

3D Accu<sup>i</sup>tomo 80



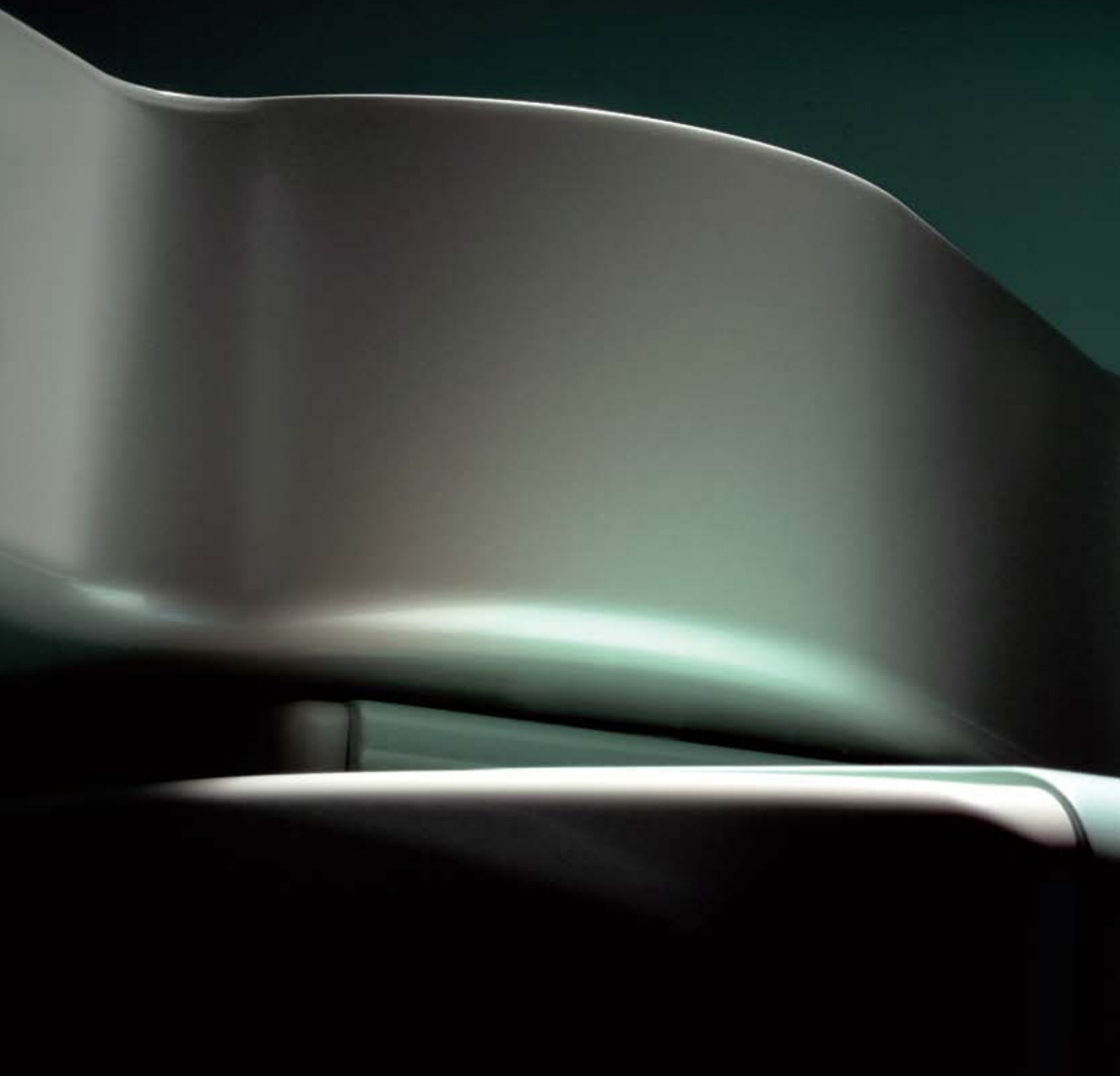
Thinking ahead.



Focused on life.

**REALIZED: GROUNDBREAKING RESOLUTION OF 80  $\mu\text{m}$  VOXEL**

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05

## THE CRYSTALLIZATION OF CUTTING-EDGE MECHATRONICS AND HIGH DEFINITION DISPLAY ALGORITHM

The 3D Accuitomo 80 offers a minute voxel size of just 80  $\mu\text{m}$  (micrometer). This super-fine voxel combined with the unit's 13 bit grayscale capability displays an amazing level of clarity never before seen in the world of 3D imaging.

**Newly developed** Zoom Reconstruction function

**Three image sizes available**

$\phi$  40  $\times$  H 40 mm,  $\phi$  60  $\times$  H 60 mm,  $\phi$  80  $\times$  H 80 mm

**Offers high definition** 3D images with low patient dose

**Displays both hard and soft tissue**

A wide dynamic range and precise grayscale differentiation capability

**Enables comprehensive examination** for diagnosing apical lesions, TMJ problems, caries, and treatment planning for implants, surgery, restorative procedures, etc.

