
3D Accu tomo 170


Thinking ahead.


Focused on life.

THE PINNACLE OF 3D IMAGING: 3D ACCUITOMO 170

05

3D Accuitomo 170 is J. Morita's most advanced unit. Highly refined, it is the 4th generation of the Accuitomo product line. It produces the highest level of clarity that Morita offers with extremely low patient dosage.

Reduced Dosage
Dosage has been reduced 30% to 40% compared to the previous Accuitomo model.

Four Imaging Modes
A mode to serve every purpose. High Resolution Mode and High Fidelity Mode can be used for the highest quality of images. High Speed Mode reduces motion artifacts. Standard Mode can be used for both limited and broad fields of view.

Nine Field of View (FOV) Sizes
A wide FOV range, from 40 x 40 mm up to 170 x 120 mm, captures a couple teeth up to the entire head and neck area.

Five Resolution Levels
Select the voxel size that best suits your diagnostic needs: 80 µm, 125 µm, 160 µm, 200 µm, or 250 µm.

Zoom Reconstruction
Use the original exposure data to zoom in on critical areas using voxel sizes as small as 80 µm.

DICOM Compatible
Morita's i-Dixel 3D imaging software is DICOM 3.0 compliant.

Viewing Software
Allows viewing and manipulation of 3D data on computers without installation of 3D imaging software.

INDUSTRY LEADING CLARITY WITH EXTREMELY LOW DOSAGE

3D ACCUITOMO 170'S EXCEPTIONAL IMAGE QUALITY can be attributed to several factors including the most advanced 3D sensors in the world and very high resolution at greater than 2 line pairs per millimeter.

Super High Resolution, 80 µm Images

Accuitomo's highly detailed images have a voxel size as small as 0.08 mm (or 80 µm). The slice width and pitch can be set between .08 and 3.2 mm. Depending on the diagnostic need, this unit offers five different resolution options to choose from: 80 µm, 125 µm, 160 µm, 200 µm, or 250 µm.*

Extremely Low Patient Dose

3D Accuitomo 170 offers reduced dosage for increased patient protection. This unit's low dosage is rooted in how the machine acquires information. Through advanced engineering, the intensity of the X-rays has been optimized which decreases the overall level of emissions. Dosage has been reduced 30% to 40% compared to the previous Accuitomo model. Maximizing the efficiency of the machine has also resulted in sharper images of soft tissue with fewer artifacts. Now, even the largest field of view of the entire head and neck area is 25% less dosage than an FMX, F-speed film.**

Even at the expanded ø 170 x H 120 mm size, 3D Accuitomo 170 maintains high resolution with low patient dose.

** Depending on the size of the Field of View, some voxel sizes may not be possible.*

*** Morita's effective dose calculated in accordance with ICRP 103 (ICRP 2007) FMX reference: Journal of the American Dental Association 2008; 139:1237-1243*

ZOOM RECONSTRUCTION

07

THE ZOOM RECONSTRUCTION FEATURE CAN generate a high resolution 80 µm 3D image for a region of interest from the larger size image already obtained.

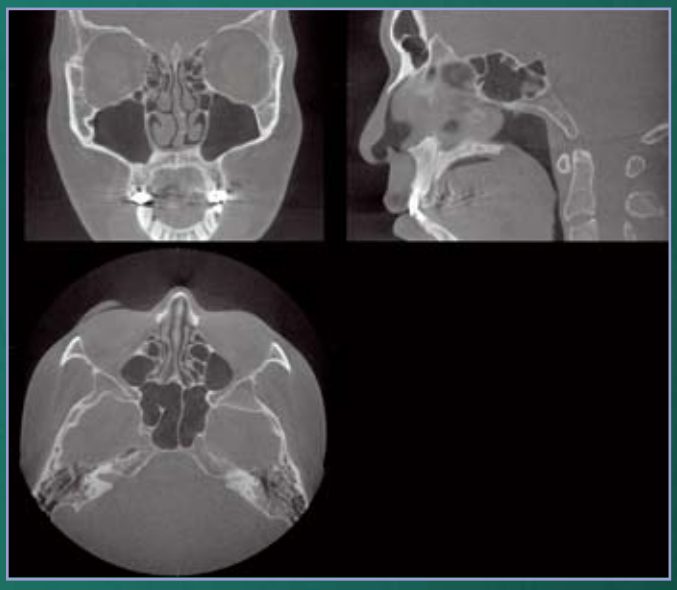
Zoom Reconstruction is a feature unique to 3D Accuitomo. It always acquires data at 80 µm the highest level of resolution. The user is able to choose a lower resolution for display, however, for large fields of view to reduce reconstruction time and file size. If a small region of interest is identified in the original scan, and more detail is needed in that area, Zoom Reconstruction will produce an 80 µm image of that small region. This allows for higher level examination and diagnosis without retaking the image. No other unit offers this feature.

Choice of Resolution Options

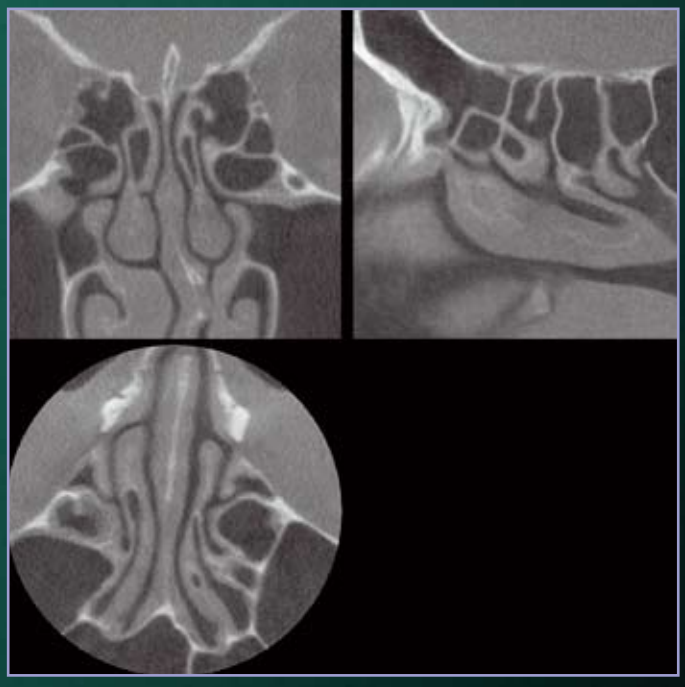
Voxel sizes of 80 µm, 125 µm, 160 µm or 250 µm can be selected as the resolution for each image area.

Default Settings Include

ø 40 x H 40 mm: 80 µm
ø 60 x H 60 mm: 125 µm
ø 80 x H 80 mm: 160 µm
ø 100 x H 100 mm: 250 µm
ø 170 x H 120 mm: 250 µm



ø 170 × H 120 mm, Voxel size: 250 µm



ø 40 × H 40 mm, Voxel size: 80 µm

FOUR IMAGING MODES

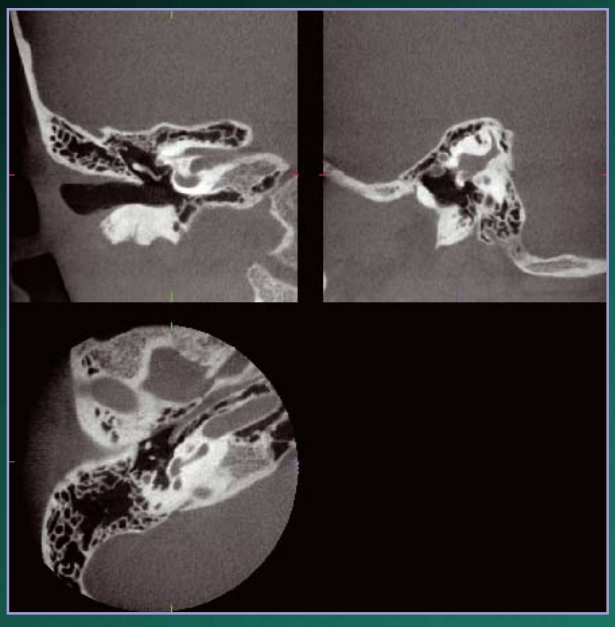
MULTIPLE IMAGING MODES allow selection of the scan time most appropriate for the clinical case, while keeping patient dose to a minimum.

Standard Mode (Std)
360° scan: 17.5 seconds, 180° scan: 9.0 seconds.
Standard Mode offers high resolution images of exceptional clarity. This is the mode historically used in clinical case studies and research published on 3D Accuitomo units. Standard Mode is suitable for limited and wide views of temporal bone, paranasal sinus, maxilla and mandible, individual teeth, etc.

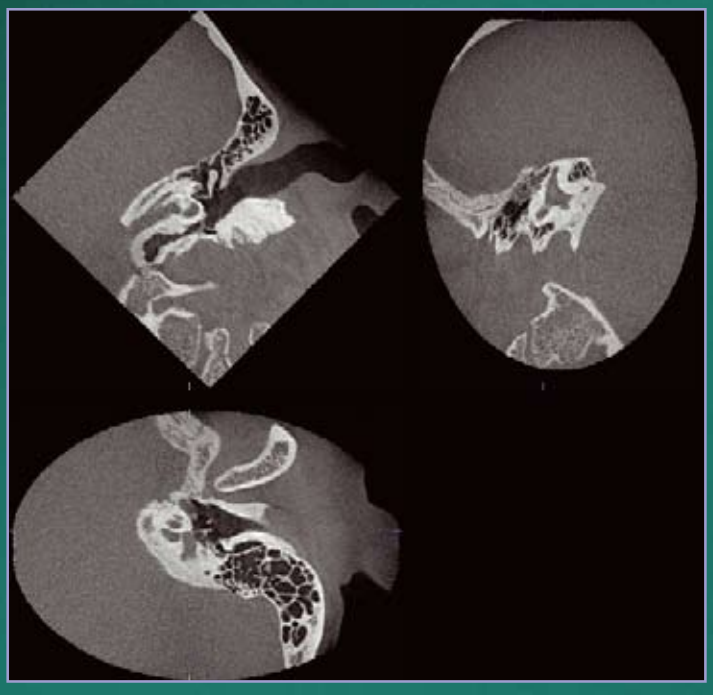
High Resolution Mode (Hi-Res)
360° scan: 30.8 seconds, 180° scan: 15.8 seconds.
This is the highest resolution. Exposures are made at one-fourth the size of the detector pixels for the greatest spatial resolution. It is ideal for observation of delicate bone structures such as the ossicular chain. Available for 40 x 40 mm and 60 x 60 mm fields of view.

High Fidelity Mode (Hi-Fi)
360° scan: 30.8 seconds, 180° scan: 15.8 seconds.
This mode has high density data to produce clear and sharp images. This mode is especially appropriate for performing zoom reconstructions.

