GE Healthcare

Lunar

enCORE-based X-ray Bone Densitometer User Manual

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DPX Series	YZB/USA 2099 SFDA(I) 20023301115	DPX-Bravo	SFDA Register Number: Product Standard Number:	JSFDA(I) 2009 No.2300674 YZB/苏0637-2009
Prodigy Series	YZB/USA 0509 SFDA(I) 20043301375		Production License Number: Production & Registration Address:	苏食药监械生产许2001-0041号 No.19 Changjiang Road, Wuxi National Hi-Tech Development Zone, Jiangsu P.R.China
iDXA	YZB/USA 1104-2007 SFDA(I) 20073302084		Service Address:	GE Medical Systems Trade Development Corporation (Shanghai) Co.,Ltd 3 floor, CTP1 building, No1. Huatuo Road ZhangjiangGaoke, Shanghai
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Operator's Manual for DPX-NT, DPX-MD+, DPX Bravo, DPX Duo, Prodigy, Prodigy Advance, Prodigy Primo, and Lunar iDXA x-ray bone densitometers systems using enCORE with Windows XP Professional computers. GE Healthcare recommends viewing the instructions for navigating the Lunar enCORE™ based X-ray Bone Densitometer User Manual before proceeding through the online guide for the first time. Before operating scanner, read the Safety and Technical Specifications manual which is part of operator's instructions.

Table of Contents

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This product includes some software components that are licensed under the GNU General Public License (GPL). Source code for GPL components is available upon request.

General Product Information

The bone densitometer is designed to estimate the bone mineral density of patients when medically indicated by their physicians. The manuals provide instructions for operating the software and scan table, system information, and maintenance information.

Variables Affecting Scan Results

Scan results can be affected by operator technique and patient variability:

- Operator technique refers to patient positioning and scan analysis. To minimize technique variables, 1) establish consistent positioning and scan analysis routines by using anatomical landmarks when positioning patients, and 2) during analysis, manipulate raw scan data only when absolutely necessary.
- Patient variability refers to changes in the patient's medical history, metabolism, and diet. It also refers to diagnostic procedures that involve radionuclide uptake and medical treatment, and the presence of external radiation (particularly the use of other radiation-generating devices in the vicinity of the system). To minimize patient variability, 1) thoroughly familiarize yourself with the patient's history, and 2) install the scanner in an environment effectively shielded from other sources of external radiation.

United States Federal Law restricts this device to the sale, distribution, and use by or on the order of a physician.

Operator Profile

The intended users of the DXA scanner are medical professionals with knowledge and experience required to work with x-ray equipment.

Training Information

GE Medical Systems Lunar or authorized GE Medical Systems Lunar distributors provide individual, hands-on training as part of the installation procedure for your system. (GE Medical Systems Lunar distributors provide training for systems installed outside the United States.) An Applications Specialist provides information on software and hardware operations, and reviews the warnings and cautions in the manuals.

IMPORTANT: Only trained technologists should operate the system. New technologists should receive training prior to unsupervised operation of the system. Additional training sessions are available on request for a nominal fee. For more information, contact GE Medical Systems Lunar Support at 800-334-5831, or your local GE Medical Systems representative.

Cautions for DXA Determinations

You should be aware of the following factors which may affect the clinical accuracy of DXA spine estimates: marked distortions of skeletal architecture-e.g., osteophytes, degenerative disc disease, spinal arthritis, spondylolisthesis, kyphoscoliosis, and vertebral fractures-and significant calcium deposits in the aorta can falsely elevate spine bone mineral values. Regions that contain these dystrophic calcifications can be excluded from the scan analysis in some cases. The scanner can be used to monitor changes in bone mineral over time in patients with these disorders, but caution must be taken in interpretation. Use DXA estimates as an aid to other methods in the evaluation of patient bone mineral status in the clinical setting.
In addition, spine estimates will be difficult to interpret for patients with orthopedic metal devices and previous surgical interventions, such as bone grafts. Radiographic contrast material and radiopharmaceuticals used for myelograms, barium enemas, and other diagnostic tests prevent accurate estimates. Barium clears the body within a few days, but the oil-based dyes used in myelograms several years ago may remain within the body for years. A three-day waiting period is sufficient time for barium and most radiopharmaceuticals to be completely discharged from the body.
Femur estimates will be difficult to interpret for patients with orthopedic metal devices and previous surgical interventions. The most common complicating factors for femur estimates are prosthetic devices and surgical implants in the region of the bone scan. Results may be adversely affected if the patient has difficulty with the desired 25° inward rotation of the leg or with maintaining this position without movement.
Total Body estimates require consistent patient positioning for accurate results and will be difficult to interpret for patients with orthopedic metal devices and previous surgical interventions. The operator should pay particular attention to the location of the patient's arms, keeping the positioning the same for each scan. Results may be affected if the patient moves during the scan.

Precautions for Standard Operating Procedures

- Do not attempt to operate the scanner without first reading this manual.
- Do not remove the assembly panels or attempt any repairs without prior instructions from authorized GE Medical Systems Lunar personnel.
- Do not sit or lie on the scan table for purposes other than scanning.
- Perform the Quality Assurance procedure each morning. If any test fails, check the position of the calibration block and rerun the QA procedure. If a test fails again, contact GE Medical Systems Lunar Support. Also, call GE Medical Systems Lunar if more than two failures occur in a one-week period.

- If the patient is or might be pregnant, always contact the patient's physician before performing a scan.
- Remain in the room with the patient while a scan is in progress.
- Restrict access to the room to authorized personnel.
- Do not attempt to service any of the system's electrical components while the scan table is turned ON. High voltage is used to produce x-rays.
- Radiation safety information is located in the safety and technical specifications manual you received with your system.
- **To stop the scanner in an emergency**, press the emergency stop button on the scan arm. DO NOT use the emergency stop button to routinely abort a scan.

Software Installation

If loading software, you will be asked for your system number and feature code during the installation procedure. These numbers are printed on the CD sleeve. Put the CD in the CD-ROM drive. When the Installation window appears, select the product software option. Follow the screen prompts to install the program. The software will attempt to install validated Microsoft Security updates on all U.S. computers before installing the product software. This may take up to 45 minutes. The Help disk (second disk) contains Help Topic documents in PDF format for printing. You will need Adobe Acrobat Reader to open PDF documents.
Note: If the CD does not automatically start, select the My Computer icon on the desktop, select the CD-ROM drive, and select the software installation icon.

Introduction

Intended Use

The X-ray Bone Densitometer (DPX-Bravo, DPX-Duo, DPX-NT, Prodigy, iDXA) supports the following intended use:

Provides an estimate of bone mineral density at various anatomical sites (Spine, Femur, Total Body, and Forearm). These values can then be compared to an Adult reference population at the sole discretion of the physician.

Provides an assessment of relative fracture risk based on the patient's T-score value using the categories of fracture risk defined by the World Health Organization (WHO).

Provides an assessment of 10-year fracture risk using WHO FRAX model.

Provides a standardized bone density report using data from the densitometer and physician- generated assessments based on the patient's demographics, which can assist the physician in communicating scan results to the patient and the patient's referring physician.

Optional Hand BMD software estimates the BMD at the hand.

Optional Dual-Energy Vertebral Assessment software provides an x-ray image of the spine for qualitative visual assessment in order to identify vertebral deformations and estimate vertebral heights (morphometry).

Optional Orthopedic Hip Software estimates Periprosthetic BMD of an orthopedic hip implant

Optional Pediatric software option expands the range of bone densitometry reference data to include ages 5 through 19 years of age. The software provides a comparison of measure variables obtained by dual energy x-ray absorptiometry to a database of reference values. These data can be used for comparative purposes at the sole discretion of the physician.

Optional Body Composition software measures the regional and whole body bone mineral density (BMD), lean and fat tissue mass and calculates other derivative values which can be displayed in user-defined statistical formats and trends, and compared to reference populations at the sole discretion of the health care professional. Some of the diseases/conditions for which body composition values are useful include chronic renal failure, anorexia nervosa, obesity, AIDS/HIV and cystic fibrosis.

Optional Advanced Hip Assessment Software provides a measurement of hip axis length (HAL) and a mean value of HAL for Caucasian and Asian females on femur images. It also calculates hip geometry values used to evaluate the structural properties of the hip.

The DPX-Duo model has special mechanical features including stirrups, storage drawers, and patient step to allow use as an exam table when bone densitometry is disabled and the scan arm is rotated and locked parallel to the table.

Device Descriptions

Structure
The X-Ray Bone Densitometer is made up of a scan arm, X-ray source assembly, and exam table. Each model is described in more detail below. The scan arm control panels for each model are described in scan arm control panel section.

Product Model
DPX Bravo and Duo

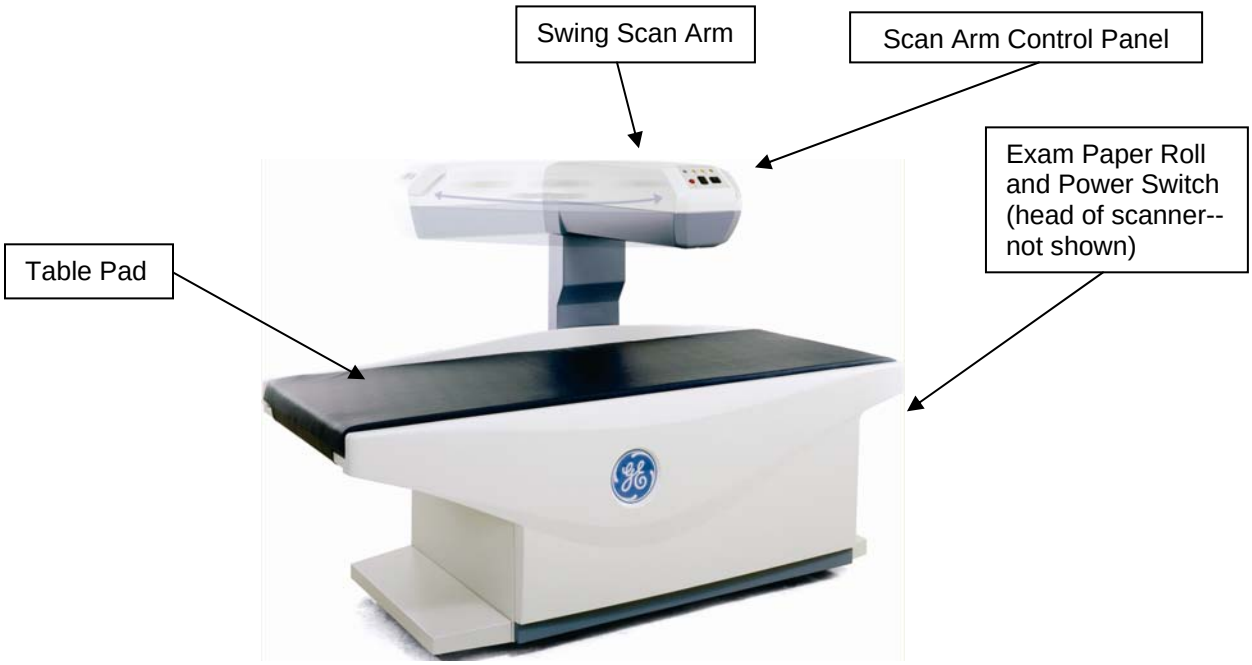
The DPX Bravo and Duo models use pencil beam technology with a single-crystal detector and have a compact table design to provide space efficiency (see images below).
The DPX Duo and the DPX Bravo come equipped with a scan arm that swings to the side of the table when not in use when not in use as a densitometer and to facilitate patient loading. X-ray scanning is not possible until the scan arm is locked into the scan position. A handle releases the scan arm interlock and allows operator to move the scan arm for patient loading. Once the patient is loaded on the table, the operator moves the scan arm back to scanning position and the arm locks into scan position. If a scan is attempted without the scan arm locked into position, the following error will be displayed:

Error Description:
Swing arm not locked in scanning position. Please lock before continuing.

Corrective Action:
Please try again. If the problem persists, contact GE Lunar Support for assistance.

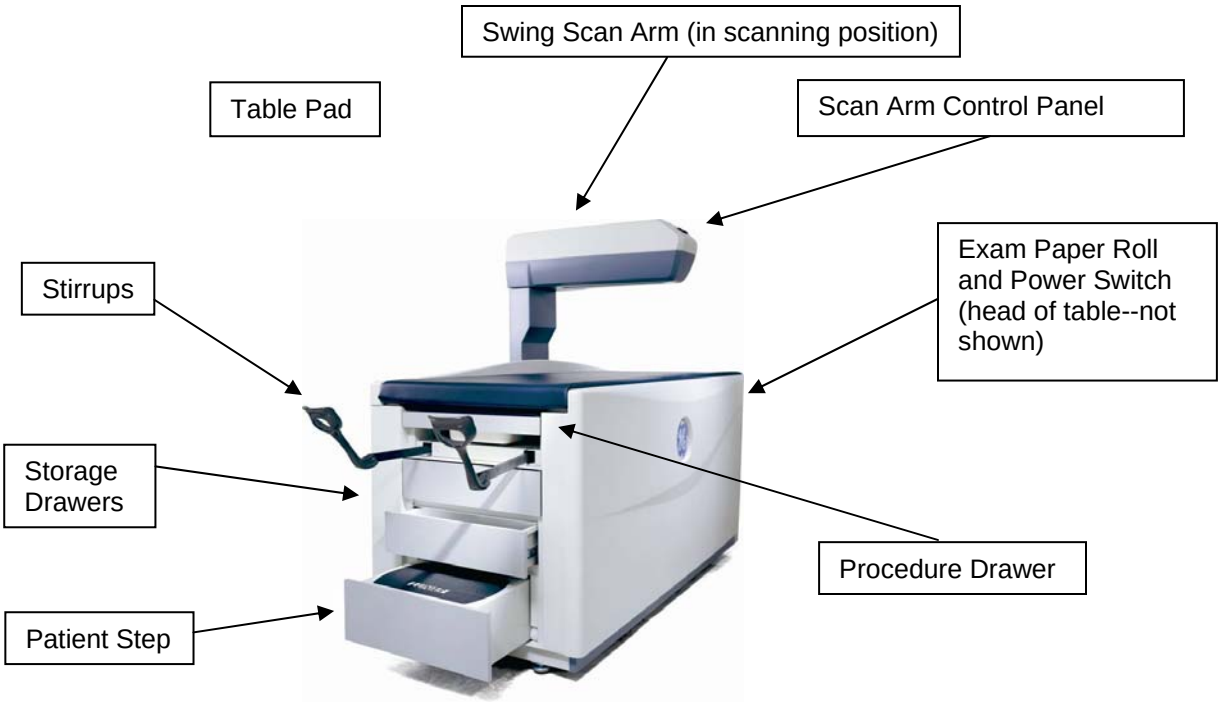
To retract the scan arm once the scan is completed**,** home the scan arm.
Pull the lever on the front of the scan arm towards you and push the scan arm to the left until it rests along the back of the scanning table. The patient can then sit up and the table is free of obstruction.

The power switch is located at the head of the table. There is also a roll at the head of the table to store up to 21" x 3" (53.34 cm x 7.62 cm) exam paper. The table weight limit is 159 kg (350 pounds).



DPX-Bravo

The DPX-Duo model also has mechanical features including stirrups, procedure drawer, storage drawers, and patient step to allow use as an exam table when bone densitometry is disabled and the scan arm is rotated and locked parallel to the table.



DPX-Duo

Product Model
DPX-Pro/NT/MD+

DPX-Pro/NT/MD+ models come in full and compact sizes and use pencil beam technology with a single-crystal channel NaI detector. The power switch is located on the lower front panel. The table weight limit is 136 kg (300 lbs).

Product Model
Prodigy Pro/Primo/Advance

Prodigy models come in full and compact sizes and use fan beam technology with a 16-channel solid-state detector. The power switch is located at the foot of the scanner. The table weight limit is 159 kg (350 lbs).

Prodigy Series

Product Model
iDXA

The Lunar iDXA uses fan beam technology with a 64-channel solid-state detector and is a scanner designed for optimal image quality and supports patient's weights to 204 kg (450 lbs).

The power switch and exam paper roll is located at the head of the scanner.

iDXA

The Warning label identifies the location of possible pinch points. When the scanner arm is in motion, make sure possible pinch point areas are clear at all times. The technologist must keep their feet away from the moving carriage. Patient limbs must remain inside the boundaries of the table top to avoid a pinch between the scanner arm and table.

Installation and Operation

Only individuals trained by GE Lunar should service or install the X-ray Bone Densitometer. Do not attempt to service the X-ray Bone Densitometer. Please call GE service or your GE distributor for support.

Before operating X-ray Bone Densitometer, please review the *Safety and Technical Specification* manual.

X-ray Bone Densitometer Table Assembly

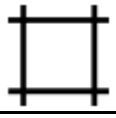
Below “Scanner” is equal to “X-ray Bone Densitometer”

Scanner Table
The Scanner table is to support the patient during a measurement or general examination. In addition, the X ray source assembly and other electronics are contained inside the scanner table.

Scan Arm
The laser light, emitted from an aperture on the scanner arm, helps you locate the measurement start position. Positioning switches let you move the scanner arm until the laser light is located at the correct start position. The start position is different for each measurement type. The scanner arm on the DPX Duo and Bravo models has a release and locking mechanism allowing the upper arm to swivel when the scanner is idle. The scanner arm must be in the locked position over the scanner table to perform a measurement.

Scan arm control panel

Indicator Lights

Symbol	Indicator	Status (on)
	Green (power)	Power is supplied to the scanner table
	Yellow (x-ray)	X-ray tube assembly is supplying x-rays
	Yellow (shutter)	Shutter is open
	Amber (laser)	Laser is on

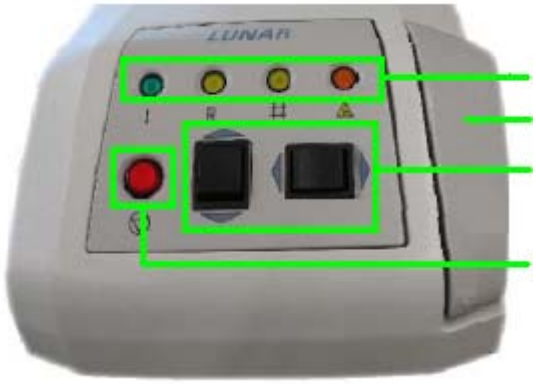
Emergency stop button
Push the red emergency stop button to stop the scanner arm and immediately shut down x-rays in an emergency. Do not use the emergency stop button to routinely stop the scanner during normal operation.

Positioning switches
The positioning switches move the scanner arm and detector to the measurement start position (the laser light indicates the position of the detector). The Back/Front switch moves the detector across the width of the scanner table. The Left/Right switch moves the scanner arm down the length of the scanner table.

Swing arm position sensing switches (DPX Duo and Bravo models only)
The swing arm position sensing switches detect the locking status of the swing arm and the swing arm latch. The swing arm latch must be locked and the swing arm must be in the locked position over the scan table before a measurement can be performed. Release of the swing arm latch during a measurement will abort the scan and the measurement data will be lost.

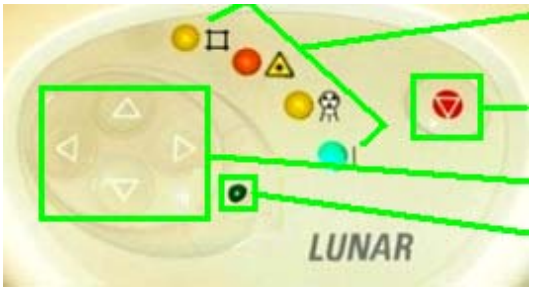
Scanner Start button (iDXA model only)
Once the patient has been positioned, the scan may be initiated from the green Start Scan button instead of starting the scan from the enCORE software.

See scan arm control panel for each model below:



DPX Duo and Bravo

DPX-Pro/NT/MD+



Indicator Lights

Emergency Stop Button

Positioning Switches

Start Scanner Button

iDXA Front Panel

The enCORE software is used to operate the X-ray Bone Densitometer, the following chapters describe how to use the enCORE software.

Note:
Daily Quality Assurance procedure
Complete quality assurance procedures daily. Make sure each QA procedure passes. Refer to Chapter 2 for detailed instructions. Make sure you save your printed results for future reference.
Archive image files
Archive your image files before you leave for the day. Refer to Chapter 5 for detailed instructions.
Shut down computer
At the end of the day, select Exit from the Main screen, and select Exit enCORE from the close window to close the program. Then shut down the computer. **Note:** Do not turn off the scanner at the end of the day for stationary systems.

Some of the functions of the enCORE are not available for all X-ray Bone Densitometer models.

Classifications
Protection against electric shock: Class I, Type B
Protection against water: IPX0
Operation mode: continuous operation with intermittent loading
The device can neither be used in flammable anesthetic mixture with air or non flammable anesthetic mixture with oxygen or nitrous oxide.

1.0 Screens and Toolbars

1.1 Overview

This section describes the screens and toolbars that are shown throughout the program. Screens and toolbars give the options necessary to complete the procedures given in this online Operator's Manual.

1.1.1 Using screens

The screens provide information that lets you set up and complete measurements, analysis, and quality assurance procedures. At the bottom of each screen, short descriptions of procedures and alternative keystrokes are given to help you complete a procedure.

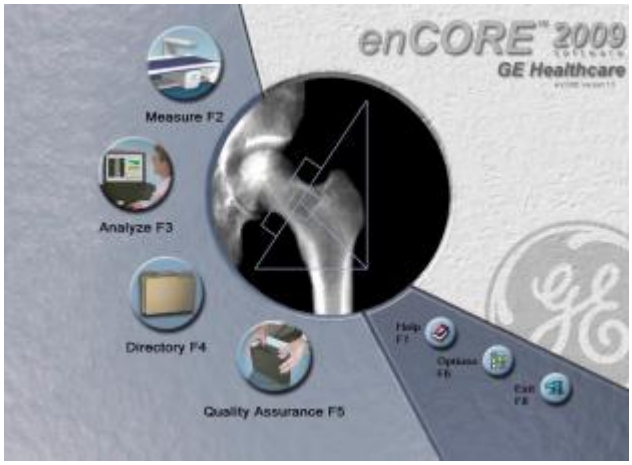
1.1.2 Using toolbars

The toolbars show icons that represent a "tool" which lets you complete a specific procedure. To view a short description of a tool, hold the cursor stationary over the tool's icon.

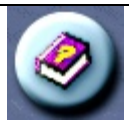
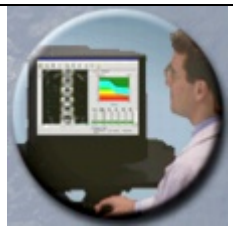
1.1.3 Patient block

The Patient block is shown at the bottom of the Analyze, Directory, and New Measurement screens. The Patient block gives information about the patient that is being analyzed, measured, or is currently selected at the Directory screen. This is the same information you record in the Patient Information dialog box or select from the Patient list before starting a new measurement.

1.2 Main Screen



The Main screen is the first screen shown during the program. Select the options that follow to access different areas of the program:

	**Help (F1)–** select to view additional reference information concerning the operation of the scanner.		**Measure (F2)–**select to start a patient measurement.
	**Analyze (F3)–**select to open a patient measurement for analysis.		**Directory (F4)–**select to work with your patient files and complete database maintenance procedures.
	**Quality Assurance (F5)–**select to access the Quality Assurance (QA) screen.		**Options (F6)–**select to change the User Options and Connectivity Options default settings or to view the Error log.
	**Exit (F8)–**select to exit the program from the Main screen.		

1.2.1 Common Toolbar

The **Common Toolbar** is shown on all screens.

Icon	Program	Description
	Measure (F2 or Ctrl+M)	Select to enter patient information or select a patient from the database to start a new measurement.
	Analyze (F3 or Ctrl+A)	Select to choose an image file for analysis.
	Directory (F4 or Ctrl+D)	Select to work with patient files and complete database maintenance procedures.
	QA (F5 or Ctrl+Q)	Select to start a **Quality Assurance** (QA) test.

1.3 Analyze Screen

The Analyze screen is used to analyze image files. This screen is shown when you select Analyze from the Common toolbar or the main screen or when you select an image file for analysis from the Directory screen.

In addition, this screen is shown immediately after a patient measurement if the "Analyze When Done" option is selected at the **New Measurement** screen.

1.3.1 Results Tabs

The data that follows is included in the Results tabs for image files:

- **ScanCheck™ tab**–provides a checklist of items to confirm and/or correct during analysis
- **Densitometry tab**–provides BMD, BMC, and Area for each region of the scan
- **Trend tab**–provides results trending over time
- **Information tab**–gives information related to the scan parameters.
- **Composition tab**- Total Body composition or Spine/Femur estimated composition
- **AHA tab**–Femur Advanced Hip Assessment, gives information about hip axis length and hip strength results.
- **Morphometry tab**. (Refer to **LVA analysis** or APVA analysis for more information.)

1.3.2 Analyze toolbar

Select tools from the **Analyze** toolbar to complete analysis procedures. Refer to specific scan types for detailed analysis recommendations for each measurement site.

General Analysis Tools

Icon	Tool	Description
	**Imaging (Ctrl+I)**	Select to adjust contrast and zoom the image file.
	**ROIs (Ctrl+R)**	Select to position ROIs during analysis. Move and size ROI as well
	**Delete ROI**	Use this option to delete an ROI
	**Move ROI**	This tool allows an ROI to be moved
	**Rotate ROI**	Select this tool to turn an ROI in a circular motion
	**Move Vertex**	Select this tool to move a vertex of an ROI
	**Label ROIs**	May be used to label an ROI.
	**Points (F4)**	Select to verify that bone and tissue samples are correctly classified. **DO NOT** adjust **point typing** unless the program made obvious errors.
	**Reset (F3)**	This option is shown after you select **Points**. Select **Reset** to delete changes you made to **point typing.**
	**Copy (F5)**	Use this option to copy ROIs from an existing image file to the current image file.
	**Cancel (Esc)**	This option is shown after you select **ROIs** or **Points**. Select **Cancel** to delete changes you made to the image file.
	**Results (Enter)**	This option is shown after you select **ROIs** or **Points**. Select **Results** to view analysis results for the image file.
	**Report (Ctrl+Shift+P)**	Select to create analysis reports for the image file.
	**Save (Ctrl+S)**	Select to save the image file and data to the patient database.
	**Close (Esc)**	Select to close the image file.

ROI Tools

Icon	ROI Tool	Description
	**ROIs (Ctrl+R)**	Select to position ROIs during analysis. Move and size ROI as well
	**Delete ROI**	Use this option to delete an ROI
	**Move ROI**	This tool allows an ROI to be moved
	**Rotate ROI**	Select this tool to turn an ROI in a circular motion
	**Add ROI**	AP Spine
	**Move Vertex**	Select this tool to move a vertex of an ROI
	**Label ROIs**	May be used to label an ROI.
	**Cancel (Esc)**	This option is shown after you select **ROIs** or **Points**. Select **Cancel** to delete changes you made to the image file.

Imaging Tools

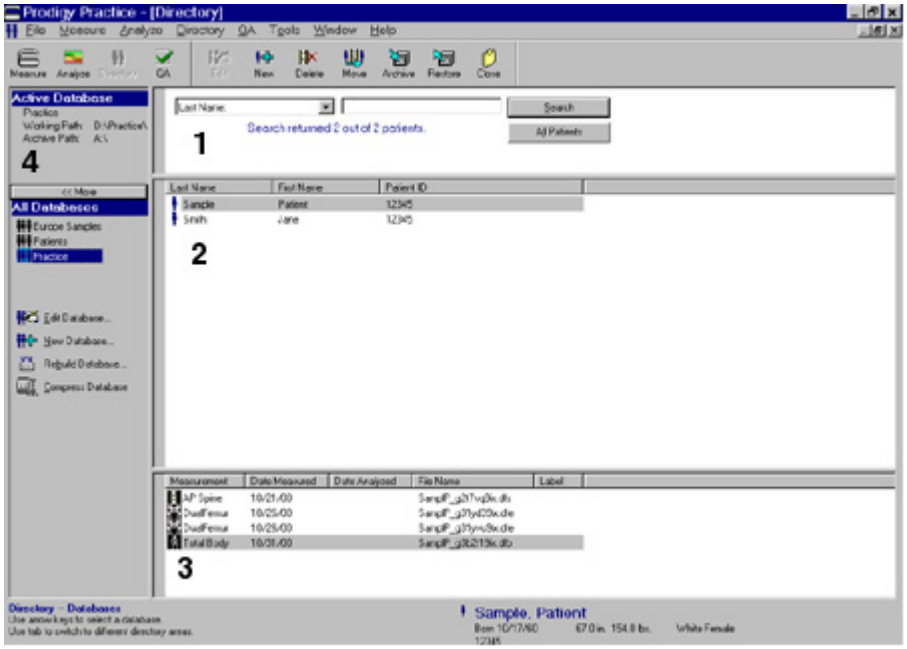
Icon	Image Tool	Description
	**Imaging (Ctrl+I)**	Select to adjust contrast and magnify the image file.
	**Points (F4)**	Select to verify that bone and tissue samples are correctly classified. **DO NOT** adjust **point typing** unless the program made obvious errors.
	**Reset (F3)**	This option is shown after you select **Points**. Select **Reset** to delete changes you made to **point typing.**
	**Copy (F5)**	Use this option to copy ROIs from an existing image file to the current image file.
	**Cancel (Esc)**	This option is shown after you select **ROIs** or **Points**. Select **Cancel** to delete changes you made to the image file.
	**Results (Enter)**	This option is shown after you select **ROIs** or **Points**. Select **Results** to view analysis results for the image file.
	**Report (Ctrl+Shift+P)**	Select to create analysis reports for the image file.
	**Save (Ctrl+S)**	Select to save the image file and data to the patient database.
	**Close (Esc)**	Select to close the image file.

1.4 Directory Screen

 The **Directory** screen is shown when you select **Directory** from the **Main screen** or from the Common toolbar. This screen lists the patient files and images that are stored in the active database.

The **Directory Screen** is divided into four areas:

1) Search Option
2) Patient List
3) Image List
4) Database Sidebar



1.4.1 Search

Use the Search option to quickly locate a patient record and image file in a large database. The **Search** option is located near the top of the Directory screen.

1. Select the database field to use in the search **(1)**.
2. Enter the patient information to use in the search **(2)**.
3. Select **Search**. The patient record and associated image files are shown in the Patient and Image lists.

The **All Patients** button clears the search criteria and lists all the patients in the database.

1.4.2 Patient and Image lists

Use the Patient and Image lists to select a patient to measure or an image file to analyze. Double-click on a highlighted patient record to start a new measurement, or double-click on a highlighted image file to analyze the image file.

- **Patient list:** The Patient list shows patient records in the database according to the patient's last name, first name, and ID. The patient information for the selected patient is also shown in the **Patient block** at the bottom of the Directory, New Measurement, and Analyze screens.
- **Image list:** The Image list shows the measurement images recorded for a patient according to measurement type, date measured, date analyzed, file name, and label. The image list may include exams made up of multiple measurement images. Assign a status or notes to an exam by right-clicking on the exam in the directory and selecting **Change Status** or **Notes**. Choose from a list of 5 status types:

Icon	Status
No Icon	Not Reviewed
	Pending Review
	Rejected
	Approved
	Closed

Enable Exam Status/notes features and set defaults, actions when sending a report, and status colors under **Tools/User Options/Directory/Directory Status**.

1.4.3 Database Sidebar

The Database sidebar shows the database that is currently being used (active database) and the working path of that directory. The **Active Database** panel indicates the location of the database and the drive used for archiving patient studies. Most systems will use a hard drive location for the working path

and a removable media drive for the archive drive. This information is always available on the Directory screen.

All Databases are presented on the database sidebar. Creating more than one database is especially useful for customers performing research studies. The database currently active is highlighted in the available databases list. To change databases, highlight the desired database from the list.

The lower portion of the Database sidebar shows all available databases, and database maintenance options. If you do not see this information, select **More >>**.
Database Maintenance tools provide the ability to edit, create, rebuild or compress the database. Refer to **Edit Database**, **Compress Database**, or **Rebuild Database**, **New Database**, for additional information.

1.4.4 Directory toolbar

The Directory toolbar displays options that let you work with your patient files.

