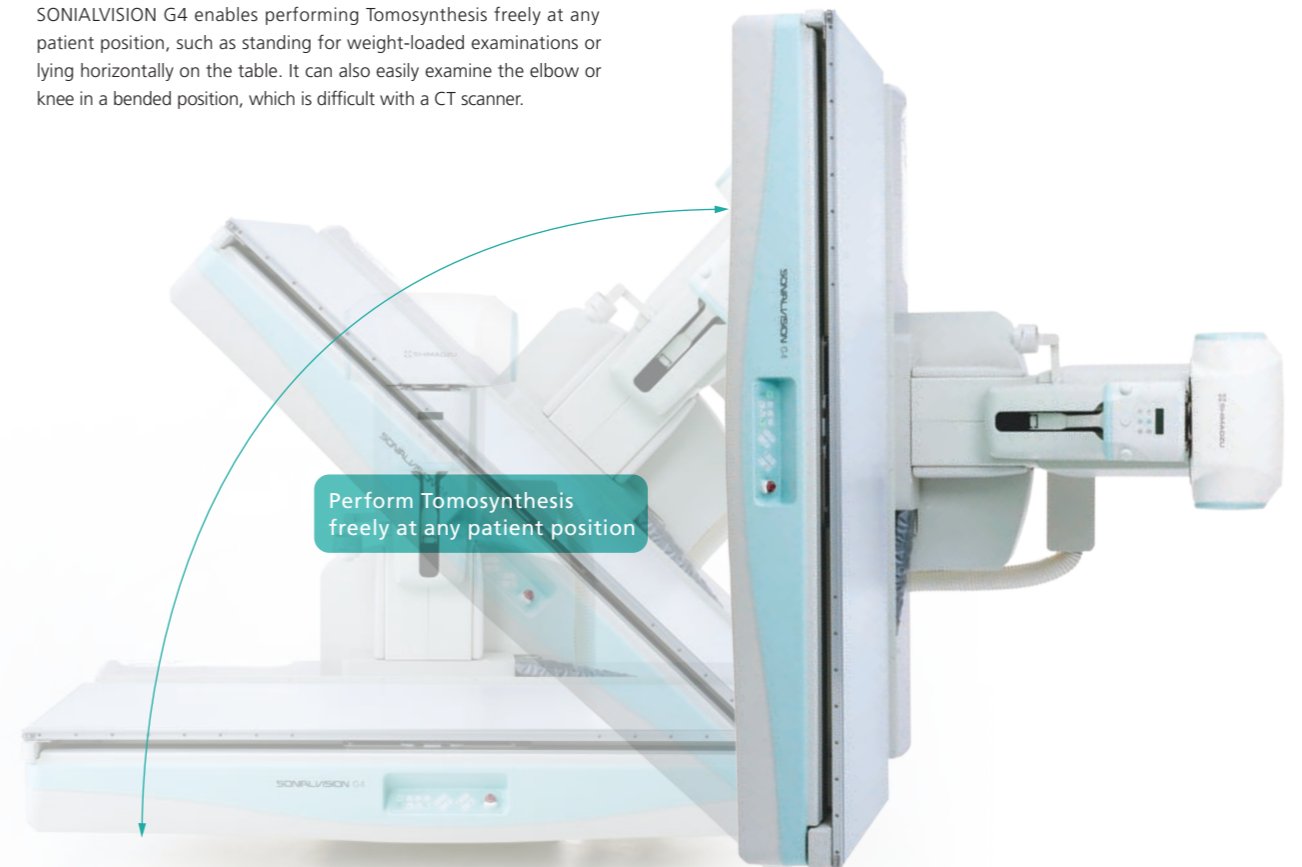
Only 2.5 seconds Scan Time

Since just one low-dose tomographic scan (2.5 sec/5 sec) can reconstruct the images of a particular cross section many times, this technique requires less time and less X-ray dose than conventional linear tomography. The short examination time is very helpful for reducing the burden on patients and operators.

High Definition Imaging

The 1x1 high definition mode (using 6-inch field-of-view) allows you to obtain tomosynthesis images with even higher spatial resolution. This mode is very effective to diagnose small areas such as bones in the finger tips etc. with more precision.