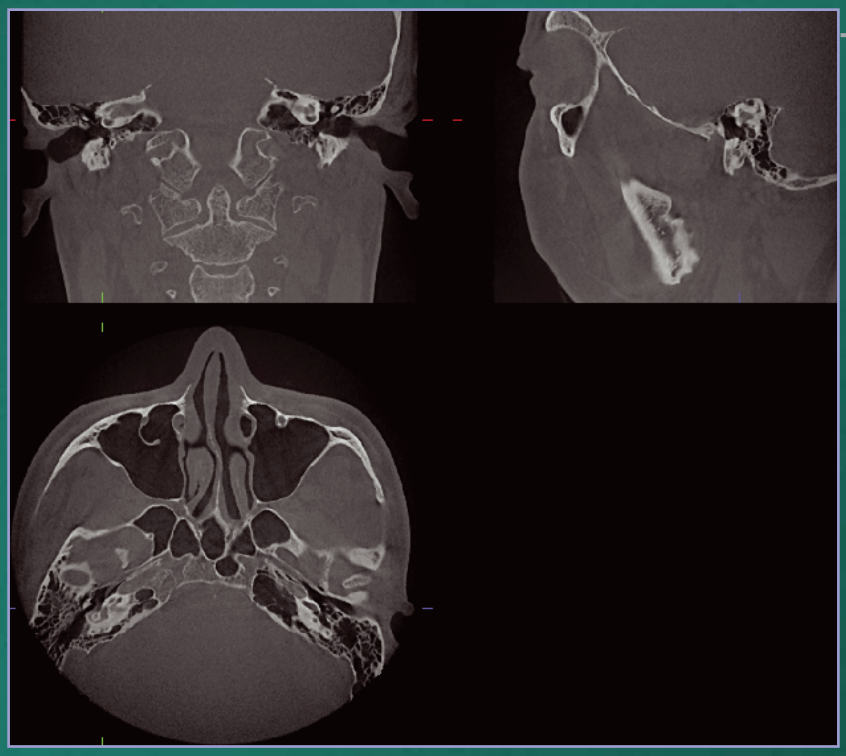
High Speed Mode (Hi-Speed)
360° scan: 10.5 seconds, 180° scan: 5.4 seconds.
High Speed mode reduces motion artifacts. It is a good choice for children or others who have difficulty remaining still. Available for 40 x 40 mm and 60 x 60 mm fields of view.



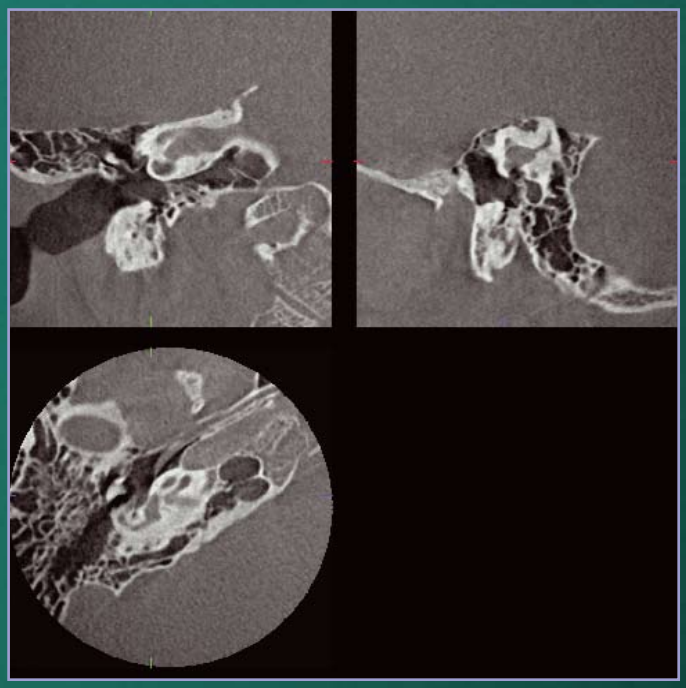
Std Mode ø 60 mm



Hi-Res Mode ø 60 mm

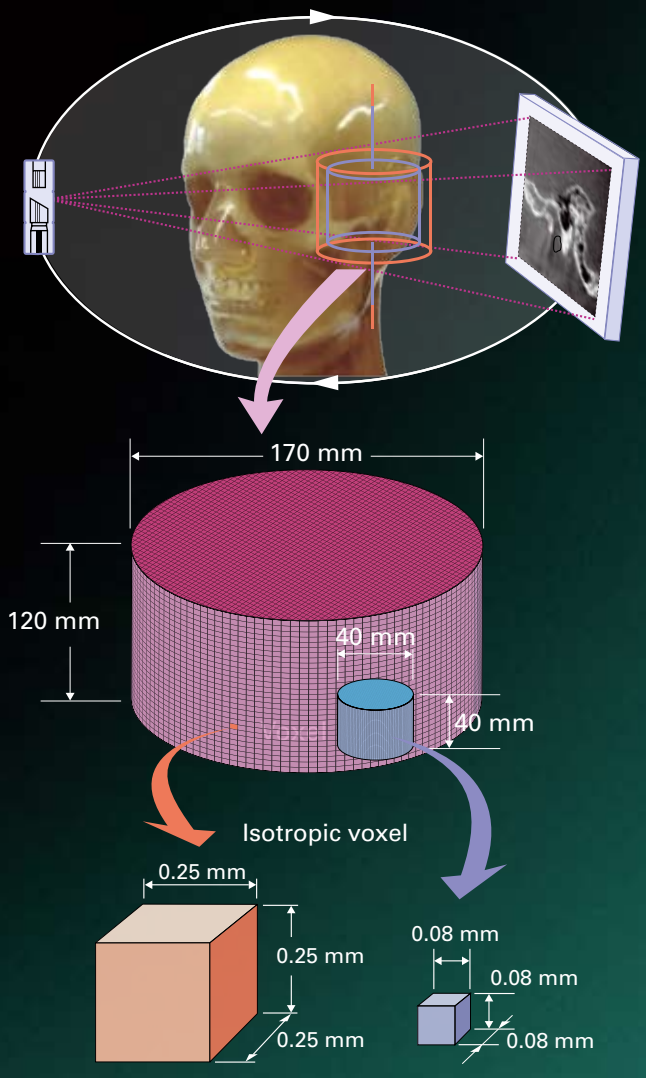


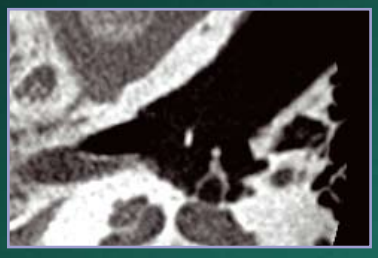
Hi-Fi Mode ø 170 × H 120 mm



Hi-Fi Mode ø 60 mm Zoom Reconstruction

3D IMAGE ACQUISITION





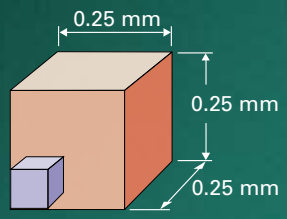
Enlarged yet smooth and distortion-free 80 µm high resolution image

How 3D Accuitomo 170 Acquires Images

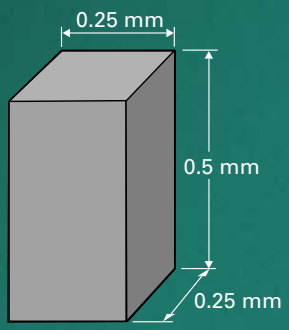
The arm rotates 360° around the center of the exposure region for 18 seconds (Standard Mode) as the X-ray head emits a cone-shaped beam. The multiple projections created during the arm's rotation are converted to a digital signal by the flat panel detector and are transmitted to the computer. After any necessary supplemental or corrective processing, the digital information is converted into a three dimensional CT image using an image reconstruction algorithm, and a high resolution image appears on the computer's display.

Low X-Ray Dosage

This unit's largest field of view of 170 x 120 mm (the entire head/neck area) offers dosage 25% less than an FMX, F-speed film.



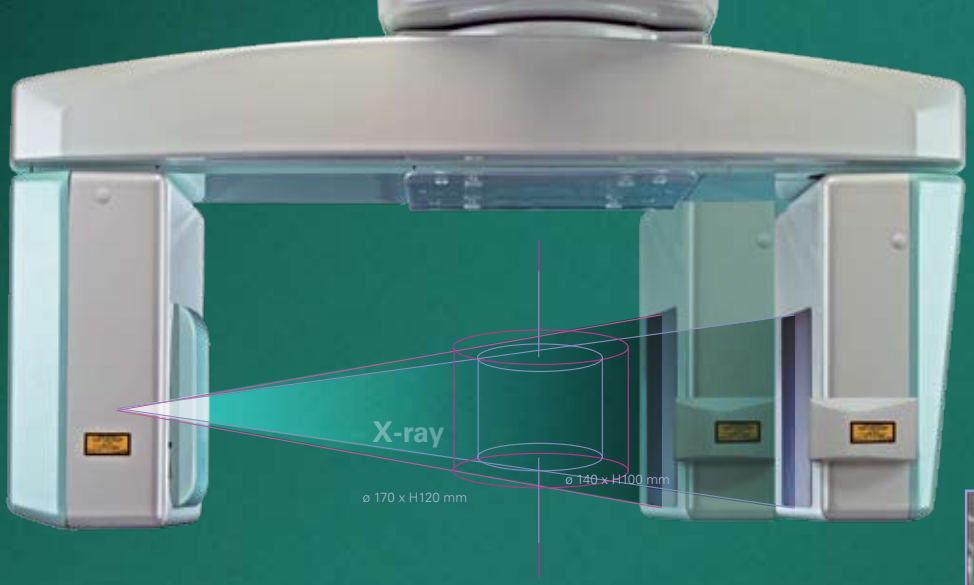
Isotropic cubic voxel
(3D Accuitomo)

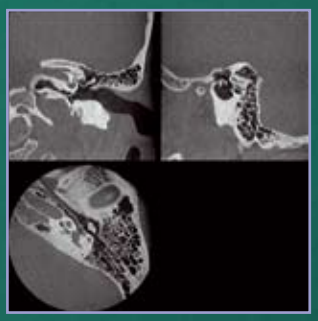


Anisotropic voxel
(Conventional CT)

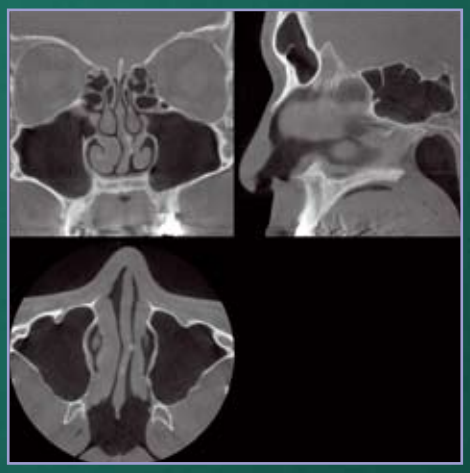
Isotropic Cubic Voxel

A voxel is the minimum unit of 3D data. 3D Accuitomo's voxel is an isotropic cube that produces images with equally fine detail in all three dimensions and minimizes artifacts produced by slice pitch and helical pitch, therefore resolution is never degraded by re-slicing. Rectangular voxels, used for conventional CT imaging (and some dental cone beam units), result in image degradation when re-sliced.