**One Data Viewer Software**

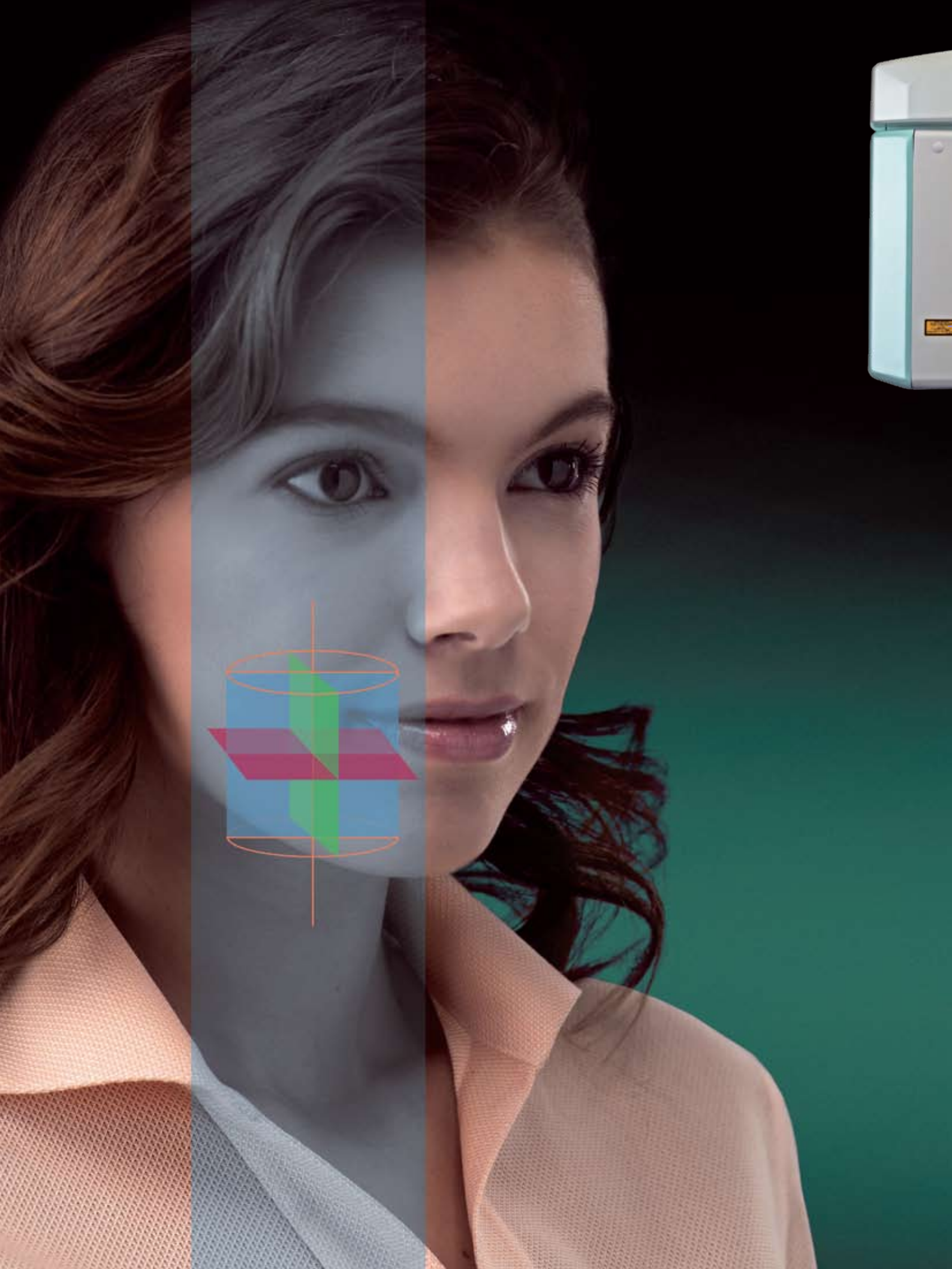
**Volume rendering function**

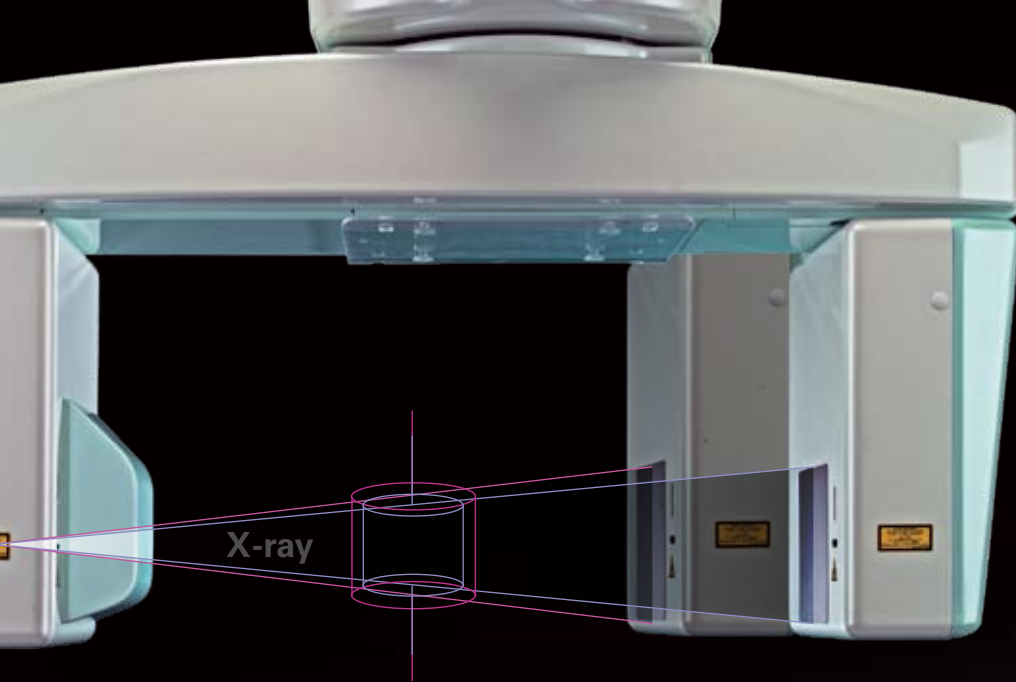
**Intra-clinic network compatibility**

**Compact**

Floor space: 63-3/4"  $\times$  47-1/4" (1,620 mm  $\times$  1,200 mm)

*Basis technology provided by NUBIC (Nihon University Business, Research and Intellectual Property Center). Developed in collaboration with Nihon University School of Dentistry and J.Morita Mfg. Corp.*





### Flat Panel Detector (FPD) Automatic Positioning Function

For  $\varnothing 40 \times H 40$  mm and  $\varnothing 60 \times H 60$  mm images, increasing the distance between the center of the object being X-rayed and the FPD, the beams are almost parallel, delivering high resolution images with no distortion. Collimation of the beams also makes it possible to minimize patient radiation dose and reduce scatter.



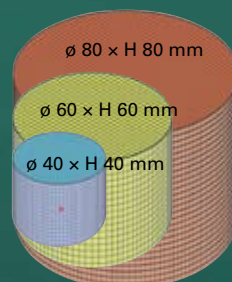
$\varnothing 40 \times H 40$  mm image is suitable for 90% of all cases while keeping patient dose to a minimum.



$\varnothing 60 \times H 60$  mm image provides a wide image area and simultaneous examination of maxillary and mandibular teeth.

### High Resolution is Maintained Even When the Image Area is Increased

From a wide image area ( $\varnothing 80 \times H 80$  mm) to a narrow image area ( $\varnothing 40 \times H 40$  mm), high resolution is maintained with no distortion even as the image is expanded from  $\varnothing 40 \times H 40$  mm to  $\varnothing 80 \times H 80$  mm.



$\varnothing 80 \times H 80$  mm image allows for a full mouth examination.

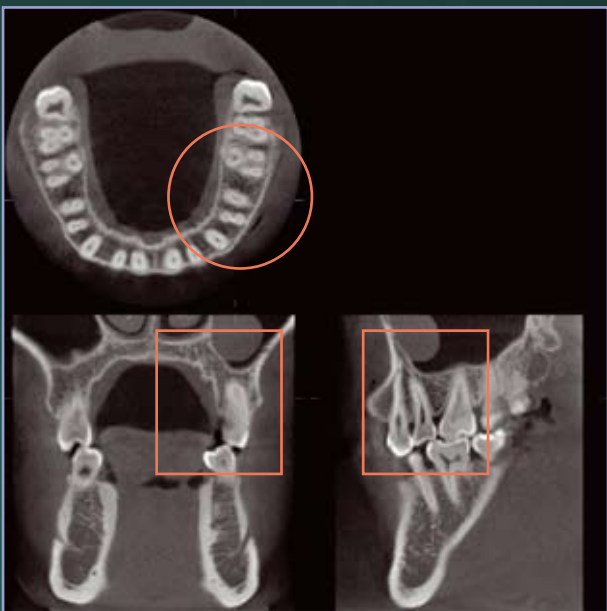
## ZOOM RECONSTRUCTION

**THE ZOOM RECONSTRUCTION** function provides high resolution, 80  $\mu\text{m}$  voxel size, 3D images of any region of interest. This allows for a comprehensive examination and diagnosis. There is no need to retake images since all data has already been acquired.

### Choice of Three Resolution Options

Voxel sizes of 80  $\mu\text{m}$ , 125  $\mu\text{m}$  or 160  $\mu\text{m}$  can be selected as the resolution for each image area.