Icon	Tool	Description
	**Edit Patient (Ctrl+E)**	Select to edit Primary, Secondary, and Additional data for the highlighted patient record in the Patient list. The edits are not saved to image files that have already been acquired for the patient. Use the Edit Image tool to edit information for individual image files.
	**New (Ctrl+N)**	Enter a new patient that is not in the patient database.
	**Delete (Del)**	Select to delete the highlighted patient, exam, or image file. You can delete the patient, exam, or image record(s), or the record(s) *and* related exam or image file(s).
	**Move (F4)**	Select to move exam to another patient record.
	**Archive (F5)**	Select to copy or move exam files from the computer hard drive to an archive location. You can archive single exams, single patients, or all patients. You can also archive all exams for all patients found during a **search.**
	**Close (Esc)**	Select to exit the Directory screen.

1.4.5 Help Text

Help Text is located in the lower left corner of every screen in enCORE™ software. The **Help Text** provides keystroke functionality, current operation of the system, and instructions for the software user.

1.5 New Measurement Screen

The New Measurement screen is used to complete a new measurement for an existing patient (recorded in the database) or for a new patient. This screen is shown or when you select **Measure** from the Common toolbar.

A list of applicable measurement sites is presented on the **New Measurement** screen. The user may select the measurement site from the **Exam List** or highlight the measurement region on the corresponding **Skeletal Image**.

1.5.1 "Analyze When Done" option

Select the **"Analyze When Done"** option if you want to analyze the image file after the measurement: the Analyze screen is shown immediately after the measurement is complete.

1.5.2 Patient and laser position graphic

When you select **Position** from the New Measurement toolbar, a graphic is shown which illustrates the correct patient and laser position for the measurement type. (The laser is not used for total body measurements.) Review **Measurement Procedure** for further information on the appropriate laser starting position.

1.5.3 New Measurement Toolbar

Icon	Tool	Description
	**Home (F3)**	Select to move the scanner arm to the Home position.
	**Set Up (F6)**	This option is shown after you select **Position**. Select **Set Up** to return to the set up screen and change the settings for the measurement. In addition, use this option to select a different measurement type and start a new measurement.
	**Repeat (F4)**	This option is shown after you complete an exam. Select **Repeat** to reposition the image and repeat the measurement.
	**Abort (F5)**	Select to stop the measurement and save, continue (resume), or start a new measurement.
	**Start (F7)**	This option is shown after you select **Position**. Select **Start** to start the measurement.
	**Position (F7)**	Select to move the scanner arm to the start position; then, use the controls on the scanner arm to position the laser light for the measurement.
	**Close (F8)**	Select to exit the New Measurement screen.

1.5.4 Home scanner arm

Select **Home Scanner** (Ctrl + H) from the **Measure** menu to move the scanner arm to the home position from any screen in the program.

 **Note:** If the scan arm has been set to Home at the foot end of the table, and the foam leg block is used for AP Spine measurement, a warning will appear. Please remove patient positioner.

1.5.5 Park Scanner

Select **Park Scanner** (Ctrl+K) from the **Measure** menu to move the scan arm on a **mobile system** to the foot of the table for lockdown.

1.6 Quality Assurance screen

 The Quality Assurance screen is used to complete a Quality Assurance (QA) procedure. This screen is shown when you select **Quality Assurance** from the Main screen or from the Common toolbar.

1.6.1 Quality Assurance Toolbar

Icon	Tool	Description
	**Trend (F2)**	QA trending history is automatically shown after a QA procedure (unless you have changed this behavior in the **User Options**). If the trending history is not shown, you can select **Trend** to view the QA trending history after you complete the QA procedure.
	**Settings (F3)**	Select to change information for trending.
	**Report (Ctrl+P)**	Select to create a report of the QA results.
	**Abort (F5)**	Select to stop the QA test.
	**Start (Enter)**	Select to start the QA procedure.
	**Close (Esc)**	Select to exit the QA screen.

1.6.1 System Status

The Quality Assurance screen indicates the current operating status of the system. The **System Status** should indicate 'System is ready to measure patients' before performing patient measurements to ensure accurate results.

Refer to the topic **Quality Assurance** for instructions on performing a quality assurance procedure.

1.7 Options

Select **Options** from the **Main screen** or select the **Tools** menu to access **User Options**, **Connectivity Options**, and the **Error Log**.

1.7.1 User Options

User Options let you set and change the program default settings.

Select **Options**  **(F6)** from the Main screen and select **User Options.**

OR

Select the **Tools** menu and select **User Options**.

Change the necessary default setting(s).
Select **OK** to save changes. If you do not want to save changes, select **Cancel**.

User Options	Description
Systems 	This tab lists scanner System ID number and Feature code. **User Interface Options, Exam File Options** and **ISCD settings**.If the **Automatic return to Directory** option is selected, you will return to the Directory screen instead of the main screen when you close windows. The **Auxiliary Workstation** option is shown if you purchased the Multi-User Database kit. Select this option to prevent the workstation from performing QA procedures or patient measurements. The **Number of Open Exams** option lets you choose how many exams can be opened for analysis at the same time.
Directory 	Use this option to determine how information is sorted in the Patient and Exam/Image lists and to configure default ethnicity. You can also choose to expand exams by default.
Analyze 	Enable/Disable analysis features for all scan types. You can also choose the type of Small Animal calibration to use and the type of forearm calibration to use for BMD results.
Results Display 	The **Results Display** tab lets you change the appearance of graphs; **Standard, WHO or JSBMR**. You can select the information shown in the results tables, select the composition results to show, and set the Morphometry SD cutoffs.
Trending 	Use this option to select the type of information shown on trending graphs and in trending tables, and configure the software to flag significant change. The integrated Precision Calculator Tool is also located within this option.
Reference Data 	Use this option to select a reference population and show the reference sources on the screen and the results reports. Use of the reference population comparisons is fully at the discretion of the clinician. The program does NOT show the comparative values when shipped from GE Medical Systems LUNAR.
Image 	Use this option to set the colors of ROIs, bone edges, and point typed areas of an image file during analysis, and enable optimal image magnification.
ScanCheck™ 	Use this option to select the ScanCheck™ checks that will be included on the ScanCheck™ tab for AP Spine, Femur, Forearm and Total Body analysis.
Reports 	Select Patient ID types and Report background color. Under Dexa Report Configurations select to report on Selected Region Only, Trend Multiple Results, Invert Image, GE Healthcare Logo, Report Dialog, sBMD Footnote, Comments, Show Vertebral Height T-Scores, and Show Ethnicity. Change the **Report Center Defaults-** where the report will be sent, the types of reports that will be created, regions to be reported on, and the number of copies for each page of the report. **User Information** Includes the site name, address, phone numbers, web site and email information.

	Morphometry Report Options are configured here.
Composer 	Configure the file type to output from Composer. Use the Spelling Options to customize spell checker functions.
QA 	Use this option to change the default setting for printing QA reports. Select **Automatic Printing: Daily QA** to have the program print a QA report each time you complete a quality assurance procedure. Select **Automatic Return to Trend Screen** to automatically return to the trend screen once a QA has completed.
Measure 	Use this option to set the default settings used during a measurement. Save prompt at end of scan (select this option to show a message after every measurement that asks you if you want to save the measurement), Allow continue after SmartScan abort, Use Old Positioner for Lateral Measurements (Densitometry and Morphometry Only), Show Previous Scan, Allow Scanner Start Button to initiate a Measurement, LVA reverse (For LVA, scan patient facing foot of table), Default to seated patient for forearm and hand scans, Pause between Femur scans, OneScan™ (no Foam Leg Block positioner for AP Spine scans), or Pause between AP Spine and Femur Scans.

2. Systems Tab

The scanner's System ID is unique. The System ID is needed for support.
The feature code is only compatible with your system ID. It enables the purchased options in your software. If you wish to try out a feature before buying it, contact your sales person for a trial feature code.

Icon	Function	Choices
	Additional Feature Codes	Enter Trial and IRB feature codes. Expiration dates will display below each feature code.
	**User Interface Options**	Automatic return to Directory will return your display back to the Directory scan after an acquisition is complete. HIPAA Secure View hides patients in the directory view. Play Multimedia Sounds option. Auxiliary Workstation for use with MUDBA setups. The **Auxiliary Workstation** option is shown if you purchased the Multi-User Database kit. Select this option to prevent the workstation from performing QA procedures or patient measurements. The **Number of Open Exams** option lets you choose how many exams can be opened for analysis at the same time.
	**Exam File Options**	HIPAA Secure Filename On: pat_z8gutml1w.dff HIPAA Secure Filename Off: SmithJf0m485s.dff Compress Exam Files to conserve space for high resolution images such as iDXA scans. Encrypt Exam Files

	**ISCD Official Position Acceptance**	Select "Yes" to accept the settings recommended by ISCD. Review current ISCD Positions from the link in the enCORE software.
	**FRAX**	Check box(s) for 'Enable FRAX' and/or 'Apply US NOF/ISCD FRAX recommendations' Review the NOF/ISCD FRAX Implementation Guide from the link in the enCORE software for details.

3. Directory Tab

Icon	Function	Choices
	**Patient Sort Options**	Sort by First name, Last name or Patient ID Ascending or Descending
	**Exam Sort Options**	Sort by Measurement, Date Measured, Date Analyzed, File Name, Archive, Import, or Status Ascending or Descending
	**Patient List Columns**	Choose Patient Third column contents: Patient ID, Facility ID, Department ID or Exam ID
	**Directory Rules & Defaults**	When duplicate patients occur follow Duplicate Patient Match Rule. Select Default Gender, Default Ethnicity, Duplicate Patient Match Rule: Use Patient Last Name & Birthdate or Use Patient ID. Checkbox Option to Expand Exams view in the directory by Default.
	**Directory Status**	Enable Exam Status/notes features. Also, set defaults, actions when sending a report, and status colors.

4. Analyze Tab

Icon	Function	Choices to Appear in the Results
	**Femur Analysis Options**	AHA: Hip Axis Length, Upper Neck region, Lower Neck region, Calculate Hip Strength results and Hip Geometry results
	**Total Body Analysis Options**	Calculate Left and Right results Calculate Total Body Less Head (TBLH) result (used for Pediatric)
	**Forearm Analysis Options**	Forearm Calibration: Lunar, SPA or Comac
	**Orthopedic Analysis Options**	Standard Gruen zones or Extended Gruen zones
	**Small Animal/Research Options**	Calibration: Chemical/Ash or Lunar
	**Morphometry Options**	Create ROIs on Request (Recommended) Automatically create Reference ROIs when needed Automatically create ROIs for T8-L4 when opening exam
	**Finish Button Options**	Finish Button On/Off Operation to perform: Send Report(s) to destinations, Save Exam and Close Exam
	**Estimated Total Body**	Estimate % Body Fat from Spine/Femur scan On or Off

5. Results Display Tab

Icon	Function	Choices
	**Reference Graph Options**	Young Adult (YA) Bars: Standard SD, WHO or JSBMR Show Y2-axis values Age-Matched (AM) Bars appearance and SD applied
	**Densitometry Table Options**	Young Adult (YA) in % or T-Score, Age-Matched (AM) in % or T-Score. Show BMC, Show Area, Show Diagnostic Category Icons and Show All DualFemur Regions
	**Composition Options**	Z-Score or Centile Results Metric or English measurement system
	**Morphometry Reference Options**	Reference in Z-Score or Percent Height Reduction Configuration for assigning deformity Mild, Moderate and Severe
	**BMI Options**	BMI cut-off points assigned per WHO or Custom BMI On or Off

6. Trending Tab

Icon	Function	Choices
	**Trend Graph Options**	Select Line Pattern, Densitometry Trend Graph, Morphometry Trend Graph, or Composition Trend Graph settings.
	**Trend Table Options**	Flag Significant Change On or Off. Configure how trending is to be displayed.
	**Precision Calculator**	A complete Precision Tool to determine Least Significant Change (LSC) for scan types: AP Spine, Femur, DualFemur, Total Body, Forearm, Hand and Lateral Spine
	**Choice of Measures to Trend On**	For Densitometry Pediatric, Densitometry Adult, Morphometry, Composition Y1 axis, Composition Y2 axis, Estimated Composition Trend, and Pediatric Growth Trend.

7. Reference Data Tab

Function	Choices
Choice of Reference Population	Asia, Australia (Combined Geelong/Lunar), Australia (Geelong), Australia (Lunar), Brazil, China, Egypt, Finland, France, Germany, Indonesia, Italy, Japan, Korea, Mexico, Middle East, Philippine, Spain, Tunisia, Turkey, UK, USA (Combined BMDCS/Lunar), USA (Combined NHANES/BMDCS/Lunar), USA (Combined NHANES/Lunar), USA (Lunar)
Scan Site	AP Spine, Femur, LVA, Total Body, Forearm or Lateral Spine
Choice of Default Region for Each Scan Type	Choose the region that will be the default region for analysis for each scan type

8. Image Tab

Icon	Function	Choices
	**Image Options**	On or Off for: Interpolation, Invert Image, Show bone edges, Show Artifacts, Size Image to Fit screen on Open. Display On or Off: Two Total Body images, Dual Femur Images top/bottom, Composition Image for Total Body.
	**Image Colors**	Change image colors for ROIs, Zoom Region/Masks, Bone Edges, Point Typing, Markers and Artifacts
	**Image Export Options**	JPG Quality set
	**Morphometry Wizard Options**	LVA Wizard Zoom Margin set in millimeters

9. ScanCheck™ Tab

Select the ScanCheck™ items that you would like to show in the analysis screen.

 ScanCheck™ On or Off

☐ Set ScanCheck™ view to appear first when analyzing

☐ Include ScanCheck™ indications on report.(bottom of screen)

Show	AP Spine Alert	Detect the following problems
☐	**Measure Technique**	Correct scan mode used?
☐		AP Spine alignment reasonably straight?
☐	**Analysis Technique**	Optimal contrast and brightness set?
☐		ROIs properly defined?
☐		L1-L4 labeled correctly?
☐		Tissue region properly defined?
☐		Bone edges properly defined?
☐		Results consistent with previous scan?
☐	**Anatomy Issues**	Analysis region free of unusual high density bone?
☐		Free of unusual T-Score variation?
☐		Free of unusual curvature?
☐		AP Spine - Comments:

Show	Femur Alert	Detect the following problems
☐	**Measure Technique**	Correct scan mode used?
☐		Sufficient pelvis and shaft separation?
☐		Femur shaft reasonably straight?
☐		Proper femur rotation?
☐	**Analysis Technique**	Optimal contrast and brightness set?
☐		ROIs properly defined?
☐		Tissue region properly defined?
☐		Bone edges properly defined?
☐		Results consistent with previous scan?
☐	**Anatomy Issues**	Analysis region free of unusual high density bone?

☐		Femur - Comments:

Show	Total Body Alert	Detect the following problems
☐	**Measure Technique**	Correct scan mode used?
☐		Patient within scan field?
☐	**Analysis Technique**	Optimal contrast and brightness set?
☐		ROIs properly defined?
☐		Patient Height Entered Correctly?
☐		Patient Weight Entered Correctly?
☐	**Anatomy Issues**	Analysis region free of unusual high density bone?
☐		Total Body - Comments:

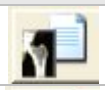
Show	Forearm Alert	Detect the following problems
☐	**Measure Technique**	Forearm alignment reasonably straight?
☐	**Analysis Technique**	Optimal contrast and brightness set?
☐		ROIs properly defined?
☐		Tissue region properly defined?
☐		Bone edges properly defined?
☐	**Anatomy Issues**	Analysis region free of unusual high density bone?
☐		Forearm - Comments:

10. Report Tab

Icon	Function	Choices
	**Report Patient ID Types**	Patient Name, Patient ID, Facility ID, Dept ID, Exam ID, Attendant, Referring Physician, Reading Physician or blank.
	**Report Colors**	Change the background color of DXA Reports
	**DXA Report Configuration**	Selected Region Only, Trend Multiple Results Only, Invert Image, Show GE Healthcare Logo, Show Report Dialog, sBMD Footnote on, Show Comments, Show Vertebral Height T-Score, Show Ethnicity
	**Report Center Defaults**	Opens the Report Center Window for configuration. See Report Center Chapter for more information.
	**Report Regions**	Select the regions desired for each scan type. "Selected Region" will report the region currently highlighted on screen

	**Report Regions for Trending**	Select the trend regions desired for each scan type.
	**User Information**	User Information will be used as a header for all DXA reports
	**Morphometry Report Options**	Morphometry Trend Regions: Deformities Only or All Regions Morphometry Trend Results: Average Height, Posterior Height, Middle Height, Anterior Height, P/A Ratio, M/P Ratio and A/P Ratio

11. Composer Tab

Icon	Function	Choices
	**Image Storage Format**	JPG, PNG, or WMF
	**Chart Storage Format**	JPG, PNG, or WMF
	**Object Storage Format**	JPG, PNG, or WMF
	**Quality and Resolution for JPG & PNG**	Automatic or manual configuration of Quality Automatic or manual configuration of Resolution
	**Spelling Options**	General options, Spelling Suggestions, Dictionary or Customized Dictionary, Advanced Settings and Performance & Accuracy settings
	**PDF Export Security Settings**	Add password protection to PDF documents exported Set permissions for printing and editing.
	**Display ICD9 codes with Fractures, Indications and Treatments**	ICD9 Codes On or Off

12. QA Tab

Icon	Function	Choices
	Default QA Copies	Enter number of copies
	**Automatic Daily QA Print**	On or Off
	**Automatic return to trend screen**	On or Off
	**Graphical Interface**	On or Off
	**Enable QA stability analysis**	On or Off
	**Compress Patient Database after QA**	On or Off
	**Allow QA Block scans outside of Daily QA**	On or Off

	**QA Means**	Reset Means Activation
	**QA AutoMentor**	Enable AutoMentor to automatically export QA report to email or Fax if QA fails

13. Measure Tab

Icon	Function	Choices
	**Save Prompt at the end of a scan**	On or Off
	**Allow a continue option after SmartScan abort**	On or Off
	**Show Previous Scan**	On or Off
	**Allow Scanner Start Button to initiate a Measurement**	On or Off
	**Use Old Positioner for Lateral Measurements (Densitometry and Morphometry only)**	On or Off
	**LVA Reverse scan arm direction. Patient head at foot of the table.**	On or Off
	**Default to seated patient for forearm and hand scans**	On or Off
	**Pause between Femur scans**	On or Off
	**OneScan (Foam Leg Block positioner not used for AP Spine scans)**	On or Off
	**Pause between AP Spine and Femur scans**	On or Off
	**Adjust the speed of movement of the scan arm: Transverse Joystick Speed &** Longitudinal Joystick Speed	Faster or Slower
	**Download scanner firmware (service tool)**	Initiate download

1.7.2 Connectivity Options

Connectivity options let you change report delivery, fax, email, DICOM, and HL7 default settings.

1. View Connectivity Options:

Select  **(F6)** from the **Main screen** and select **Connectivity Options.**

OR

Select the **Tools** menu and select **Connectivity Options**.

2. Select one of the **Connectivity Options** tabs that follow:

Connectivity Options	Description
Report Delivery 	Use this option to select the recipient of your e-mailed and faxed results reports. **Referring physician**-The program sends reports to the physician listed in the patient's Primary information.

	Reading physician-The program sends all reports to the physician listed in this field.
Fax 	Use this option to change the default settings for the fax feature. The **Receive Incoming Faxes** feature lets you receive faxes if you have a fax modem attached to your system. The **Invert Image** feature lets you invert the gray scale for images on your faxes. An analog phone line is required. The Fax option is only available if you purchased the TeleDensitometry kit.
Email 	Use this option to change the default settings for the email feature. In Outlook Express or Outlook, setup a "Personal Address Book" to interface with enCORE. The **Add case information to Subject** feature automatically includes the patient's name, the scan type, and the name of the file you are emailing in the Subject line of the email message. Make sure a check appears in the check box if you want to use this feature. The **Invert Image** feature allows you to invert the gray scale for images in your emails. The **Image quality** drop-down list allows you to choose the quality level for images included in your emails. Quality affects the size of the image. The Email option is only available if you purchased the TeleDensitometry kit.
DICOM 	Use this option to change the default settings for the DICOM feature. If you change the store folder location, you will also have to change the Report Folder Location setting in the LUNAR DICOM program. The **DICOM Worklist** feature displays a list of patients who are scheduled for DXA measurements. The list is supplied by the hospital information system. Make sure a check appears in the Directory in Worklist Mode check box if you want to use this feature. The DICOM option is only available if you purchased the DICOM kit.
HL7 	Use this option to change the default settings for the HL7 feature. The **Worklist Mode** feature displays a list of patients who are scheduled for DXA measurements. The list is supplied by the hospital information system. The Reporting option can send Text and Images in HL7 format. DO NOT change any of the HL7 default settings without authorization from your network administrator. The HL7 option is only available if you purchased the HL7 kit.
Support 	This option lists the fax and email information for your service provider. The program uses this information to email or fax QA reports to your service provider if the QA procedure fails.

1.7.3 Error Log

In the event you encounter difficulties which prevent normal operation of the program, view the Error Log for a list of errors that may be causing the problem. Service will need the digital file of errors.

1. To view the Error log:

Select **Options**  **(F6)** from the Main **screen** and select **Error log...**

OR

Select the **Tools** menu and select **Error Log**.

2. To export the error logs go to **Tools / Send Configuration** and check the options to export.

The Error log consists of two sections:

- **Sessions**–This section lists the dates and times that the program was being used and the number of errors that occurred during each session.
- **Errors**–This section gives a description of each error that occurred during the selected session.

Troubleshoot button takes you to a help topic about the selected error. **Find Errors** takes you to similar errors in the list.

If you cannot correct the error condition, go to **Tools / Send Configuration** and check the Error log and Configuration files options. Email the files into support. Or you can print the Error log by selecting **Print Errors.** Call your GE representative and provide them with the error description as shown in the Errors section.

2.0 Quality Assurance

2.0.1 Daily Quality Assurance Procedure

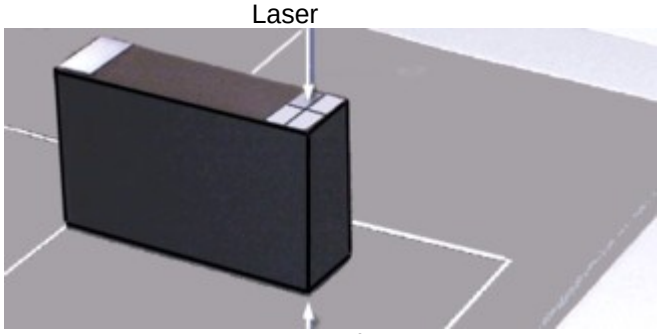
Complete a Quality Assurance (QA) test each morning before you measure a patient. If the room temperature changes more the 5°C during the day, then perform another Daily QA. This procedure calibrates and verifies functionality, as well as, the accuracy and precision of the densitometer. The QA procedure should be performed a minimum of once a week if the scanner is not being used. **Save all QA printouts.**

Use the black calibration block to complete a QA test (the calibration block consists of tissue-equivalent material with three bone-simulating chambers of known bone mineral content). Leave the pad on the scanner table during the QA procedure.

1.  Select **Quality Assurance (F5)** from the **Main screen** or select  **QA** from the Common toolbar.

2.  Select **Start**. A message instructs the technician to position the calibration block.
3. Put the calibration block on the pad so that the laser light (**1**) rests in the center of the cross-hair label on the calibration block.

Laser



Brass on bottom

4. Select **OK**. Follow the screen prompts to complete the QA procedure.
5. If the QA test did not pass, reposition the calibration block and repeat the procedure. If the procedure fails a second time, call Lunar Support for assistance.
6. To print the QA results, select **Report** if the auto print option is not set. **Save the QA printout.**

2.0.2 Quality Assurance Options

Go to **Tools / User Options / QA** tab.
Click here or go to the Options chapter.

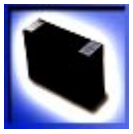
2.0.3 Graphical Interface

Startup Test:
Database Validation
Scanner Self-test
QA Block Search
Peaking

Mechanical Test:
Beam Stop
Transverse Distance
Longitudinal Distance

X-ray / Detector:
Spectrum Spillover
Reference Counts
Detector Status

Calibration:
BMD values of High, Medium and Low block chambers
Tissue values of Lean, Normal and Fat block values
Trend analysis



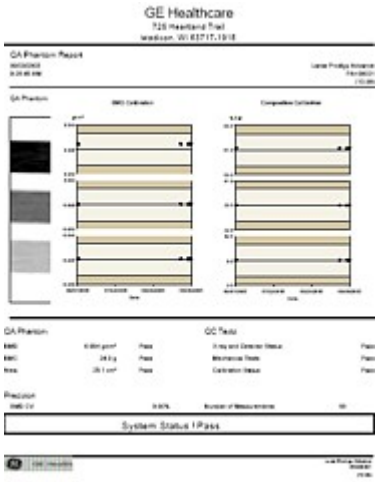
Phantom:
BMD, BMC, Area,
Edge detection

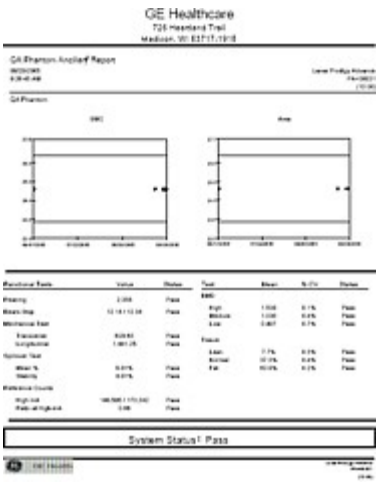
Click on the **Trend** tool to exit out of the QA process screen.

2.0.4 QA Trend Reporting Options

Click on Settings. The settings screen provides many options for QA trend reporting components. In the upper right panel are options for the **QA Report Type**.

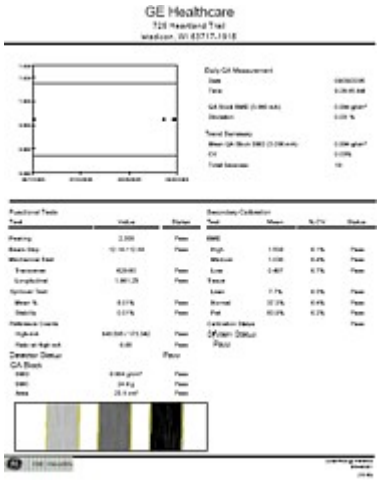
- QA Phantom Report
- Ancillary page
- Legacy QA Report





QA Phantom Report

QA Ancillary page



Legacy QA Report

3.0 Measurement

3.1 Measurement Overview & Warnings

Patient considerations:
Obey the patient considerations that follow before you start a patient measurement:

• **Clothing restrictions:** Make sure the patient removes items that can attenuate the x-ray beam, such as clothing with zippers, snaps, buckles, and buttons. Ask patients to wear a jogging suit to the exam or give them an examination gown when they arrive.

• **Radionuclide and radiopaque agents:** Make sure the patient has not ingested or been injected with radionuclides or radiopaque agents in the past 3–5 days. If the patient has taken tests that use such agents, postpone the measurement until all traces of the element have left the patient's body. A 72-hour waiting period is usually long enough for most agents to leave the patient's body. However, consult your radiation safety officer (RSO).

• **Pregnancy restrictions:** If it is necessary to measure a pregnant patient, the fetus could be exposed to small amounts of radiation. Postpone the measurement until the end of pregnancy if clinical management is not affected. The decision to subject a fetus to radiation exposure must be made by the referring physician, noting that 1) bone quality for most patients does not significantly change during pregnancy and 2) in the advanced stages of pregnancy, the fetus' mineralized bone can interfere with measurements of the mother's spine and femur.

Measurement Warnings

WARNING: Each GE LUNAR scanner is equipped with a Class II Laser that is less than 1 milliwatt in strength. **DO NOT STARE INTO THE BEAM.**

WARNING: Remove Foam Leg block prior to positioning scan arm over the patient and immediately after completing an AP Spine scan.

WARNING: Insure the patient's head, arms, knees or any body part are not in direct path of a moving scan arm.

3.2 Measurement Procedures

This section describes the basic steps necessary to complete a patient measurement. These steps must be completed in the order given. Review the steps before you start a patient measurement.
Note the following, whenever you see the following symbol:

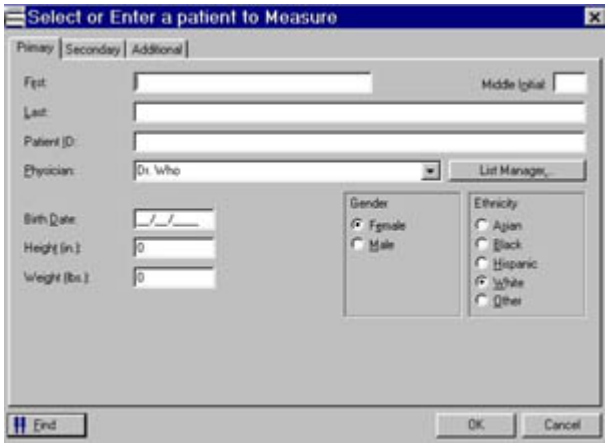
WARNING: Each GE LUNAR scanner is equipped with a Class II Laser that is less than 1 milliwatt in strength. **DO NOT STARE INTO THE BEAM.**

WARNING: Remove Foam Leg block prior to positioning scan arm over the patient and immediately after completing an AP Spine scan.

WARNING: Verify the patient's head, arms, knees or any body part are not in direct path of a moving scan arm.

3.2.1 Step 1: Record or select patient

To complete a patient measurement, you must record information for a new patient or select a patient record from the database.



Record new patient information

1. Select  from the **Main screen** or  from the **Directory** toolbar.

2. Record the necessary information in the three tabs that are shown on the Patient Information dialog box:

   - **Primary tab**–You must record the patient's name, birth date, height, and weight to complete a patient measurement. Change the default gender or ethnicity in the **Tools/User Options/ Directory/Directory Rules and Defaults**.
   - **Secondary tab**–The Secondary tab lets you record comments and administrative information that is not required to complete a patient measurement. If the ISCD guidelines are turned on under **Tools/User Options/Systems**, it is important to enter a menopause age for postmenopausal women as the WHO criteria will only be applied to postmenopausal women and men age 50 and older.
   - **Additional tab**–The Additional tab lets you record fracture, indication, and treatment information for the patient. In addition, you can also enter the patient's insurance information. This information is not required to complete a measurement.

3. Select OK when you have finished recording the patient information. The **New Measurement** screen is shown if you started from the Main screen; if you started from the Directory screen, highlight the patient's name and select Measure from the toolbar to go to the New Measurement screen.

Select existing patient record
Select a patient for a new measurement from either the **Main** screen or the **Directory** screen. Use the Search option to find the patient, if necessary.
Main screen
   a. Select **Measure**. The Patient Information dialog box is shown.
   b. Select **Find**. The Patient and Image lists are shown.
   c. Double-click on the patient in the Patient list. The Patient Information dialog box is shown.
   d. Make sure the patient information is correct, then select **OK**. The New Measurement screen is shown.

Directory screen
Double-click on the patient in the Patient list, or highlight the patient and select **Measure** from the Common toolbar. The New Measurement screen is shown.

3.2.2 Step 2: Select measurement site

The New Measurement screen shows a skeletal image which gives the sites you can select to measure. Use the mouse to click on the site you want to measure. The site you select is highlighted in the Exam list.

Information about the measurement modes is located in the *Safety Information and Technical Specifications* manual you received with your system.

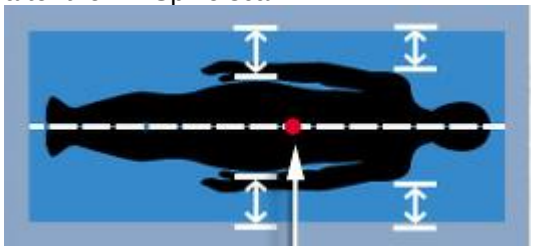
Now follow the measurement procedure for the site you selected.

3.2.3 AP Spine measurement

The positioning requirements for an AP Spine measurement depend on whether you have chosen to use the foam leg block positioner in the **User Options** Measure tab.
The foam block **must not** be used if OneScan™ is checked for a specific measurement, but it **must** be used if OneScan™ is not checked for the measurement. For OneScan™ measurements, the T-Score calculation assumes the foam block is not used.