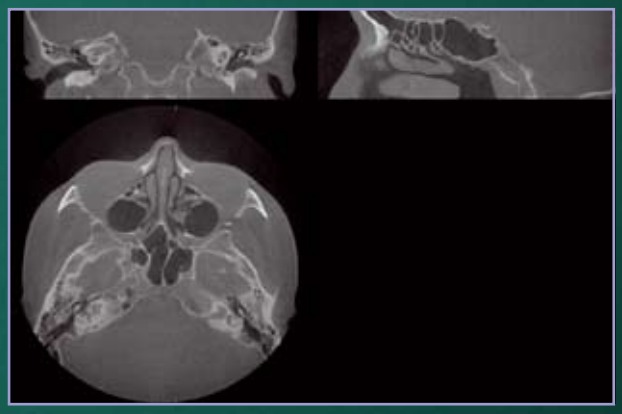




Temporal bone: ø 60 × H 60 mm



Paranasal sinuses: ø 100 × H 100 mm



Observation of the paranasal sinuses together with right and left temporal bone: ø 170 × H 50 mm

Observation of the paranasal sinuses together with right and left temporal bone: ø 170 × H 120 mm

Flat Panel Detector (FPD) Position Adjustment

Adjusting the position of the FPD reduces X-ray dosage, provides higher resolution, and minimizes distortion.

For regions such as 140 x 100 mm, moving the FPD slightly farther away from the center of the exposure area results in a better orthographic projection, which reduces distortion and improves resolution.

Optimizing collimation of the beam, depending on the size of the area, also reduces X-ray dosage and X-ray scattering as well.

Nine Fields of View

There are nine sizes for exposure regions with diameters ranging from 40 to 170 mm.

Diameter x Height (mm)

- ø 170 x H 120 mm
- ø 140 x H 100 mm
- ø 100 x H 100 mm
- ø 80 x H 80 mm
- ø 60 x H 60 mm
- ø 40 x H 40 mm
- ø 170 x H 50 mm
- ø 140 x H 50 mm
- ø 100 x H 50 mm

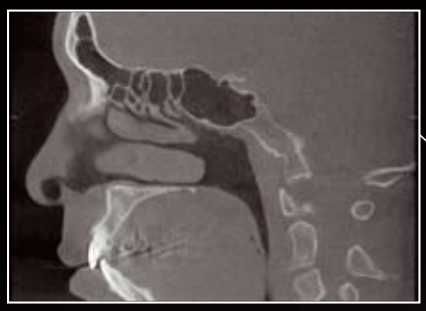
Resolution Stays High for Even Large Areas

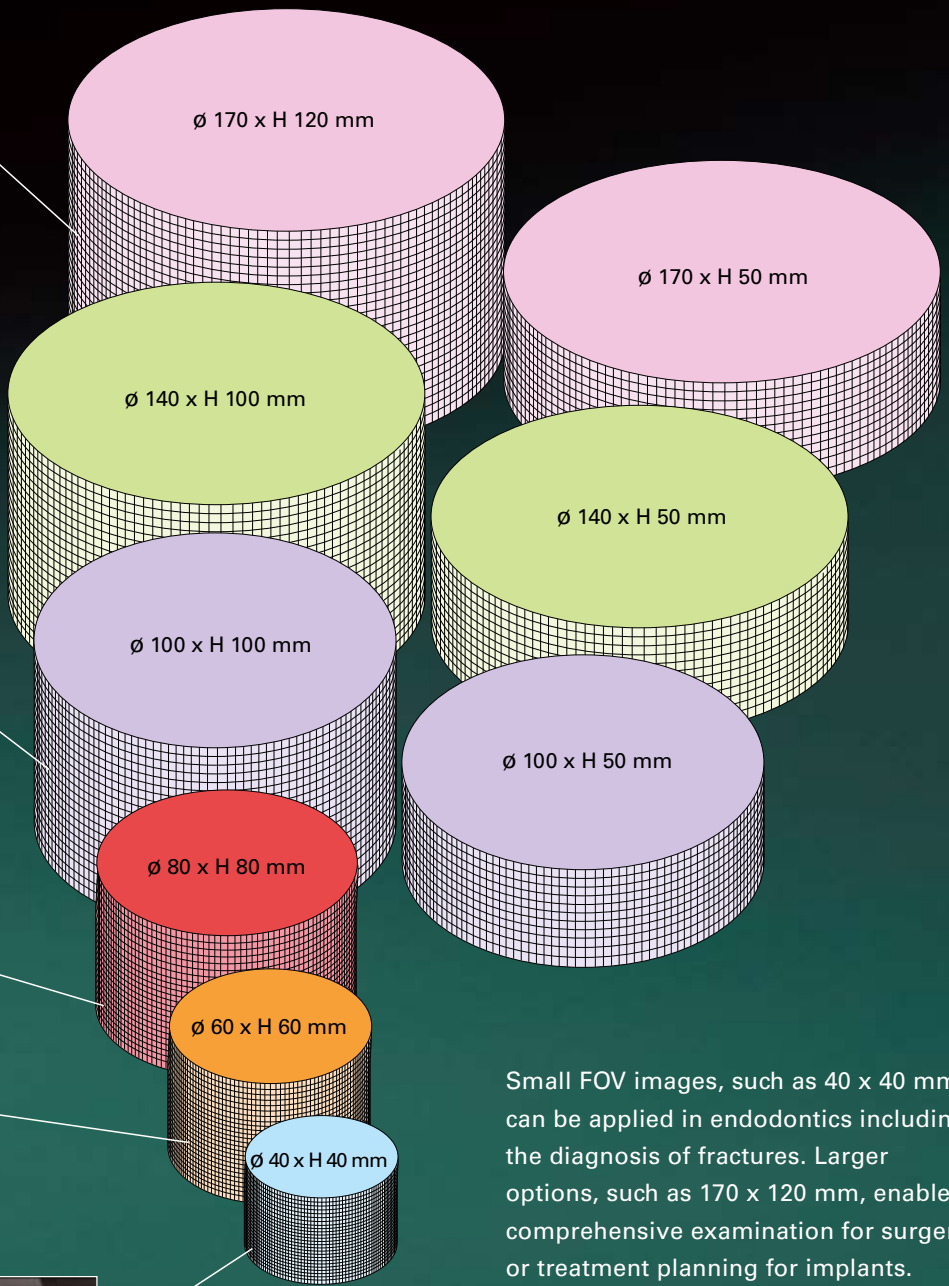
Resolution stays high and distortion is minimized for all regions from the smallest to the largest field of view.

NINE FIELDS OF VIEWS

13

3D ACCUITOMO 170 OFFERS A WIDE FOV RANGE from a couple teeth up to the entire head and neck area. By closely matching the FOV to the region of interest, patient dose is kept to a minimum.



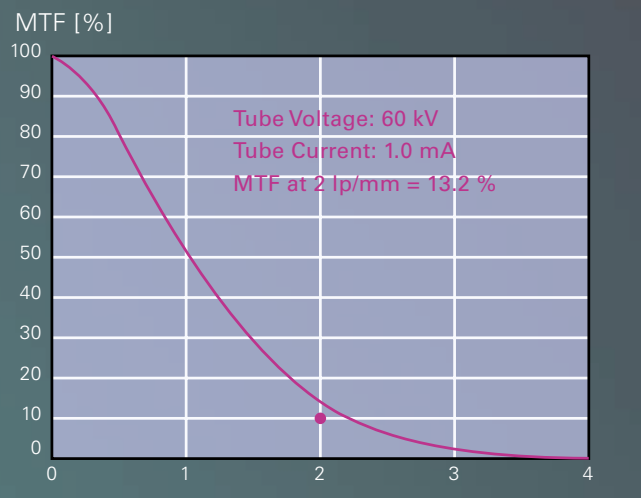


Small FOV images, such as 40 x 40 mm, can be applied in endodontics including the diagnosis of fractures. Larger options, such as 170 x 120 mm, enable a comprehensive examination for surgery or treatment planning for implants.

HIGH QUALITY 3D IMAGES WITH LOW DOSAGE

USING A HIGH-SENSITIVITY, HIGH-RESOLUTION flat panel detector, extremely detailed, high resolution images can be obtained of the head and neck region such as the temporomandibular joint (TMJ), erupting or impacted teeth, dental anomalies and pathology, tumors or cysts, fractures, sinuses, and cranial base for a wide range of multi-purpose diagnostic scanning.

Spatial Resolution*
MTF: Modulation Transfer Function



This function is based on data from a typical product.

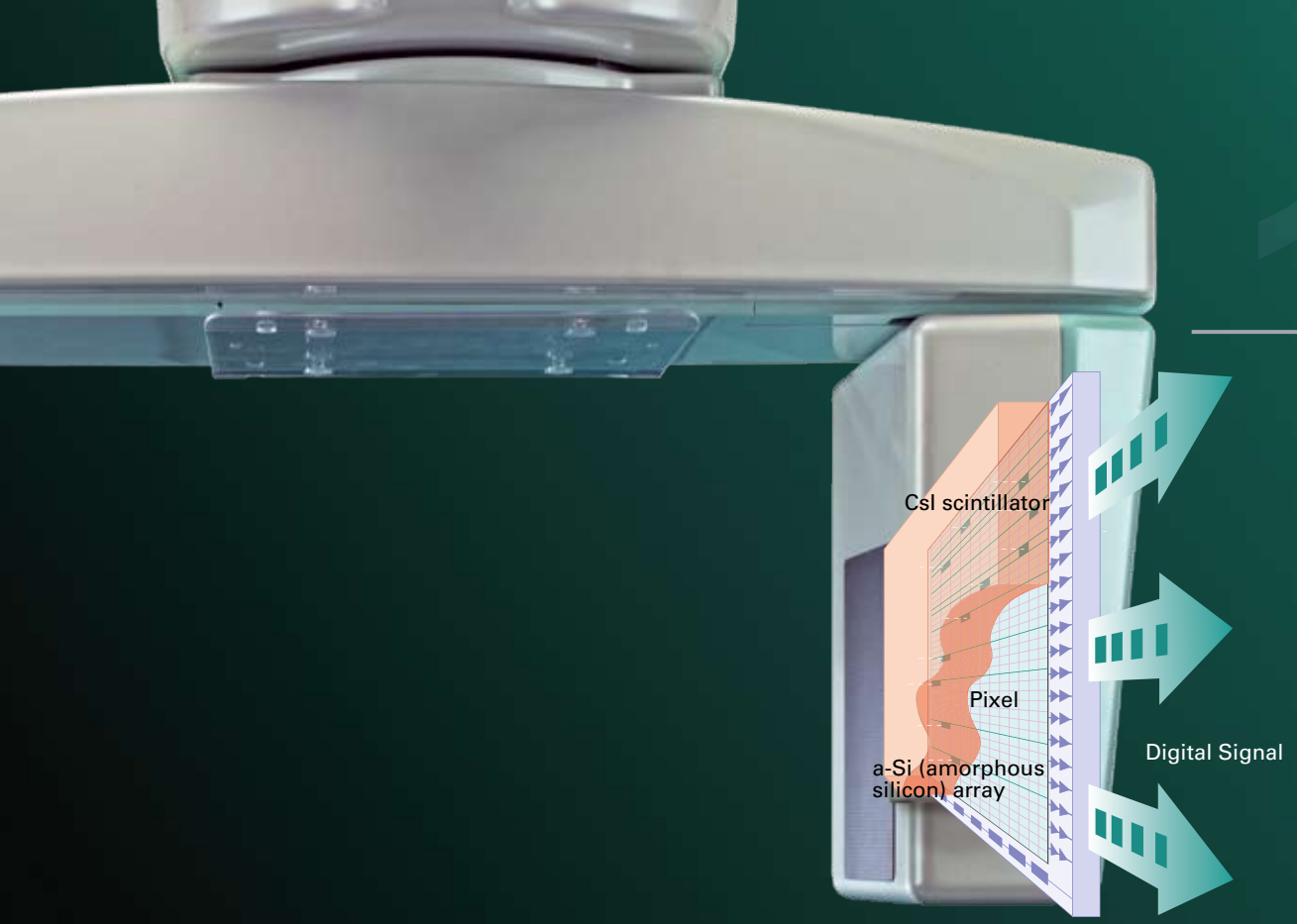
Flat Panel Detector (FPD)