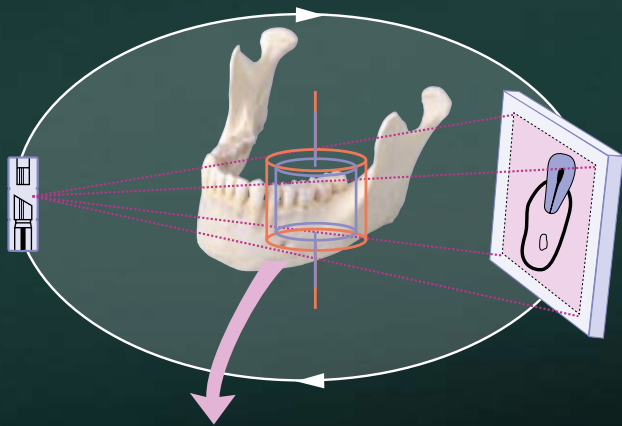
Default setting  $\varnothing 40 \times H 40 \text{ mm}$ : 80  $\mu\text{m}$   
 $\varnothing 60 \times H 60 \text{ mm}$ : 125  $\mu\text{m}$   
 $\varnothing 80 \times H 80 \text{ mm}$ : 160  $\mu\text{m}$



$\varnothing 80 \times H 80 \text{ mm}$ , voxel size: 160  $\mu\text{m}$  resliced image

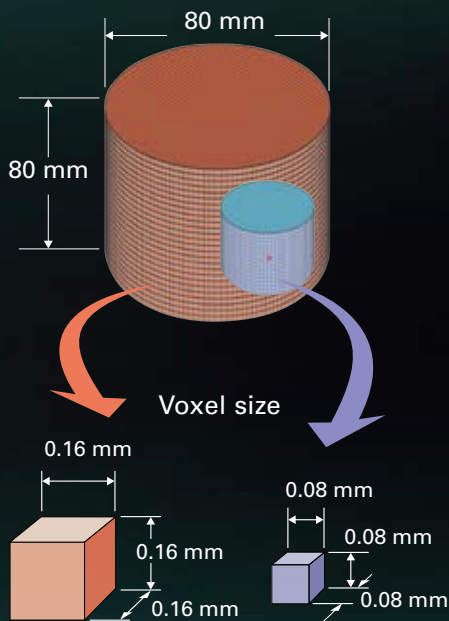


$\varnothing 40 \times H 40 \text{ mm}$ , voxel size: 80  $\mu\text{m}$



### Radiographic Procedure

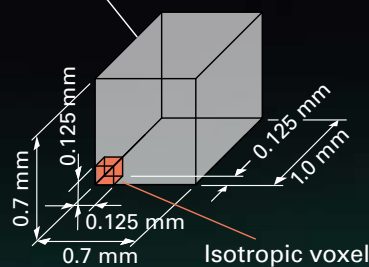
A small cone-shaped X-ray beam irradiates the FPD for approximately 18 seconds while the C-arm makes one 360° rotation around the region of interest. The raw images are digitized in the FPD and are transferred to the host computer. After post-processing, a reconstruction algorithm generates super-high resolution, 3-dimensional images displayed on the computer monitor.



### Low Effective Dose

The exposure time is approximately 18 sec. and the effective dose is only about 1.6 times\* as high as that of a panoramic X-ray with film exposure and 1/7\*\* the CTDI<sub>w</sub> value of a conventional CT.

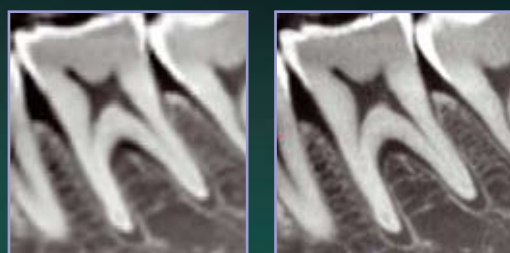
### Anisotropic voxel



### Isotropic Voxel

The voxel is an isotropic cube that provides a highly detailed image without artifacts that are usually caused by slice pitch and helical pitch that are common with medical CT scans.

**Voxel:** The minimum unit of 3D data.



voxel size: 160 μm      voxel size: 80 μm

Wide yet smooth and distortion-free 80 μm high resolution images

\* Effective dose is calculated in accordance with the ICRP 2007 Draft for exposure of the Mandibular Molar Region with Morita's recommended loading factor (80 kV, 3 mA, ø 40 mm H 40 mm). Comparison is to the Veraviewepocs film (75 kV, 8 mA, 16 sec).

\*\* CTDI<sub>w</sub> value measurement is made according to IEC 60601-2-44 with Morita's recommended loading factor. The comparison is to the reference CTDI<sub>w</sub> value for the maxillofacial and parallel sinus indicated in ICRP Pub. 87 Appendix A (ø 40 mm H 40 mm).

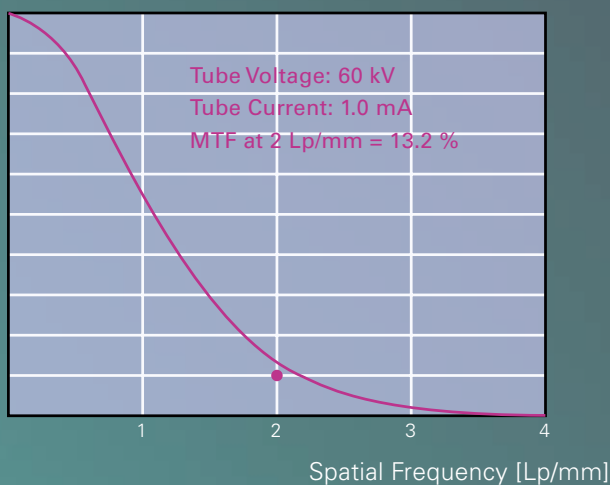
## HIGH DEFINITION / LOW DOSE

### THE ULTRA-SENSITIVE, HIGH RESOLUTION

Flat Panel Detector (FPD) provides high definition 3D images for a more thorough examination while diagnosing apical lesions, root fractures, accessory canals, TMJ problems, and treatment planning for implants, endodontics, surgery, restorative procedures, etc.