1. Foam Leg Block

- **If you are using the foam leg block positioner:**
  Help the patient onto the scanner table and position the patient as follows in the center of the scan table. Use the centerline on the table as a reference to align the patient.The patient's arms should be on the scanner table, alongside the patient's body.
- **Warning**: Remove the foam leg block prior to positioning the scan arm and immediately after the AP Spine scan.

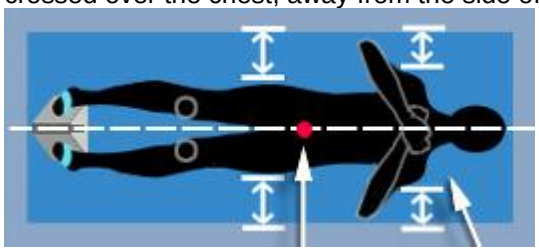


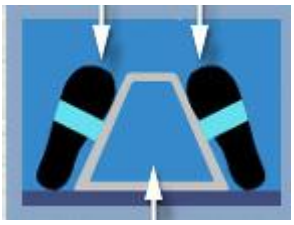

 Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position. A graphic is shown that gives the correct patient position and measurement start position.

- **If you are using the foam leg block:**
  Use the support block to elevate the patient's legs. Make sure the patient's thighs form a **60°to 90°** angle with the table top. This step helps separate vertebrae and flatten the lower back.

2. OneScan™

- **OneScan™ Does not use the foam leg block positioner:**
  Help the patient onto the scanner table and position the patient as follows in the center of the scan table. Use the centerline on the table as a reference to align the patient. The patient's arms should be crossed over the chest, away from the side of each hip.

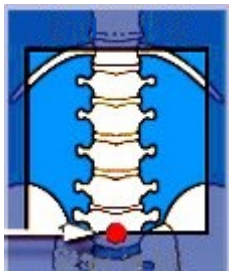




 Select **Position** from the New Measurementtoolbar. The scanner arm moves to the approximate start position. A graphic is shown that gives the correct patient position and measurement start position.

- **OneScan™ Does not use the foam leg block positioner:**
  Use the centerline on the scanner table as a reference to make sure the foot brace is centered. Align the centerline with the guide on the base of the foot brace. Internally rotate the patient's legs, and secure the patient's feet to the foot brace (GE-Lunar suggests not removing the shoes).

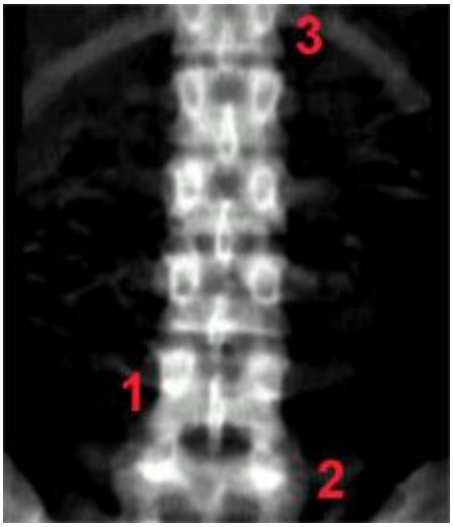
3. Laser Position
   Use the graphic shown to adjust the position of the laser light. Position the laser light approximately **5 cm** below the patient's navel and in the same longitudinal plane as the patient's midline.



4.  Select **Start** from the New Measurement toolbar to start the measurement. Monitor the image to make sure it is correct.

5. Make sure the spine is in the center of the image, all of L4 **(1)** is shown, the top of L5 **(2)** is shown in the first 1-2 sweeps for Prodigy, 5-15 scan lines for DPX. **(3)** Approximately 1/2 of T12 is shown.

   If the image is not correct, select **Abort**, reposition the laser light, and restart the measurement.



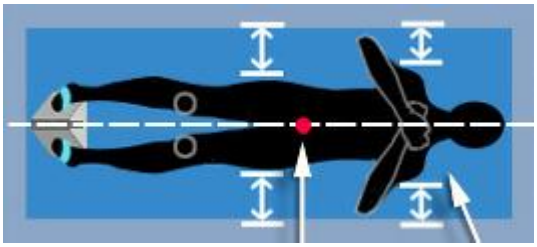
6.  If you want to complete another measurement for the patient, select **Set Up** from the New Measurement toolbar. Refer to the topic **New Measurement** screen for additional screen functions.

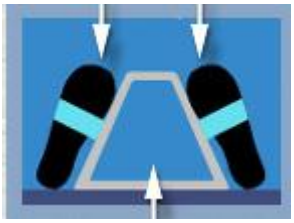
7.  If you have completed measurements for the patient, select **Home** to move the scanner arm to the Home position.

8.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

3.2.4 Femur/DualFemur measurement

1. Help the patient onto the scanner table and position the patient as follows:
   The patient's body is in the center of the scanner table - use the centerline on the table as a reference to align the patient. The patient's arms are crossed over the chest, away from the side of each hip.





2.  Select **Position** from the **New Measurement** toolbar. The scanner arm moves to the approximate start position.
3. A graphic is shown that gives the correct patient position and measurement start position for the site you are measuring. Use the centerline on the scanner table as a reference to make sure the foot brace is centered. Align the centerline with the guide on the base of the foot brace. Internally rotate the patient's legs, and secure the patient's feet to the foot brace (GE-Lunar suggests not removing the shoes).
4. Select the appropriate **scan mode** based on the thickness of the femur area. Note that the scan mode for the femur may be different than the scan mode used for the AP Sine, based on the patient's weight distribution. Use the graphic shown to adjust the position of the laser light. Position the laser light approximately **7-8 cm** below the greater trochanter where the transverse (Pubic Symphysis) and midline of the femur intersect. **If you are performing a DualFemur™ measurement, position the laser light for the left femur first.**

5.  Select **Start** from the New Measurement toolbar. Monitor the image to make sure it is correct. The Femur image shows the greater trochanter (**1**), femoral neck (**2**), and ischium (**3**).
A minimum of three centimeters of tissue should be shown above the greater trochanter and below the ischium.

Select Abort  **and reposition the laser light if the image is not correct.**

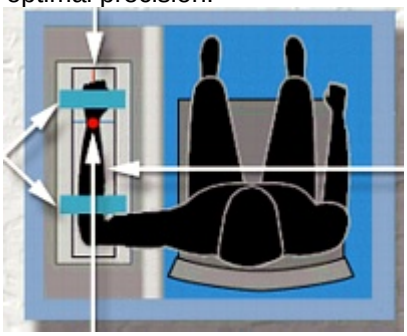
DualFemur:
DualFemur lets you measure the patient's left and right femur in an automatic sequence. After the program has measured the left femur, the scan arm moves to the approximate start position for the right femur. Check the start position and, if necessary, adjust the measurement start position for the right femur.

Note: DPX-Duo and DPX-Bravo have a narrow scan region. Therefore, repositioning the patient for the contra-lateral femur may be necessary.

 Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

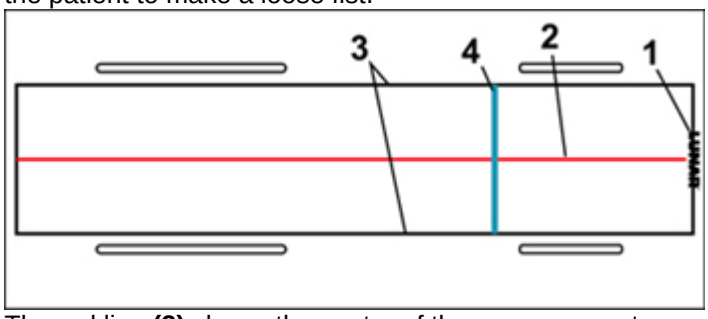
3.2.5 Forearm measurement

1. Put the forearm positioner on top of the pad. The LUNAR logo should be located near the patient's fingers. The forearm positioner keeps the patient's forearm from moving during a measurement.
2. Seat the patient in a chair next to the scan table.
   Note: Use a chair without arms or wheels. Use the same chair for all forearm measurements to get optimal precision.



Note: Lunar iDXA and Prodigy scanners have an option to scan the patient in a non-seated position with the scan positioner under the forearm (Tools /User Options/Measure tab). Continue to use the same method of positioning. If previous scans were done in a seated position, continue to use the same scanning method to trend data.

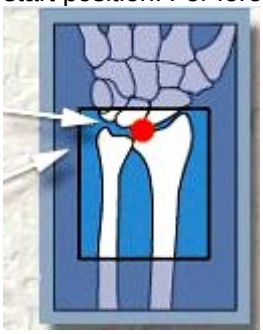
3. The arm is placed on the positioning board with the palm down with the hand near the Lunar label **(1)**. Tell the patient to make a loose fist.



The red line **(2)** shows the center of the measurement area. Center the patient's forearm along this line. The black lines **(3)** show the boundary of the measurement area. Position the patient's forearm so that both the radius and the ulna are between these lines. The blue line **(4)** shows the starting point of the measurement. Position the patient's forearm so the distal end of the ulna is at this line. Position the laser light at this line**(4)** when you start a measurement.

4. Attach the velcro straps over the fist and over the arm immediately below the elbow. The straps must be outside the measurement region.

5.  Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position. For forearm measurements, be careful that the scanner arm does not bump the patient's head.



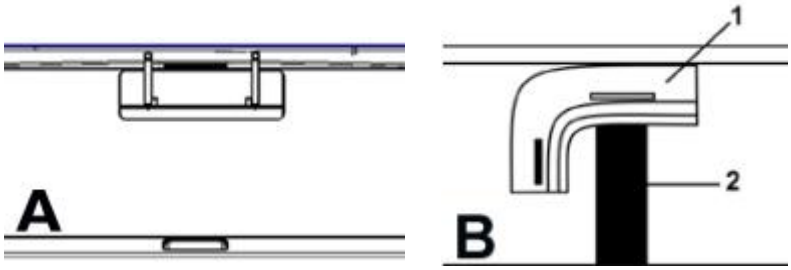
6. Use the graphic shown on the New Measurement screen to adjust the position of the laser light. The Laser Light is positioned in the center of the wrist, adjacent to the ulna styloid. If necessary, move the positioner and the patient's arm so that the laser light shines in the center of the patient's arm and is aligned with the **blue line** on the forearm positioner. Make sure the patient's elbow makes a 90-degree angle, and make sure the forearm positioner is straight on the table top. All of the ulna styloid should be visible. The forearm bones should be centered and straight.

7.  Select **Start** from the **New Measurement** toolbar to start the measurement. Monitor the image to make sure it is correct.
   Make sure the forearm is in the center of the image and the distal end of the ulna **(1)** is shown near the top of the image. If the image is not correct, select **Abort**, reposition the laser light, and restart the measurement.

8.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

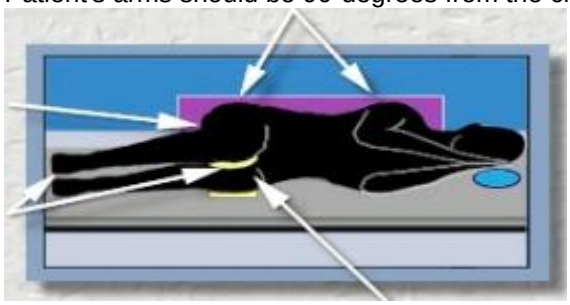
3.2.6 Lateral Spine/LVA measurement Option

1. Put the lateral positioner on the table.
   Positioner A should unfold and set over the back rail of the table. Positioner B (1) should be placed on top of the spine strap (2) and against the back rail of the table.

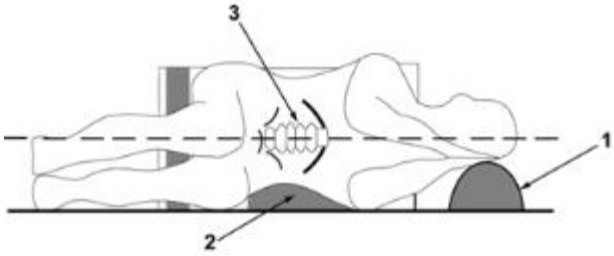


2. The lateral positioner and the instructions below are intended to position the l**umbar spine straight and parallel to the scanner table**. Refer to the figure below to complete the steps that follow.
   - **Set a pillow on the table for the patient's head.**
   - Position the patient's knees toward the chest until the lower back and both shoulders are flat against the lateral positioner.
   - **Make sure the patient's spine is parallel to the scanner table.**

3. **Positioner A:**
   Refer to the figure below to complete the steps that follow for Positioner A:
   - Place a pillow under the patient's head.
   - Set a foam wedge below the bottom knee and between the knees for comfort.
   - Make sure the patient's back and hips are flat against the positioner.
   - Patient's arms should be 90-degrees from the chest.



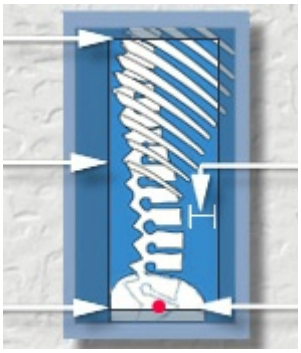
4. **Positioner B:**
   Refer to the figure below to complete the steps that follow old Positioner B:
   - Pull the compressor strap over the patient's torso and secure it to the back of the positioner. Make sure the strap does not hang over the back edge of the scanner.
   - Set a foam wedge between the patient's thighs and the bottom of the positioner. Set a second wedge between the patient's knees, and set a third wedge below the bottom knee. Make sure the patient's back is flat against the positioner and adjust the strap so the patient does not roll forward during the measurement.
   - Adjust the foam wedge between the back of the patient's thighs and the positioner to hold the knees in place during the measurement.



5.  Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position.
6. Adjust scan length or width as needed. LVA Morphometry scan length can be increased to 55.4 cm. LVA Spine Geometry scan length should be increased to 69.5 cm. For patients that a unable to rest on their left side for LVA scanning, select the **Reverse** box to allow the patient to rest on their right side and reverse the scan arm direction. Use the graphic shown on the New Measurement screen to adjust the position of the laser light. Position the laser light at the **top** of the patient's iliac crest.

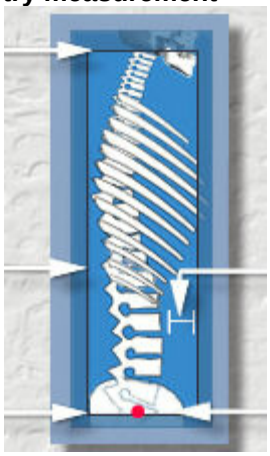
Lateral Spine measurement

LVA Morphometry measurement



Note: An LVA measurement only produces BMD results when SmartScan is turned **off**. When SmartScan is on, the scan time is reduced.

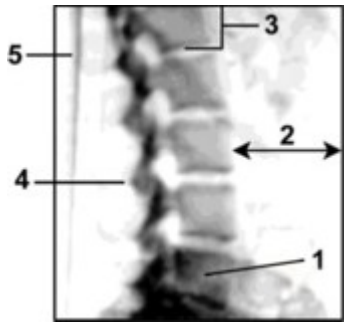
LVA Spine Geometry measurement



7.  Select **Start** from the New Measurement toolbar to start the measurement. Monitor the image to make sure it is correct.
8. Make sure the image is correct.
   - The image starts in the Sacrum so that all of L5 is visible..
   - At least 2.5 cm of soft tissue is shown on the anterior side of the vertebrae.
   - The image ends in L1 for a Lateral Spine measurement, near T4 for an LVA Morphometry measurement, or near C1 for a LVA Spine Geometry Measurement.

- All of the posterior elements appear in the image.
- The edge of the positioner may appear in the image. This is not a problem.

If the image is not correct, select **Abort**, reposition the laser light, and restart the measurement.

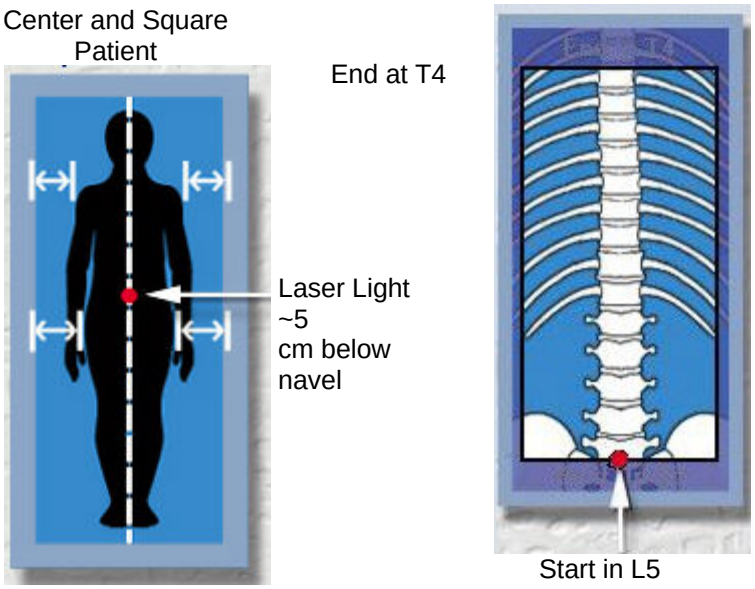


9.  If you have completed measurements for the patient, select **Home** to move the scanner arm to the Home position.
10.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

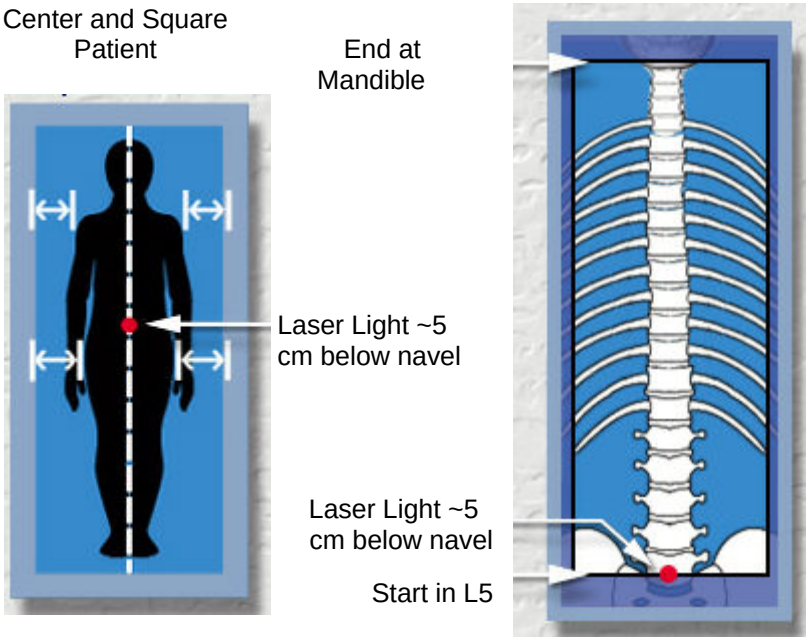
3.2.7 APVA Measurement Option

1. Follow the same scan procedure that is typically for AP Spine measurements.
2.  Select **Position** from the **New Measurement** toolbar. The scanner arm moves to the approximate start position. APVA Morphometry scan length can be increased to 55.4 cm. APVA Spine Geometry scan length should be increased to 69.5 cm. 
3. Use the graphic shown on the New Measurement screen to adjust the position of the laser light. Position the laser light approximately 5 cm below the patient's navel. End the scan in T4 for APVA Morphometry Measurement or near mandible for APVA Spine Geometry Measurement.

APVA Morphometry Measurement



APVA Spine Geometry Measurement



4. Select **Start** from the New Measurement toolbar to start the measurement. Monitor the image to make sure it is correct.

5. Make sure the image is correct. If the image is not correct, select **Abort**, reposition the laser light, and restart the measurement.

6. If you have completed measurements for the patient, select **Home** to move the scanner arm to the Home position or select next.

7. Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement**screen for additional screen functions.

3.2.8 Dual VA Measurement Option

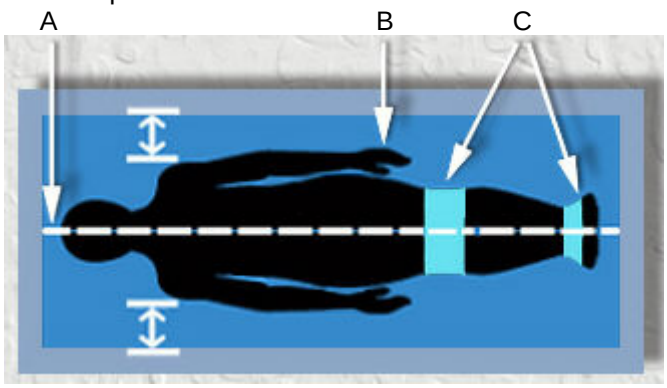
Dual VA measurement includes both APVA and LVA measurements in one exam
.

3.2.9 Total Body Measurement Option

1. Make sure all attenuating materials (belts, metal buttons, etc.) are removed from the measurement region. For Total Body scans, all materials that may cause significant attenuation must be removed.

2. Help the patient onto the scanner table and position the patient as follows:
   A· ·the patient's body is in the center of the scanner table—use the centerline on the table as a reference to align the patient. **Note:** If a patient is wider than the scan area, the patient can be positioned for a half body scan. In addition to all of the left or right side of the body, the entire head and spine should be included in the scan window.

B the patient's hands are turned on sides with thumbs up, palms facing legs and arms are alongside the patient's body. If possible, hands should not touch legs. Verify that the patients arms are within the scan area lines on the table pad.
C velcro strap



3. Select **Position** from the New Measurement tool bar. The scanner arm moves to the approximate start position.

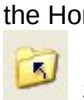
4. A graphic is shown that gives the correct patient position and measurement start position for the site you are measuring. Remove the patient's shoes. Make sure the patient's head is approximately **3 cm** below the horizontal line on the table pad. Use the velcro straps to secure the patient's knees and feet to prevent movement during the measurement.
Note: You are not required to adjust the scan arm position for **Total Body** measurements.

5.  Select **Start** from the New Measurement toolbar to start the measurement.

6. Monitor the image to make sure it is correct. A correct Total Body image shows the patient's entire body. Make sure the head **(1)**, feet **(2)**, and patient's arms **(3)** are shown in the image.

   If the image is not correct, select **Abort** and reposition the patient.

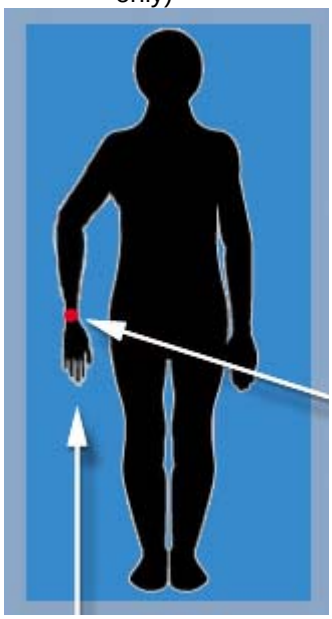
7.  If you have completed measurements for the patient, select **Home** to move the scanner arm to the Home position.

8.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

3.2.10 Hand Measurement Option

1. Set the patient in a chair next to the scan table. Have the patient place the hand flat on the table, 2 cm from the line on the table pad, with the thumb and fingers together.
   Note: Use a chair without arms or wheels. Use the same chair for all hand measurements to get optimal precision.
   Note: Lunar iDXA scanners also have an option to scan the patient in a non-seated position with the scan positioner under the hand (Tools /User Options/Measure tab). Continue to use the same method of positioning. If previous scans were done in a seated position, continue to use the same scanning method to trend data.

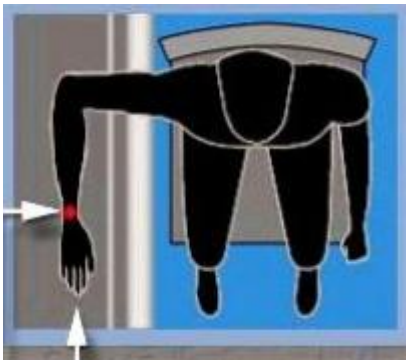
Non-Seated (iDXA only)



Fingers and thumb flat and together

Laser Light: In center of wrist, adjacent to ulna styloid

Seated



Position hand 2 cm from the line on the table pad, fingers and thumb flat and together

2.  Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position. For hand measurements, be careful that the scanner arm does not bump the patient's head.

3. Use the graphic shown on the New Measurement screen to adjust the position of the laser light. If necessary, move the positioner and the patient's arm so that the laser light shines in the center of the wrist, adjacent to the ulna styloid.

Let scan proceed past all fingertips

All of the Ulna Styloid is visible

Laser Light: In center of wrist, adjacent to ulna styloid

4.  Select **Start** from the **New Measurement** toolbar to start the measurement.
5. Monitor the image to make sure it is correct. Make sure the scan proceeds past all fingertips, and make sure that all of the ulna styloid is visible. If the image is not correct, select **Abort** and reposition the patient.
6.  If you have completed measurements for the subject, select **Home** to move the scanner arm to the Home position.
7.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

3.2.10 Small Animal Body Measurement Option

CAUTION: This software is for investigational use on laboratory animals or for other tests that do not involve human subjects.

WARNING: Proper cleaning and handling procedures must be followed to prevent the possibility of cross-infections between subjects scanned on the same system.

Clean and disinfect the system according to your local and country-specific hygienic regulations. Protect table pad and table top from wetness and prevent the ingress of liquid into the scanner by protectively covering the scanner with a waterproof non-attenuating material. Some plastics and vinyls may have unique x-ray attenuation properties that could affect results.

1. Make sure all attenuating materials (metal, etc.) are removed from the measurement region.
2. Position the subject on the scanner table. Center specimen on center line, placing the head toward head end of the table, start a few centimeters above the head.
3.  Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position.

4.  Select **Start** from the New Measurement toolbar to start the measurement of few centimeters above the head.
5. Monitor the image to make sure it is correct. If the image is not correct, select **Abort** and reposition the subject.
6.  If you want to complete another measurement for the subject, select **Set Up** from the New Measurement toolbar.
7.  If you have completed measurements for the subject, select **Home** to move the scanner arm to the Home position.
8.  Select **Close** to exit the New Measurement screen. Refer to the topic **New Measurement** screen for additional screen functions.

3.2.11 Abort measurement

 Select **Abort (F5)** from the New Measurement toolbar if the image is not correct or if you determine that a sufficient area of the measurement is obtained. When you select **Abort**, the measurement stops automatically when the detector reaches the edge of the scan window. A message shows the options that follow:

- **"Resume Measurement"–**Select this option to continue the measurement that you chose to abort.
- **"Save Measurement"–**Select this option to save the current measurement.
- **"Do not save measurement. Reposition this measurement."–**Select this option to start the measurement again using the same settings. The box that is shown around the image shows the measurement area. Use the arrow keys to move the box and reposition the measurement. Select **Start** from the New Measurement toolbar to restart the measurement
- **"Do not save measurement. Set up a new measurement."–**Select this option to change the settings for the measurement.

3.3 Pediatrics Option

The Pediatric option provides BMC, BMD and Z-Score values for females and males who are 5-19 years old. **Measurement** procedures are the same as the procedures for adult patients.
Reference values are available for AP spine, Femur and Total body measurements.

When a patients age is less than 20 years, additional pediatric patient information fields appear automatically.

Pediatric Skeletal Age and Pubertal Stage. This information is obtained by the physician through other means.

3.4 OneScan

OneScan™ performs a AP Spine and DualFemur exam without repositioning between scans. OneScan™ does not use the foam leg block positioner for spine positioning.

3.4.1 Configuring OneScan On/Off

The OneScan option can be defaulted on or off through **User Options/ Measure**.

A pause may be enabled to occur between femurs (DualFemur) or between AP Spine and Femur scans. See **OneScan Measurement** below.

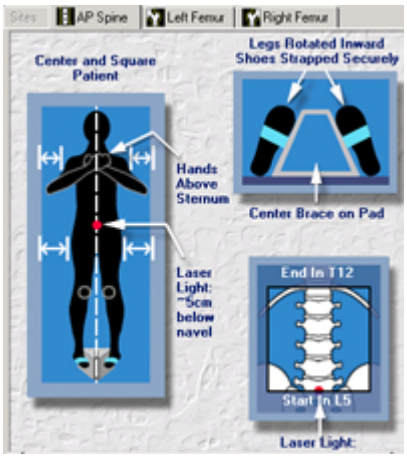
The **Position** screen also includes a OneScan **checkbox.** If the patient has had a previous scan, the software will auto-select the matching OneScan option for trending.

(Determine if the OneScan feature was on or off through examination of the analysis screen under the **Information** tab.)

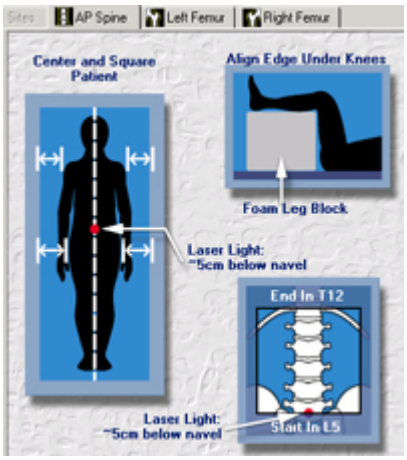
3.4.2 Positioning the Patient

The positioning graphics are tied **directly** to the configurable OneScan checkbox. The graphics will change slightly, depending upon the configuration selected.

Graphics: OneScan **ON**



Graphics: OneScan **OFF**

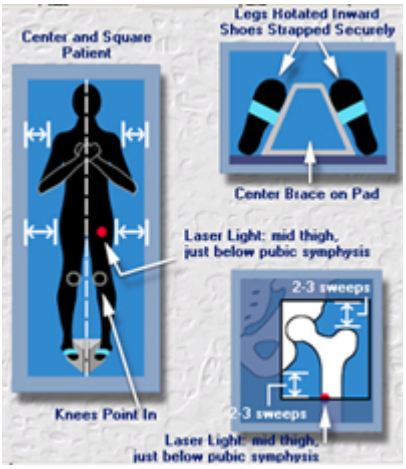


Positioning the patient remains the same if you choose to not use the OneScan option. However, if you are using OneScan, the following positioning should be utilized:

1) Help the patient onto the scanner table and position the patient in the center of the scan table. Use the centerline on the table as a reference to align the patient.
2) The patient's arms should be crossed over the chest, away from the side of each hip.
3) Align the centerline on the scanner table with the guide on the base of the foot brace.
4) Internally rotate the patient's legs, and secure the patient's feet to the foot brace (GE-Lunar suggests not removing shoes).

3.4.3 OneScan™ Measurement

During a combined AP Spine and DualFemur (or single femur) measurement the software immediately proceeds to the femur setup. With the OneScan feature enabled, the software proceeds directly to the positioning screen indicated below for adjustment of the laser light position. The OneScan feature eliminates this pause as the patient is already positioned with their feet in the DualFemur brace for femur measurements.



Note: OneScan is intended to be used without the leg block.

A Pause may be enabled between scans. This option is found in **Tools/User Options / Measure** tab. Check the desired options.

3.5 OneVision Feature

The OneVision feature allows the user to set up multiple measurements within one exam. This eliminates keystrokes and improves throughput for customers that routinely perform multiple measurements on each patient. OneVision feature is required for DICOM or HL7 reporting interfaces. By default, the enCORE software includes the exam combinations of AP Spine + DualFemur or AP Spine + DualFemur + LVA. Exam combinations can be found at the top of the Exam list. The images included in the Exam are displayed in tab view above the skeletal image.