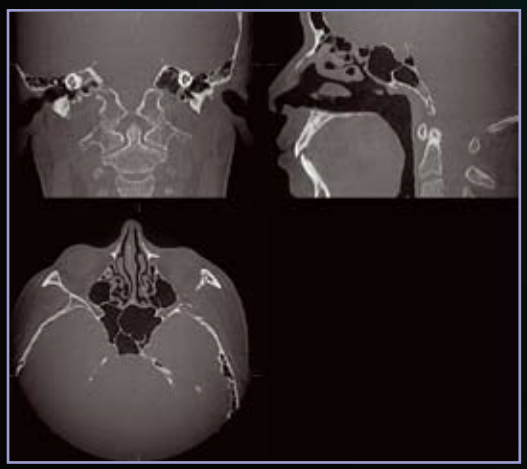
FPD conversion of X-ray exposure into a digital signal results in a dramatic improvement in image quality and a reduction in X-ray dosage. The FPD is not affected by magnetic fields and has superb sensitivity and resolution to produce superior 3D images with minimal distortion and a wide dynamic range expressed with a rich distribution of grayscale values.

X-rays are converted into visible light by the directly deposited CsI scintillator and then the light is converted into an electrical signal by a photo diode. The FPD is quite thin and has a long working life.

High Resolution

Detailed images have a resolution of at least 2.0 lp/mm (MTF 10%) with a voxel size of 80 µm.





Highly detailed imaging

Minimal Distortion

The flatness of the detector minimizes distortion. This eliminates the need for a compensation process, as used with analog systems, to correct for distortion prior to image reconstruction.

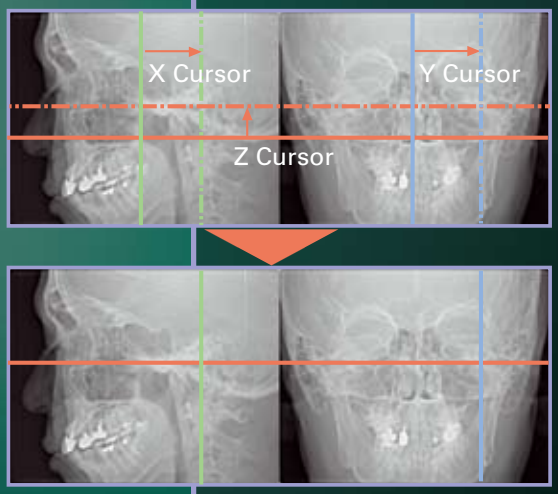
Wide Dynamic Range**

The FPD has a wide dynamic range of 14 bit data (64 times 8 bit data). This produces a precise grayscale differentiation.

** Spatial resolution refers to how distinct an image appears the smaller it becomes; it measures the fineness of an image. Spatial frequency is the unit of measurement of line pairs per distance (mm). As the map scale decreases, the patterns of contrast become harder to see. This is known as MTF (Modulation Transfer Function). It represents the number of line pairs per 1 mm that can be distinguished based on contrast. It is said that humans can only differentiate about 10%.*

*** Dynamic range: Numerical values express the reproducibility of the signal and the ratio of the largest and smallest input values in dBs. The dynamic range of the digital signal is also sometimes expressed in bits. The highest signal level is taken to be the level remaining after subtracting the noise level. The value of the dynamic range indicates how weak of a signal can be reproduced, or, in other words, how high the contrast resolution will actually turn out to be.*


3D Accuitomo
READY
SCAN time 1.0 sec
MODE
CT
SCOUT
FOV
Φ170 × 120
SCAN
180°
360°
SCAN MODE
Std
Hi-Fi
Hi-Res
Hi-Speed
80kV 2.0mA
Tube Voltage
Tube Current
Param. Memory
J.MORITA MFG.CORP
Kyoto Japan
IN/OUT
READY
BEAM
LOCK/FREE


X Cursor
Y Cursor
Z Cursor

SIMPLE, ACCURATE POSITIONING

17

THE THREE POSITIONING LASER BEAMS AND AN LCD make patient positioning easy. The chinrest stabilizes the patient's head to avoid movement. Scout images enable even more accurate positioning.

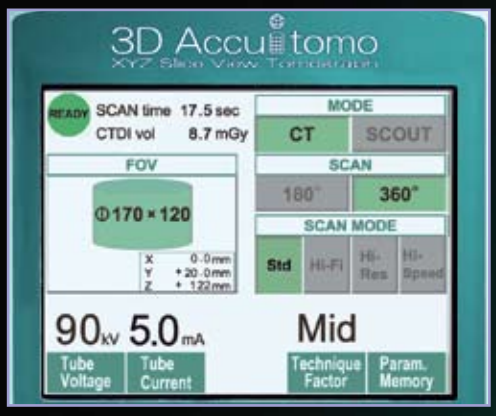
Easy as One, Two, Three

First, the patient's initial position is set and recorded using the three positioning laser beams. Then, the region of interest is aligned in the LCD. The chair automatically moves into the optimal position. During the X-ray exposure, the patient is stabilized by the chinrest and the headrest.

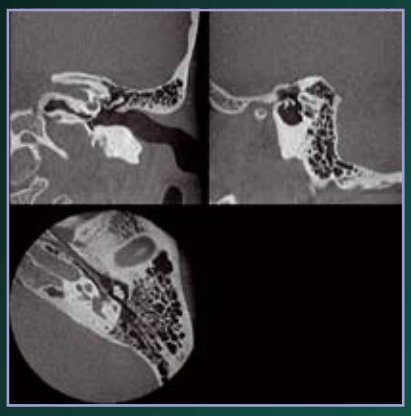
2-Directional Scout

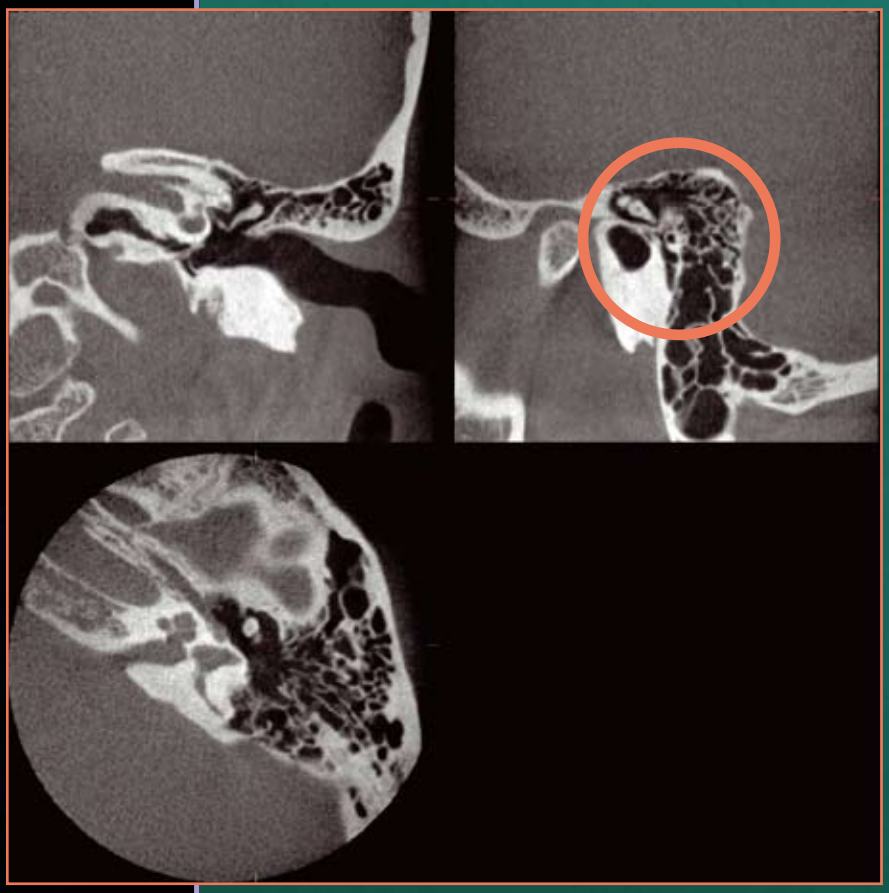
For even more accurate positioning, scout images can be utilized. After positioning, two still X-ray images of coronal and sagittal views can be taken to confirm that the position is accurate. If adjustment is necessary, positioning can be changed by dragging the cursor on the monitor and moving it to the center of the region of interest. Hitting the "ready" key will then automatically move the chair, and thus the region of interest, to the desired position.

The Scout exposure (80 kV and 2.0 mA) will increase the total X-ray dosage of a Standard Mode CT exposure (90 kV and 5.0 mA) by about 2%.