### Spatial Resolution\* MTF: Modulation Transfer Function



*This function is based on data from a typical product.*

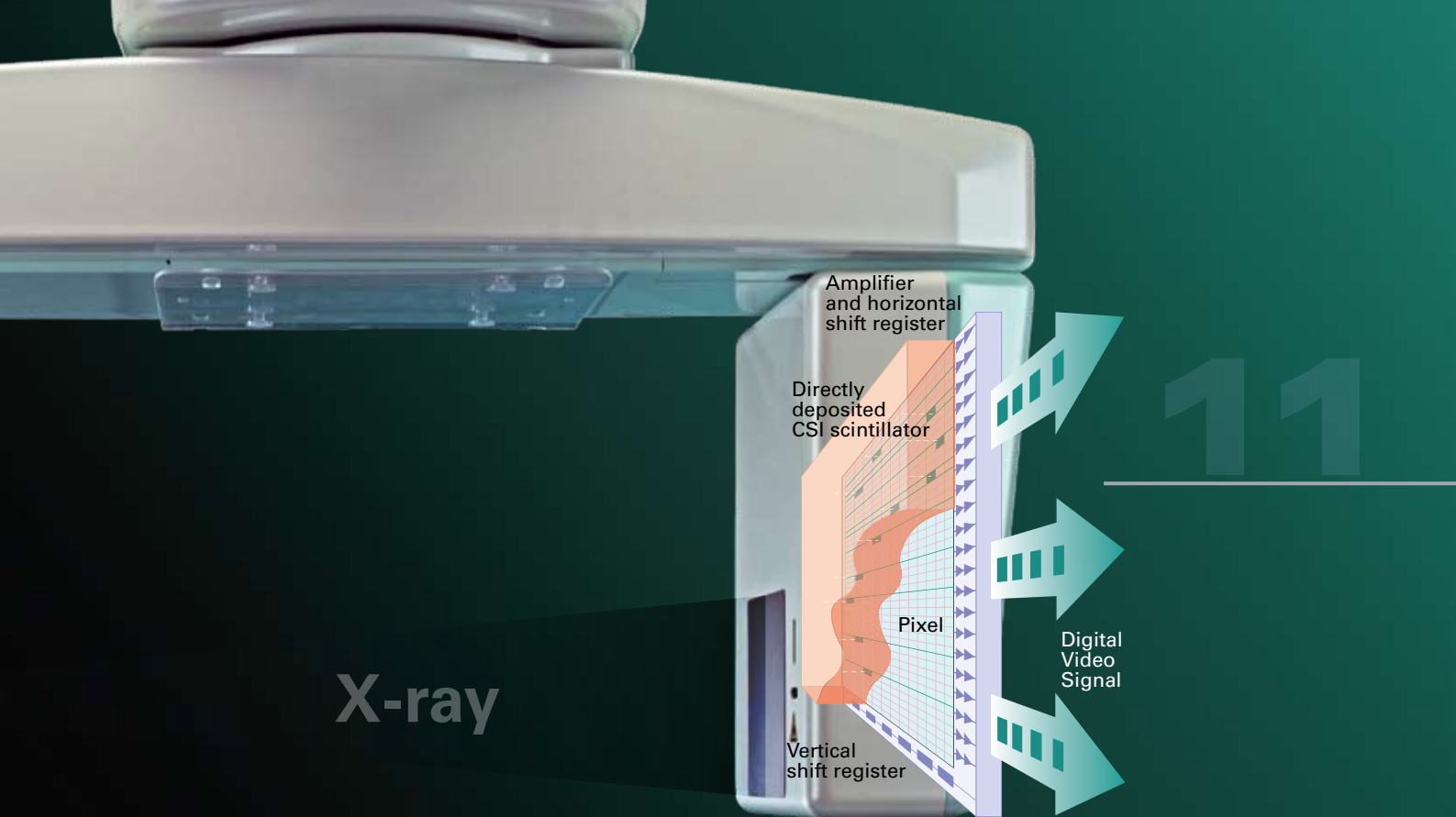
### Flat Panel Detector (FPD)

The FPD provides a high quality image by converting X-ray intensity into digital signals. It has superior sensitivity and a wide dynamic range with precise grayscale differentiation capability and no distortion.

X-rays are converted into visible light by the directly deposited CSI scintillator. Then, a photo diode converts the light into an electrical signal. The FPD is quite thin and has a long lifespan.

### Super-High Resolution

The resolution of the 3D Accuitomo 80 is greater than 2 line pairs per mm (MTF 10%). The highly detailed images have a voxel size of 0.08 mm. The slice width and pitch can be set between 0.08 and 3.2 mm.



Creates very high quality radiographs of soft-tissue areas (such as the mucous membrane of the maxillary sinus and skin, etc.) as well as hard tissue areas (such as enamel, dentin, and alveolar bone).

### No Image Distortion

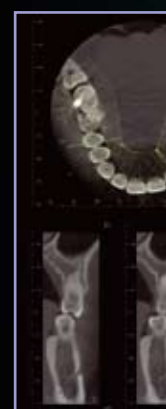
The image receptor is flat so the X-ray projection occurs without any distortion. The FPD eliminates the less accurate compensation process required by analog systems.

### Wide Dynamic Range \*\*

A wide dynamic range produces a precise grayscale differentiation capability. This makes it possible to view both hard and soft tissue. The FPD provides a higher reproducibility of the grayscale using 13 bit technology.

\* 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%.

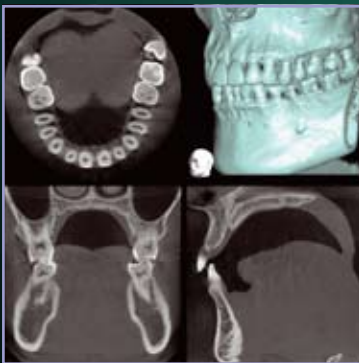
\*\* Dynamic range: Numerical values express the reproducibility of the signal and the ratio of the largest and smallest input values in dBs. The dynamic range of the digital signal is also sometimes expressed in bits. The highest signal level is taken to be the level remaining after subtracting the 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.



## EASY IMAGE PROCESSING

**MULTIPLE IMAGE PROCESSING** functions allow the i-Dixel volume-rendering software to display a variety of helpful information, including both 3D and 2D data. The software is seamlessly integrated into your network environment.

*i-Dixel*



### Volume-Rendering

The volume-rendering capability of i-Dixel generates a three dimensional image of anatomical structures on the display monitor. High definition 3D images of both hard and soft tissue can be obtained by adjusting the histogram and threshold level depending on the region of interest.

### Real-Time Reslice

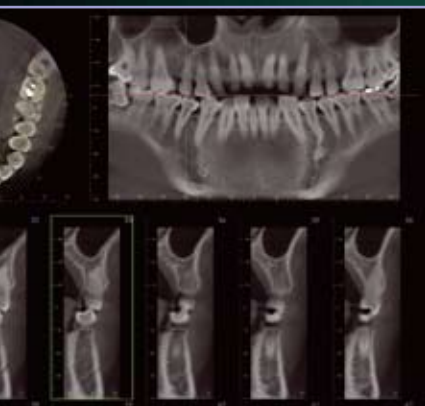
Volume-rendering images and slice images are linked. Observation angles and/or slicing angles can be viewed simultaneously and easily manipulated in real time by simply dragging anywhere on the volume or slice images.

### Curved MPR

Orthogonal cross-sectional images along the dental arch can be observed.

### Other Key Features

- XYZ view windows
- Reslicing
- Zoom
- Rotate
- Histogram
- Edge enhancement
- Distance and angle measurement
- Reversed image
- Mirror image
- Slice distance measurement
- DICOM 3.0 compliant
- Density control
- Spatial frequency filtering
- Patient orientation display
- Density measurement





3D Accutomo 80



i-Dixel software



i-Dixel software



i-Dixel software

### Intra-clinic network

### Out of network computer

In external clinic networks without 3D Accutomo, 3D images can be viewed on a PC with both of the following methods:



i-Dixel Viewer Software



One Data Viewer

## SHARING IMAGE DATA

15

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

### **One Data Viewer Software**

One Data Viewer is a unique Morita software feature which is a stand-alone, executable application. It allows 3D images to be viewed on computers without i-Dixel. Data files can be taken anywhere and viewed on any computer without i-Dixel.

### **One Data Viewer EX**

3D images and patient information can be observed.

### **One Data Viewer Plus (Optional)**

In addition to the One Data Viewer EX functions, the Plus version provides distance and angle measurement, zooming, image reversal, and additional adjustments for brightness, contrast, and gamma curve.

### **i-Dixel Viewer Software**

By installing i-Dixel Viewer software on any computer, all i-Dixel features can be utilized.

### **DICOM Support (Optional)**

i-Dixel can be seamlessly integrated into a DICOM compatible clinic network environment. DICOM, or Digital Imaging and Communications in Medicine, creates and maintains an international standard for image data communication and storage, to achieve compatibility between various information systems in health care environments. DICOM enables the exchange of diagnostic images, patient examination data and other relevant information regardless of the manufacturer or model of the medical imaging systems involved. It also supports the system architecture link to HIS/RIS.