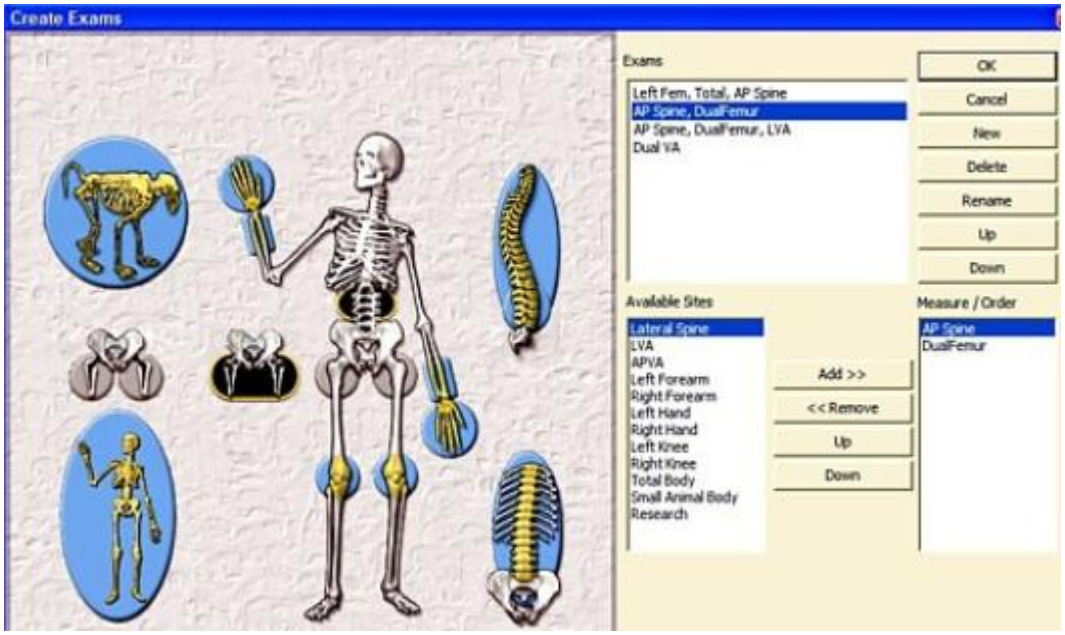
When scanning with a series of OneVision scan types,  select **Next** to proceed to the next image site in the exam or **Repeat** the current measurement. Refer to **Measurement procedure** for details on how to obtain an appropriate image measurement.

3.5.1 Create Exam Protocols

The user may create their own exam protocols with the OneVision feature. Select **Create Exams** from the **Measure** menu on the Windows Tool bar.

Select the **New** button to create an exam protocol. The user may also delete, rename, or edit existing exam protocols from the Create Exam dialog.

Enter a protocol name in the box provided. It is recommended to enter a name that describes either the images included in the exam or a specific description of the exam. Then, select **OK**.



Once the protocol name is entered, you may define the measurement sites included in the exam and the sequence of the measurements in the exam. Select the image site from the available sites on the left and select **Add** to add the image site to the Exam. Use the **Up** or **Down** buttons to modify the sequence of image measurements in the exam. When you have finished, click **OK**.

3.6 Orthopedic Hip Option

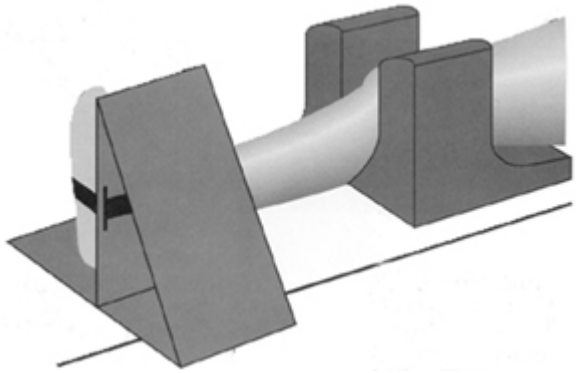
The Orthopedic option lets you get BMD, BMC, and Area values for patients with femur implants. This option is available for research purposes and is only available if you purchased the orthopedic option.

To perform a patient measurement, first select or record the patient as described in **Section 3.1**. Then, select **Left Ortho** or **Right Ortho** in the Exam list on the New Measurement screen.

Information about the measurement modes is located in the ***Safety Information and Technical Specifications*** manual located in the Help topics.

3.6.1 Position Patient

Select **Position** from the New Measurement toolbar. The scanner arm moves to the approximate start position. The patient should be centered and square on the table.



Use the centerline on the scanner table as a reference. The patient's arms must be crossed over the chest, away from the side of each hip. Place the foam knee positioner under the knee of the leg to be scanned, with the tapered end toward the patient's thigh. The foot of the leg to be scanned should be strapped to the vertical side of the foot brace. The leg should be in a neutral position, NOT rotated as in the femur scan. You should also position the leg so the femoral shaft and implant are parallel with the centerline on the scan table.

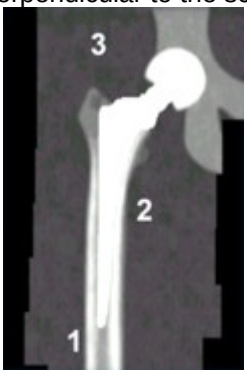
Refer to the topic **Measurement procedures** for additional information.

3.6.2 Adjust Measurement Start Position

Use the graphic shown on the New Measurement screen (shown when you select **Position** from the New Measurement toolbar) to adjust the position of the laser light. Position the laser light mid-thigh, approximately **3-4 cm** below implant tip.

3.6.3 Start measurement

Select **Start** from the New Measurement toolbar to start the measurement. Monitor the image to make sure the **(1)** scan is initiated 3-4 cm below the implant tip, **(2)** femoral shaft and implant are perpendicular to the scan path, **(3)** scan continues 2-3 cm above the greater trochanter.



3.7 Quick View

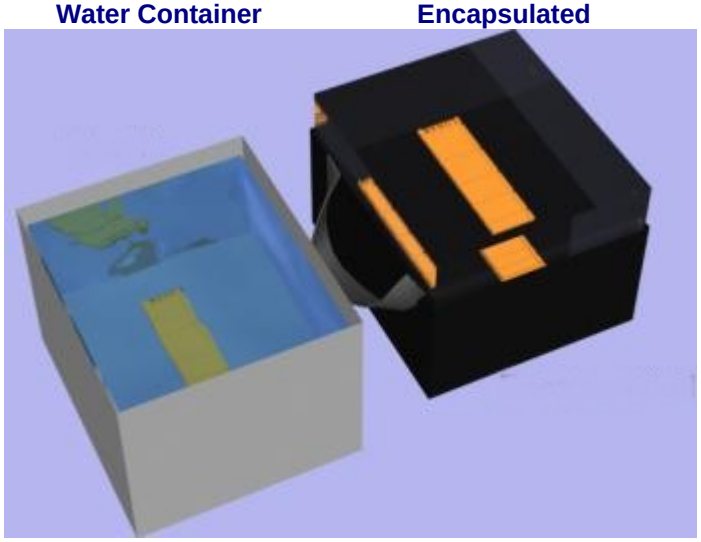
QuickView offers a fast, 10 second Spine or Femur scan that may be useful for quick review of a region. This option provides a BMD and T-Score value for females and males who are ≥ 20 years of age. **Measurement** and **Analysis** procedures are the same as other scan mode procedures.
Standard scan modes provide optimal precision and are recommended for follow-up scans to monitor changes in BMD. Determine precision with the scan mode used to monitor patients.
The larger pixel width of QuickView results in reduced resolution.

For more details on the scan mode specifications, review the ***Safety and Specification*** help file.

3.8 Spine Phantom Procedure

While many instruments require a separate Quality Control to be run in addition to the Quality Assurance, the enCORE based scanner does not require this separate measurement. The daily QA procedure run on the scanner both calibrates the machine, and also has “bone” chambers that are used for Quality Control measurements. This removes the necessity of requiring a phantom to be measured by the user for separate control measures. The phantom is considered a service tool. Every system includes an aluminum spine phantom and water container. An encapsulated phantom is available for purchase.

Water Container **Encapsulated**



A Spine Phantom baseline was performed with the installation of your scanner. This will be found within the patient database. For general use, use the same patient information that was established with that Spine Phantom scan.
NOTE: The procedure below assumes you are familiar with **AP Spine scan** and **Analysis** procedures.

3.8.1 Measure the Spine Phantom.

Put 15 cm of water in the plastic container and position the aluminum phantom in the middle of the plastic container. Position the phantom so that L5 is toward the foot of the scanner.

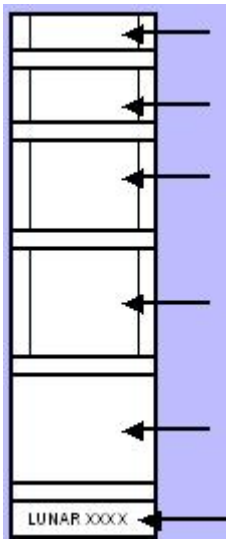
1. From the Main Menu screen, select **F2 (Measure)**.

2. Have you measured the phantom before?
   - If yes, select the phantom from the patient list and continue to step 5.
   - If no, continue to step 3 to record the information for the spine phantom.

3. Record the primary information in the dialog box.
   - **First name**: Spine
   - **Middle initial**: None
   - **Last Name**: Phantom
   - **Birth Date**: Record the current date minus 40 years. For example, if today's date is September 28, 2006, type 09/28/1964. **DO NOT** change this date for future Spine Phantom measurements.
   - **Height**: 67 inches
   - **Weight**: 154 pounds or 70 kilograms
   - **Sex**: Male
   - **Ethnic Group**: White
4. Select the secondary tab and record the following information:
   - **Facility ID**: Record the phantom number given on the L5 region of the spine phantom.
   - **Department ID**: Record your System ID number. This number is located in the User Options-System tab.

5. Select **Position** from tool bar. A graphic is shown which illustrates correct patient and laser position for the scan type.

6. Position the laser cross-hair in the on the letter “R” in the word “LUNAR” on the L5 vertebral body of the phantom. Start the scan.

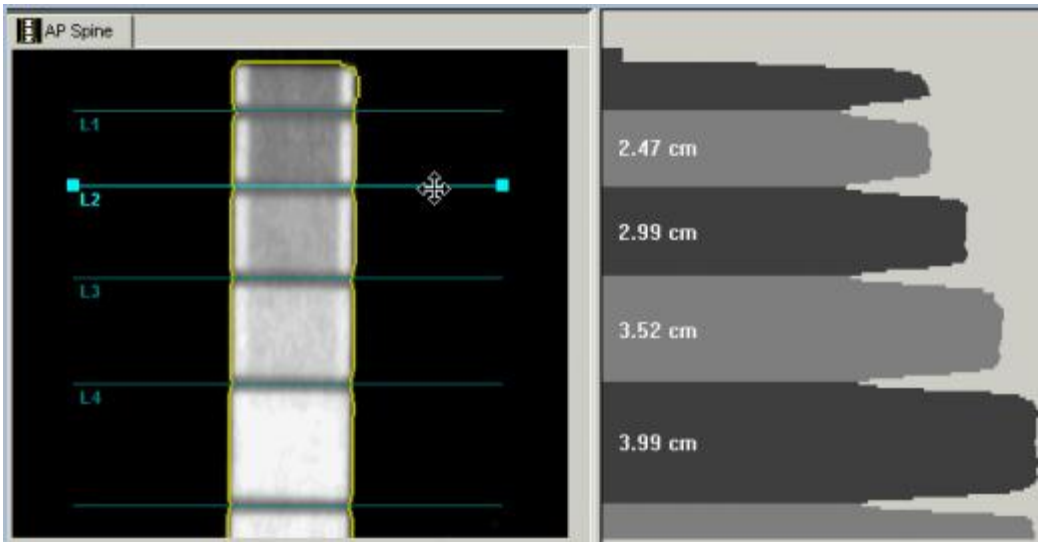


Once approximately half of T12 is imaged, select **Abort** from the toolbar.

Choose **Save measurement** from the Save Dialog Box and select OK if the measurement was performed correctly.

For spine phantom analysis it is necessary with to verify and adjust accordingly for the following vertebral heights:
L2: 3.00 cm +/- .02 cm
L3: 3.50 cm +/- .02 cm
L4: 4.00 cm +/- .02 cm
L2-L4 region height should be 10.5 cm.

In the Analysis screen, select **ROI**'s tool to view this information.



4.0 Analysis Procedures

AT ALL TIMES, let the program perform the analysis unless the scan image obviously must be corrected.

4.1 Basic analysis procedures

Note: The results tabs for AP Spine, Femur, Forearm and Total Body images include a **ScanCheck™** (computer assisted densitometry) The list of Yes/No questions should be used to assist in analysis. There is a space for comments. You can print the checklist by selecting to print **ScanCheck™** in the Report Center. Refer to **ScanCheck™ Section** for more information.

4.1.1 Select Image

1. From the **Main screen**, select **Analyze**. (From the Directory screen, select the patient from the Patient list. Use the **Search** option to locate a patient in a large database).
2. Select the image to analyze from the Image list,
3. Select **OK** (or the Analyze button from the directory screen).
4. enCORE typically performs the analysis automatically. Do not change ROIs or Point Typing unless the analysis shows an obvious need for corrections

4.1.2 Adjust Image

 Select **Imaging** from the Analyze toolbar to adjust the image: the Image Tools window is shown. Use this window to change the gray levels of the image and zoom the image.

Image Tools Window

The Image Tools window shows a bone profile and gives the options that follow:

- **Brightness**-To adjust the brightness for the image, click and drag the brightness scroll bar right or left. Select **OK**.
- **Contrast**-To adjust the contrast for the image, click and drag the contrast scroll bar right or left. Select **OK**.
- **ClearView**-For LVA and iDXA AP Spine, Femur, and Forearm images, you can adjust the sharpness. To increase or decrease the sharpness of the image, move the arrow up or down the ClearView scale.

- **Zoom**-To zoom the image, use the bar to scroll through the percentage values. Select **OK**. Use the  Pan tool if the image is larger than the window area on the Analyze screen.

Check **Show Advanced Features** to adjust Threshold, Range, Black/White Controls, or Image Type and to reset contrast.

- **Threshold-To adjust the threshold, select the Threshold option and either move the vertical lines that are shown on the bone profile, enter values in the black/white fields, or adjust the Brightness/Contrast controls. Select OK.**
- **Range-To adjust the range, select the Range option and either move the vertical lines that are shown on the bone profile or enter values in the black/white fields. Select OK.**
- **Black/White-Enter a value in the Black and White fields. Select OK.**
- **Type-Click the drop down menu and choose between the following image types: Enhanced Bone, Tissue, and Unfiltered Bone. Select OK.**
- **Reset Contrast-Select Reset Contrast to reset settings. Select OK.**

Use the tools given in the following table to magnify an image during analysis. These tools are shown on the **Analyze** screen:

Icon	Tool	Description
	**Reset Mode**	Select to deactivate the Zoom and Pan Image tools.
	**Zoom Image**	Move the cursor over the image and use the Zoom Image tool to activate mouse control to zoom in or out on the image.
	**Pan Image**	If you zoom the image larger than the viewable area on the screen, use the Pan Image tool to view hidden areas of the image. Select the Pan Image tool, then drag the cursor to move the image.
	**Zoom Image**	Move the cursor over the image and use the Zoom Image bar to zoom in or out on the image.

4.1.3 Advanced: Adjust ROIs

ROIs do not need to be adjusted in most circumstances. The procedures for adjusting ROI position are specific to each measurement site. Caution: Some ROI adjustments will render the results unreliable. See the specific scan type recommendations for analysis.

4.1.4 Advanced: Adjust Point Typing[1]

 enCORE analysis automatically assigns point typing to a scan and usually requires no adjustment. Significant changes to Point Typing will affect both the results and reproducibility of a scan. The procedures that follow give instructions to examine and adjust point typing for an image (only Artifact point typing can be adjusted for Total Body analysis).

DO NOT adjust the point typing unless the program has made obvious errors. Change the point typing only if the area that needs to be changed is larger than the default cursor size. It is recommended that changes be limited to **Bone** and **Neutral** point typing.

[1] *A tool that lets you 1) view how the program classified the sample points, and 2) change the classification if necessary. The point typing determines the placement of bone edges.*

Select **Points** from the Analyze toolbar: the Point Type window is shown. The program automatically determines if a sample is bone, tissue, neutral, air, or artifact:

- **Bone- Verify that the bone is typed as Bone.**
- **Artifact- Foreign material to be excluded in analysis.**
- **Tissue–Tissue point typing is specific to each measurement site.**
- **Neutral–Select the Neutral brush type and verify that a thin border of neutral samples is shown around the bone.**

DO NOT adjust the point typing unless the program has made obvious errors. Change the point typing only if the area that needs to be changed is larger than the default cursor size. Only change the **Bone** and **Neutral** point typing.
To adjust point typing, select a brush type (Bone or Neutral) and a brush size. Click on the image to make your changes.

If necessary, select the **Artifact** brush to point type an artifact in the image.


Select **Reset** to return the image to its original state.


Select **Undo** to correct errors you make while adjusting the point typing.

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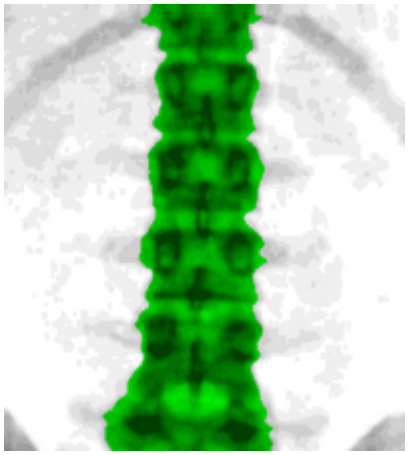
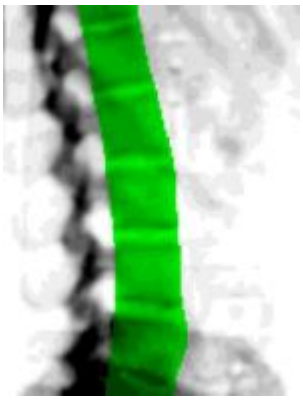
Examples of correct bone point typing

AP Spine correct bone point typing 	Femur correct bone point typing 
Forearm correct bone point typing 	Lateral spine bone point typing 

Refer to the specific scan type Analysis for further information.

4.2 AP Spine Analysis

Note: The results include **ScanCheck™** tab. Use ScanCheck™ to assist in the analysis of the image and to help you make corrections where necessary. See the section on **ScanCheck™** for more information.

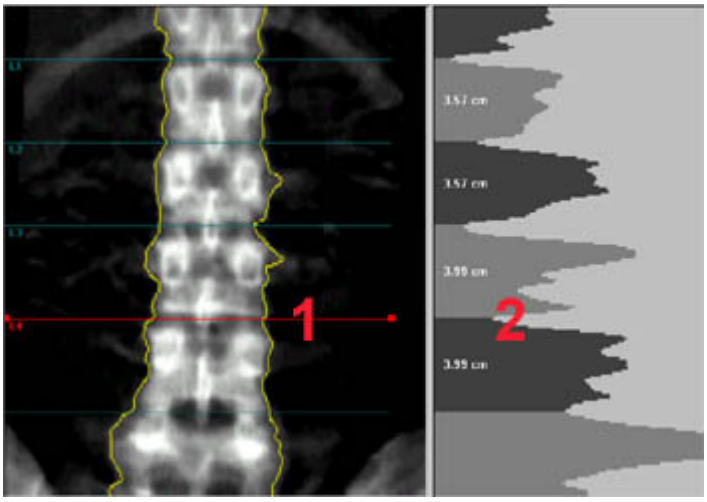
4.2.1 AP Spine analysis procedure

enCORE software will place the ROIs correctly most of the time. Do not make adjustments to the analysis unless there is an obvious adjustment needed.

Complete the steps below to complete an AP Spine analysis:

1. Select an image file for analysis.
   If necessary, select **Imaging** from the Analysis tool bar to adjust the image.

   If necessary, select **ROIs** from the Analyze toolbar to adjust the ROIs. Make sure vertebrae are correctly identified and intervertebral (IV) markers are between the vertebral bodies **(1)** and located at the lowest point of bone density as indicated on the bone profile **(2).** Select **Results** to view the analysis results.

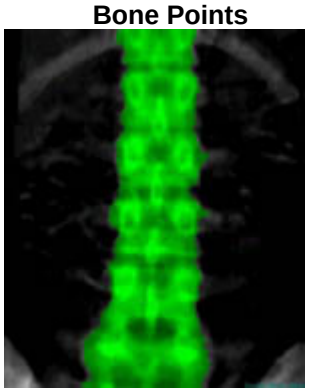


Use the tools given if it is necessary to adjust ROIs for an AP Spine image:

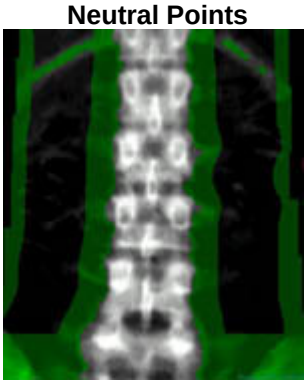
Icon	Tool	Description
	**Add ROI**	This tool is shown when you select ROIs. Select the Add ROI tool to add an ROI during AP Spine analysis. When you add a new ROI, it is inserted below the ROI that is selected on the image. Select the Label ROIs tool to label the ROIs accordingly.
	**Delete ROI**	This tool is shown when you select ROIs. Select the Delete ROI tool to remove an ROI during AP Spine analysis: use the left mouse button to click on the ROI, then select the Delete ROI tool. Select the Label ROIs tool to relabel the ROIs if necessary.
	**Move ROI**	This tool is shown when you select ROIs. Select the Move ROI tool to move ROIs.
	**Rotate ROI**	This tool is shown when you select ROIs. Select the Rotate ROI tool to rotate an ROI.
	**Label ROIs**	This tool is shown when you select ROIs. Select the Label ROIs tool to relabel ROIs after you have added or deleted an ROI from an image.
	**Exclude ROIs**	The Exclude ROI tool lets you remove ROIs from AP spine results. Select the Exclude ROI tool, and then select the ROIs you want to exclude from analysis. Parentheses appear around the ROI labels of excluded ROIs. Results for individual ROIs are shown even if the ROIs are excluded from analysis. Excluded ROIs are not included in the results for combinations of vertebrae.
	**Show/Hide ScanCheck™ Markers**	This tool allows you to show/ hide ScanCheck™ markers that indicate a possible high density area, such as an artifact or osteophyte.

If necessary, select **Points** from the **Analyze** toolbar to adjust point typing. **DO NOT** adjust the point typing unless the program made obvious errors. If you adjust point typing,
2. Select **Results** to view the new analysis results based on your changes.

Bone Points



Neutral Points



Tissue Points

3. Select **Save** to save your changes, or select **Close** then **No** if you do not want to save your changes.

Refer to Basic Analysis Procedure for additional AP Spine Analysis information.

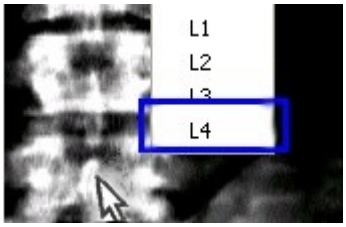
4.3 APVA Morphometry Analysis

4.3.1 APVA Morphometry analysis procedure

Complete the steps below to complete an APVA analysis.
Select an image file for analysis. If necessary, select **Imaging** from the Analysis tool bar to adjust the image.

Icon	Tool	Description
	**Morphometry Wizard**	Select this tool to start the Morphometry Wizard. The Morphometry Wizard helps you label, measure, and assign deformities to the vertebrae.
	**Change Deformity Indication**	Select **Change Deformity Indication** to change the deformity assessment for a vertebra.
	**Delete ROI**	Click on the Delete tool and then click the target ROI.

1. Click on the vertebra you want to analyze, and select a label for the vertebra. The **Morphometry Wizard** opens.



2. Select a deformation for the vertebra. When you assign a deformation to a vertebra, the symbol for the deformation appears next to the ROI label in the results table in the Analysis window.

3. Select **Save** to save your changes, or select **Close** then **No** if you do not want to save your changes.

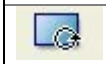
Refer to **Basic Analysis Procedures** for additional APVA Analysis information.
Note: If you chose **Dual VA,** the exam includes APVA and LVA measurements. Refer to **LVA Analysis** for more information.

Image contrast may be inverted. Go to **Tools/ User Options / Images** tab. Check the option to **Invert Images.**

4.4 APVA Spine Geometry Analysis

APVA Spine Geometry features only appear in the enCORE software if you purchased the APVA Spine Geometry option for your bone densitometer.

4.4.1 APVA Spine Geometry Analysis Tools

Icon	Spine Geometry Analysis Tool	Description
	**Move / Size ROI**	Click on the **Move / Size ROI** tool. Click and drag ROI or edges as needed.
	**Rotate ROI**	Click on the **Rotate ROI** tool. Click and drag near the end of the ROI.
	**Delete ROI**	Click on the Delete tool and then click the target ROI.
	**Add ROI**	Click on **Add ROI** tool and then select desired ROI from menu.
	**Label ROI**	Select ROI to relabel, then click **Label ROI** tool. Choose desired label from menu.
	**Angle**	After at least two ROIs have been added, the **Angle** tool will activate. Click **Angle** tool to change angle configurations.
	**Show/Hide ROIs**	Onscreen control to show or hide ROIs.

4.4.2 APVA Spine Geometry Analysis Procedure

The software will automatically place the ROIs in most cases. The vertebrae used for analysis are defined as the last vertebral bodies at extreme ends of the spinal curvature, where the end plates tilt to the side of curvature concavity. Use the APVA Spine Geometry Analysis tools to adjust ROIs. In patients with multiple spinal curves, each component can be measured. To add additional ROIs:

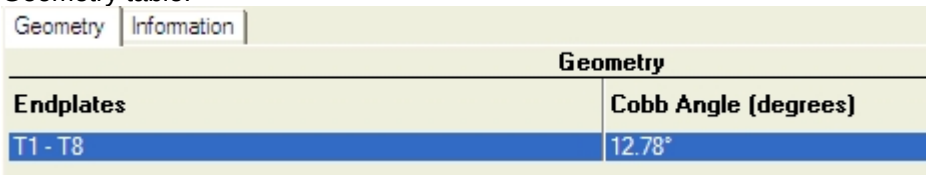
1. Click the Add ROI button or press the Insert key on keyboard. The Add ROI menu should appear.

2. Select the superior end vertebra from the menu and move the ROI line through and parallel to the superior end plate on the superior end vertebra using the Spine Geometry analysis tools, if necessary.

3. Click the Add ROI toolbar button or the Insert key on the keyboard again. The Add ROI menu should appear again.

4. Select the inferior end vertebra and move the ROI line through and parallel to the inferior end plate on the inferior end vertebra using the Spine Geometry analysis tools, if necessary.

The Cobb Angle (degrees) will show to the right of the scan image under the Geometry tab in the Geometry table:



5. Three reports are available for APVA Spine Geometry Reporting:

APVA Spine Geometry	displays the APVA scan image and any Cobb Angle analysis.
Dual VA Spine Geometry Standard	displays the LVA and APVA scan images only. This report is only available if the exam contains both LVA and APVA scans.
Dual VA Spine Geometry Ancillary	displays the Cobb Angle analysis without images. This report is only available if the exam contains both LVA and APVA scans.

Refer to **Basic Analysis Procedures** for additional Analysis information.

4.5 Femur/ DualFemur Analysis

Note: The results tabs for Femur images include a **ScanCheck™** tab with a list of Yes/No questions. These questions should be used to assist in the analysis of the image and to help you make corrections where necessary. The answers to the questions can be recorded on the tab. The tab also includes space for comments. To print the checklist, select **Print ScanCheck™**.

4.5.1 Femur Analysis Procedure

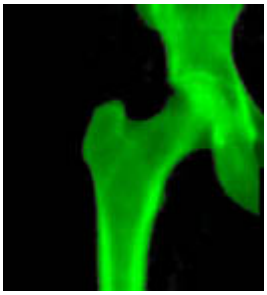
1. Select an image file for analysis.

Note: When you open a DualFemur image for analysis, the left and right femur images are both shown. The active femur has a blue box around its image window. Click inside an image window to make that femur image the active image. The results include BMD values for each region of each femur and averages and differences between femurs. Reference data and trending are available.

2. If necessary, select **Imaging** from the Analyze toolbar to adjust the image.

3. If necessary, select **Points** from the Analyze toolbar to adjust point typing. **DO NOT** adjust the point typing unless the program made obvious errors. If you adjust point typing, select **Results** to view the analysis results based on your changes.

Bone Points



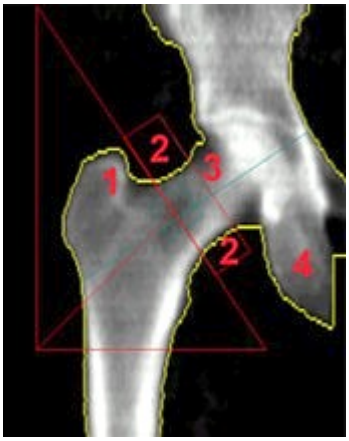
Neutral Points

Tissue Points

4. Typically no adjustments are necessary to ROI placement.

DO NOT adjust (move, rotate, or size) the Neck ROI unless it is obviously incorrect.
The Neck ROI should be positioned as follows:

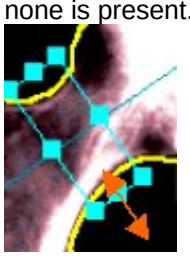
- The Neck ROI includes no part of the greater trochanter.
- The Neck ROI includes soft tissue on either side of the neck.
- The Neck ROI is perpendicular to the femoral neck.
- The Neck ROI, contains little or no ischium. If the ischium is included in the Neck ROI, the program automatically assigns the bone within the ischium as Neutral.



5. GE Healthcare LUNAR does not recommend adjusting the Neck ROI.

   Select the **Search** tool to position the neck ROI correctly. **Search** locates the region of the lowest BMD and most narrow area of the neck.
   If it is necessary to perform further adjustments, select the ROI tool from the Analysis toolbar to complete the procedures that follow:

   - **Move–**Select the Move ROI tool. Use the cursor to select and move the Neck ROI and the Neck Axis.
   - **Rotate–**Select the Rotate ROI tool. Use the cursor to select and rotate the Neck ROI and the Neck Axis.
   - **Lengthen ROI–**Select the Size tool. Use the cursor to include tissue on either side of the neck if none is present. Never edit the Neck ROI width.

6. Select **Results** to view the analysis results.

7. Select **Save** to save your changes.

Refer to **Basic Analysis Procedure** for additional Femur Analysis information.

4.6 Advanced Hip Analysis

The values computed by this software option are used to estimate the structural properties of the hip. The values are not for clinical diagnosis of a disease.

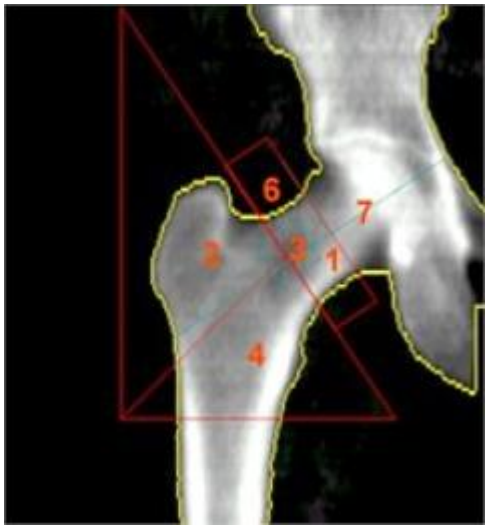
4.6.1 Advanced Hip Analysis Options

Advanced Hip Assessment Results are available for Femur and DualFemur™ reports. Advanced Hip Assessment Results (AHA) includes upper neck region, lower neck region, hip axis length (HAL) and hip strength results. AHA is a purchased software feature.

Go to **Tools / User Options / Analyze** tab to enable these options.

4.6.2 Advanced Hip Assessment

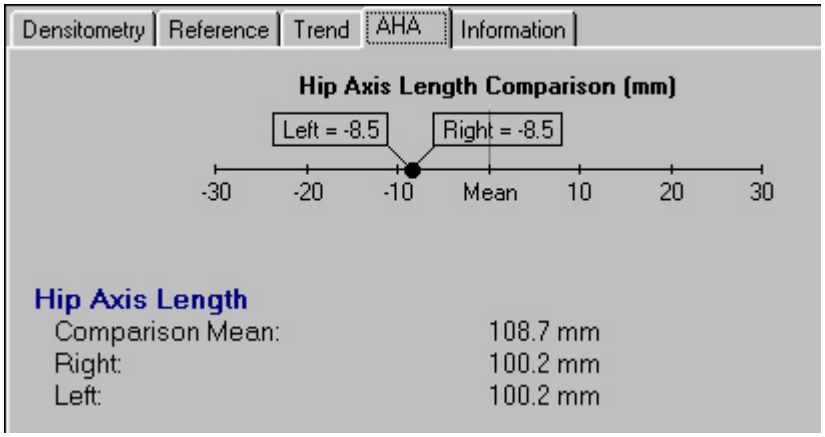
Advanced Hip Assessment (AHA) includes all the standard femoral regions of interest previously available. In addition, AHA provides a measurement of two new regions of interest-upper and lower femoral neck, automated determination of hip axis length, and hip strength values.