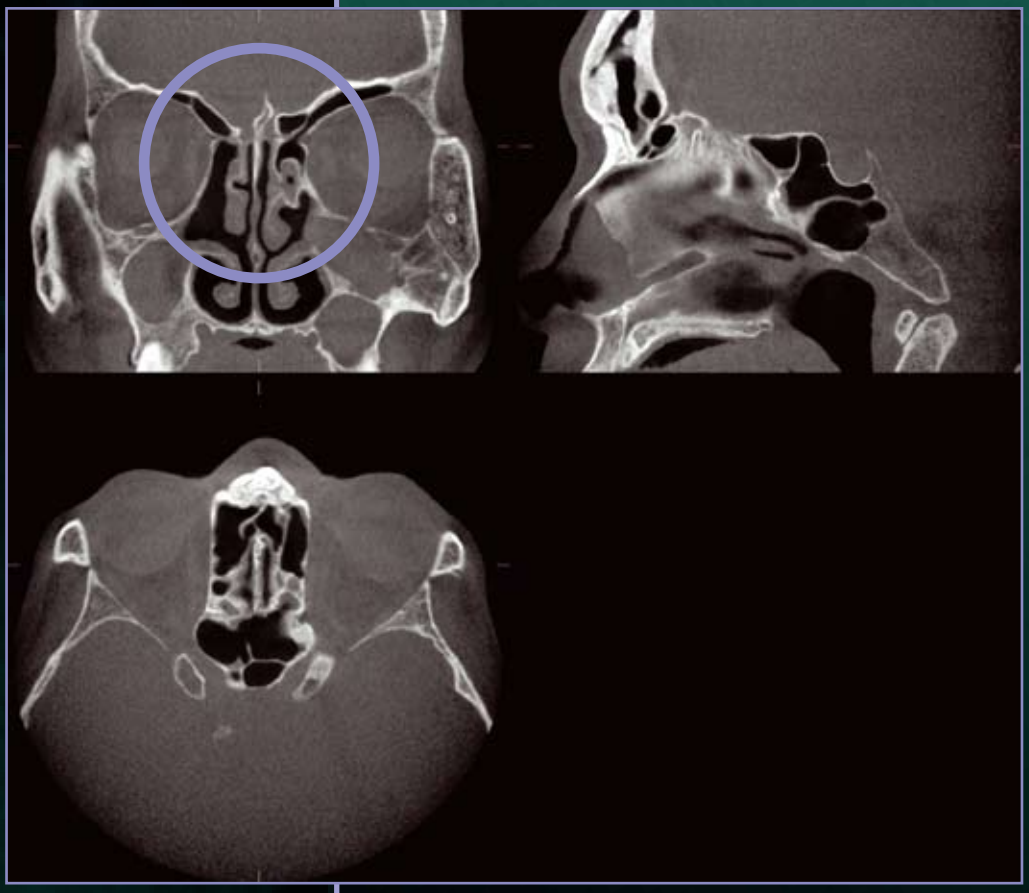


3D image region of interest is well centered.





Temporal bone: ø 60 x H 60 mm. Voxel size: 125 µm



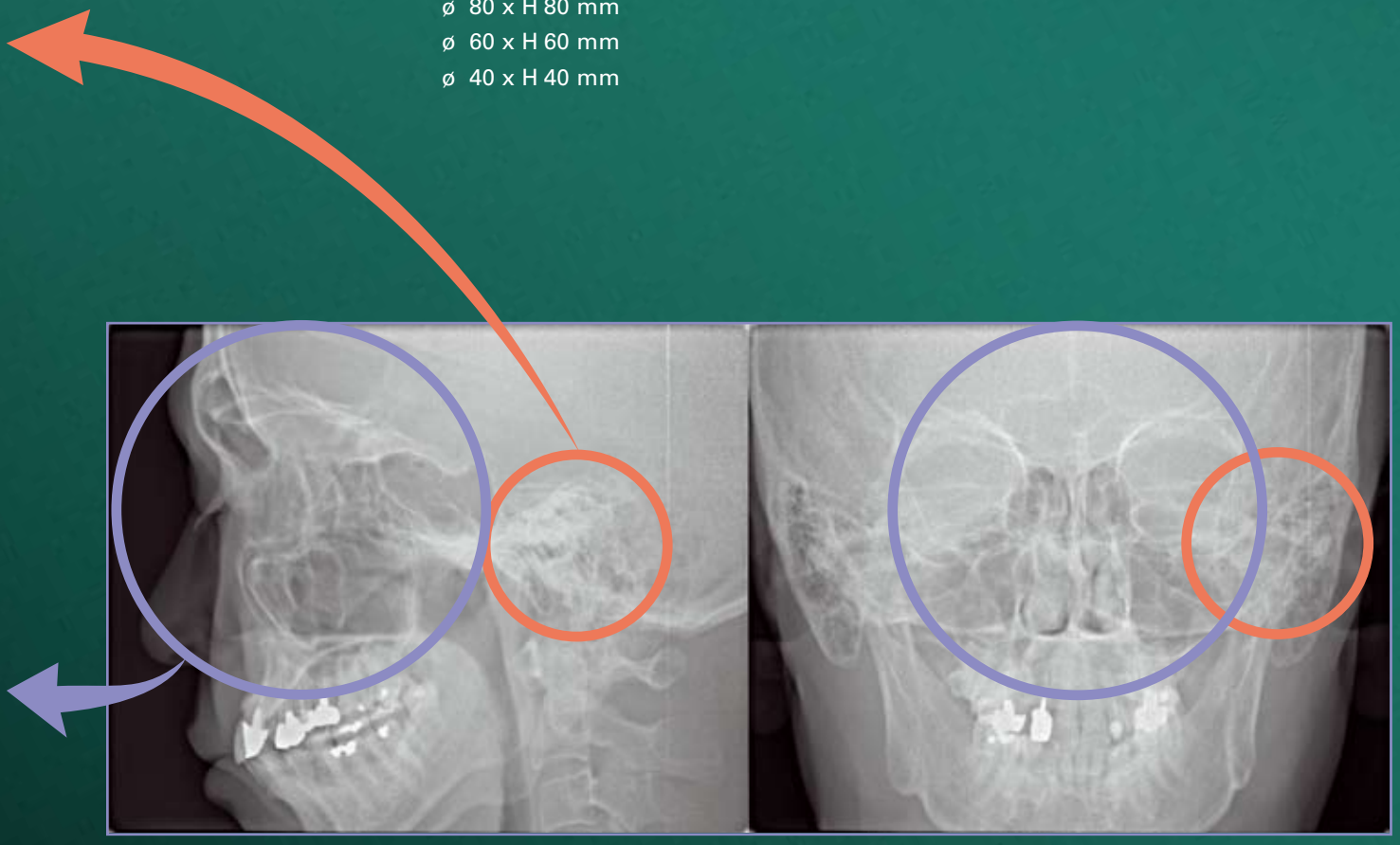
Paranasal sinuses: ø 170 x H 120 mm. Voxel size: 250 µm

LIMITED CT IMAGE AREA FOR REDUCED X-RAY DOSAGE

LIMIT THE X-RAY DOSAGE by accurately determining the minimum region of interest before exposing the patient to the higher dosage CT scan.

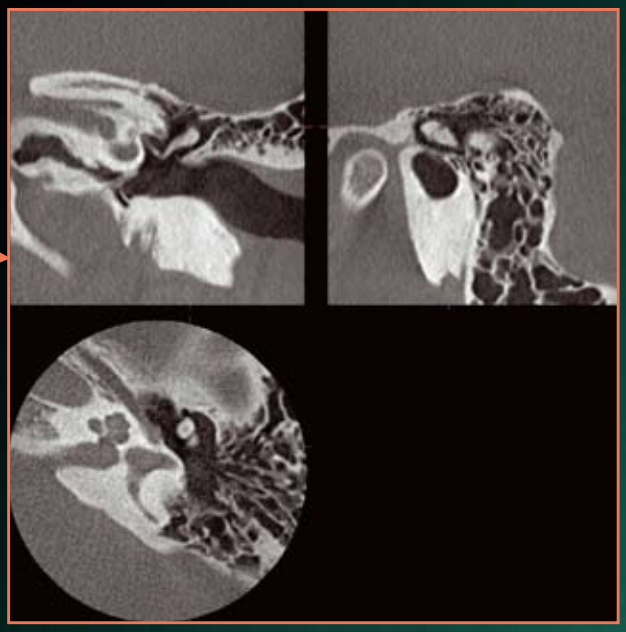
Imaging Area: Diameter x Height (mm)

ø 170 x H 120 mm	ø 170 x H 50 mm
ø 140 x H 100 mm	ø 140 x H 50 mm
ø 100 x H 100 mm	ø 100 x H 50 mm
ø 80 x H 80 mm	
ø 60 x H 60 mm	
ø 40 x H 40 mm	



Scout Image

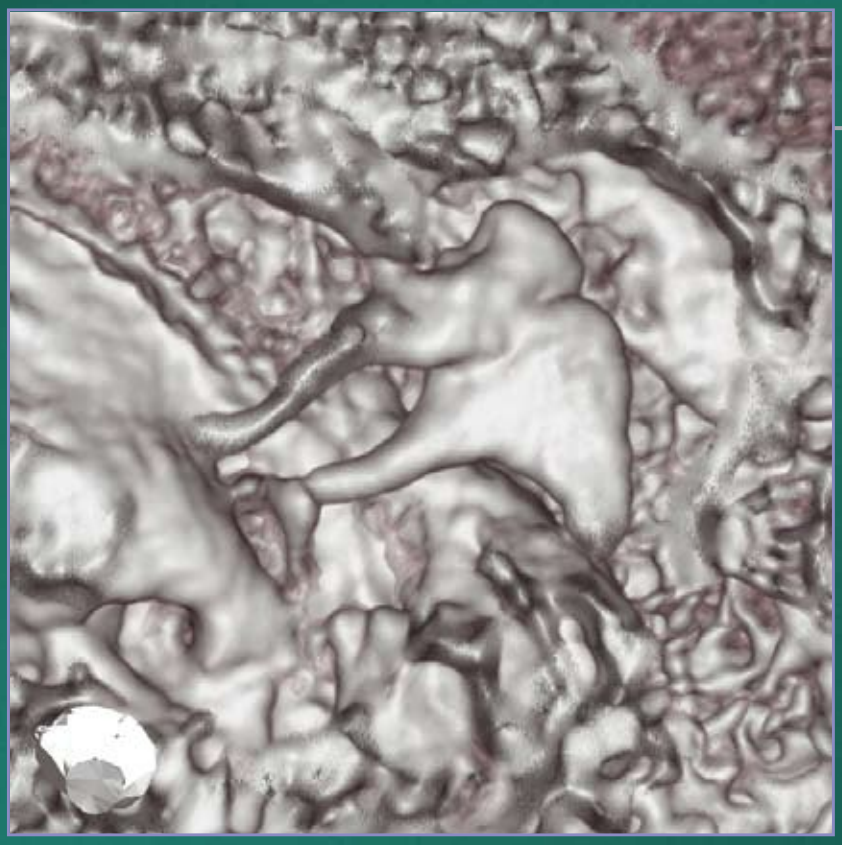
ZOOM RECONSTRUCTION WITH 80 µm VOXEL RESOLUTION