### **i-Dixel Supports the Following DICOM Service Classes:**

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



### 3D Accu<sup>3D</sup>tomo

XYZ Slice View Tomograph

READY 17.5 sec CTDiw 5.0 mGy

MODE	
CT	SCOUT
SCAN	
180°	360°
FOV	
40 x 40	60 x 60
80 x 80	80 x 80

X 0.0 mm  
Y +20.0 mm  
Z +122 mm

80 kV 5 mA 0°

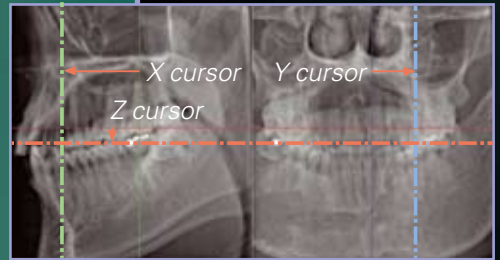
Tube Voltage	Tube Current	Slice Angle	Size	Param. Memory
80 kV	5 mA	0°		

J. MORITA MFG. CORP.  
Kyoto, Japan



IN/OUT READY BEAM

LOCK/FREE



3D Accu<sup>3D</sup>tomo

XYZ Slice View Tomograph

READY 17.5 sec CTDiw 5.0 mGy

MODE	
CT	SCOUT
SCAN	
180°	360°
FOV	
40 x 40	60 x 60
80 x 80	80 x 80

X 0.0 mm  
Y +20.0 mm  
Z +122 mm

80 kV 5 mA 0°

Tube Voltage	Tube Current	Slice Angle	Size	Param. Memory
80 kV	5 mA	0°		

J. MORITA MFG. CORP.  
Kyoto, Japan

## SIMPLE, ACCURATE POSITIONING

**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.

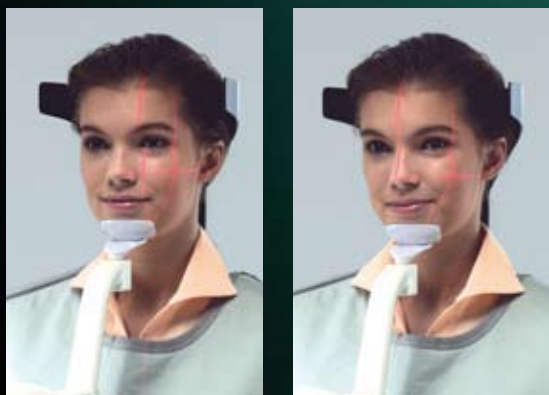
### Easy as One, Two, Three

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 created. After positioning, take two still X-ray images of coronal and sagittal views 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.

*Taking scout images (80 kV, 2 mA) increases X-ray dosage by approximately 2.4%.*



*3D image with the region of interest located at the center.*

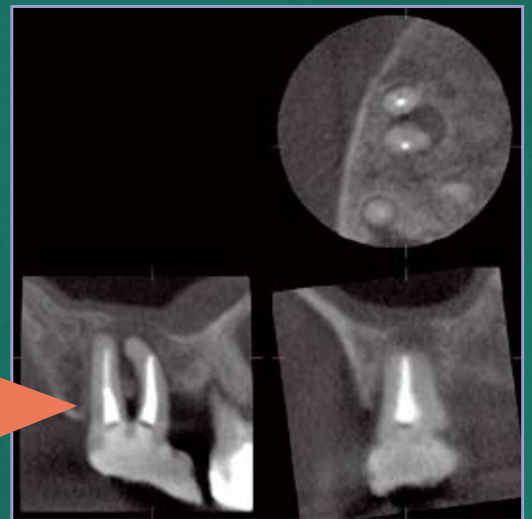
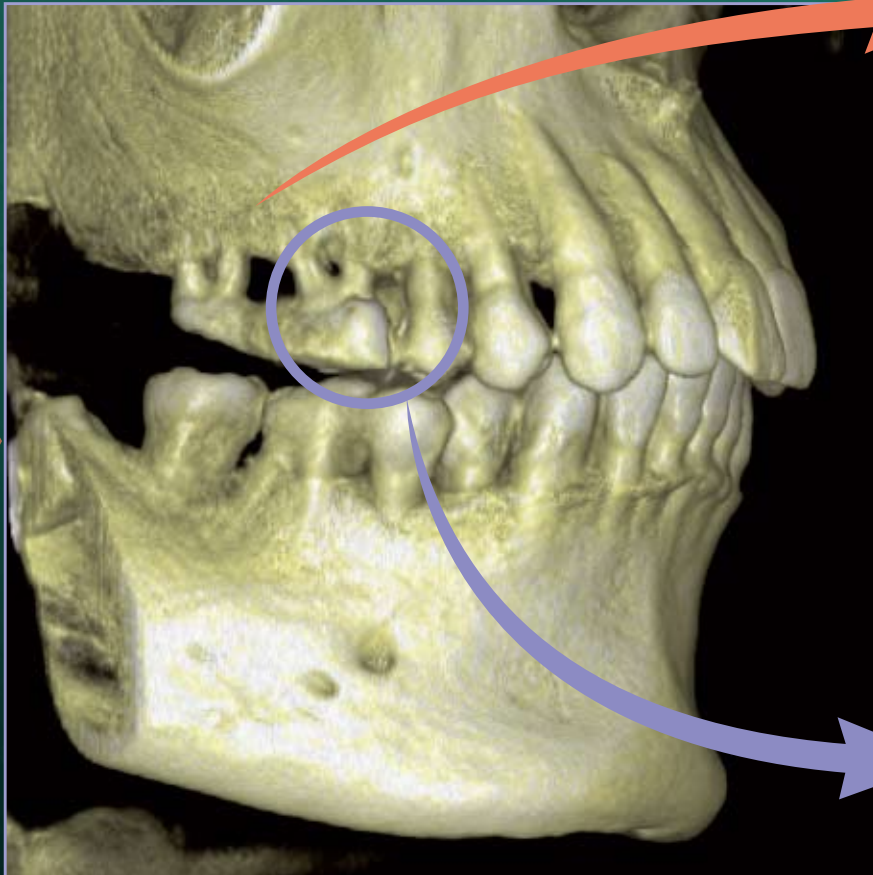