1. Lower Femoral Neck
2. Trochanter
3. Ward's
4. Shaft
5. Total Hip (defined as the density of the combined region of the femoral neck, trochanter, and shaft regions.
6. Upper Femoral Neck
7. Hip axis length (HAL)

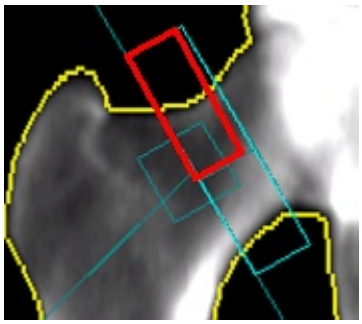
4.6.3 Hip Axis Length

HAL can be found on the AHA tab under the Hip Axis Length Comparison chart. This DualFemur measurement example indicates a comparison mean of 108.7 mm. The patient's right hip axis length is 100.2 mm and the left hip axis length measured 100.2 mm.

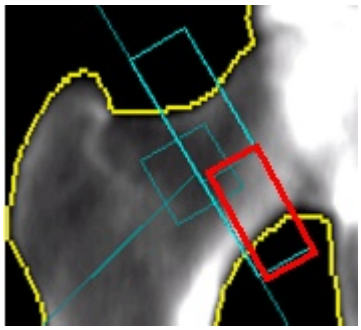


4.6.4 Upper Neck and Lower Neck Regions

Upper Neck ROI (indicated in red on this image) includes the bone above the neck axis line. This region is automatically determined by the software based upon the Neck ROI position and the calculated neck axis position.

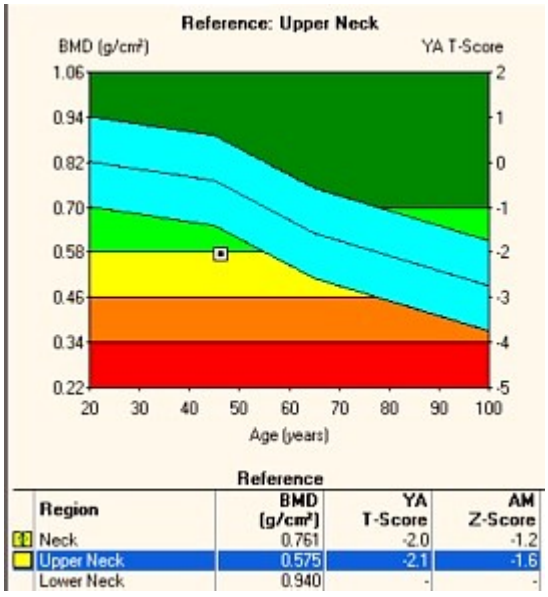


Lower Neck ROI (indicated in red on this image) includes the bone below the neck axis line. This region is automatically determined by the software based upon the Neck ROI position and the calculated neck axis position.



Upper Neck Reference Data

Comparison to Reference Data is available for the upper neck region. Femur upper neck reference data ia available for both males and females for the following reference populations: USA, Germany, Australia, UK, Brazil, and Finland. Both Young Adult and Age-Matched Results are displayed for Upper Neck. Age-matched adjustments are provided for weight and ethnicity for all supported populations. The "Upper Neck" region can be found immediately below the "Neck" in the region table.



Reference

Region	BMD (g/cm²)	YA T-Score	AM Z-Score
Neck	0.761	-2.0	-1.2
Upper Neck	0.575	-2.1	-1.6
Lower Neck	0.940	-	-

4.6.6 Hip Strength

Provides an index of hip strength by combining BMD, Femur Geometry, Age, Height and Weight. The Hip Strength Index is derived from published information from the *Journal of Bone Mineral Research* 1994 article entitled, *Geometric Structure of the Femoral Neck Measured Using Dual-Energy X-ray Absorbtiometry.*

Hip Strength Index = strength / stress
where,

strength = 185 - 0.34(age - 45); Age >45 years

stress = moment * y / CSMI + force / CSA

moment = d1 * 8.25 * weight * 9.8 (height / 170)$^{1/2}$ * cos(180° - θ)

force = 8.25 * weight * 9.8 * (height / 170)$^{1/2}$ * sin(180° - θ)

d1 = Distance along the neck axis from the center of the femoral head to the section of minimum CSMI.

y = Distance from center of mass to the upper neck margin, along the section of minimum CSMI.

theta (θ) = Angle of the intersection of the neck and shaft axes

The value is not for clinical diagnosis of disease.

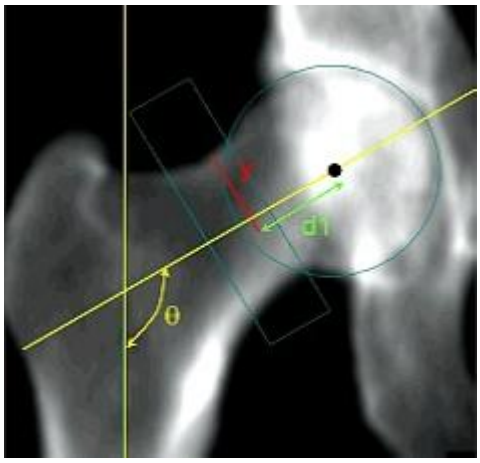
Hip Strength Results

Side	Strength Index	CSMI (mm4)	CSA (mm2)	d1 (mm)	d2 (mm)	d3 (mm)	y (mm)	alpha (degrees)	theta (degrees)
Right	1.9	15,168	157	23.7	52.3	35.5	18.9	0	120

4.6.7 Hip Geometry

Definitions

CSA	Cross-sectional area
CSMI	Cross-sectional moment of inertia
Alpha (α)	Angle of shaft axis with respect to vertical
Theta (θ)	Shaft-neck angle
y	Distance from the center of mass to the superior neck margin
d1	Distance from head center to section of minimum CSMI along neck axis
d2	Distance along the neck axis from the center of the femoral head to the neck/shaft axis intersection
d3	Average diameter of the femoral neck



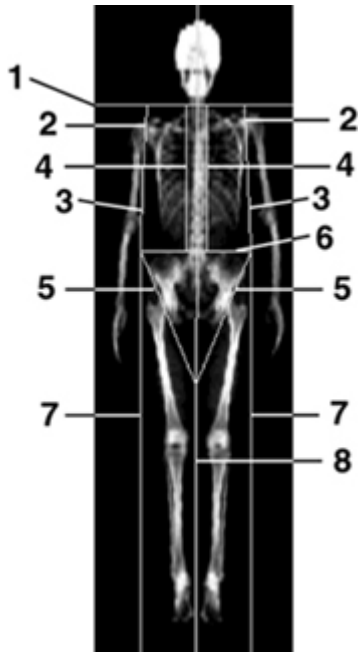
4.7 Total Body Analysis

4.7.1 Total Body Analysis Procedure

Both the bone and soft tissue images are shown when you open a total body image for analysis. Changes you make to the cut positions on one image are also made on the other image. You can turn off the dual image option in the **User Options** Image tab. Refer to the topic **Options** for further information on configuring User Options.

Complete the steps below in the order given to complete a Total Body analysis:
Select an image file for analysis.
Select **Imaging** and adjust the image if necessary.

4.7.2 Total Body Cuts



1 Head: The Head cut is located immediately below the chin.

2 Left and right arm: Both arm cuts pass through the arm sockets and are as close to the body as possible. Ensure the cuts separate the hands and arms from the body.

3 Left and right forearm: Both forearm cuts are as close to the body as possible and separate the elbows and forearms from the body.

4 Left and right spine: Both spine cuts are as close to the spine as possible without including the rib cage.

5 Left and right pelvis: Both pelvis cuts pass through the femoral necks and do not touch the pelvis.

6 Pelvis top: The Pelvis Top cut is immediately above the top of the pelvis.

7 Left and right leg: Both leg cuts separate the hands and forearms from the legs.

8 Center leg: The Center Leg cut separates the right and left leg.

Adjust Cuts

Select the  **ROI** tool from the Analysis toolbar.

Select the  **Move Vertex** tool. Adjust the cut itself or select a vertex to adjust the cut position.

Icon	Tool	Description
	**Move Vertex**	This tool is shown when you select **ROIs**. Select the Move Vertex tool if it is necessary to position ROI vertices or cuts.

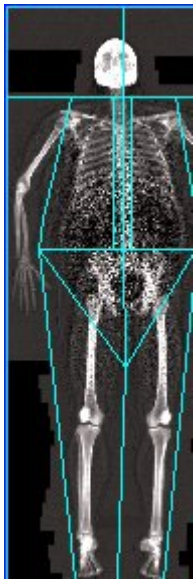
Select **Results** to view the analysis results. Select **Save** to save your changes or select **Close** then **No** if you do not want to save your changes.

4.7.3 Total Left / Total Right Regions

The option to generate total left and total right regions is located in **Tools / User Options / Analysis** tab. Check the option box to enable Left/Right Total Body results.

4.7.4 Half Body Scan to Estimate Total Body

For very wide patients that do not fit within the scan boundaries it is recommended that the analysis of half of the body be done.



In this example, only the entire right half of the body fit into the scan area.

 Click on the tool to estimate one side of the body from the other.

4.8 Composition Analysis

Composition results are shown on the screen when you select the Composition tab in the Analyze window.

- Fat as a percentage total tissue and as a percentage of region tissue.
- Total mass in kilograms or pounds.
- Grams or pounds of soft tissue, fat tissue, and lean tissue.
- BMC in grams or pounds.
- Centile or Z-score
- BMI

Options for Centile or Z-score and Metric or English (US) results are found under **Tools / User Options / Results Display / Composition Options**

The program prints a Composition report if you select the Composition report option in the Reports dialog box.

Use the cut positions to define the tissue regions. Adjust the cuts as necessary to include all of the tissue in the appropriate regions. Be very careful to separate the arm regions from the tissue in the hips and thighs.

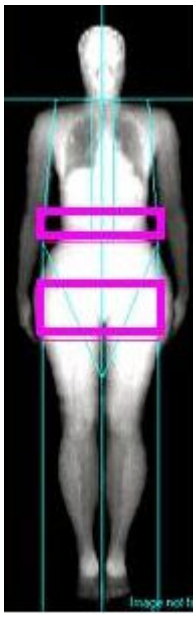
Note: Estimated Total Body %Fat is only available with OneVision Exams comprised of AP Spine plus Femur.

Left Total / Right Total Regions

The option to generate total left and total right regions is located in **Tools / User Options / Analyze / Total Body Analysis Options**. Check the option box to enable "Calculate Left/Right Total Body" results.

4.8.1 Composition Measurement of Android and Gynoid Fat

Android and Gynoid Composition ROIs are available in analysis.



Basic ROI descriptions:
Android ROI = Lower boundary at Pelvis cut. Upper boundary above Pelvis cut by 20% of the distance between Pelvis and Neck cuts. Lateral boundaries are the Arm cuts.
Gynoid ROI = Upper boundary below the Pelvis cut line by 1.5 times the height of the Android ROI. Gynoid ROI height equal to 2 times the height of the Android ROI. Lateral boundaries are the outer Leg cuts.

The A/G ratio is between the %Fat of the Android (central) and %Fat of the Gynoid (hip and thigh) regions. The Enhanced Composition report page will display the Android/Gynoid ratio.

4.8.2 Composition BMI (Body Mass Index)

BMI reference graph is from the World Health Organization's classification. BMI has been added to the Composition display tab if the composition results option is selected. The graph is intended for adult men and nonpregnant women that are 20 years of age or older. The BMI is a simple but objective anthropometric indicator of the nutritional status of the adult population. The 4 configurable reference graph divisions are:

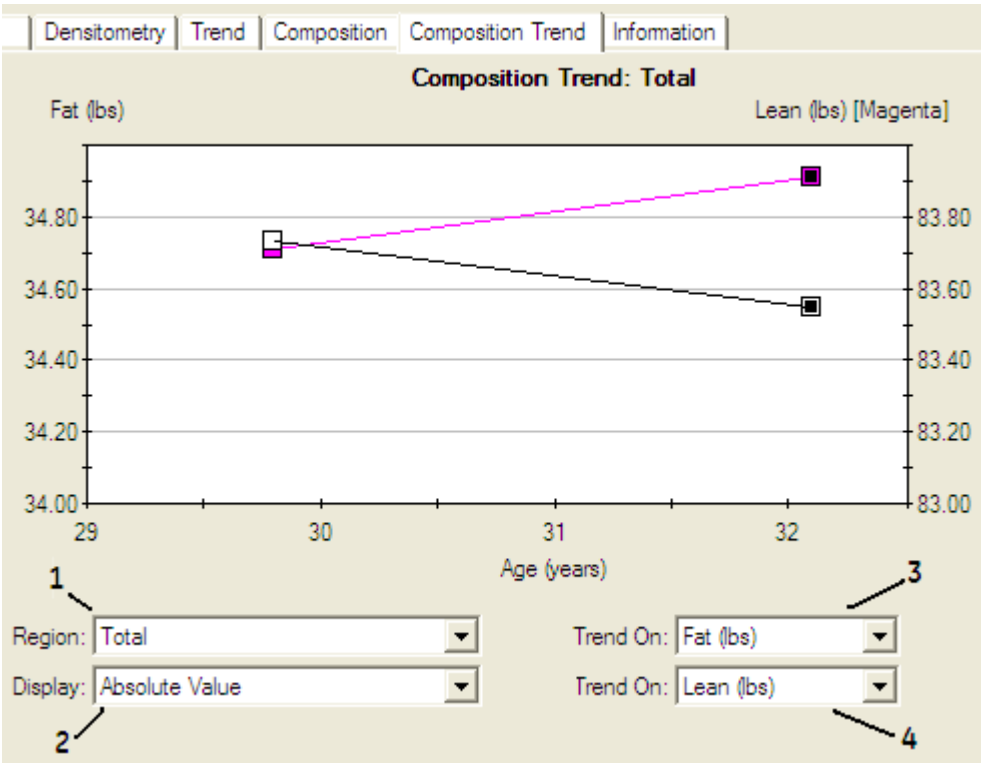
Underweight (<18.5 BMI)
Normal (18.5-24.9 BMI)
Overweight (25.0-29.9 BMI)
Obese (30.0 and above)

BMI = Weight in kilograms ***/*** (Height in meters)^2
Body Composition BMI Graph is available in Composer Reports as an option.

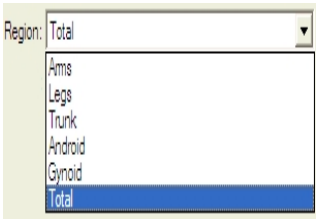
Note: BMI does not distinguish between fat and lean. Therefore, BMI is not a good indicator of ideal body weight for athletes and body builders with above average lean muscle mass. In other words, an athlete with a large muscle mass may have a BMI in the overweight range, but not be overweight for his/her body size.

4.8.3 Composition Trending Options

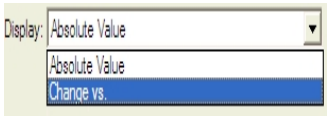
The options to change trending graphs is found on the Composition Trend tab in the Analysis Screen.


Densitometry
Trend
Composition
Composition Trend
Information
Composition Trend: Total
Fat (lbs)
Lean (lbs) [Magenta]
34.80
34.60
34.40
34.20
34.00
83.80
83.60
83.40
83.20
83.00
29
30
31
32
Age (years)
1
2
3
4
Region: Total
Display: Absolute Value
Trend On: Fat (lbs)
Trend On: Lean (lbs)

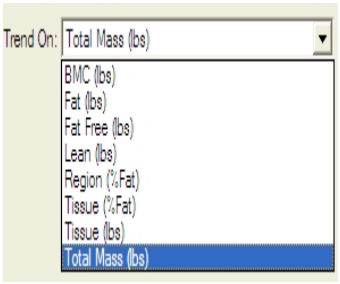
1. Choose **Region** to trend from drop down menu



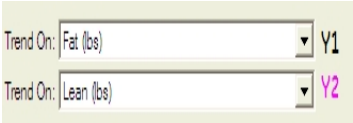
2. Choose a **Display** option



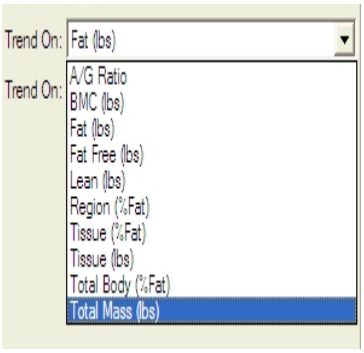
3. If **Change vs.** is selected for Display option, choose a **Trend On** option for Y1 only. This will plot %Change vs Previous or Baseline for Y1.



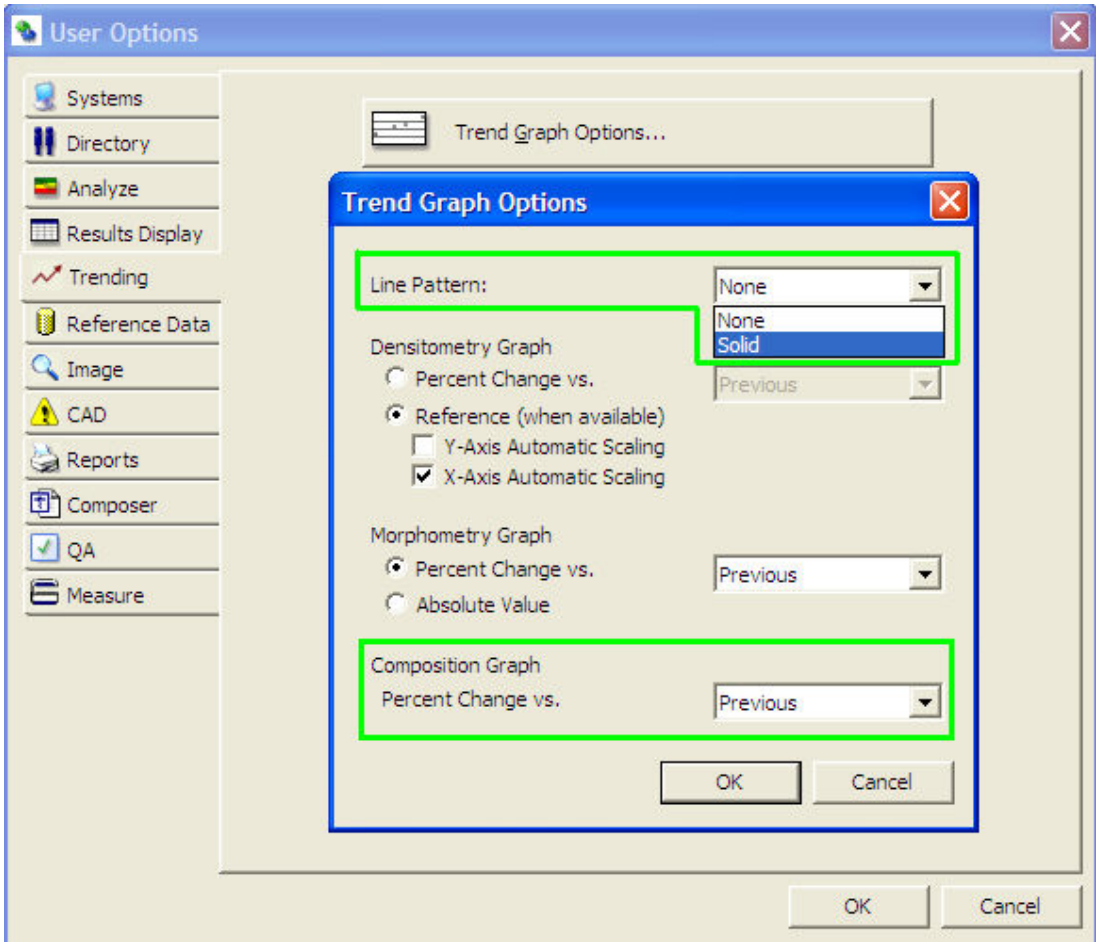
4. If **Absolute Value** is selected for the Display option, two **Trend On** options will appear for Y1 and Y2. Y1 is represented in black and will appear on the left axis and Y2 is represented in magenta and will appear on the right axis.



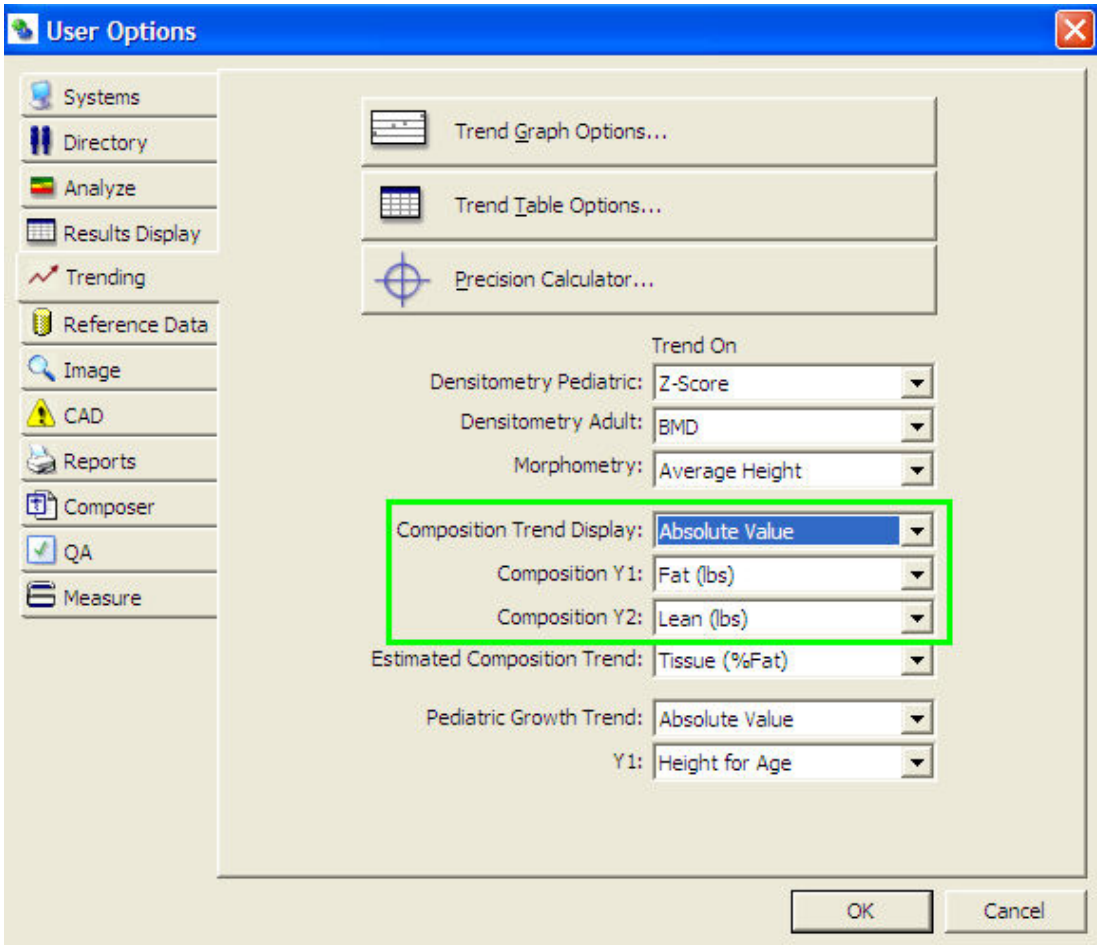
Additional Trend On options A/G Ratio and Total Body (%Fat) are available.



Line Pattern and Change vs. Previous or Baseline options are set under **Tools / User Options / Trending / Trend Graph Options**.



Display, Y1, and Y2 options can also be changed under **Tools / User Options / Trending**.



Composition trending tables will display the **Composition Trend** of the region selected and the **Fat Distribution.**

4.8.4 Composition Report Options

Composition Ancillary Report

In addition to the main Composition report enCORE also features a composition ancillary report. The Ancillary report page includes **fat mass ratios** of **Trunk/Total**, **Legs/Total**, and **(Arms+Legs)/Trunk.**

Enhanced Composition Report

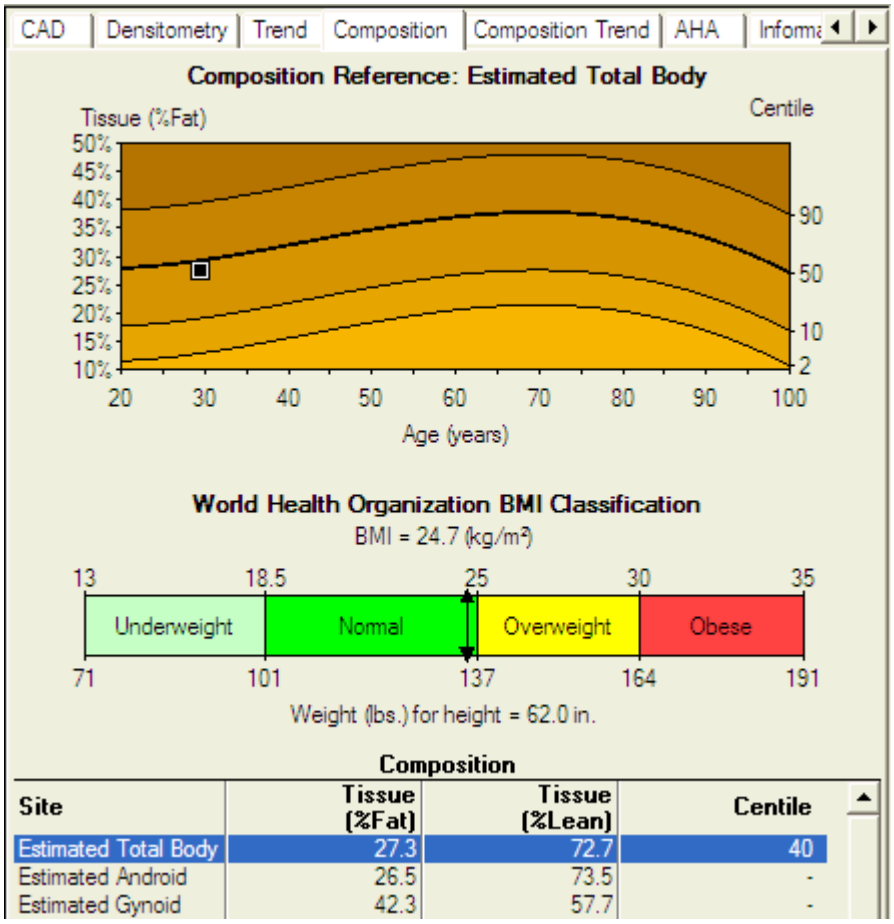
enCORE also features an Enhanced Composition option. This report provides the Composition Reference Graph, a Composition Trend Graph, a Fat Distribution Table and the WHO BMI reference chart.

4.8.5 Estimated Total Body %Fat and Android/Gynoid %Fat

Using the scan tissue data from standard spine and femur scans, it is possible to make an estimate of the total body %Fat and Android/Gynoid %Fat. The required scan types are as follows:

- An exam with AP Spine and a Femur.
- An exam with AP Spine and Dual Femur (averaged value).

A Composition tab in the analysis screen for Spine/Femur exams, displays a reference graph, BMI graph, and table that includes Tissue (%Fat), Tissue (%Lean), and Centile.



The Estimated Total Body exam report found in the Report Center for Spine/Femur exams includes a reference graph, trend graph (when applicable), BMI graph, and table that includes Tissue (%Fat), Tissue (%Lean), and Centile are displayed.

4.8.6 Estimated Total Body Composition Limitations

68% of estimated total body %Fat values will be within approximately 3% of the measured value for males and females. The estimated Total Body %Fat estimates are only valid for Caucasian and Asian patients. The estimated Android and Gynoid %Fat estimates are only valid for Caucasian patients. Patient's age, weight, height, BMI, and spine and femur measurement values fall must fall within limited ranges (see below for details).

Caucasian Range Limits for Valid Total Body %Fat Estimation Variables

	Limits	Age	Height (cm)	Weight (kg)	BMI	Spine %Fat	Spine Thickness (cm)	Femur % Fat	Femur Thickness (cm)	Predicted Total Body %Fat
Female	min	20	130	40	15	2	11	10	10	10
	max	100	185	135	48	55	27	50	25	60
Male	min	20	150	50	15	2	13	10	12	10
	max	100	200	125	45	55	29	40	22	45

Caucasian Range Limits for Valid Android & Gynoid %Fat Estimation Variables

	Limits	Age	Height (cm)	Weight (kg)	BMI	Spine %Fat	Spine Thickness (cm)	Femur %Fat	Femur Thickness (cm)	Predicted Total Body %Fat	Gynoid %Fat	A/G Ratio	Android %Fat
Female	min	20	130	40	15	2	11	10	10	10	22	0.3	2
	max	100	185	135	45	55	27	50	23	60	62	1.25	61
Male	min	20	150	55	18	2	15	10	12	10	20	0.75	18
	max	100	200	125	42	53	28	40	22	45	49	1.6	53

In addition to the above fixed ranges for Total Body, Android, and Gynoid %Fat, the spine thickness values should fall within limits which vary with BMI which are given in the equations below (BMI is calculated from the entered height & weight):

Caucasian Female spine tissue thickness (cm) = $-9.014 + 5.214\sqrt{(BMI)} \pm 3.8$ cm
Caucasian Male spine tissue thickness (cm) = $-6.726 + 5.199\sqrt{(BMI)} \pm 3.0$ cm

Android and Gynoid %Fat has an additional limitation:

Spine Thickness / Femur Thickness = 1.46

Asian Range Limits for Valid Total Body %Fat Estimation Variables

	Limits	Age	Height (cm)	Weight (kg)	BMI	Spine %Fat	Spine Thickness (cm)	Femur %Fat	Femur Thickness (cm)	Predicted Total Body %Fat
Female	min	20	140	34	14	5.85	10	9	9	5
	max	90	180	90	35	4.79	21	45	17	50
Male	min	20	150	35	14	4.79	11	10	9	5
	max	90	180	92	31	46	22	40	17	43

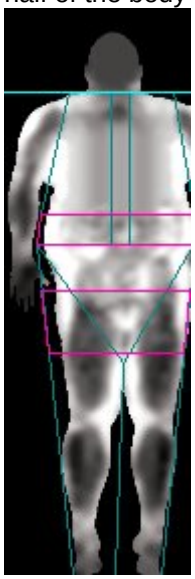
In addition to the above fixed ranges, the spine and femur thickness values should fall within limits which vary with BMI which are given in the equations below (BMI is calculated from the height & weight entered):

Asian Female spine thickness (cm): $7.861 + 0.06798*BMI^{1.5} \pm 5.54$
Asian Female femur thickness (cm): $0.07868 + 2.669*\sqrt{(BMI)} \pm 3.39$

Asian Male spine thickness (cm): $-8.958 + 5.313\sqrt{(BMI)} \pm 6.63$
Asian Male femur thickness (cm): $-2.633 + 3.277\sqrt{(BMI)} \pm 4.10$

4.8.7 Half Body Scan to Estimate Composition

For very wide patients that do not fit within the scan boundaries it is recommended that the analysis of half of the body be done.



In this example, only the entire right half of the body fit into the scan area. Click on the 

tool then click on the 

tool to estimate one side of the body from the other.

If the Total Body is derived from an estimate from half of the body, an "(e)" will appear next to the Region column in Densitometry and Composition results tables and next to the Measured Date column in Trend tables.