Auditory ossicular chain zoom reconstruction

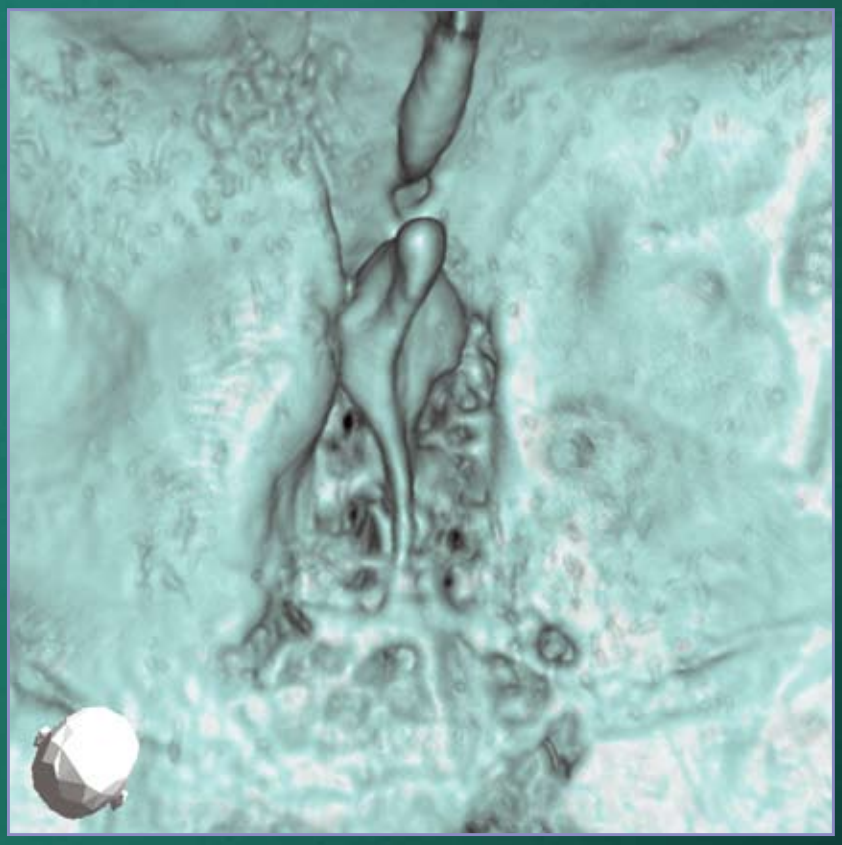
Select a region of interest such as the temporal bone or paranasal sinus and zoom in with 80 µm voxel resolution for a more detailed observation.

Ethmoid sinus zoom reconstruction



Auditory ossicular chain

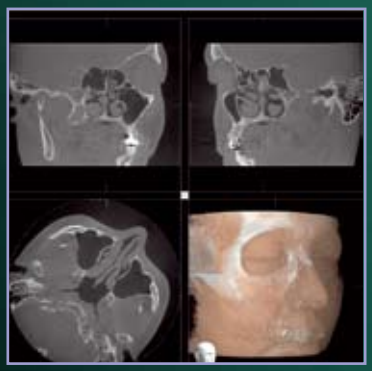
Volume rendering produces a detailed 3D view of internal structures.



Lamina Cribrosa

i-Dixel IMAGE PROCESSING SOFTWARE

RECENTLY UPDATED, i-Dixel 2.0 IMAGE PROCESSING SOFTWARE is easy to use with several added features for advanced image manipulation and observation.



Compatibility

i-Dixel 2.0 comes standard with 3D Accuitomo 170 and all Morita 3D units. It is compatible with Microsoft Windows® 7 and can be seamlessly integrated into a network environment.

Version 2.0 Updates

An improved user interface makes i-Dixel 2.0 easier to use and navigate. Updated filters between i-Dixel and One Volume Viewer (viewing software) offer uniform image quality and resolution. Several new features have also been added for advanced image manipulation including real time re-slice in the highest resolution, implant planning, and a nerve canal tracing function. i-Dixel 2.0 is also fully integrated with TDO Practice Management Software – the most comprehensive and widely used endodontic software in the world. TDO users can seamlessly incorporate an Accuitomo unit into their practice with full compatibility.

FEATURES

Volume Rendering

Volume rendering of CT data produces three dimensional images. Select the area of interest and adjust the controls for the histogram to create a detailed image of very fine structures.

Curved MPR (cMPR)

cMPR allows observation of an orthogonal representation of the dental arch or any arbitrary curve.

Other Key Features

- XYZ View Windows
- Re-slice
- Zoom
- Rotate
- Histogram
- Edge Enhancement
- Distance and Angle Measurement
- Negative Image
- Mirror Image
- Slice Distance Measurement
- Surface Rendering
- DICOM 3.0 Compatible
- Brightness Conversion
- Spatial Frequency Filter
- Patient Orientation Display
- Density Measurement
- Nerve Canal Tracing
- Report Comments for Images

SHARING IMAGE DATA

INSTALLING i-Dixel SOFTWARE on all intra-clinic computers enables sharing of image data on each linked client computer. Observation of images on non-network computers can be achieved with One Data Viewer and One Volume Viewer without installing i-Dixel.

One Data Viewer & One Volume Viewer

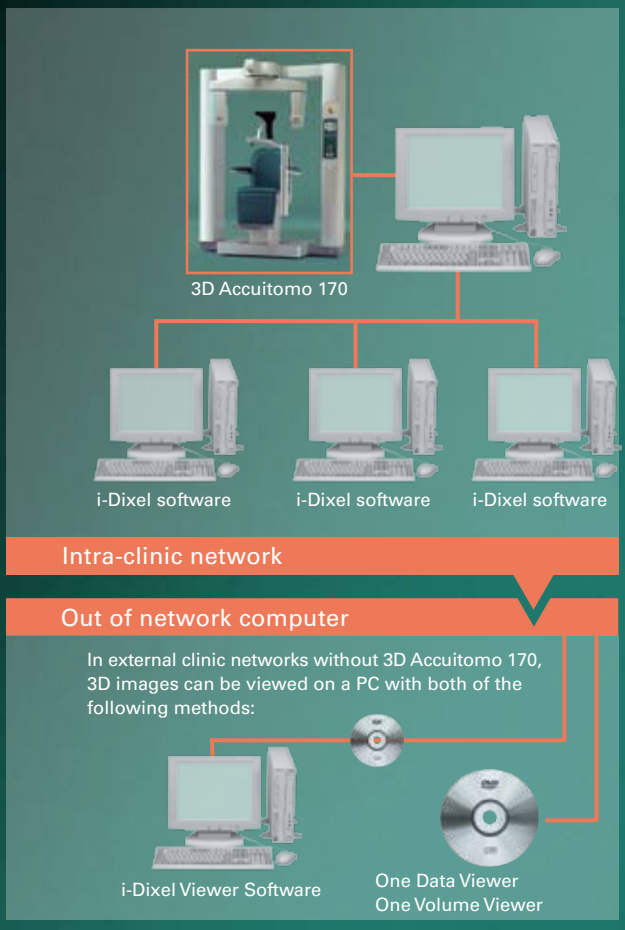
These unique Morita applications allow you to view three dimensional images and volume rendered images even if the computer does not have i-Dixel software installed.

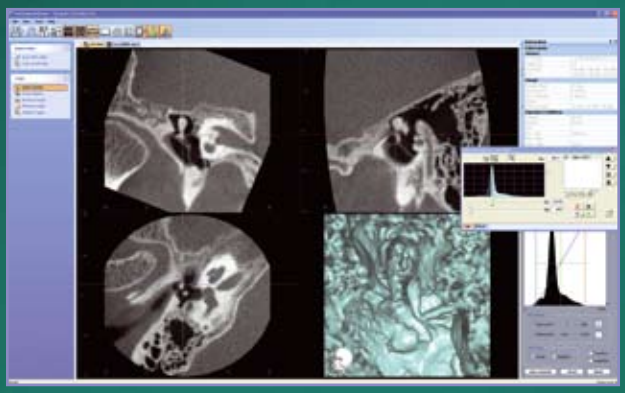
CT data can be exported from the i-Dixel application and later stored on a CD, DVD, or removable media. This information can then be transferred to a computer outside the clinic to view CT images, volume rendered images, and patient information.

Additional functions include zoom, black and white reverse, brightness and contrast adjustment, as well as optional length and angle measurement capabilities.

i-Dixel conforms to the following DICOM standards:

1. Modality worklist management service class
2. Storage service class
3. Modality performed procedure step service class
4. Print management service class