Normal
TOMO mode

4 pixels are read
as 1 pixel

High definition
TOMO mode

1 pixel is read
as 1 pixel
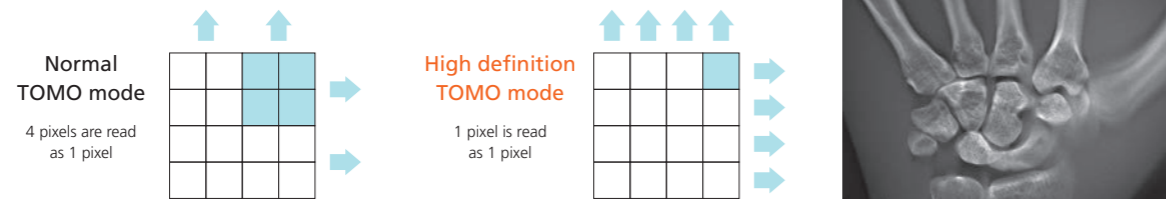
Oblique Tomosynthesis*

The Oblique Tomosynthesis feature provides oblique tomographic images reconstructed at any optimal angle up to +-20 degrees laterally or vertically to match your ideal diagnosis angle.
This feature helps when examining spines, hip joints and other areas that could be difficult to be observed by the standard horizontal tomographic images parallel to the table-top.

Original angle

Oblique angle
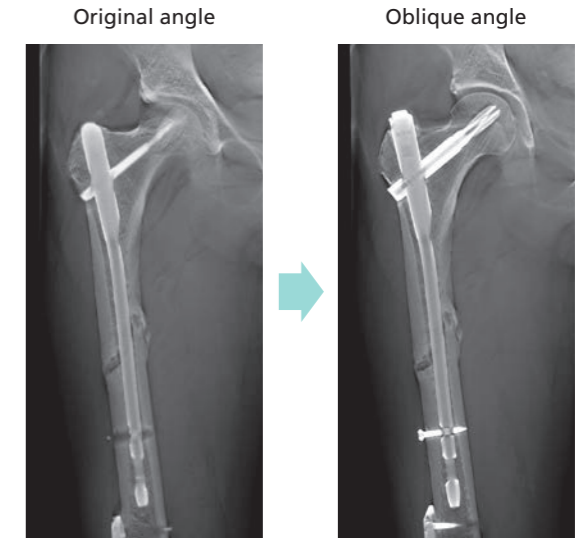
Minimal X-ray Dose

Tomosynthesis allows you to observe multiple slices of volume data with minimizing X-ray dose, requiring a single linear tomography stroke acquisition only. By switching the field-of-view and using collimation, X-ray exposure to areas outside the area of interest, such as when viewing the femur, can be minimized to prevent unnecessary radiation exposure.
A "Low-dose Tomosynthesis" mode is available to reduce the dose level even further, which makes the system useful for the pediatric examination as well.

The overall status of the metal implant can be determined by showing the image slightly tilted in the transverse and vertical directions.

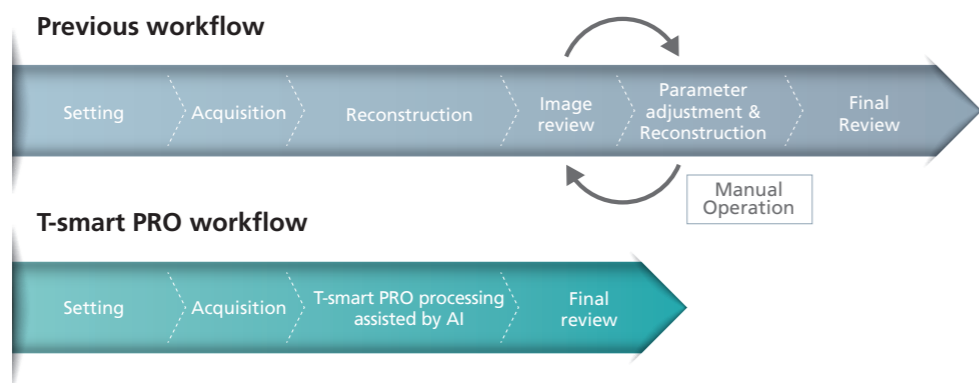*Requiring the "Side Station i3" separately.