*Volume rendering images*

## ZOOM RECONSTRUCTION OF AREAS OF INTEREST

### Resolution Power of 80 $\mu\text{m}$ !

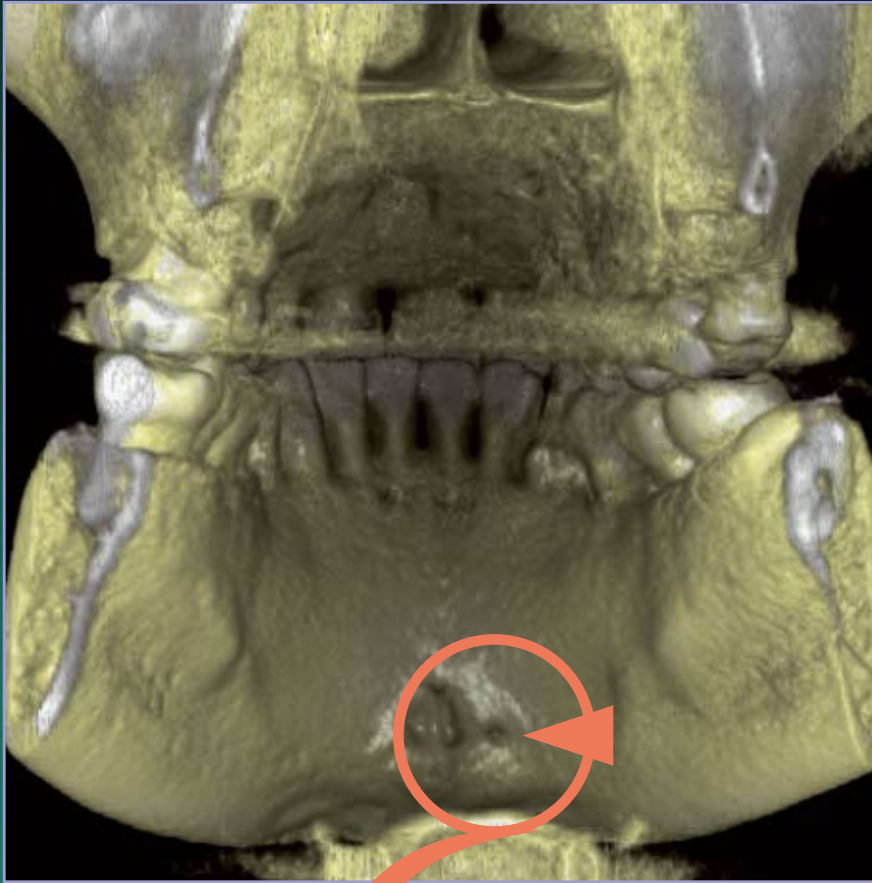
Resorption of alveolar bone was seen in the periapical region of the maxillary first and second molars. By specifying the area of interest and performing zoom reconstruction (80  $\mu\text{m}$  voxel), a more detailed examination was completed.



*Lesion present on the mesio-buccal root of the maxillary right first molar and its proximity with the maxillary sinus.*

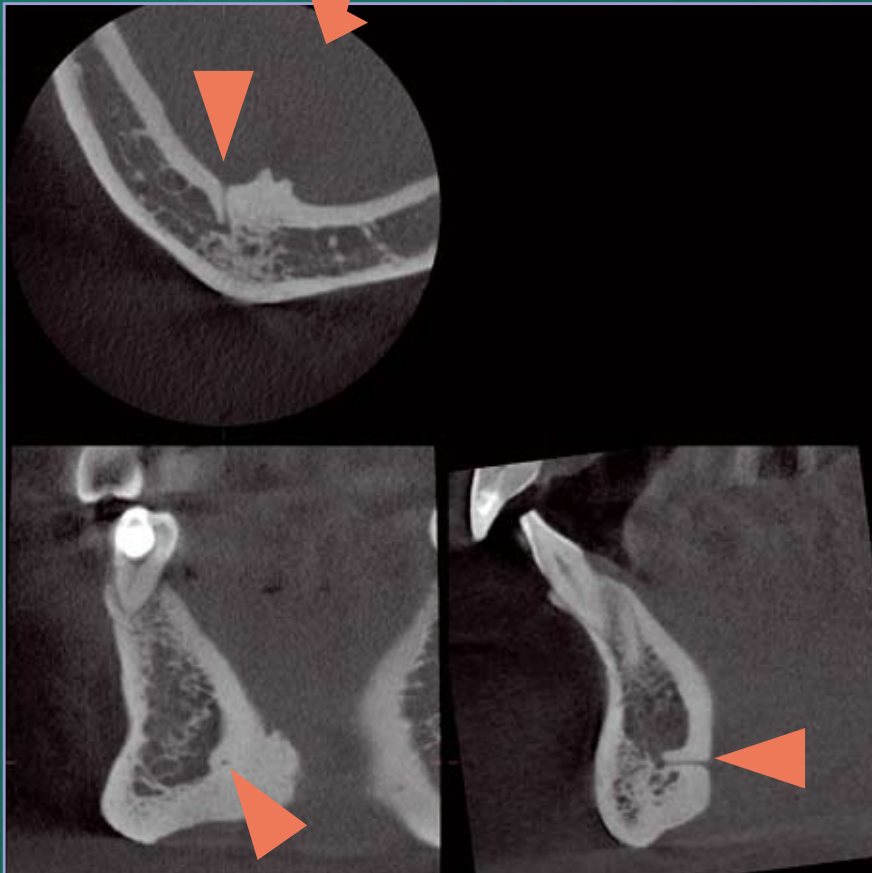


*Lesion of the mesio-buccal root of the maxillary right second molar and its proximity to the maxillary sinus.*



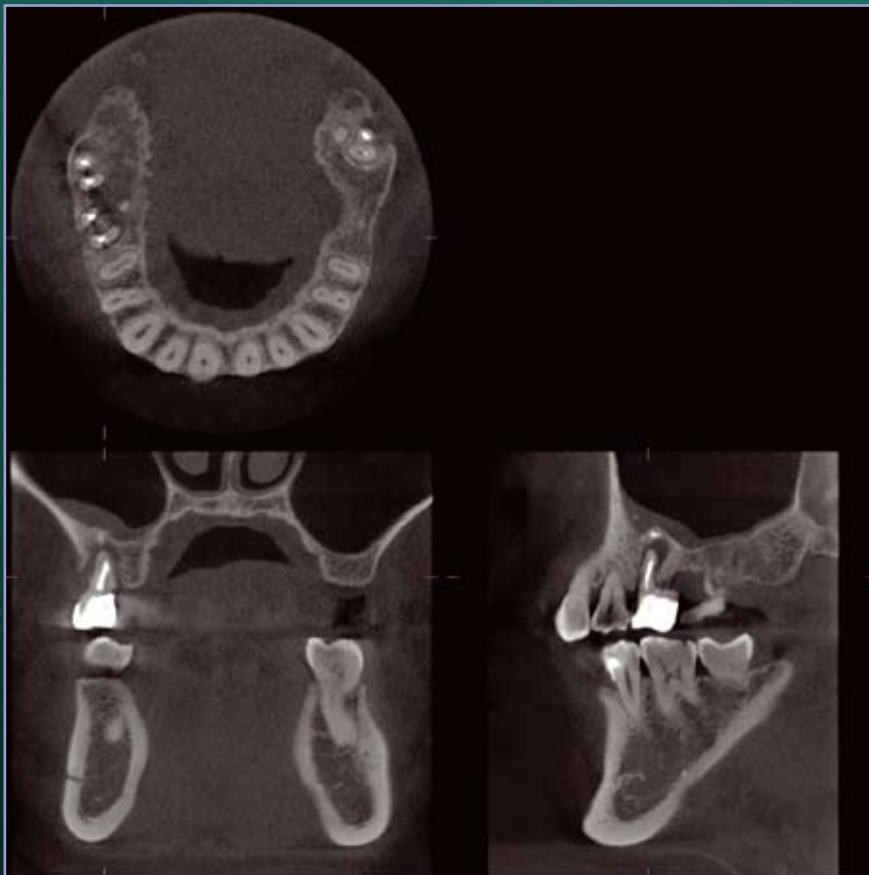
**A cavity** on the lingual side was detected, and by specifying the area of interest and performing zoom reconstruction (80  $\mu\text{m}$  voxel), a more detailed examination was completed.