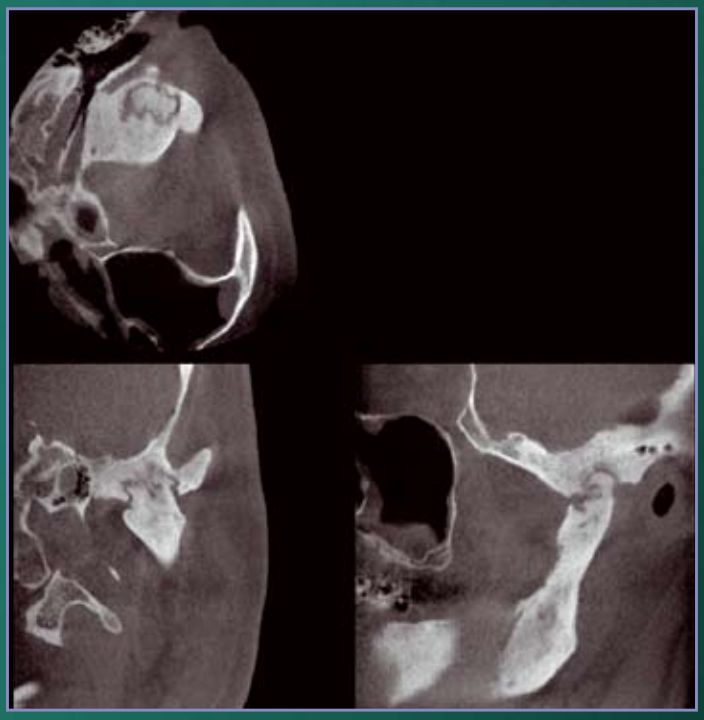


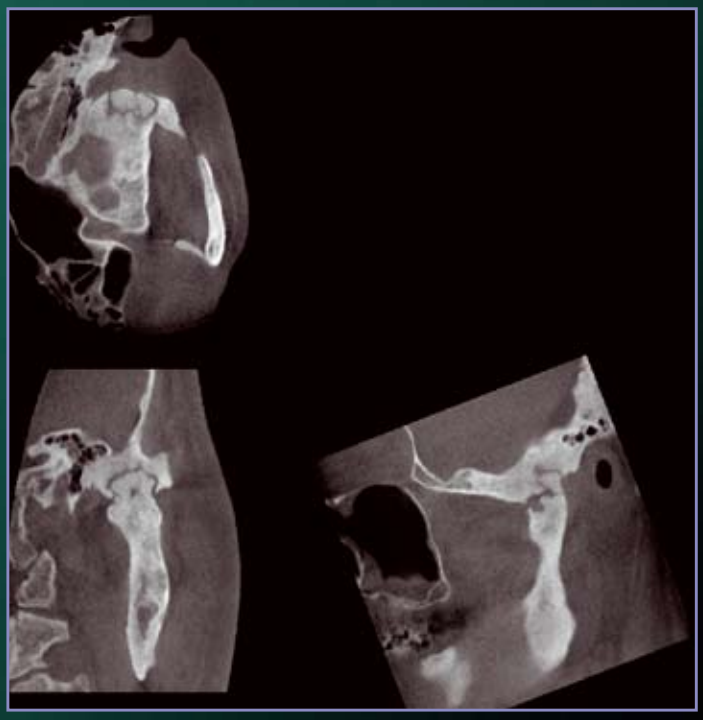
One Volume Viewer

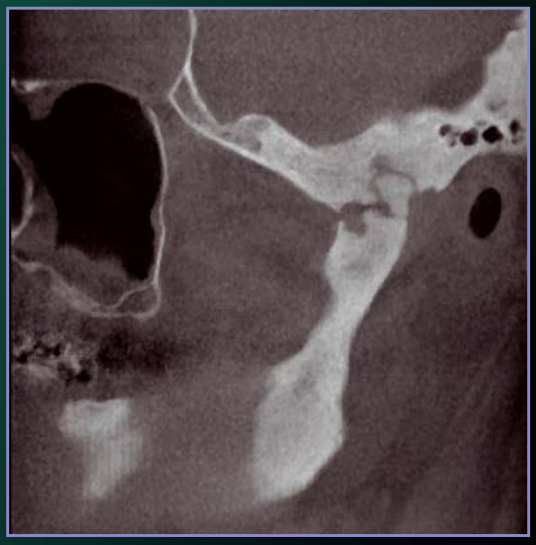
CLINICAL CASES

OSTEOMYELITIS

Osteomyelitis of the left condyle and the temporomandibular fossa.

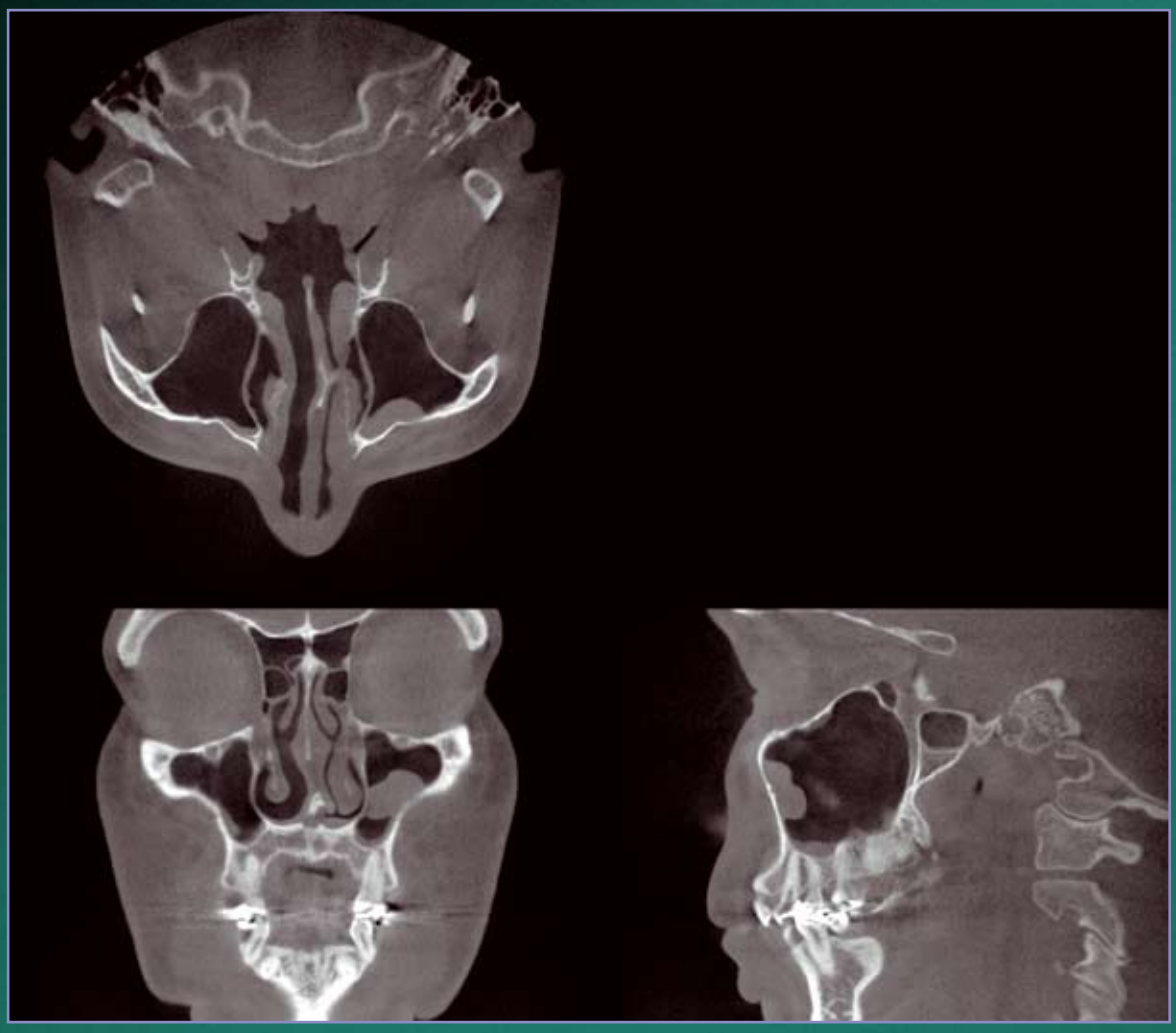


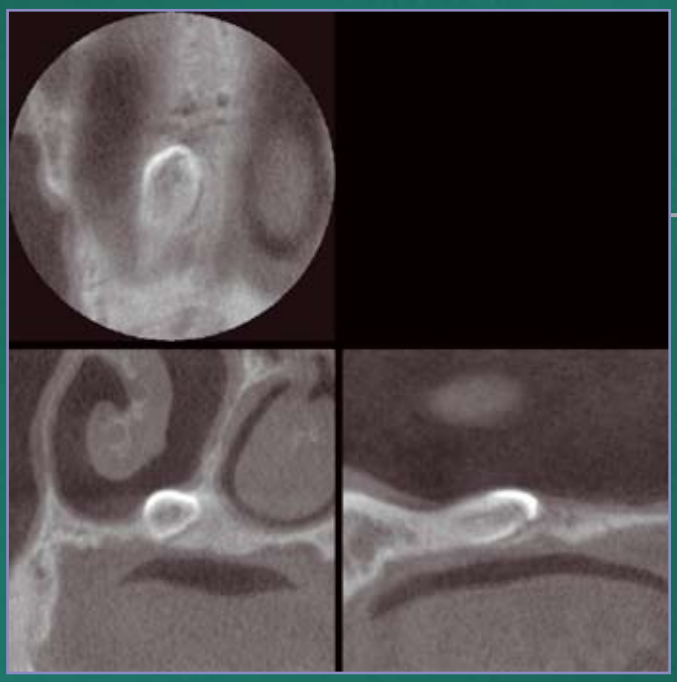




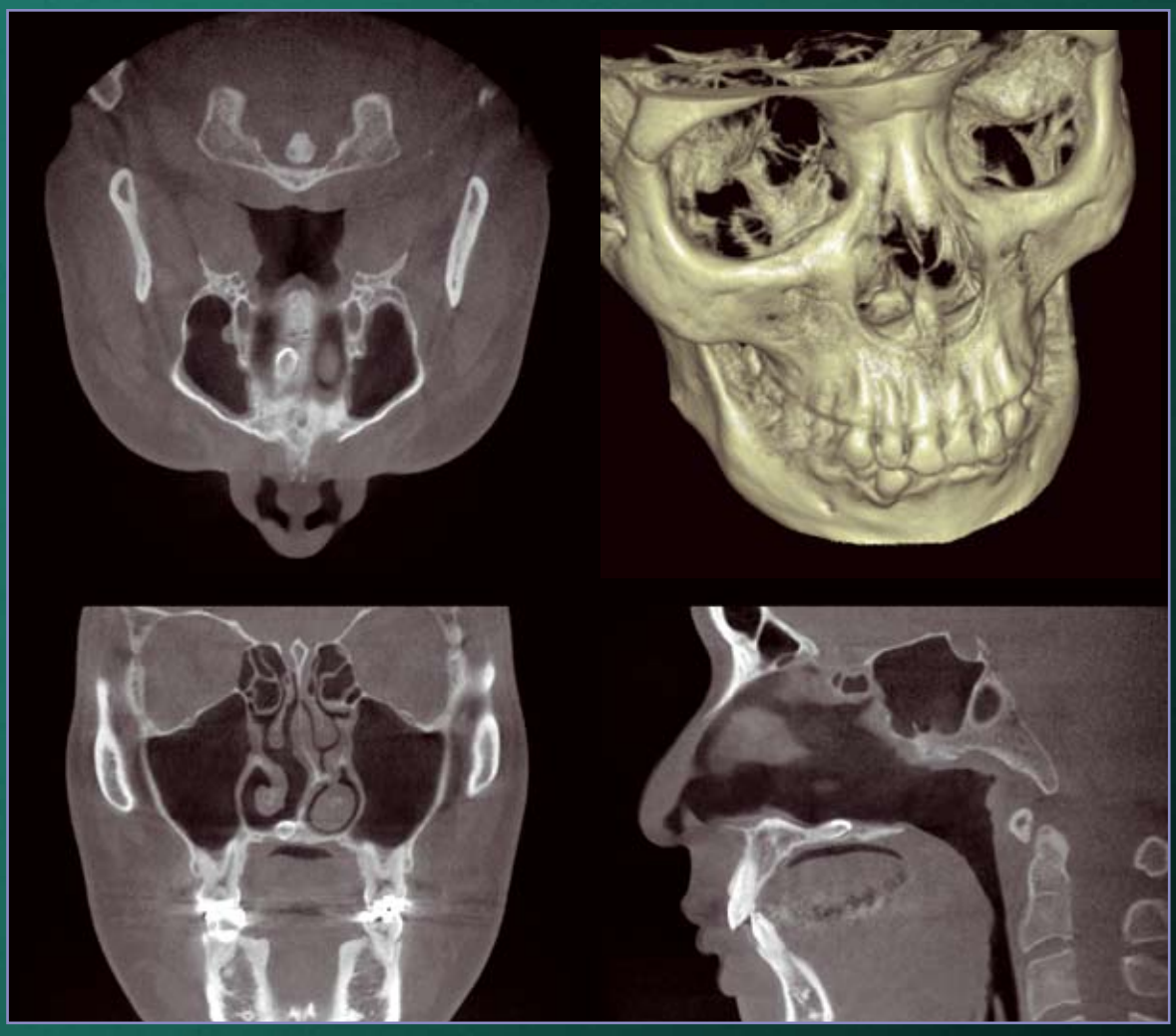
NASAL SINUSITIS AND INVERTED SUPERNUMERARY TOOTH

All paranasal sinuses are fully developed. Findings of the sinuses are normal except the left sinus in which there is a polyp on the frontal wall. In the left nasal cavity, the mucous membrane of concha nasalis inferior and media is thickened. The nasal septum deviates to the left. These changes are narrowing the middle meatus and the nasal air passage. The image confirms that there is no obstruction in the middle meatus or the infundibulum.