Densitometry

Region	BMD (g/cm²)	BMC (g)	Area (cm²)	YA T-Score	AM Z-Score
(e) Legs	1.693	1,611	952	-	-
(e) Trunk	1.245	1,412	1,134	-	-
(e) Ribs	1.214	559	461	-	-
(e) Pelvis	1.236	542	439	-	-
Spine	1.325	311	235	-	-
(e) Total	1.446	4,217	2,917	2.4	1.5

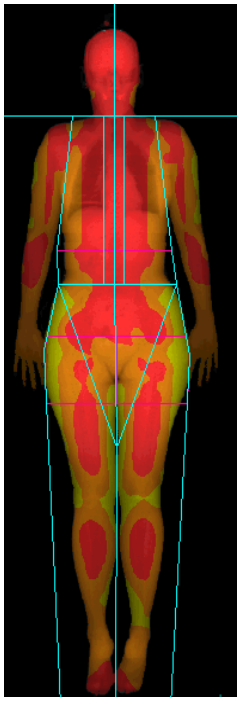
Composition Trend: Total

Measured Date	Age (years)	Tissue (%Fat)	Centile	Total Mass (kg)
01/26/2007	31.5	29.1	99	56.0
(e) 04/09/2006	30.7	41.6	100	160.9

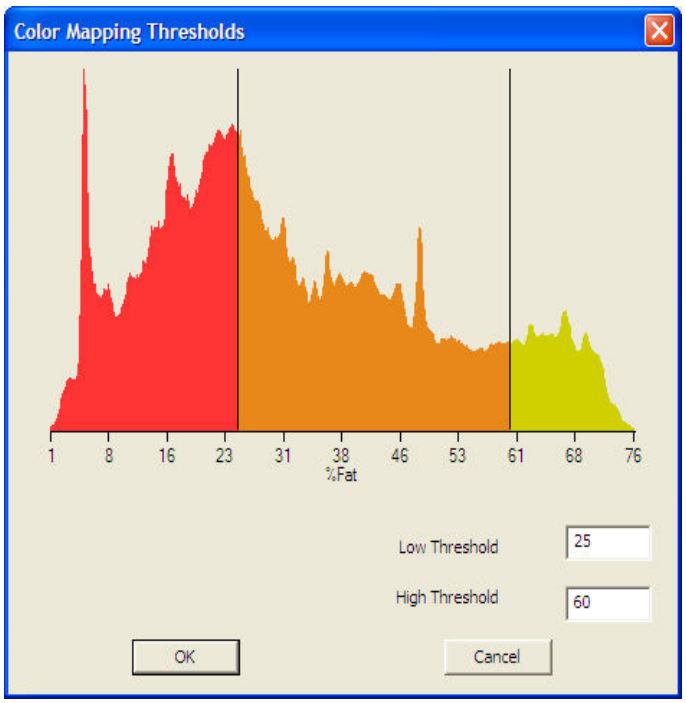
4.8.8 iDXA Composition Color Mapping

iDXA enCORE software provides the option to color map the total body scan.

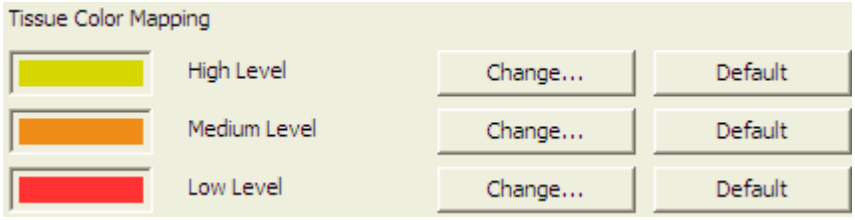
1. Click on the Color Mapping button  to the left of images in the Analysis screen to display.



2. Click on the Color Mapping Thresholds button  to make threshold adjustments.



3. Default Tissue mapping colors are red, orange, and yellow where red represents an area of low level %Fat, orange represents an area of medium level %Fat, and yellow represents an area of high level %Fat. These colors are customized under **Tools/User Options/Image/Image Colors**.



4.8.9 Resting Metabolic Rate (RMR) and Relative Skeletal Muscle Index (RSMI)

Resting Metabolic Rate (RMR) and Relative Skeletal Muscle Index (RSMI) are Composer field codes.

RMR, which is synonymous with Resting Energy Expenditure (REE), is an estimate of how many calories are burned at a resting state and represents the minimum amount of energy needed to maintain body temperature, heartbeat, and respiratory rate. RMR is calculated using Harris-Benedict equations [1]:

RMR (male) = 66.473 – (6.775 * age [yrs]) + (13.7516 * weight [kg]) + (5.0033 * height [cm])

RMR (female) = 655.0955 – (4.6756 * age [yrs]) + (9.5634 * weight [kg]) + (1.8496 * height [cm])

RSMI represents the relative amount of muscle in the arms and legs and is calculated using the Baumgartner equation [2]:

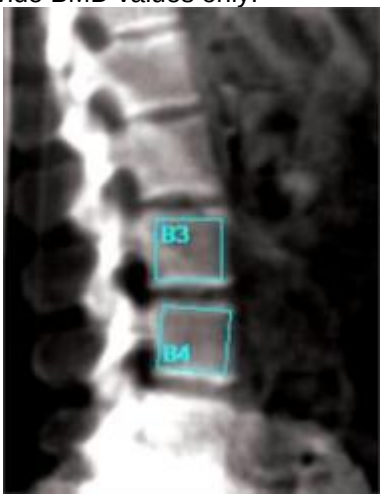
RSMI = (lean mass of arms [kg] + Lean mass of legs [kg]) / (height [m])^2

[1] Harris JA, Benedict FG. A biometric study of basal metabolism in man. Washington, DC: Carnegie Institute of Washington, 1919. (Carnegie Institute of Washington Publication 279).

[2] Baumgartner RN, Koehler KM, Gallagher D, Romero L, Heymsfield SB, Ross RR, Garry PJ, Lindeman RD (1998) Epidemiology of sarcopenia among the elderly in New Mexico. *Am J Epidermiol* 147(8):755-763.

4.9 Lateral Spine Analysis

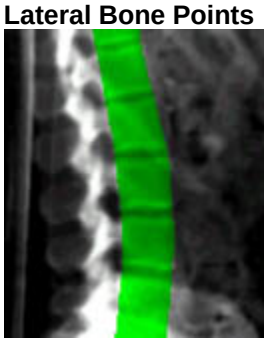
Lateral Scans provide BMD values only.



4.9.1 Lateral Analysis

1. Do not make any changes to the locations of the ROIs unless the program made obvious errors.
2. Adjust the Body ROIs using either the arrow keys or the mouse. The Body ROI should be positioned with the top of the ROI just below the upper vertebral endplate and the bottom of the ROI just above the lower vertebral endplate.
    - Each ROI should contain ONLY BONE.
    - Do not analyze B4 if the pelvis covers part of the vertebral body.
    - Do not analyze B2 if ribs cover part of the vertebral body.
    - Do not adjust the point typing unless the program made obvious errors. Select **Points** from the Analyze toolbar to adjust point typing.

Lateral Bone Points



Lateral Neutral Points

Lateral Tissue Points

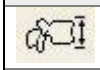
3. Select **Results** to view the new analysis results based on your changes.
4. Select **Save** to save your changes or select **Close** then **No** if you do not want to save your changes.

Refer to **Basic Analysis Procedures** for additional Lateral Spine Analysis information.

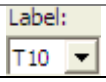
4.10 LVA Morphometry Analysis

LVA Morphometry features only appear in the enCORE software if you purchased the LVA Morphometry option for your bone densitometer.

4.10.1 LVA Morphometry Analysis Tools

Icon	Morphometry Analysis Tool	Description
	**Morphometry**	Select **Morphometry** to complete a Morphometry analysis of a LVA measurement.
	**Density**	Select **Density** if a bone density analysis of a LVA is desired. This option is **not** available if you used **SmartScan** during measurement.
	**Morphometry Wizard**	Select this tool to start the Morphometry Wizard. The Morphometry Wizard labels, measures, and assigns deformities to the vertebrae.
	**Change Deformity Indication**	Select **Change Deformity Indication** and then click the target ROI to set or change the deformity assessment for a vertebra. Only use this tool to override automated morphometry analysis.
	**Show/Hide ROIs**	Onscreen control to show or hide ROIs. Morphometry reports do not show ROIs.
	**Delete ROI**	Click on the Delete tool and then click the target ROI.

With the Morphometry Wizard enabled  , the following tools become available after clicking a target ROI:

Icon	Morphometry Wizard Tool	Description
	**Move / Size ROI**	Click on the **Move / Size ROI** tool. Click and drag ROI or edges as needed.
	**Rotate ROI**	Click on the **Rotate ROI** tool. Click and drag near the corner, but inside the ROI to rotate the ROI.
	**Adjust Vertices**	Click on the **Adjust Vertices** tool. Click and drag vertices as needed.
	**Position Reference ROIs**	This tool is only available on LVA scans after reference vertebrae are identified. This will reposition the reference ROIs.
	**Label ROI**	Click on drop down menu and select correct vertebra to label ROI.

ROI Suggestions

- Select the **Move/Size ROI** tool or the **Rotate ROI** tool to move or rotate an ROI.
- Select the **Delete ROI** tool to delete an ROI.
- Right-click an ROI and choose Relabel or click an ROI to enter the Morphometry Wizard and use the **Label ROI** tool to re-label an individual ROI.
- Select **Save** to save changes or select **Close** then **No** if you do not want to save changes.

4.10.2 LVA Morphometry Configuration

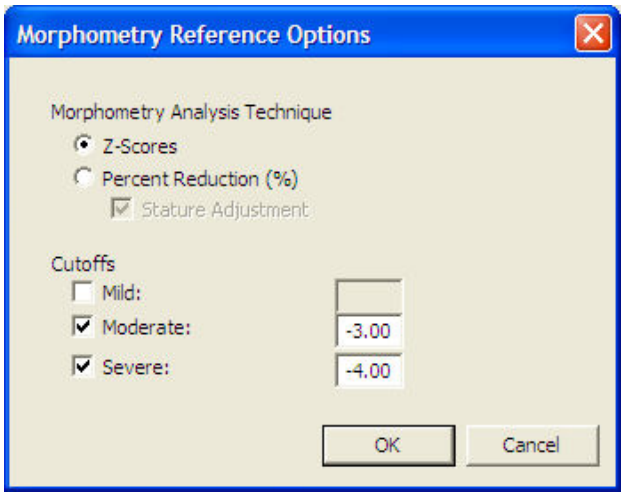
The Morphometry analysis feature is available if you purchased the LVA option for your bone densitometer.

The enCORE software will provide the Morphometry results for the vertebrae of interest according to the parameters setup in **Tools / User Options / Results Display / Morphometry Reference Options**.

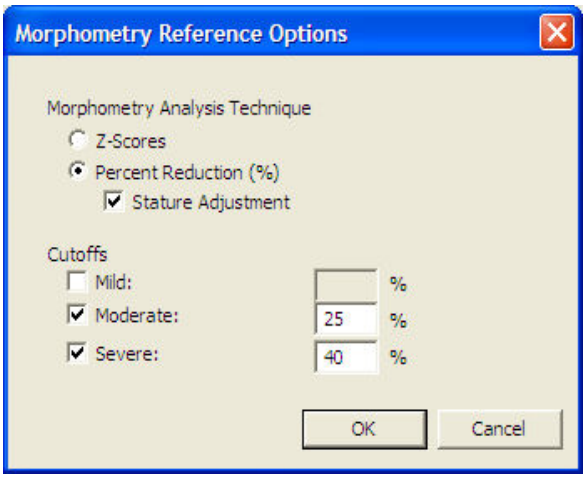
A. **Z-Score Morphometry Mode** uses Average Height, A/P and M/P ratios in the results and includes stature adjustment.

B. **Percent Reduction (%) Morphometry Mode** uses the ratio of posterior height to anterior height to check for Compression. Therefore, when Percent Reduction (%) mode is used, P/A ratios are provided. Checking stature adjustment while in Percentage Adjustment mode, provides the additional output of Average height (%) values (Note: This requires the additional step of confirming the heights are set properly for L2-L4.).

A



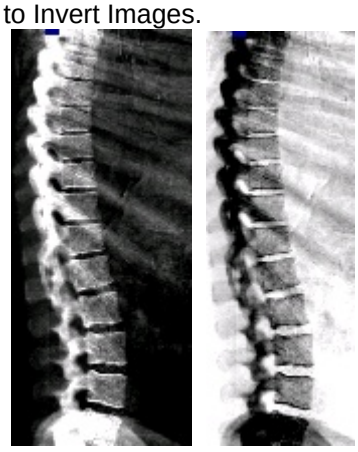
B



C. Cutoffs determine what deformity will be labeled as Mild, Moderate or Severe. Adjust if necessary.

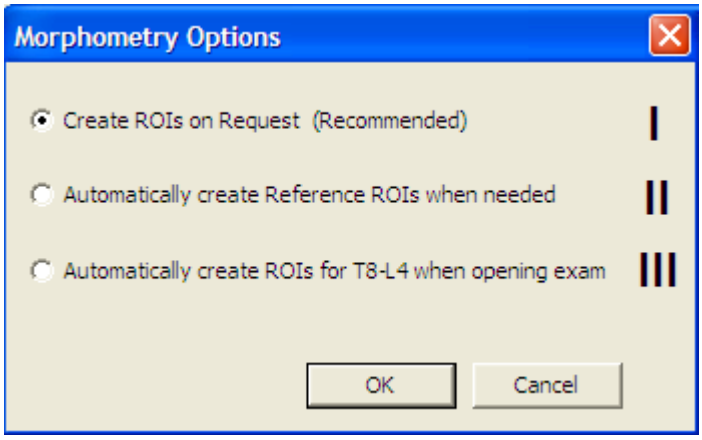
4.10.3. LVA Imaging

Select the imaging tool to adjust the image. The ClearView bar enhances the bone edges of the vertebrae. To invert the contrast of your images, go to **Tools/ User Options / Images** tab. Check the option to Invert Images.



4.10.4 LVA Morphometry Analysis Steps

Select desired analysis type under **Tools / User Options / Analyze** tab and select the **Morphometry options**.



1. Enable Morphometry Wizard  then follow the steps for the analysis type selected.

I Create ROIs on Request (Recommended)

a) Click on a vertebra that appears deformed as close to the center of the vertebra as possible.

b) The Morphometry Wizard window will open. Verify the ROI label and positioning and make appropriate changes if necessary. Make sure each vertex of the ROI is centered in the vertebral endplate. Re-do the auto-endplate finding by double-clicking in the exact center of the vertebra.

c) Click on **Next**.

d) Click on L4 in the Morphometry Wizard window and click on **Next**.

e) Verify the heights of L2, L3, and L4 and make changes as needed. These vertebrae will be used as a reference. If any of the reference vertebrae are deformed, it will not be used in the stature adjustment. Click on **Finish**.

f) To analyze additional vertebrae, repeat steps a-b and click on **Finish**.

II Automatically create Reference ROIs when needed

a) Click on a vertebra that appears deformed as close to the center of the vertebra as possible.

b) The Morphometry Wizard window will open. Verify the ROI label and positioning and make appropriate changes if necessary. Make sure each vertex of the ROI is centered in the vertebral endplate. Re-do the auto-endplate finding by double-clicking in the exact center of the vertebra.

c) Click on **Finish**. L2, L3, and L4 ROIs will automatically be created.

d) Verify the heights of L2, L3, and L4. If changes are necessary, click on the vertebra to open the Morphometry Wizard and make appropriate changes.

e) To analyze additional vertebrae, repeat steps a-b and click on **Finish**.

III Automatically create ROIs for T8-L4 when opening exam

a) T8-L4 ROIs will automatically be created upon opening scan for analysis.

b) Verify ROI label and positioning. If changes are necessary, click on the vertebra to open the Morphometry Wizard and make appropriate changes.

c) To analyze additional vertebrae, click on a vertebra as close to the center as possible. The Morphometry Wizard window will open. Verify the ROI label and positioning and make appropriate changes if necessary. Make sure each vertex of the ROI is centered in the vertebral endplate. Re-do the auto-endplate finding by double-clicking in the exact center of the vertebra. Click on **Finish**.

2. The software automatically assigns the Morphometry label, for all analysis types.

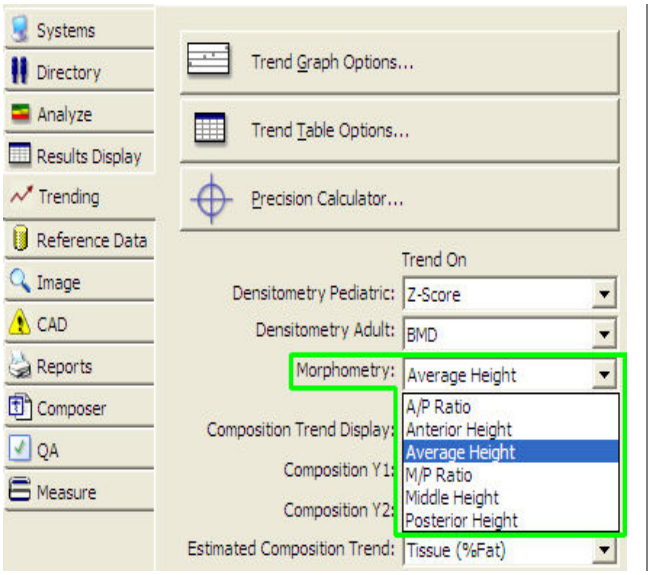
Region	Avg. Ht. (cm)	Avg. Ht. (%)	P/A Ratio (%)	M/P Ratio (%)	A/P Ratio (%)
T10	0.99	54	330	41	30
L1	2.09	92	101	103	99
L2	2.04	86	100	88	100
L3	2.37	98	97	91	103
L4	2.45	102	85	93	118

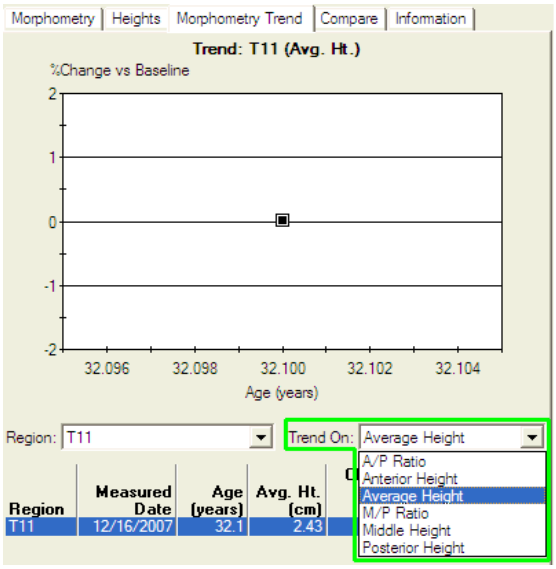
Symbol	Label
	Mild Wedge
	Moderate Wedge
	Severe Wedge
	Mild Biconcavity
	Moderate Biconcavity
	Severe Biconcavity
	Mild Compression
	Moderate Compression
	Severe Compression

3. To change a Morphometry deformity label, click on the "Change Deformity" icon  and then click on the vertebra of interest. A warning will appear, click OK. A list of deformities will be displayed. Select the desired deformity indication label. When you assign a deformation to a vertebra, the symbol for the deformation appears next to the ROI label in the results table in the Analysis window. **Note:** Only use this tool to override automated morphometry analysis.
4. Select **Save** to save your changes, or select **Close** then **No** if you do not want to save your changes.

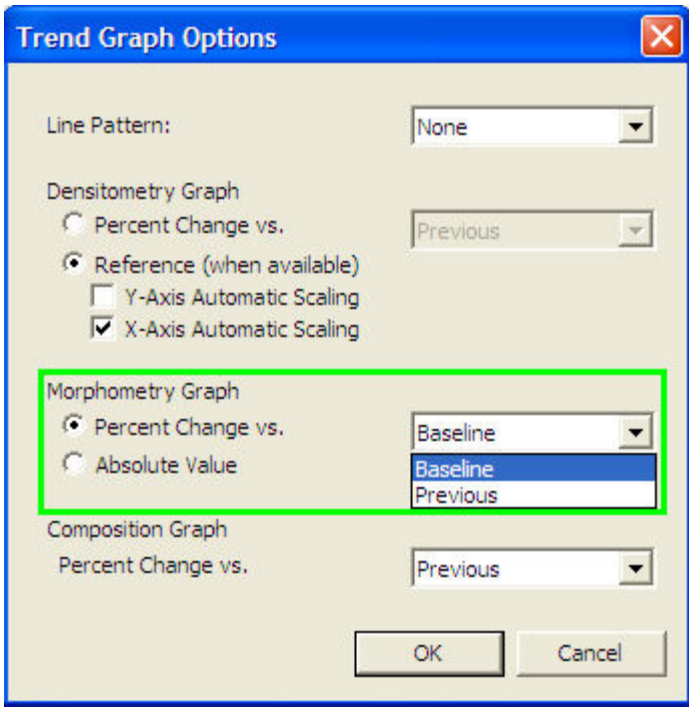
4.10.5 Trending Morphometry

1. Options to trend Morphometry on-screen are found under **Tools/ User Options / Trending.** Change **Trend On** option under Tools / User Options / Trending or on the Morphometry Trend tab in the analysis screen. Select A/P Ratio, Anterior Height, Average Height, M/P Ratio, Middle Height, P/A Ratio or Posterior Height.

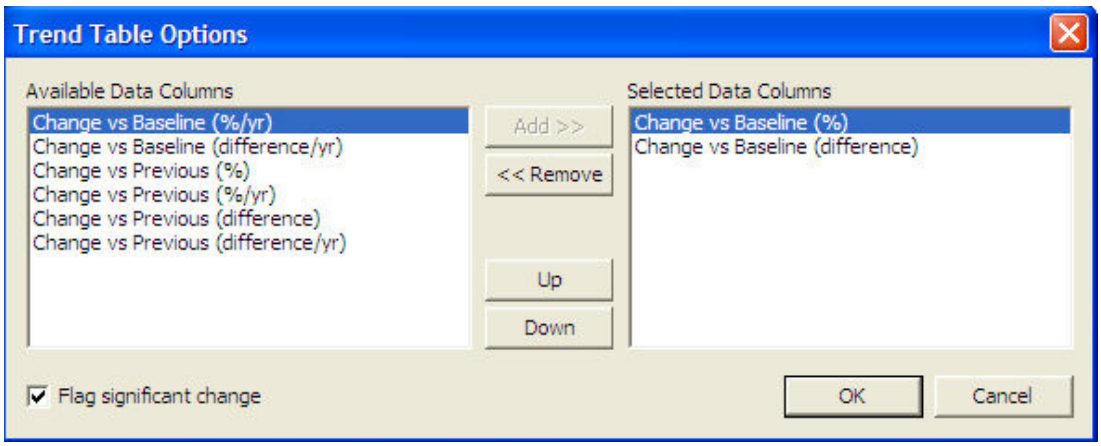




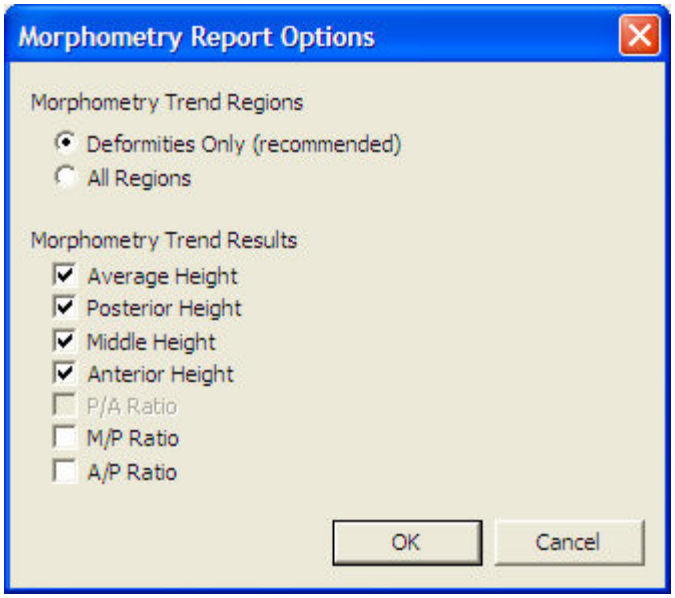
2. Trend Graph Options are found under **Tools / User Options / Trending / Trend Graph Options**



3. Trend Table Options are found under **Tools / User Options / Trending / Trend Table Options**



4. Options to trend Morphometry on DXA reports are found under **Tools/ User Options / Reports / Morphometry Report Options.** Multiple trending selections can be made for a single report.



5. Composer Trending options are configured within the Composer program.

Refer to **Basic Analysis Procedures** for additional Analysis information.

4.11 LVA Spine Geometry Analysis

LVA Spine Geometry features only appear in the enCORE software if you purchased the LVA Spine Geometry option for your bone densitometer.

4.11.1 LVA Spine Geometry Analysis Tools

Icon	Spine Geometry Analysis Tool	Description
	**Move / Size ROI**	Click on the **Move / Size ROI** tool. Click and drag ROI or edges as needed.
	**Rotate ROI**	Click on the **Rotate ROI** tool. Click and drag near the end of the ROI.
	**Delete ROI**	Click on the Delete tool and then click the target ROI.
	**Add ROI**	Click on **Add ROI** tool and then select desired ROI from menu.
	**Label ROI**	Select ROI to relabel, then click **Label ROI** tool. Choose desired label from menu.
	**Angle**	After at least two ROIs have been added, the **Angle** tool will activate. Click **Angle** tool to change angle configurations.
	**Show/Hide ROIs**	Onscreen control to show or hide ROIs.

4.11.2 LVA Spine Geometry Analysis Steps

The software will automatically place the ROIs in most cases. The vertebrae used for analysis are defined as the last vertebral bodies at extreme ends of the spinal curvature, where the end plates tilt to the side of curvature concavity. Use the LVA Spine Geometry Analysis tools to adjust ROIs. To add additional ROIs:

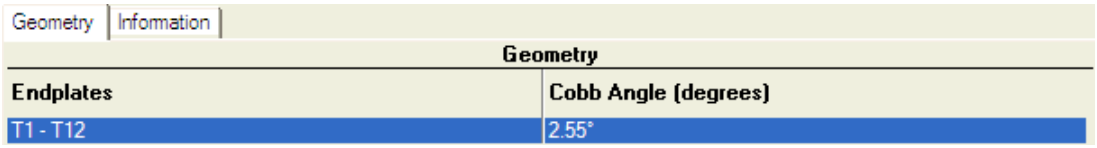
1. Click the Add ROI button or press the Insert key on keyboard. The Add ROI menu should appear.

2. Select a vertebra and move the ROI line through the superior end plate of the chosen vertebra using the Spine Geometry analysis tools, if necessary.

3. Click the ROI toolbar button or the Insert key on the keyboard again. The Add ROI menu appears again.

4. Select another vertebra. Another ROI line is placed on the LVA scan. Move the ROI through the inferior end plate of the chosen vertebra using the Spine Geometry analysis tools, if necessary.

The Cobb Angle (degrees) will show to the right of the scan image under the Geometry tab in the Geometry table:



5. Three reports are available for LVA Spine Geometry Reporting:

LVA Spine Geometry	displays the LVA scan image and any Cobb Angle analysis.

Dual VA Spine Geometry Standard	displays the LVA and APVA scan images only. This report is only available if the exam contains both LVA and APVA scans.
Dual VA Spine Geometry Ancillary	displays the Cobb Angle analysis without images. This report is only available if the exam contains both LVA and APVA scans.

Refer to **Basic Analysis Procedures** for additional Analysis information.

4.12 Forearm Analysis

4.12.1 Forearm analysis procedure

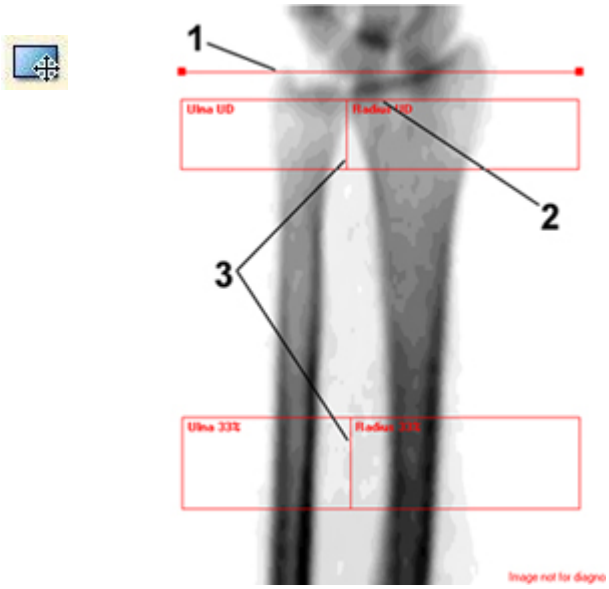
1. Select an image file for analysis.

2. If necessary, select **Imaging** from the Analyze toolbar to adjust the image.

3. If necessary, select **ROIs** from the Analyze toolbar to adjust ROIs.

Make sure the forearm ROIs are positioned correctly as follows:

- **1** the Reference line is located at the distal tip of the ulna styloid process.
- **2** the UD ROI does not contain the radial endplate.
- **3** the vertical lines in the center of the UD and 33% ROIs are located between the radius and ulna.



Do not make any changes to the locations of the ROIs unless the program made obvious errors.

a. Select **Length**, and make sure the length of the patient's forearm is correct.

Icon	Tool	Description
	**Length**	This option is shown after you select **ROIs** during a Forearm analysis. Select **Length** to change the forearm length value.

b. Select the **Move/Size ROI** tool or the **Rotate ROI** tool and move the Reference Line to the correct location. All the ROIs move when you move the Reference Line.

c. If the radial endplate is included within the UD ROI, move the UD ROI to just proximal the endplate.

DO NOT move the 33% ROI after you correctly position the Reference Line. The program positions the 33% ROI based on the location of the Reference Line.

4. If necessary, select **Points** from the Analyze toolbar to adjust point typing. DO NOT adjust the point typing unless the program made obvious errors. If you adjust point typing, select Results to view the new analysis results based on your changes.

Bone Points

Neutral Points

Tissue Points

5. Select **Save** to save your changes or select **Close** then **No** if you do not want to save your changes.

Refer to **Basic Analysis Procedure** for additional Forearm Analysis information.

4.13 Hand Analysis

4.13.1 Hand analysis procedure

1. Select **Imaging** from the Analyze toolbar to verify point typing.
2. Select **ROI** is from the Analyze toolbar to adjust ROIs. Make sure the hand ROIs are positioned correctly as follows: The enclosed area includes the entire hand to the tips of the fingertips and ends at the ulna styloid process. The ROI should include the carpal bones, but not the ulna or radius.
3. Select the **Move ROI** tool or the **Move Vertex** tool to adjust the edges of the region of interest.

Icon	Tool	Description
	**Move ROI**	Select to move the ROI edges. Do not move the lines unless they are obviously incorrect.
	**Move Vertex**	Select to move the vertices of the ROI.

4.  If necessary, select **Points** from the Analyze toolbar to adjust point typing. Do not adjust the point typing unless the program made obvious errors. If you adjust point typing, select **Results** to view the new analysis results based on your changes.

Bone Points

Neutral Points

Tissue Points

5. Select **Save** to save your changes, or select **Close** then **No** if you do not want to save your changes.

Refer to **Custom Analysis Procedures** for additional Analysis information.

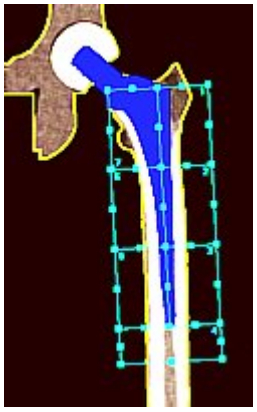
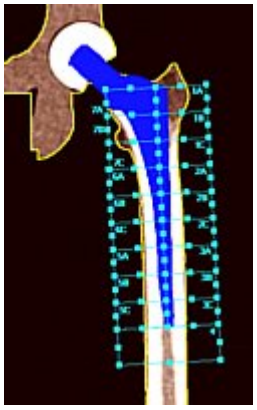
4.14 Orthopedic Analysis

4.14.1 Basic Analysis Tools for Orthopedic

Orthopedic Analysis is done automatically. Select either **Standard Gruen** or **Extended Gruen Zones**. Set the default Gruen method in **Tools/ User Options/ Analyze** and select the **Ortho Analysis Option**.

Toggle between Standard and Extended Gruen zones from the **ROIs** screen. 

 Standard  Extended

Verify that the ROIs and implant length are correctly identified. The following tools are available on the ROIs screen:

 Click on the ROIs Tool to view the following options.

Icon	Tool	Description
	**Move / Size Gruen**	This option enables the selection and adjustment of a single Gruen zone.
	**Ruler**	Edit the Top and Bottom points of the Implant
	**Length**	Edit the Length of the Implant

The **Ruler** icon allows the user to measure the implant length The Ruler provides a measurement value real time by clicking on the edge and moving to the user's choice of destination. Either edge of the ruler may be relocated for a measurement.

The **Length** icon provides the opportunity to modify the length of the implant. (The software automatically calculates a length based on the automated ruler measurement.) The Length feature also includes a **Find** button which prompts the software to search for the implant edges based upon the ruler position.