*Cavity on lingual side (tip of arrow)*



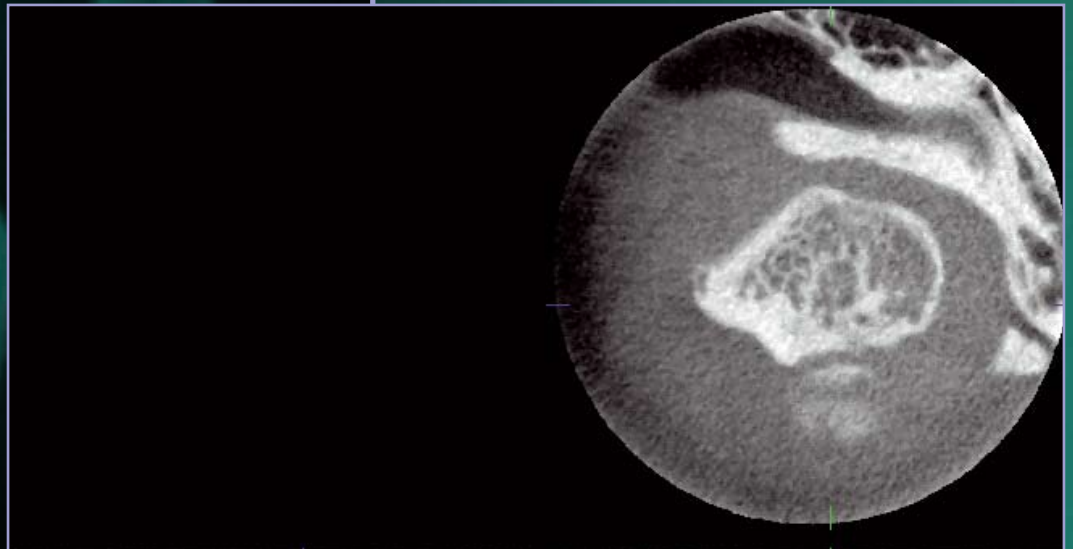
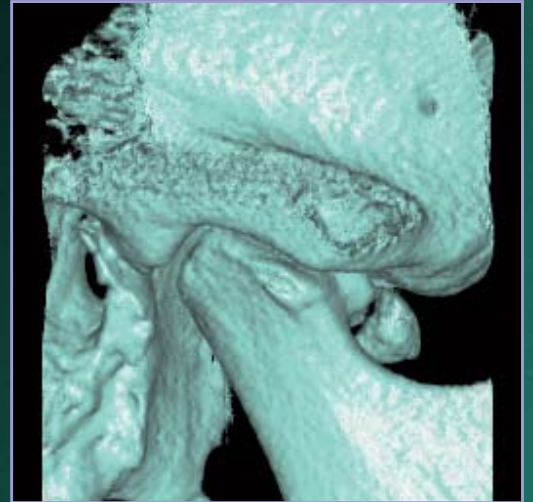
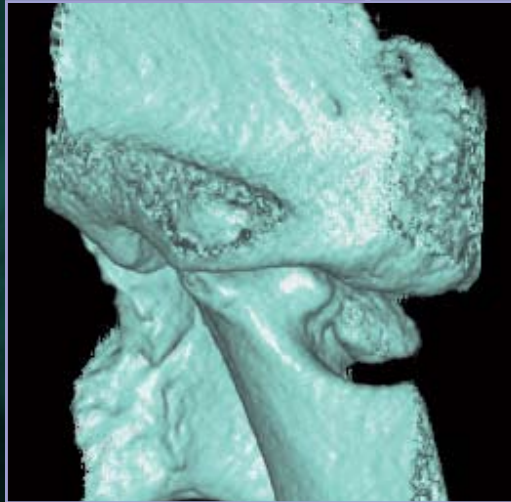
## CLINICAL CASES

**HIGH QUALITY 3D IMAGING** allows for a comprehensive radiographic examination. The  $\varnothing$  80 mm x H 80 mm imaging area covers the entire mandibular, maxillary, and TMJ areas. This includes soft tissue, membranes, and skin as well as hard tissues such as enamel, dentin, and bone.



### Periodontitis and Apical Lesions

Resorption of alveolar bone can be seen in the maxillary right posterior periapical region.



ø 40 × H 40, 80 μm 90 kV, 5 mA

## CLINICAL CASES

22

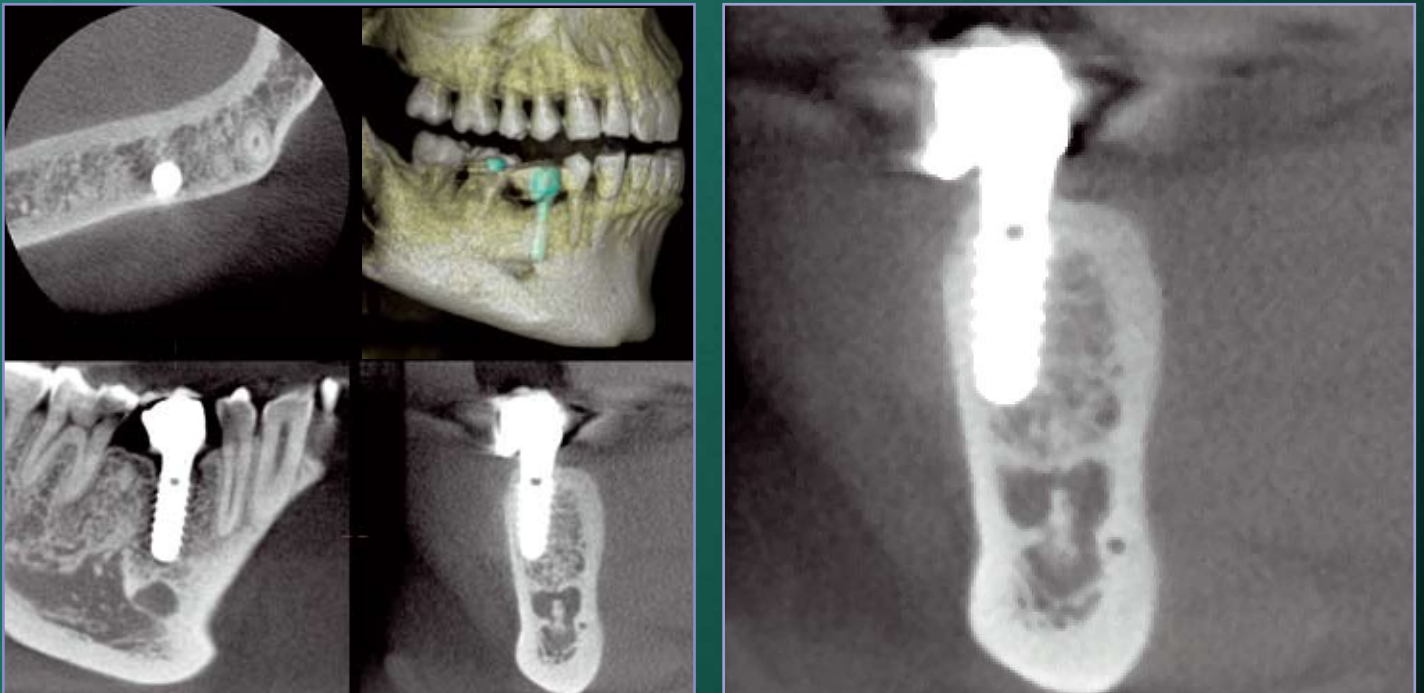
**THE Ø 40 × H 40 mm IMAGING AREA** is suitable for 90% of cases and has a low patient dose.