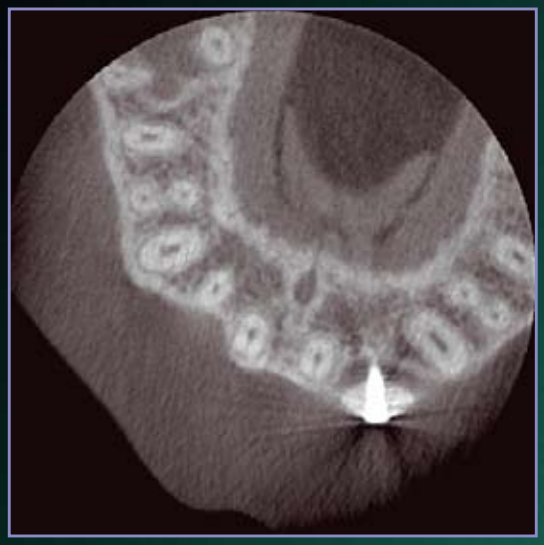


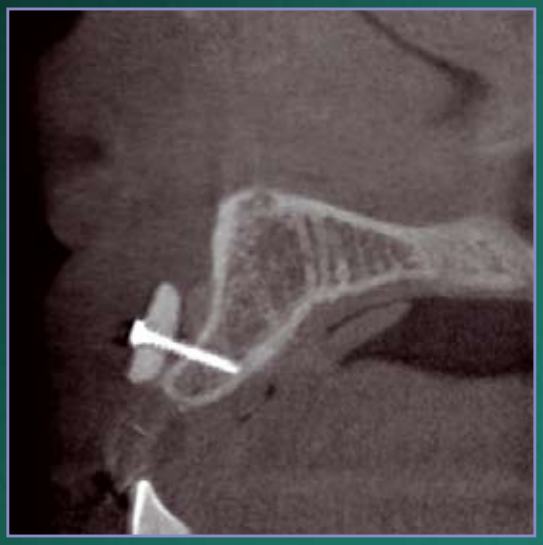
In addition, an inverted supernumerary tooth exists in the middle of the palate. It does not represent follicle enlargement or other pathological changes.



LABIAL BONE

Labial bone graft of the upper anterior region.





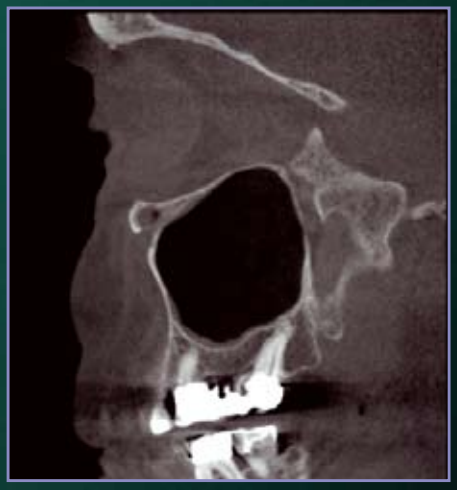
LARGE FOLLICULAR CYST

Large follicular cyst in the left body of the mandible.

MAXILLARY SINUS ASYMMETRY

29

Marked asymmetry between right and left maxillary sinus.

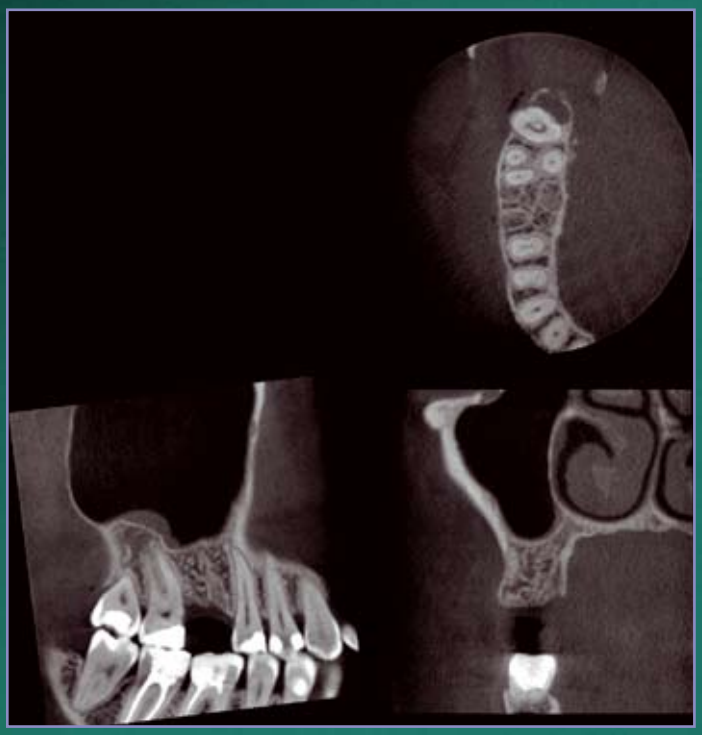


RESIDUAL ROOT

Inflammatory bone destruction associated with a residual root tip.

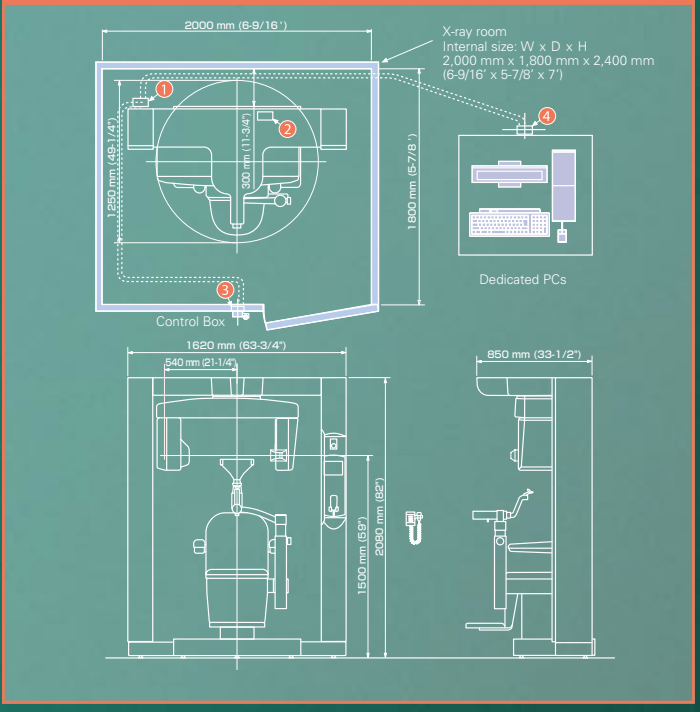
IMPLANT PLANNING

Volume of the alveolar bone of the region of missing molar.



TECHNICAL SPECIFICATIONS

Dimensions



1. Outlet of computer cable and operation cable
2. Outlet of power supply
3. Outlet of operation cable
4. Outlet of computer cable

Specifications

Trade Name		3D Accuitomo
		XYZ Slice View Tomograph
Model		MCT-1
Type		EX1/2 F17
Input Voltage		100 / 110 / 120 VAC
		220 / 230 / 240 VAC
Power Consumption		max. 2.0 kVA
X-ray Head		
	Tube Voltage	60 - 90 kV
	Tube Current	1-10 mA (Max 8 mA : Hi-Fi, Hi-Res Mode)
	Focal Spot Size	0.5 mm
Exposure Time (360° / 180°)		Std Mode: 17.5 / 9.0 sec.
		Hi-Fi Mode: 30.8 / 15.8 sec.
		Hi-Res Mode: 30.8 / 15.8 sec.
		Hi-Speed Mode: 10.5 / 5.4 sec.
Field of View (Diameter × Height)		ø 170 x H 120 mm, ø 170 x H 50 mm, ø 140 x H 100 mm, ø 140 x H 50 mm, ø 100 x H 100 mm, ø 100 x H 50 mm, ø 80 x H 80 mm, ø 60 x H 60 mm, ø 40 x H 40 mm
Voxel Size		80 µm, 125 µm, 160 µm, 200 µm, 250 µm
Outer Dimensions		
	Main Unit (W x D x H)	1,620 mm × 1,250 mm × 2,080 mm (63-3/4" x 49-1/4" x 82")
	Control Box (W x D x H)	96 mm × 40 mm × 115 mm (3-3/4" x 1-5/8" x 4-1/2")
Weight		Approx. 400 kg. (882 lbs)

X-ray protection should be provided for the patient when X-rays are emitted.
Design and specifications are subject to change without notification.

Images provided by:
Fukushima Medical University
Technical Assistance: NUBIC (Nihon University Business, Research, and Intellectual Property Center)
Collaborative Development: J. Morita Corp. & Nihon University

Erkki Tammisalo
Emeritus professor of Oral Radiology
Tomodent, Private Laboratory of Oral Diagnostic Imaging
Turku, Finland

MORITA

J. MORITA MFG. CORP.

Distributed by

J. MORITA USA, INC.
9 Mason, Irvine, CA 92618 U.S.A.
Toll Free: (800) 831-3222, Fax: (949) 465-1095, www.morita.com/usa

J. MORITA EUROPE GMBH
Justus-von-Liebig-Strasse 27A, D-63128 Dietzenbach, Germany
Tel: +49-6074-836-0, Fax: +49-6074-836-299, www.morita.com/europe

J. MORITA AUSTRALIA & NEW ZEALAND
247 Coward Street, Suite 2.05, Mascot NSW 2020, Australia
Tel: +61 2 9667 3555, Fax: +61 2 9667 3577, www.morita.com/anz

J. MORITA MIDDLE EAST
Saraya Al Wessam Bldg., Tower A, Appt. 902
Cross roads Tag Roasaa & Abu Heif, Saba Pacha, Alexandria, Egypt
Tel: 203 58 222 94, Fax: 203 58 222 96, www.jmoritamiddleeast.com

J. MORITA CORPORATION
33-18, 3-Chome, Tarumi-cho Suita City, Osaka, 564-8650 Japan
Tel: +81-6-6380-2525, Fax: +81-6-6380-0585, www.morita.com/asia

Developed and Manufactured by

J. MORITA MFG. CORP.
680 Higashihama Minami-cho, Fushimi-ku, Kyoto, 612-8533 Japan
Tel: +81-75-611-2141, Fax: +81-75-622-4595, www.morita.com/dental

L-616 01/11