Shimadzu metal artifact reduction technology using AI image processing enables to focus on patient care by providing easy-to-interpret Tomosynthesis images with more efficient workflow.
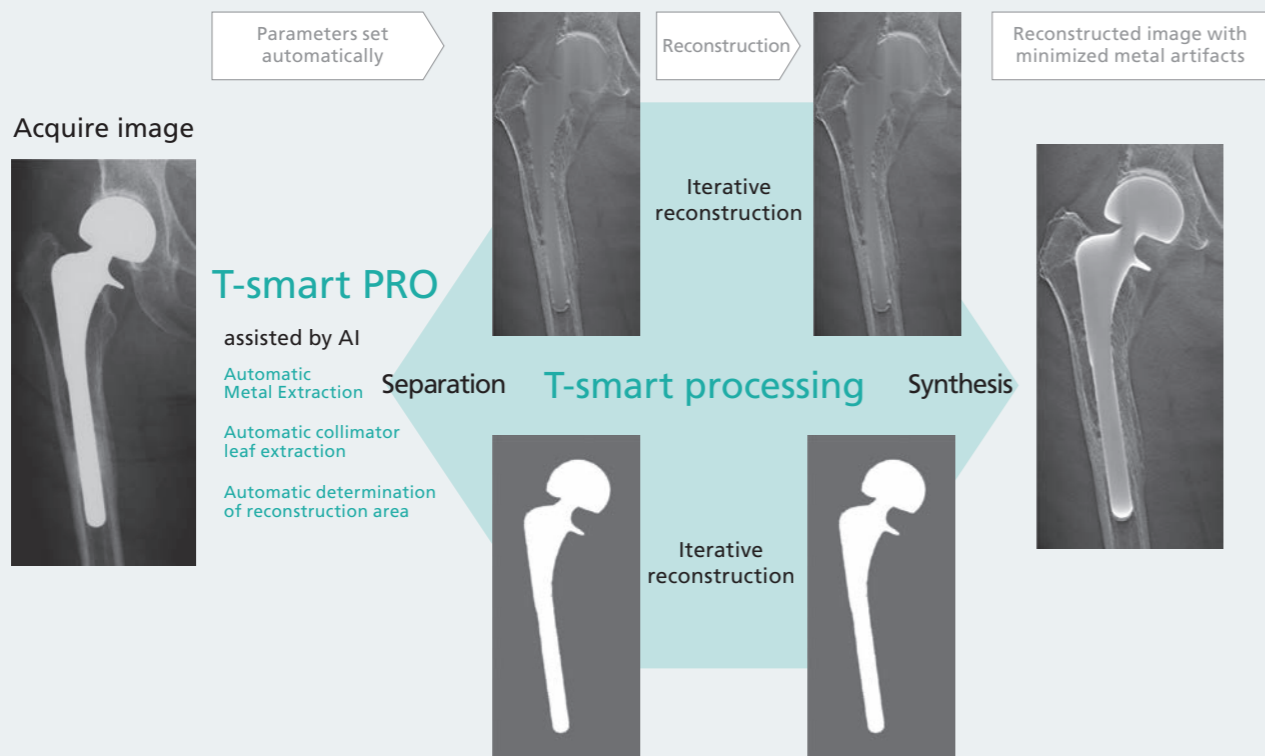
T-smart PRO(*) assisted by AI

Tomosynthesis-Shimadzu Metal Artifact Reduction Technology PRO

"T-smart PRO" is our advanced Tomosynthesis technology. T-smart, our highest-grade metal artifact reduction technology, is combined with Shimadzu's AI image processing technology, which uses deep learning technology. T-smart PRO saves time and complexity problems by automatically adjusting the reconstruction parameters based on the metal size, metal type, and body part. The entire workflow is so simple that anyone can obtain Tomosynthesis images with ease and efficient workflow.

Previous workflow

Setting → Acquisition → Reconstruction → Image review → Parameter adjustment & Reconstruction → Final Review

Manual Operation

T-smart PRO workflow

Setting → Acquisition → T-smart PRO processing assisted by AI → Final review

T-smart PRO Process

Parameters set automatically → Reconstruction → Reconstructed image with minimized metal artifacts

Acquire image

T-smart PRO
assisted by AI

Automatic Metal Extraction
Automatic collimator leaf extraction
Automatic determination of reconstruction area