### TMJ Osteoarthritis

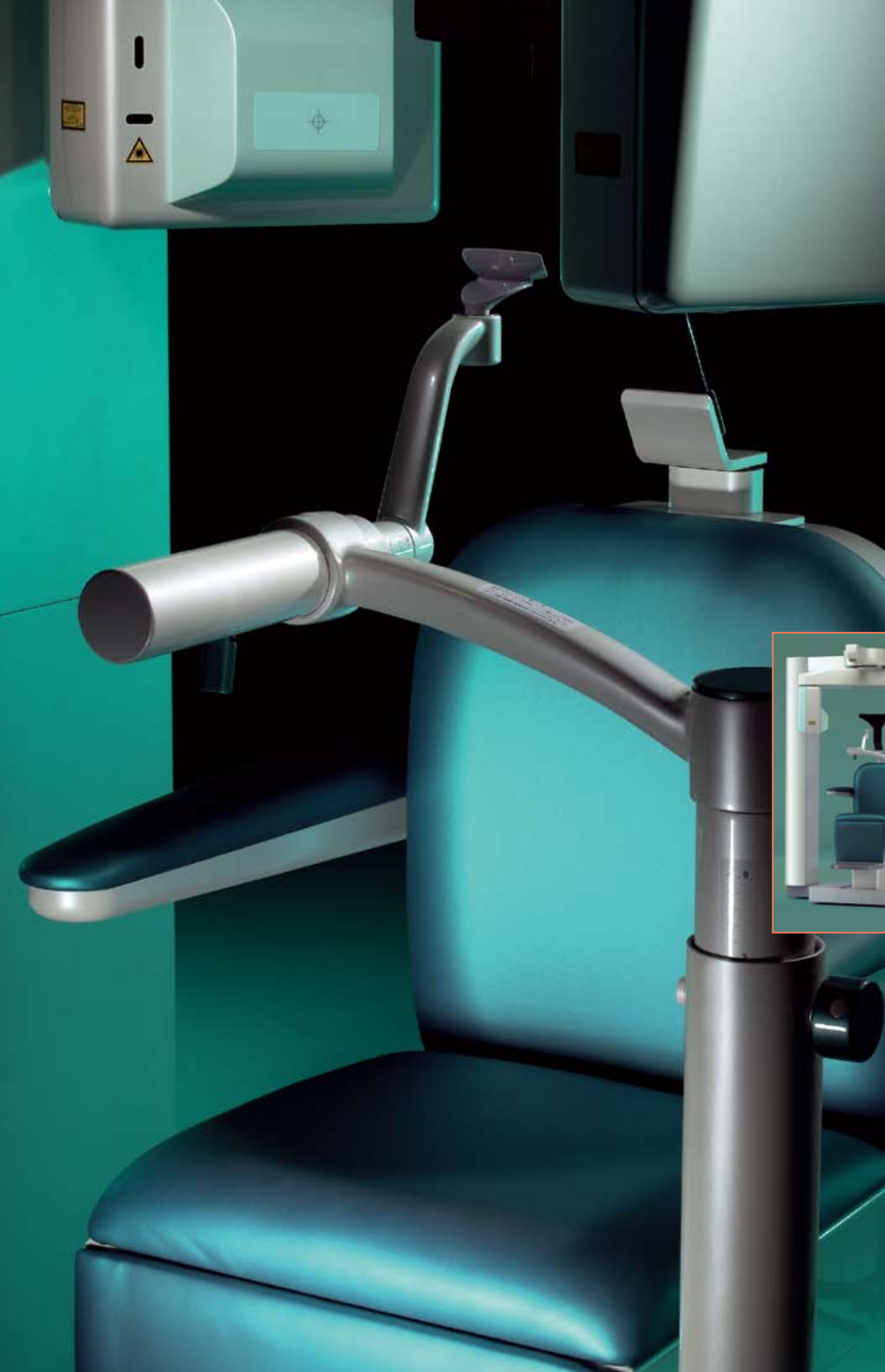
It can be seen that the condylar head is interfering with an articular tubercle and causing deterioration. Moreover, a bone fragment can be seen at the anterior edge of the condylar head.

### Implant Follow-up

Follow up radiographic examination of an implant reveals a gross lesion apical to the fixture. Zoom reconstruction (80 µm voxel) was applied to assist in diagnosis.



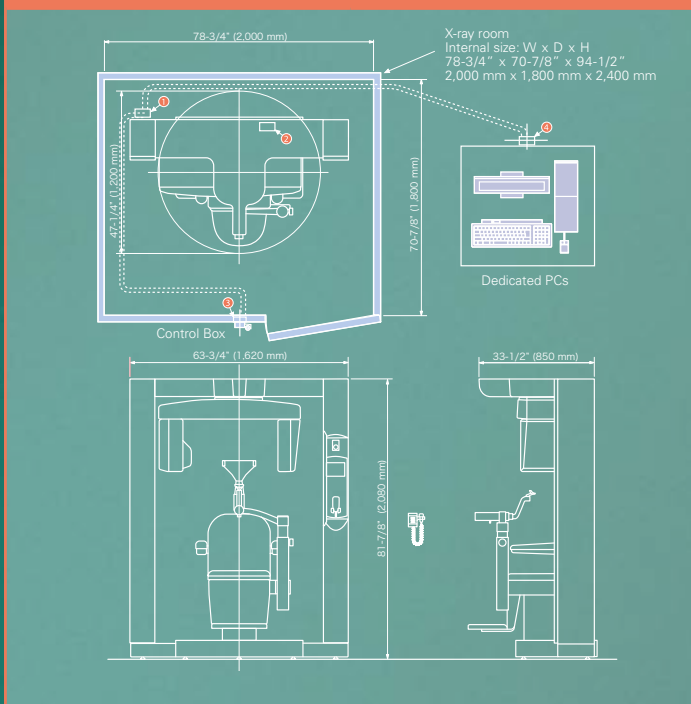
After  $\phi 80 \times H 80$ , 160 µm imaging (90 kV, 4 mA),  $\phi 40 \times H 40$ , 80 µm zoom reconstruction was performed.



# 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	EX F8 (EX-1F8/EX-2F8)	
Input Voltage	100/110/120VAC (EX-1F8)	
	220/230/240VAC (EX-2F8)	
Power Consumption	max. 2.0 kVA	
X-ray Head		
Tube Voltage	60 - 90 kV	
Tube Current	1-10 mA (8 mA Max at 81-90 kV)	
Focal Spot Size	0.5 mm	
Exposure Time	18 seconds or less	
Size of Imaging Area	Diameter 40 x Height 40 mm Diameter 60 x Height 60 mm Diameter 80 x Height 80 mm	
Voxel Size	80 μm, 125 μm, 160 μm	
Outer Dimensions		
Main Unit (W x D x H)	63-3/4" x 47-1/4" x 81-7/8" 1,620 mm x 1,200 mm x 2,080 mm	
Control Box (W x D x H)	3-3/4" x 1-5/8" x 4-1/2" 96 mm x 40 mm x 115 mm	
Weight	Approx. 882 lb. (400 kg)	

\* Clinical images are provided by Kitasenju Radist Dental Clinic, i-View Imaging Center, Japan

\* X-ray protection should be provided for the patient when X-rays are emitted.

\* Design and specifications are subject to change without notification.

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