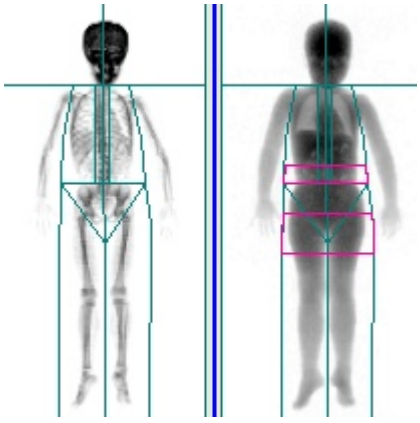
It is recommended that the top of Gruen zones 1 and 7 align with the shoulder of the implant. Upon entering the ROI screen, the **Gruen** icon is selected and all ROIs are active. This allows the user to move all regions at the same time. However, the user has the option to move each zone individually, if desired.

4.15 Pediatric Analysis

Pediatric analysis is a purchased option. Reference data is available for U.S. and European populations. Reference data is limited to AP Spine, Femur and Total Body analysis. Z-scores and percentages are used to compare the pediatric patient to their peers. Pediatric patients have not yet reached their peak bone densities.

4.15.1 Pediatric Total Body Analysis

Pediatric Total Body will provide reference data for U.S. and European reference populations. The BMD of the head appears to dominate the Total Body BMD in children.



To enable the feature to omit the head ROI, select **Tools / User Options / Analyze** / **Total Body Analysis Options**. Check the option box. Click **OK**.

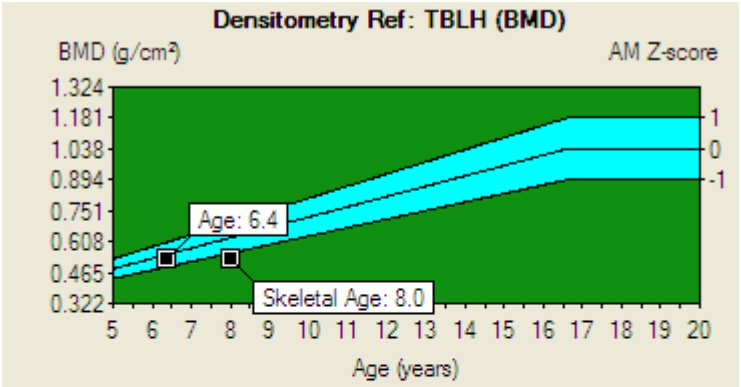
Select Regions or Omit Region on DXA Report

To select regions or omit the head ROI on DXA reports, select **Tools / User Options / Reports** tab.

Click on the **Report Regions** button.
Click on the **Total Body** tab.

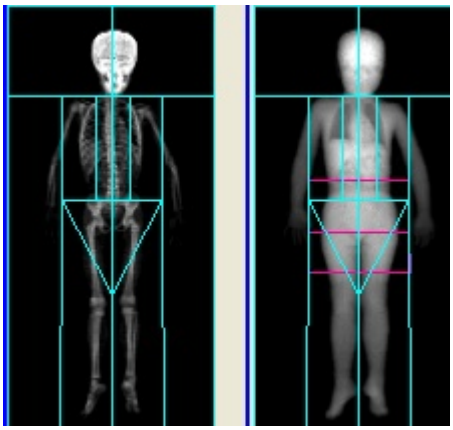
Highlight the desired region or TBLH (Total Body Less Head) option in the left Available window. (TBLH indicates the head is omitted from the analysis.)
Click on the **Add** button.
The new selected region ROI will be added to the Selected list on the right.

Repeat the same steps to add the ROI region to the Composition Report.



Densitometry

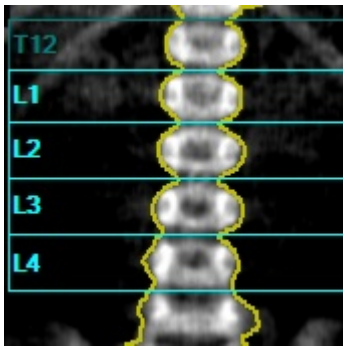
Region	BMD (g/cm²)	AM (%)	AM Z-score
Trunk	0.516	-	-
Ribs	0.477	-	-
Pelvis	0.550	-	-
Spine	0.522	-	-
Total	0.684	100	0.0
TBLH	0.522	94	-0.5



Note the variable SD reference values for pediatrics are shown with tapered edges since children mature at different rates.

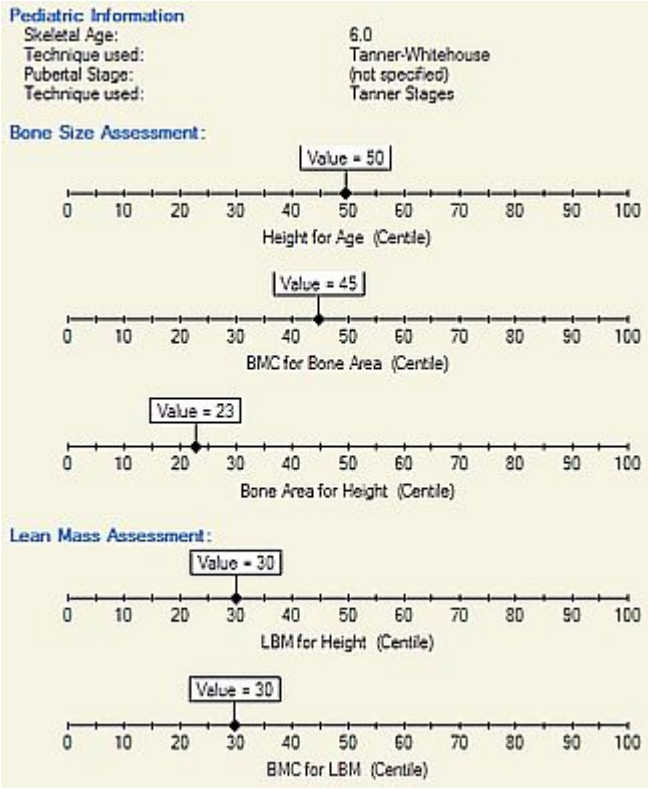
4.15.2 Pediatric AP Spine and Femur Analysis

Pediatric AP Spine and Femur will provide reference data for U.S. and European reference populations.



4.15.3 Pediatric Monitoring Tools

Pediatric Growth tools can be found under the Peds tab in the analysis screen. The software will provide information on Bone Size and Lean Body Mass Assessment.



The Pediatric information must be entered in the Patient Information screen.

Bone Size Assessment

- Height for Age (Centile)
- BMC for Bone Area (Centile)
- Bone Area for Height (Centile)

Lean Mass Assessment

- LBM (lean body mass) for Height (Centile)
- BMC for LBM (Centile)

Reporting the Growth Information

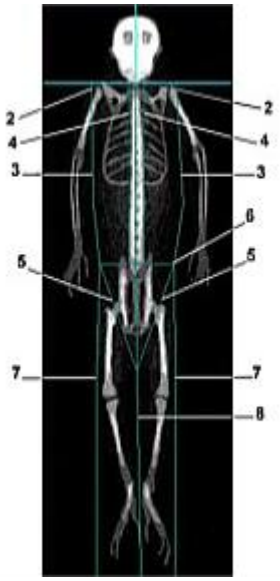
In the Reports options, select the Ancillary check box to report the Growth Analysis data.

4.16 Small Animal Body Analysis

4.16.1 Small Animal Body Analysis Procedure

Both the bone and soft tissue images are shown when you open a small animal body image for analysis. Changes you make to the cut positions on one image are also made on the other image. You can turn off the dual image option in the User Options image tab. Refer to the topic **Options** for further information on configuring User Options.

Complete the steps below in the order given to complete a Small Animal Body analysis.
1. Select an image file for analysis.
2. Select **Imaging** and adjust the image if necessary.
3. Make sure the small animal cuts are positioned as follows:



1 Head: The Head cut is located immediately below the chin.
2 Left and right arm: Both arm cuts pass through the arm sockets and are as close to the body as possible. Ensure the cuts separate the hands and arms from the body.
3 Left and right forearm: Both forearm cuts are as close to the body as possible and separate the elbows and forearms from the body.
4 Left and right spine: Both spine cuts are as close to the spine as possible without including the rib cage.
5 Left and right pelvis: Both pelvis cuts pass through the femoral necks and do not touch the pelvis.
6 Pelvis top: The Pelvis Top cut is immediately above the top of the pelvis.
7 Left and right leg: Both leg cuts separate the hands and forearms from the legs.
8 Center leg: The Center Leg cut separates the right and left leg.

If necessary, select **ROIs** and the **Move Vertex** tool. Adjust the cut itself or select a vertex to adjust the cut position. Select **Results** to view the analysis results.

Icon	Tool	Description
	**Move Vertex**	This tool is shown when you select **ROIs**. Select the Move Vertex tool if it is necessary to position ROI vertices.

- **Vertex:** Use the left mouse button to click on a vertex, then drag the cursor (the cursor is shown as a circle to indicate the vertex is selected).
- **Cut:** Use the left mouse button to click on a cut (not a vertex), then drag the cursor.

4. If necessary, select **Points** to examine point typing. **DO NOT** adjust the point typing unless the program made obvious errors. If you adjust point typing, select **Results** to view the analysis results based on your changes.


Use the Adjust Image Threshold tool if necessary to adjust the threshold of the tissue and bone point typing. This is for research only.

5. Select **Save** to save your changes or select **Close** then **No** if you do not want to save your changes.

4.16.2 Small Animal Body Tissue Quantitation

Tissue quantitation is part of the Small Animal Body analysis. The program reports lean and fat tissue quantities.

Composition results are shown on the screen when you select the Composition tab in the Analyze window. The program prints a Composition report if you select the Composition report option in the Reports dialog box.

Use the cut positions to define the tissue regions. Adjust cuts as necessary to include all of the tissue in the appropriate regions. Be very careful to separate the arm regions from the tissue in the hips and thighs.

Refer to **Custom Analysis Procedures** for additional Analysis information.

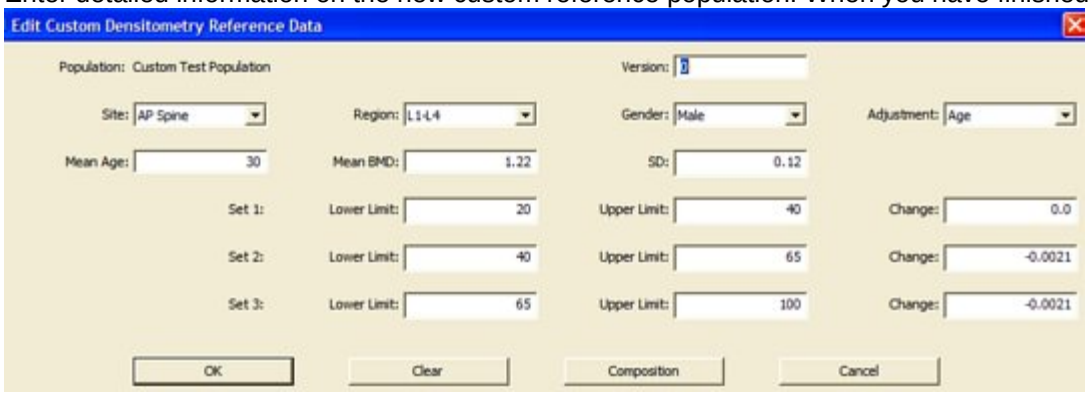
4.17 Custom Reference Population

You can create a custom reference population and use that population for comparison to your patients' results. After you create or edit your custom reference population, you can select it for analysis by selecting the **Tools** menu, selecting **User Options**, selecting the **Reference Data** tab, and selecting the population from the drop-down list.

Caution: Invalid reference data may result in an incorrect comparison by the physician.

4.17.1 Create a New Reference Population

1. Select **Custom Reference Data** from the **Tools** menu.
2. Select **New** in the Create Reference Data dialog box.
3. Enter a name for the new custom reference population. Then, select **Edit**.
4. Enter detailed information on the new custom reference population. When you have finished, select **OK**.



4.17.2 Edit a Custom Reference Population

1. Select **Custom Reference Data** from the **Tools** menu.
2. In the Custom Reference Data dialog box, select the population that needs editing from the drop-down list. Then, select **Edit**. (If you want to delete the population, select **Delete** instead.)
3. Edit the existing custom reference data. When you have finished, select **OK**.

4.18 ScanCheck™

ScanCheck™ (formerly known as CAD or Computer-Assisted Densitometry) assists the user in detecting Spine, Femur, Forearm and Total Body abnormalities. ScanCheck™ provides guidelines to minimize operator error through identification of potential measurement and/or analysis errors. ScanCheck™ assesses consistency of the current AP Spine or Femur scan to the previous scan. When potential anomalies are identified, helpful instructions are displayed as well as multimedia help.
A checklist of measurement and analysis tasks is available to ensure correct analysis, facilitate interpretation by doctor, and make an integrated assessment.

The user must apply their own knowledge and judgement to determine if there are any potential problems with the image measurement, analysis or repeatability.

4.18.1 ScanCheck™ Tab

When the ScanCheck™ tab is active, the identification of artifacts, incorrect analysis, etc., is displayed to the right of the analyzed image. The ScanCheck™ tab gives the technologist a checklist of items to confirm and/or correct during the analysis. The tab includes a series of Yes/No questions with space for comments. If the software has ScanCheck™, those indicators will be displayed within the checklist. Any ScanCheck™ component may be disabled under **Tools / User Options / ScanCheck™** tab.

4.18.2 ScanCheck™ Checklist

The software verifies areas regarding **measurement, analysis**, and **anatomy** and breaks the ScanCheck™ checklist into these three categories for the measurement site. This should be used to analyze the image and make corrections where necessary. Click on a ScanCheck™ warning to display a dialog with further instruction for correcting the specific ScanCheck™ warning.

For the **AP Spine-Measure**, the following areas are verified and/or identified:

- Verify mode is correct for patient thickness.
- Verify spine is aligned.

Example: ScanCheck™ is indicating a potential problem.

 Patient thickness is outside the range for this mode.

If the user clicks on the blue hyperlink "Patient thickness...", the following dialog is displayed with both a description of the problem detected and a recommended solution.

ScanCheck™ Assessor Example:

Description:

 The wrong scan mode may have been selected for this patient's thickness.

Recommendation:

 Consider rescanning the patient using the proper scan mode based on patient thickness ...

Hyperlinks are available for all ScanCheck™ indications with the yellow exclamation point.

4.18.3 ScanCheck™ Check Rerun

The software will automatically rerun ScanCheck™ checks once the user goes into ROIs. The user can make modifications based upon ScanCheck™ recommendations in the **ROI** screen and select **Results**.
Note: **ALWAYS** manually review and consider any ScanCheck™ findings.

4.18.4 Adjusting ScanCheck™ Thresholds

ScanCheck™ features can be disabled or adjusted in **Tools / User Options / ScanCheck™** tab.
Some aspects of the detection can be adjusted to be relatively more or less sensitive.
Decreasing the detection threshold will make the ScanCheck™ detection more sensitive. Increasing the threshold will make the detection less sensitive. The **Default** button returns the threshold to its original value.

4.18.5 Adjustable Thresholds

AP Spine ScanCheck™ Heading	**Adjustment**
AP Spine Measure:	**Spine does not appear to be aligned properly. Angle threshold (degrees): 0-90**
AP Spine Analysis:	Scan was started too low. Scan Start Threshold (mm): 5.0-200.0
	Scan was stopped too late. Scan End Threshold (mm): 5.0-200.0
	Bone area is substantially different from previous scan. Bone area threshold (%): 0-100
AP Spine Anatomy:	Unusual high density areas detected. Detection Sensitivity: 1.0-10.0
	T-Score for an individual vertebra shows an unusual variation from the L1-L4 T-Score. Average T-Score variation threshold: 0.0-5.0
	T-Score for at least one vertebra shows an unusual variation from the T-Score of an adjacent vertebra. Adjacent T-Score variation threshold: 0.0-5.0
	T-Score for at least one vertebra shows an unusual variation from the T-Score of another vertebra. T-Score variation threshold: 0.0-5.0
	Unusual spine curvature was detected. Angle (Cobb) threshold (degree): 0-90

Femur ScanCheck™ Heading	Adjustment
Femur Measure:	Femur shaft does not appear to be aligned properly. **Angle threshold (degree): 0-90**
	Poor femur rotation. Lesser trochanter visibility threshold (mm): 0-10
Femur Analysis:	Bone area is substantially different from previous scan. Bone area threshold (%): 0-100

Forearm ScanCheck™ Heading	Adjustment
Forearm Measure:	**Forearm does not appear to be aligned properly. Angle threshold (degrees): 0-90**

4.19 Practice Management Tools

4.19.1 Practice Management Tools Option

Practice Management Tool is a general-purpose business reporting tool for your practice. Create a report by selecting **Composer/Practice Management Tools** from the Composer Menu. Practice Management Tools includes a list of templates to make the creation of reports with Conditions simpler. **Practice Management** dialog is divided into three areas:

1. Tools for Adding, Editing, and Deleting queries (Add, Edit, Delete, Site/Region Filters, History Catalog).
2. Available reports and their description (Select a Report).
3. Options for proceeding forward and/or backward through Business Report wizard. (Next, Back, Cancel).

4.19.2 Adding, Editing and Deleting Queries

Upon entering, the Practice Management Tools (Select Report) window appears where you may **Add**, **Edit**, and **Delete** Reports, as well as, set **BMD Site/Region Filters** and view the **History Catalog.**

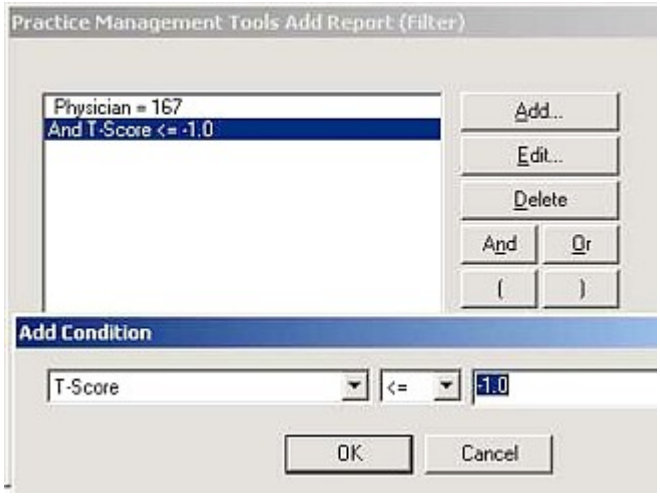
Adding Queries

Select **Add** from the Practice Management dialog. This prompt will allow the user to choose a name for the query and enter a description of the criteria for the report. It is highly recommended to use a naming method for the reports that makes the report easily identifiable. For example, if you are creating a report that will include all patients over 50 that have a T-Score of less than 2.0, the report would be easily identified as Over 50 and T-Score less than 2.0. However, the user has the option to enter any name.

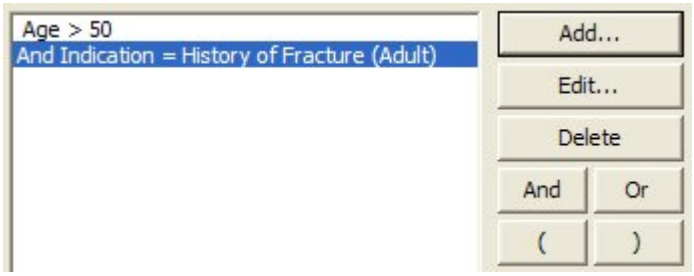
The conditions defined here will be used to produce the patient list when generating a report.

Select **Add** and the **Add Condition** dialog box appears. The user may select from the drop down menus for the condition. Only the conditions displayed are available, i.e. the user is unable to enter their facility specific conditions.

The user must also insert the criteria for the condition.



A list of conditions will default to an **'And'** command to combine the conditions listed. However, the user has the opportunity to select an **'Or'** command or define multiple conditions within parenthesis for multiple **'And'/'Or'** combinations.



The user may also **Edit** or **Delete** conditions by selecting the condition and choosing one of these tools.

Select **OK** once you have completed all conditions for the query. The recently created query is available for selection in the list of report types. Select **Next** to advance to **Available Report Types**.

Editing Queries

Select **Edit** from the Practice Management dialog to make modifications to the name, description, or any conditions associated with the report. Once the user selects Edit, the software will guide the user in editing the report query. The first dialog that is displayed provides the user the opportunity to modify the Name of the report or the Description associated with the report. Once again, it is highly recommended to use a naming method for the reports that makes the report easily identifiable.

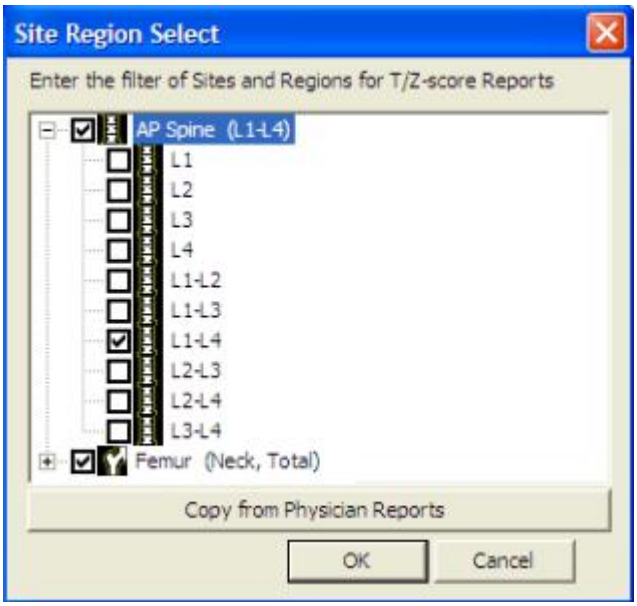
Next, the software allows the user to modify any **conditions** associated with the report including the **criteria** for each condition and how each of the conditions are handled. The user may add conditions, edit the existing conditions, and delete conditions.

Select **OK** once all modifications have been made. The software will return to the main Practice Management Tools dialog with the report recently edited highlighted. Select **Next** to advance to **Available Report Types**.

BMD Site/Region Filters

Click the **BMD Site/Region Filters** button to choose the Sites and Regions for the T and Z-score reports. Click the box next to the sites and regions to select. Click the plus symbol to expand the sites to display the available regions.

Click the **Copy from Physician Reports** button to use the Sites and Regions from Composer.



Deleting Queries

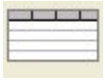
Select **Delete** from the **Practice Management** dialog to permanently remove a business report. Once the user highlights the report to be deleted and selects **Delete**, the software will display a dialog to confirm deletion of the report. Select **OK** to permanently delete the Business Report.

History Catalog

Click the History Catalog button to view the History Chart. **Note**: In order to view a **History Chart**, multiple **Pie Charts** must be saved under one Condition or query heading.

4.19.3 Available Reports

Use or modify one of the sample report queries or create a new report query.
Select the Output format: Patient List, HCFA Form, Mail Merge or Chart.

1.  **Patient List** generates a list of all patients meeting your query criteria. Click the **Customize** button to tailor the patient list output. Select one of the three output types:

Output Type	Description
Patient data only (Fast)	Provides patient information (e.g. biographical, physician, insurance), but does not include exam data (e.g. T-score, BMD)
Patient data and most recent Exam data (Medium)	Provides patient information and most recent exam data. Generation of this report may take extra time.
Patient data and full Exam history (Slow)	Provides patient information and full exam history. Generation of this report may take a long time.

Icon	Tool	Description
	Sort By	Click the **Sort By** drop down menu to sort by a column included in the report. Select Ascending or Descending.
	Add Patient Column	Click **Add Patient Column** button to add patient biographical, physician, and/or insurance information columns to the report output. Click available columns to add to the report and then click OK
	Add BMD Column	Click **Add BMD Column** button to add most recent, lowest T-score/Z-score and site/region of lowest T-score/Z-score. Click available columns to add to the report and then click OK.*This button is only available when creating reports with the most recent exam data.*

	Add Morph Column	Click **Add Morph Column** button to add the lowest morphometry Z-score. Click available columns to add to the report and then click OK. *This button is only available when creating reports with the most recent exam data.*
	Add Composition Column	Click **Add Composition Column** button to add mass and %Fat columns. Click available columns to add to the report and then click OK. *This button is only available when creating reports with the most recent exam data.*
	Configure Exam History	Click **Configure Exam History** button to add Densitometry (BMD, BMC, Area, T-score, and Z-score); Composition (Bone, Fat, and Lean Mass); and Morphometry (Anterior, Middle, Posterior, and Average Heights) sites/regions. Click the box next to the sites and regions to select. Click the plus symbol to expand the sites to display the available regions.*This button is only available when creating reports with the full exam history.*
	Delete Column	Click to highlight the column to delete and then click the Delete button.

The list can be printed or exported to a text file.

2.  **HCFA Forms** option generates a list of all patients meeting your query criteria. The list can be printed directly to your HCFA insurance forms or exported to a text file.

3.  **Mail Merge** option can be used to generate form letters or envelopes for mailing lists. Save the file with a unique name in *.mmf format. Once mailing lists are created and saved they can be recalled from the **Select Form** button.

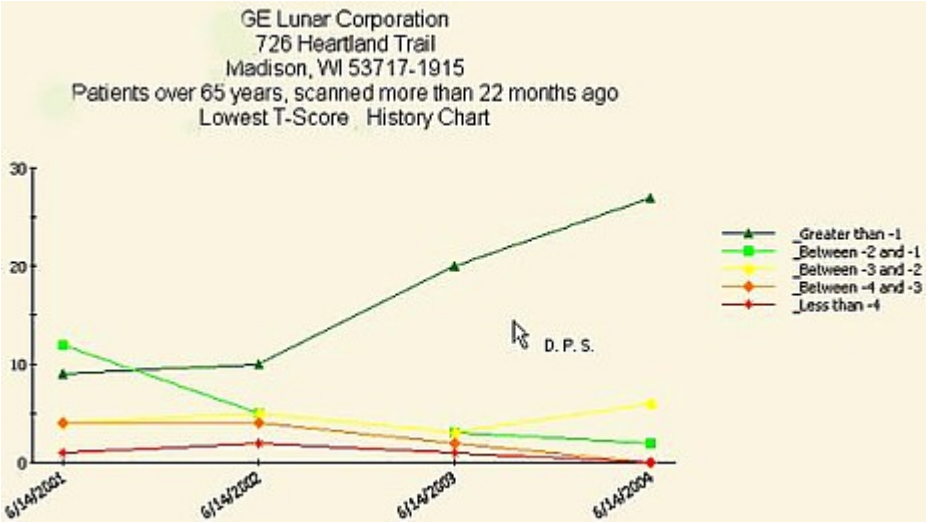
4.  **Chart** option has the ability to show summary displayed as a Pie Chart. The chart can be based on a wide selection of options such as treatment, lowest value, technician (attendant) or referring physician. Output the information to a file or printer.

Chart is based on:

Last Name	Reading Physician	Lowest BMD T-Score
City	Attendant	Site of Lowest BMD T-Score
State	Insurance Company	Region of Lowest BMD T-Score
Postal Code	Indications	Lowest BMD Z-Score
Country	Treatments	Site of Lowest BMD Z-Score
Gender	Fractures	Region of Lowest BMD Z-Score
Referring Physician		

Clicking once on a particular cut will pull the cut from the Pie graph and display the details of that cut.
To examine all the details of the chart, double click anywhere on the pie chart. A complete list of the components and statistics appear.

Select **Save This To History**. The History Chart is used to track saved Pie chart trends over time. In order to create a **History Chart**, multiple **Pie Charts** must be saved under one Condition or query heading. Click on the **Browse** button to save the chart to a location of your choice.



Select either the **Printer** or **File** option to output te information.

4.20 Composer Reports

Composer is a purchased feature to create patient summary reports for referring physicians. The assessments that are appropriate for the patient's results are included in the summary report.
Note: For detailed information on features and functions available with Physician Reports, select the multimedia option within the enCORE software.

4.20.1 Generate a Composer Report

1. With an analyzed exam open, click on the right side of the **Reports** button
2. Select **New Composer Report**.
3. Choose your report style sheet.
4. Click Next.
5. Preview Report.
6. Save Report.
7. Print or output Report.

4.20.1 Physician Report Database

New databases

You can create more than one Physician Reports database. For example, if two doctors use the same scanner, and each doctor uses different assessments, then the doctors should have separate databases.

1. Select **Database** from the **Composer** menu.
2. Select **New.**
3. Enter the filename for the new database.
4. Select **Save**.

Change the active database

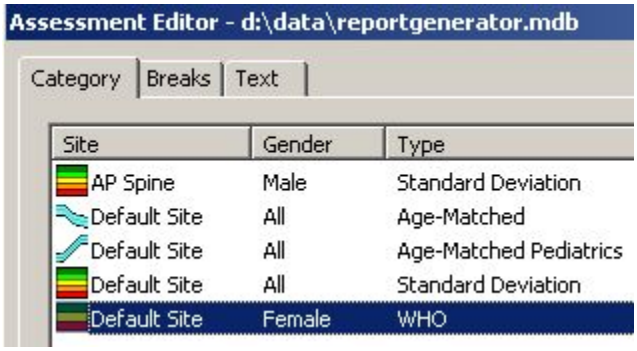
1. Select **Database** from the **Composer** menu.
2. Select **Open**.

3. Select the database you want to use.
4. Select **Open**.

4.20.2 Assessment Editor

1. Select **Assessment Editor** from the **Composer** menu. The Assessment Editor window is shown. The assessment categories are shown on the left side of the window and the assessment graph is shown on the right. The assessment graph is divided into sections called assessment boxes. The program uses these boxes to assign an assessment to the patient's results.

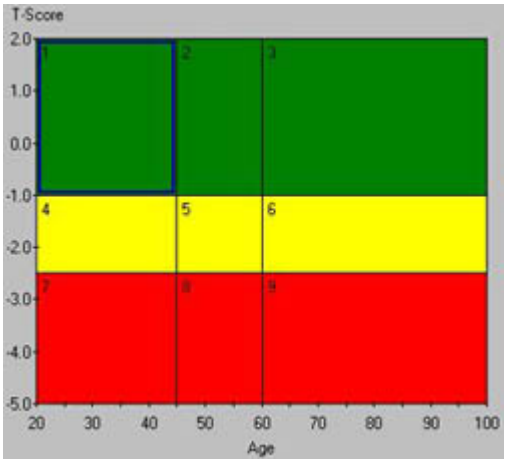
2. Select the **Category** for which you want to record assessments. Select the **New** button to create a site-specific, type-specific, or gender-specific category, if necessary. Select **Edit** to change a category or **Delete** to remove one.



3. Select the **Text** tab. Numbered assessment boxes are shown on the assessment graph.

4. Select the box for which you want to edit an assessment, recommendation, or follow-up. The current assessment, recommendation, and follow-up for that box is shown on the left side of the window.

5. Edit the assessment.

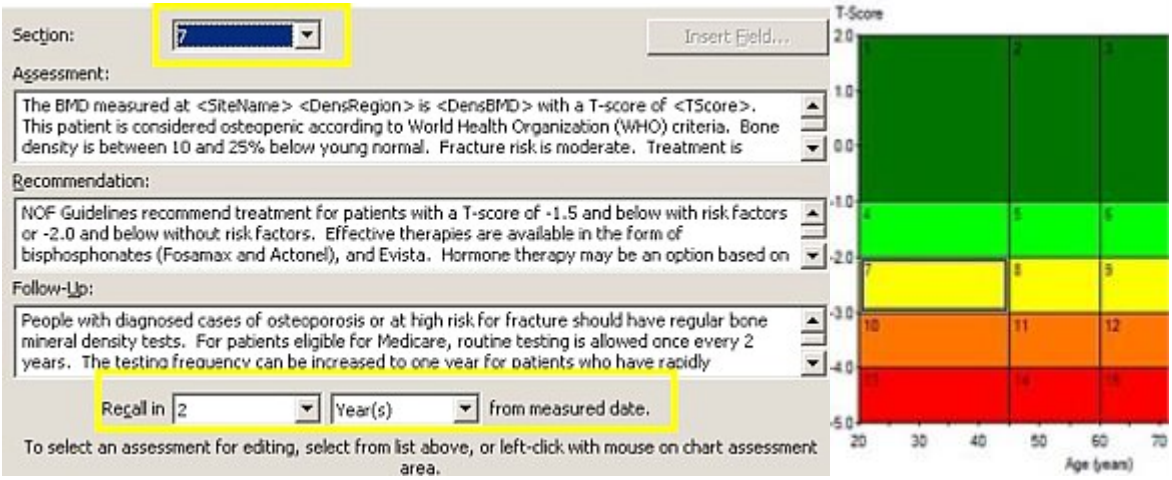


Note: GE Healthcare LUNAR provides sample assessments to help write your own assessments. The sample assessments begin with the word "(Sample)" and will appear on the summary report as a "Sample".