Separation — T-smart processing — Synthesis

Iterative reconstruction
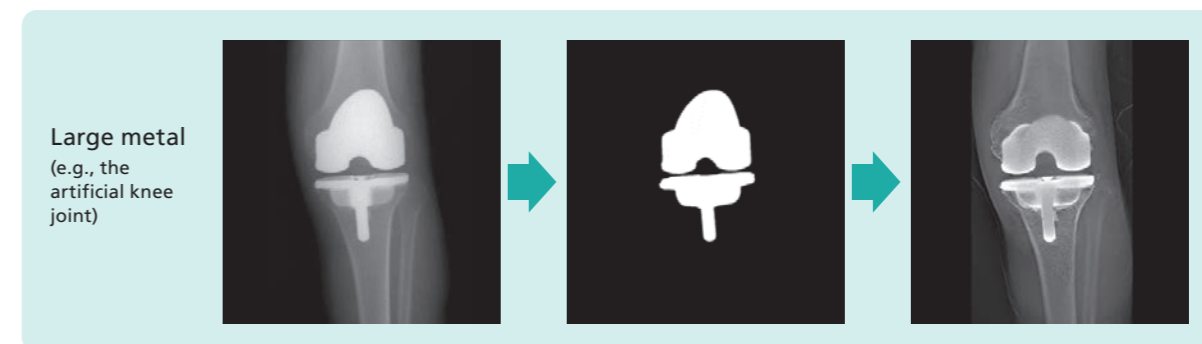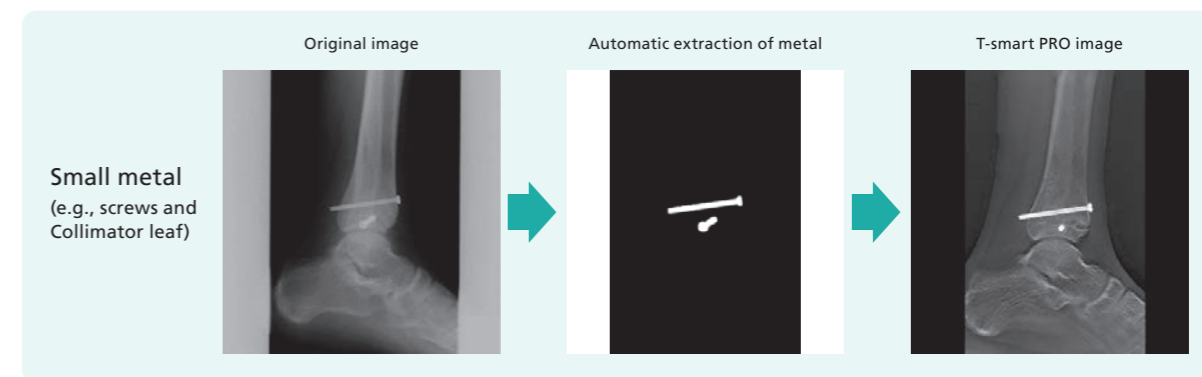
Iterative reconstruction

T-smart PRO provides enhanced Tomosynthesis images by suppressing the artifacts around the metal objects even further.

Features for providing optimal images

Automatic extraction of metal

T-smart PRO using AI technology automatically and accurately extracts and separates metal from an original image. It is possible to automatically set parameters that previously required skilled setting techniques, and to easily obtain reconstructed images minimizing metal artifacts.

Original image	Automatic extraction of metal	T-smart PRO image

Small metal
(e.g., screws and Collimator leaf)

Large metal
(e.g., the artificial knee joint)

Automatic determination of reconstruction area

T-smart PRO estimates height and body thickness of the target and automatically sets the range of image reconstruction. It can reduce the possibility of deviation of a region of interest from a reconstructed image that may occur with manual settings, and enables a patient to have Tomosynthesis examination in a more comfortable position.

Search area
Search area

Auto-determined reconstruction area

Auto-determined reconstruction area

(cm)
40
30
20
10
0
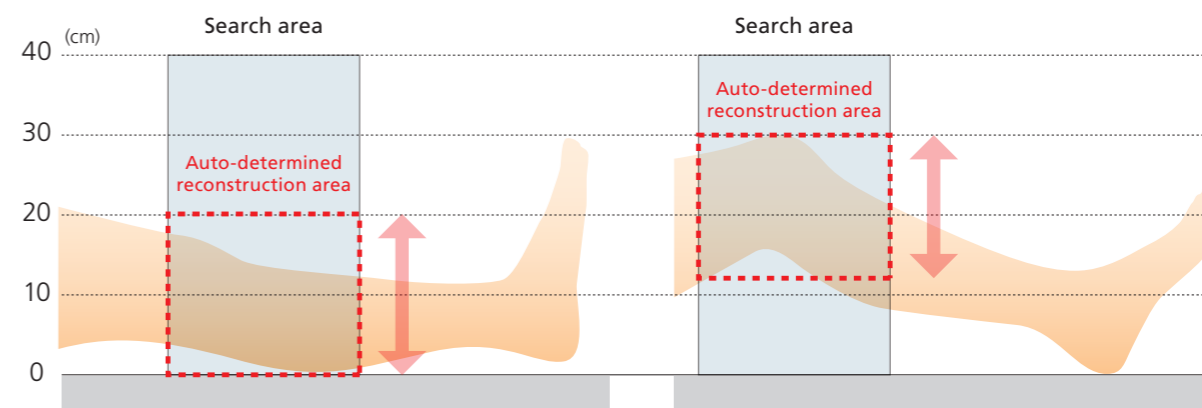
This image explains the concept of Automatic determination of reconstruction area.

* The AI (Artificial Intelligence) technology used in T-smart PRO is a "trained model" that was trained at some point and performed accuracy evaluation. It doesn't continue learning after installation.
* Requiring the "Side Station i3" option separately.

See more about clinical images

Label Description: Multi-purpose Digital R/F System SONIALVISION G4

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