Note: Select the **Insert Field** button to use field codes in the assessment. Field codes automatically insert information such as a patient's birth date, the BMD of the measured region, or today's date into the assessment.

6. Recall Date

The Composer Report can automatically add the Recall Date indicating the recommended return appointment based an the measurement date and what has been set up in the Assessment Editor screen. Select the Recall option in either Year(s) or Month(s).



7. Change Breaks

The **Breaks** tab in the Assessment Editor window lets you change the assessment cutoffs by adding or removing the lines that define the boxes.

1. Select **Assessment Editor** from the **Composer** menu.
2. Select the **Breaks** tab.
3. Add or remove break lines.

To add a break line, select the location of the new break from the drop-down lists on the left side of the window, and then select **Set/Remove**. To remove a break line, use the drop-down lists to select the location of the line you want to remove, and then select **Set/Remove**.

NOTE: You can also add and remove break lines directly on the assessment graph. Move the mouse cursor over the assessment graph and click once to add or remove a break line.

4. Select the **Text** tab to record assessments, recommendations, or follow-up for the new boxes.

4.20.3 Style Sheets

enCORE software includes a style sheet designer that enables a user to create a personalized physician report. Create a physician template, or use one of the templates provided.

Style Sheet Tools

Icon	Function
	New Report (Ctrl+N)
	Open Document
	Save Report (Ctrl+S)
	Report Center (Ctrl+Shift+P)
	Print Preview (Ctrl+Shift+V) Print Preview Wizard (Ctrl+Shift+W)
	Spell Check (F7)
	Insert Auto Text
	Create New Auto Text
	Edit Auto Text
	Edit/Insert Field
	Close Report
	Undo
	Redo
	Cut Selected Text
	Copy Selected Text
	Paste Text
	Edit Headers and Footers
	Switch Between Headers and Footers
	Show Previous Header Footer
	Show Next Header Footer
	Set Header Footer Properties

Edit/ Create Style Sheet

1. Select **Style Sheet** from the **Composer** menu.
2. Select **New** to create a new style sheet or **Open** to open an existing style sheet.
3. Record the information you want to use in the reports.
   - The style sheet works in a similar manner to any word processor with options such as cut, copy, paste, and header/footer options.
   - The program will use **field codes** in the report if you select the **Field Insert** toolbar button and then select field code options.

- The user may modify the sequence of indications, comments, etc., and insert images and tables in the report for easy editing/viewing.
- The user may open the default style sheet included with the software. Make the necessary modifications specific to their facility and save the style sheet under a different name.

NOTE: Refer to the **enCORE Composer Training Guide (Help/Composer)** for basic information on features and functionality. Refer to Composer MultiMedia for detailed instructions.

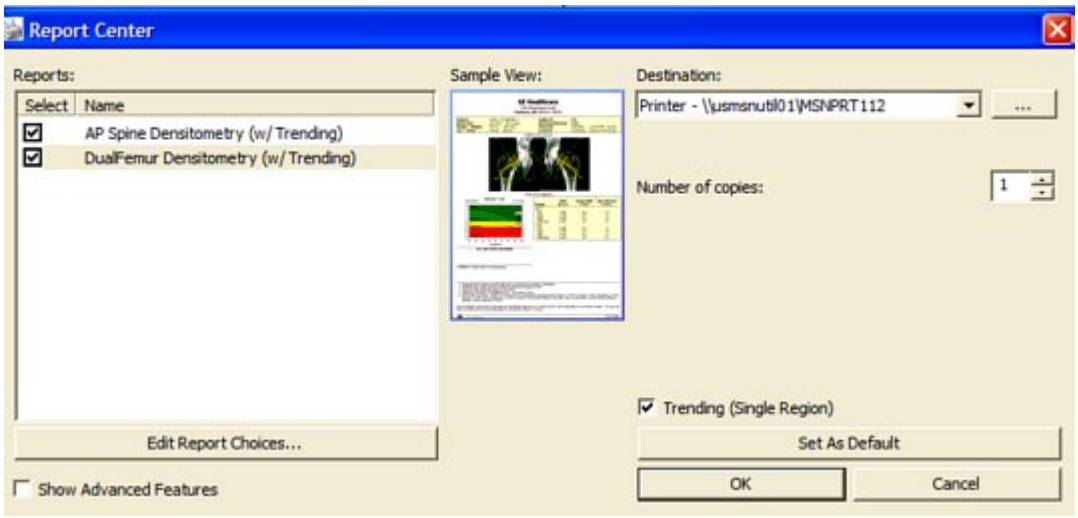
4. Select **Save** to save the style sheet and enter a name for the style sheet.

4.21 DXA Results Report

4.21.1 Creating Results Report

1. Open an Analyzed Exam.

2.  Select **Report** from the **Analysis** toolbar. The Report Center dialog box is shown.



3. Check the box for each report that you want to generate. Change the report settings, if necessary, and check the box to select each device to which you want to send this report (such as the printer, HL7, etc.).

- The **Number of Copies** field shows how many copies of each report the program will create.
- Check the **Individual Page Copies** box to set the number of copies for each page of the report.
- Check the **Trending** option to enable single region trending.
- Click on **Set as Default** to default to these settings for all reports.

4. Check **Show Advanced Features** to view all output options. **E-mail, Fax, DICOM,** and **HL7** report output options are available. (The customer must have the appropriate equipment on site and the LUNAR program features purchased with enCORE to utilize the optional output features.)
Note: Select the **Reports** tab from the **User Options** dialog box to change the default settings for the Report dialog box. Refer to the Options topic for further information on configuring reports.

5. Select **OK** to create the results report.

4.21.2 Configure Report Regions

Go to Options Chapter or **Tools / User Options / Reports** for information on report regions configuration.

4.21.3 DXA Results Report

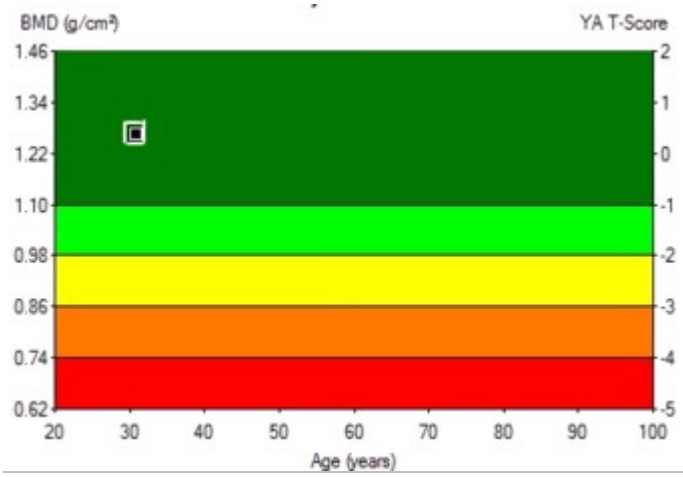
There are four standard sections to a results report:
1. Heading and patient information contains the report heading and patient ID types you selected in the User Options, the patient's biographical information, and the measurement and analysis dates.
2. Image and Analysis information contains the image, reference graph, and results table. If you selected the Trending default in the Reports tab in User Options or the Trending option in the Patient Report dialog box, a trending graph and trending table also appear in this section.
3. Comments Section contains information you entered in the Comments filed of the patient information dialog box.
4. Footnotes contains scan information, the reference population used for analysis, and Age-matched criteria.

4.21.4 Examine Results

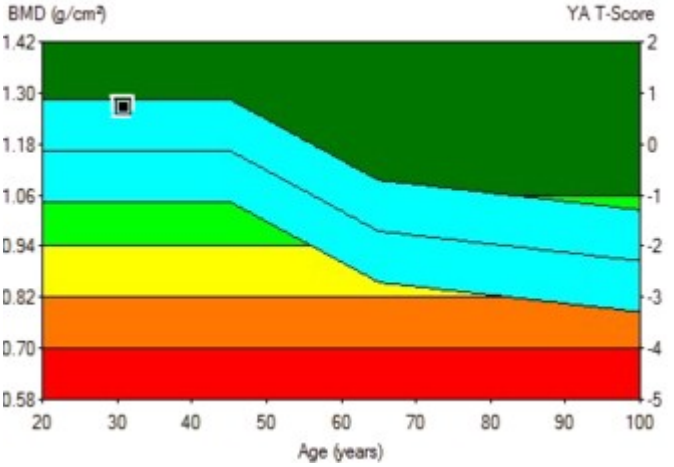
The Results tabs on the Analyze screen let you review BMD, reference, trend, and composition results. To change default settings for graphs, reference data, and results tables, refer to the topic **Options**.

1. Reference Graph

The reference graph provides a visual representation of the exam results. A patient's BMD, expressed in grams per centimeter squared, is plotted against his or her age. The square with a black dot represents the patient. Each colored bar below the dark green section represents one Standard Deviation below the Young Adult value. The thin line separating the dark green from the light green indicates a T-Score of –1. Following across the patients T-Score can be determined.



The **T-Score** indicates how many Standard Deviations a patient's BMD is from the **Young Adult BMD**. A negative T-Score indicates the patient's BMD is below the mean BMD value of the healthy Young Adult reference population. A positive score indicates the patient's BMD is above the Young Adult average reference value.



The blue bar displays the **Age Matched Reference** and demonstrates the change in bone density associated with aging. The centerline of the blue bar is called a regression line. The regression line shows the expected BMD at different ages for a particular measurement site. The blue bar represents the expected Age-matched BMD +/- 1 standard deviation for a given patient.
enCore factors in two variables which affect the regression line: **Weight Adjustment** and **Ethnic Adjustment**.

2. Body Weight

Body weight is moderately associated with BMD (r = ~0.3). As weight increases or decreases, bone density generally increases or decreases proportionally. For every kilogram of weight above or below the average weight for men (78 kg) and women (65 kg), the expected BMD is adjusted by 0.004 for AP Spine BMD and 0.003 for femur BMD. This weight adjustment is applied for weights between 25 and 100 kg. Weight adjustments are applied to Age-matched values (Z-Score) only. Young Adult (T-Score) values are not affected. If the same patient weighs 90 kg instead of 45 kg, the blue regression bar shifts upward while the patient's BMD is unchanged. In other words the Age-matched weight adjustment increased the patient's expected BMD.

3. Ethnic Adjustment

The Ethnic Adjustment, like the Weight Adjustment, only affects the Age-matched regression bar. Young Adult values are not affected. The ethnic adjustment takes ethnic origin into consideration for the final Age-matched comparison. The program automatically shifts the Age-matched regression bar up or

down according to ethnic origin if this option is turned on or off in **Tools/ User Options/Reference Data**.

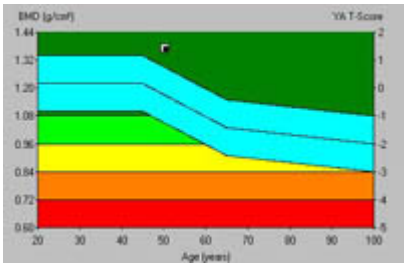
4. enCORE may be configured to display the **World Health Organization** (**WHO**) or **Japanese Society for Bone and Mineral Research** (**JSBMR)** Bars in **Tools/User Options/Results Display Tab/Reference Graph Options**. This option labels the graph with the different WHO or JSBMR classifications; Normal, Osteopenia, and Osteoporosis.

4.21.5 Reference results

Use of the reference population comparisons is fully at the discretion of the clinician. The program does NOT show the comparative values when shipped from GE Healthcare LUNAR.

1. Reference graph

Select **Densitometry** from the Results tabs to examine the reference graph. The Reference graph show the patient's T-Score and Z-Score results.



2. Reference results table

The results table shown below the Reference graph gives the results for each region analyzed. To view the results for a region on the Reference graph, highlight the region.

Region	BMD (g/cm²)	BMC (g)	Area (cm²)
L1	1.207	14.27	11.82
L2	1.261	16.34	12.96
L3	1.284	17.14	13.35
L4	1.297	20.43	15.76
L1-L2	1.235	30.61	24.78
L1-L3	1.252	47.76	38.14
L1-L4	1.265	68.19	53.89
L2-L3	1.273	33.48	26.31
L2-L4	1.282	53.92	42.07
L3-L4	1.291	37.58	29.11

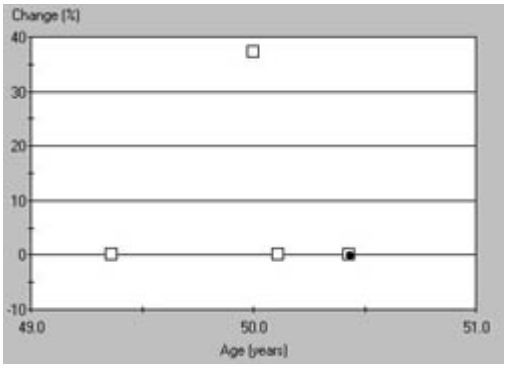
BMD values should be considered together with other risk factors (low body weight, fracture history, corticosteroid use, use of long-acting tranquilizers, history of falling) in the patient evaluation. In particular, patients with a prior history of osteoporotic fracture should be considered to have double the risk of future fracture at any density level.

4.21.6 Patient Trending

enCORE provides a monitoring tool to view changes in a patient's BMD over time. To view trending results, 1) all of the trended measurements must be from the same site, and 2) each trended measurement must be analyzed.

1. Trending graphs

Select **Trend** from the **Results** tabs to graph patient trending information according to Percent Change or Reference. Each measurement is shown as a separate square on the graph. A dot is shown in the square that represents the current image. To change the graph display, go to **Tools/ User Options** / **Trending** tab. Refer to the topic **Options** for configuring User Options.



2. Trending results table

The trending results table is shown below the Trending graph. The table gives the date of the measurement, the patient's age, the BMD for the measurement, and the change in BMD. Trending information is shown for the region highlighted in the **Densitometry** table. To change the region, select the **Densitometry** tab, highlight a new region, and select the **Trend** tab.

4.22 Precision Calculator

4.22.1 Precision Calculator Recommendations

The following are recommendations to assist in optimizing enCORE's Precision Calculator interface to find your facility's DXA precision error.

If you need to acquire scans for your precision study, be aware that local regulatory policies often apply to such studies. Please consult the appropriate regulatory body for more information.

The **International Society for Clinical Densitometry** (**www.iscd.org**) is a good resource for information on precision and bone densitometry.

1. Create a new database to be used for your study scans only. Select the New Database tool in the left panel below the More bar. Assign the database a new name. Review the Database Chapter for more information.

2. No imported scans should be included in your precision study database.

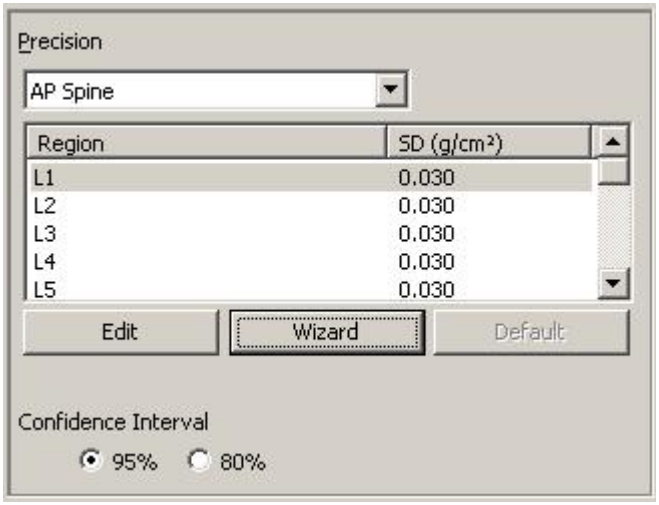
3. All scans must be analyzed using identical regions. If any patient in the study does not match the whole criteria, it is excluded from the precision calculation.

4. You must have completed the study criteria to utilize this tool.

- Use two scans per patient (**30** patient minimum).
- Use three scans per patient (**15** patients minimum).

5. If there are additional scans included for the patient, the calculator will only use the most recent.

4.22.2 Precision Wizard



A Precision Wizard tool is available to assist the technologist step through the process of generating the results from the completed Precision Calculation study without additional spreadsheet tools.

Select **Tools/ User Options Trending/Precision Calculator**.

Click on the **Wizard** button.

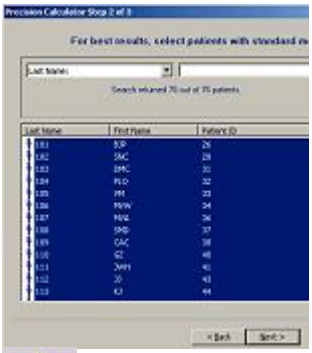
95% Confidence Interval is recommended.

Step 1
Check one option:

- Use two scans per patient (**30** patient minimum).
- Use three scans per patient (**15** patients minimum).

Select the scan **Sites** and select the **Regions** to be evaluated.

Step 2
Hold the Ctrl key down while highlighting all the study subjects.

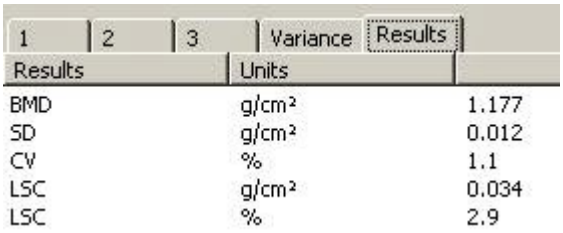


Select **Next.**

If the selection does not meet the minimum number of patients, a warning will appear.

If the selection meets the minimal requirements, a progress bar will appear.

Step 3
The **Results** tab will be displayed.
Each numbered tab represents a data set.
If 2 scans of 30 patients were done only two numbered tabs will appear.



Step 4
At the bottom of the window are the output options buttons.

"**Export**" allows saving results as a *.txt file.
"**Report**" will open your default printer window.
Select "**Apply**" to apply the adjustment to the current database.

Results:

BMD= Average BMD
SD = Standard Deviation. This is the Precision Error in g/cm^2.
CV = Coefficient of Variation = SD / Mean in percent.
LSC = Least Significant Change at 95% Confidence Interval.

Least Significant Change (LSC) at 95% Confidence Interval = Precision Error x 2.77

If **Apply** is selected, the footnote indicating your precision will be found in the printed DXA report.

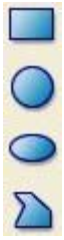
The first example indicates 68% of the repeat scans for this lab fall within 1Standard Deviation (plus or minus 0.010 g/cm2) for this site and region.
1 -Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for AP Spine L1-L4)

4.23 Custom Analysis

Create custom ROIs for image files. Custom Analysis results are given in BMD, BMC, Area only; reference population data is not available. Custom Analysis results are to be used for investigation purposes only.

1. Select an image file for analysis.
2. Select **Imaging** from the Analyze toolbar and adjust the image if necessary.
3. Select **Custom** from the **Analyze** pull-down menu.
4.  Select **ROIs** from the Analyze toolbar.
5. Use the Custom Analysis tools to create and adjust ROIs.
6. Select **Results** to view analysis results for each ROI created.
7. Select **Save** to save your changes or select **Close** then **No** if you do not want to save your changes.

Custom Analysis toolbar
Use the tools given below to create custom ROIs for image files during Custom Analysis. The tools are shown after you select **ROIs**.

Icon	Tool	Description
	**Delete ROI**	Select to remove an ROI. Use the left mouse button to click on the ROI, then select the Delete ROI icon.
	**Rotate ROI**	Select to Rotate an ROI. Use the left mouse button to click on an ROI, then drag the cursor.
	**Move/Size ROI**	Select to move or size ROIs. To move an ROI, click on the ROI and then drag the cursor. To change the size of an ROI, click on an ROI handle and then drag the cursor.
	**Create ROI Shape**	You can create four different ROI shapes: Rectangle (shown at left), Circle, Ellipse, or Polygon. Select a shape, use the left mouse button to click on the image, then drag the cursor.
	**Create Line**	Select to create a Line ROI. Use the left mouse button to click on the image, then drag the cursor.
	**Create Point**	Select to create a Point ROI. Use the left mouse button to click on the image and create a point.
	**Insert Vertex**	Select to add a vertex to an ROI. Use the left mouse button to click on an ROI and add a vertex.
	**Delete Vertex**	Select to remove a vertex from an ROI. Use the left mouse button to click on a vertex and remove it.
	**Move Vertex**	Select to move an ROI vertex. Use the left mouse button to click on a vertex, then drag the cursor.

Use the tools given below to create and open templates of custom ROIs. The tools are shown in the Analyze toolbar at the top of the Analyze window after you select **ROIs**.

Icon	Tool	Description
	**Open Custom ROI Template**	Select to open a template from a previous custom analysis.
	**Save Custom ROI Template**	Select to save the custom ROIs as a template.

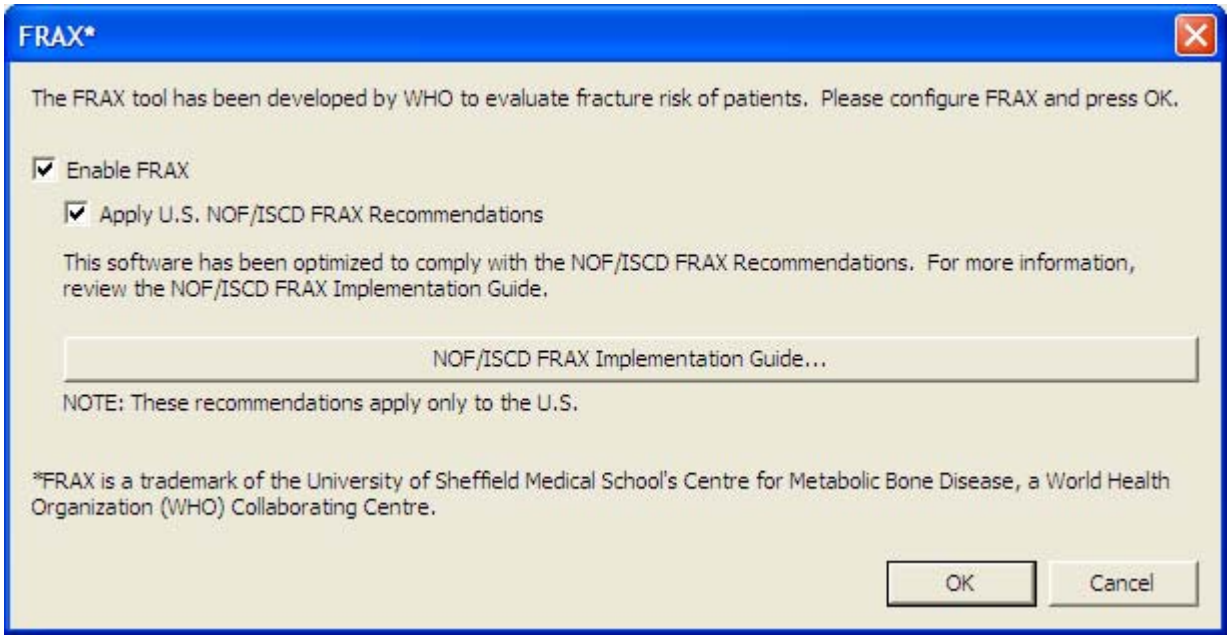
4.24 FRAX* 10-Year Fracture Risk

FRAX 10-Year Fracture Risk Provides an estimate of 10-year fracture probability of hip fracture and 10-year probability of a major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture) for men and post menopausal women ages 40-90 years. This estimate is based on the patient age, gender, population, ethnicity, height, weight, femur neck BMD T-score, and the presence or absence of several risk factors and computed using the FRAX model endorsed by the World Health Organization (WHO). T-scores are based on the NHANES reference values for women aged 20-29 years.

The physician should review local clinical guidelines then determine the optimal FRAX configuration.

4.24.1 Enable FRAX

Select Tools/User Options/System tab and press the FRAX button. enCORE software provides options to configure FRAX to always calculate a patient's fracture risk (Check Enable FRAX), or calculate FRAX according to NOF/ISCD recommendations (Both checked as shown below) or never calculate FRAX (Both unchecked). The default is both unchecked. Click OK.



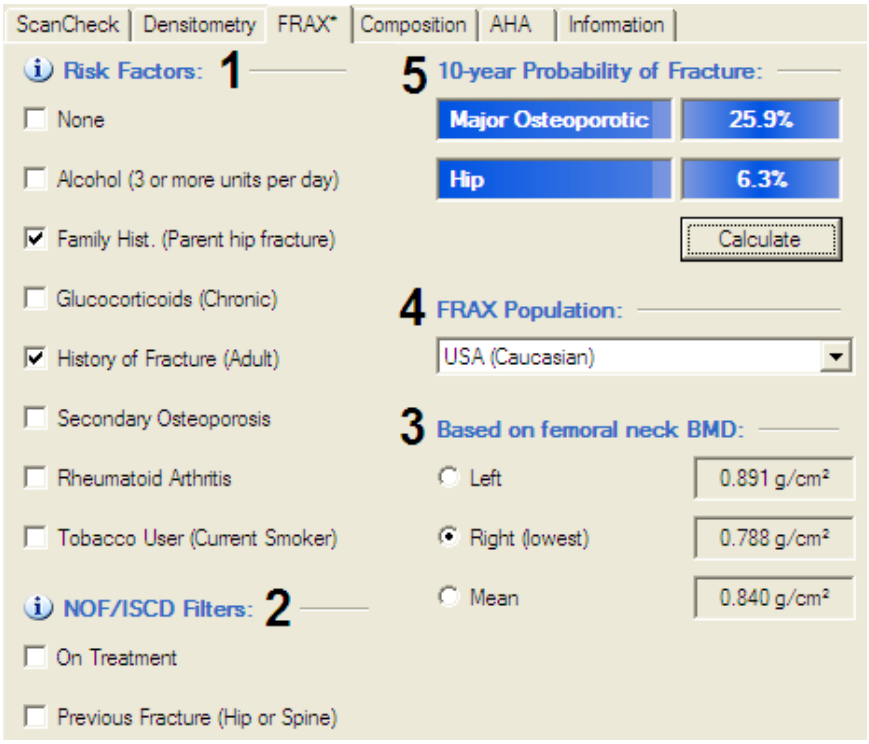
The NOF and ISCD recommend DXA software calculate FRAX output only when the patient meets NOF criteria for using FRAX to assist with treatment decision i.e.,
a. An untreated postmenopausal woman or a man age 50 or older
b. With low bone mass (T-score between -1.0 and -2.5)
c. With no prior hip or vertebral fracture (clinical or morphometric).
d. And an evaluable hip for DXA study

Note: These recommendations apply only to the US. Review these guidelines at NOF or ISCD web sites.

4.24.2 FRAX 10-Year Fracture Risk Calculation

The FRAX tab is available during Left Femur, Right Femur, and DualFemur analysis.

Using the image, follow steps 1 - 4 to calculate FRAX 10-Year Probability of Fracture.



1. Click the boxes next to the listed risk factors to place a check mark in the appropriate risk factors. Use the table below to determine if risk factor should be selected for a patient.

Risk Factors	Select risk factor if the patient:
Alcohol (3 or more units per day)	Takes 3 or more units of alcohol daily. This is equivalent to a standard glass of beer (285 ml), a single measure of spirits (30 ml), a medium-sized glass of wine (120 ml), or 1 measure of an aperitif (60 ml)
Family Hist. (Parent hip fracture)	Has a history of hip fracture in the patient's mother or father
Glucocorticoids (Chronic)	Is exposed to oral glucocorticoids or has been exposed to oral glucocorticoids for more than 3 months at a dose of prednisolone of 5 mg daily or more (or equivalent doses of other glucocorticoids)
History of Fracture (Adult)	Has a previous fracture in adult life occurring spontaneously, or a fracture arising from trauma which, in a healthy individual, would not have resulted in a fracture
Secondary Osteoporosis	Has a disorder strongly associated with osteoporosis. These include type I (insulin dependent) diabetes, osteogenesis imperfecta in adults, untreated long-standing hyperthyroidism, hypogonadism or premature menopause (<45 years), chronic malnutrition, or malabsorption and chronic liver disease
Rheumatoid Arthritis	Has a confirmed diagnosis of rheumatoid arthritis
Tobacco User (Current Smoker)	Currently smokes tobacco

2. Click the boxes next to the NOF/ISCD Filters to place a check mark in the appropriate filters. See the following guidelines to determine if the filter should be selected for a patient.

On Treatment
Examples of "On Treatment" patients include:

- Estrogen/Hormone Therapy or SERM within the past one year
- Calcitonin within the past one year
- Parathyroid Hormone (PTH) within the past one year
- Denosumab within the past one year
- Bisphosphonate within the past two years (unless it is an oral taken for <2 months)

Note: Calcium and vitamin D do NOT constitute “On Treatment” in this context.

Previous Fracture (Hip or Spine)
Prior hip or vertebral fracture (clinical or morphometric).

3. DualFemur measurements will automatically select the region (Left or Right) with the lowest femoral Neck BMD (lowest). Change this selection by clicking on the region of choice (Left, Right, or Mean).

4. Select the appropriate FRAX Population from the dropdown menu. If the patient's country is not represented, select the country for which the epidemiology of osteoporosis most closely approximates the patient's country. Based on the FRAX model, Sweden and US are considered very high risk. UK and Italy are considered high risk. China, Spain, France, and Japan, are considered moderate risk. Turkey is considered low risk.

5. Click the **Calculate** button. The 10-year probability of hip fracture and 10-year probability of a major osteoporotic fracture will be displayed.

4.24.3 FRAX 10-Year Fracture Risk Reports

The following FRAX 10-Year Fracture Risk reports are available:

Composer: **FRAX**

DXA reports: **DualFemur FRAX**, **Left Femur FRAX**, and **Right Femur FRAX** (availability based on open exam)

Refer to **DXA Results Report** and **Composer Report** sections for more information on generating reports.

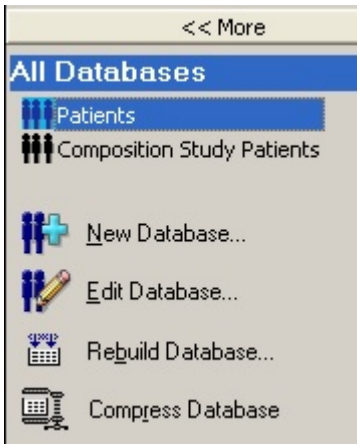
*FRAX is a trademark of the University of Sheffield Medical School, Centre for Metabolic Bone Diseases. A World Health Organization (WHO) Collaborating Centre.

5.0 Database Maintenance

5.1 Maintenance Procedures

Complete database maintenance procedures at the **Directory** screen: select **Directory** from the **Main screen** or from the Common toolbar. Options to complete database maintenance procedures are given in the Database sidebar (refer to **Screens and Toolbars** for a description of screens and toolbars).

The Database sidebar includes the following database maintenance tools: **Edit Database**, **New Database**, **Rebuild Database**, and **Compress Database**. Follow the links for each of the tools to learn their functionality.



Note: The database maintenance tools are not displayed by default. Select the **More>>** button if you are unable to view the database maintenance tools.

5.2 Compress Database

 Select **Compress Database** (from Database side bar) to remove excess records that are left in the database when you delete patient records. For performance reasons, these files are left temporarily in the database. **Compress Database** also performs a repair function on the database. The software will display a message once database compression/repair is completed.
"Compression of the Patient database successful."

When it is necessary to compress the database, a message is shown when you exit the program; "**Compress the database to improve performance?**" Select **Yes** to compress the database. Note: Large databases may take a long time to compress. Always initiate the Compress utility from the closest proximity to where the database resides in networked environments.

Note: The database maintenance tools are not displayed by default. Select the **More>>** button if you are unable to view the database maintenance tools.

5.3 Delete Database

The Delete Database option is located in the **Directory** menu.

1. Select the database you want to delete in the Database sidebar.
2. Select **Database Utilities** from the Directory menu.
3. Select **Delete Entire Database**. A warning message appears verifying that you do want to delete the database. Click **OK** to continue or **Cancel** to abort the deletion process.

When you select **OK**, the Delete Database dialog box gives the options that follow:

- **Just remove database connection**—removes the database name from the database list, but does not delete the database file from the database folder. Select this option if you want to remove the database from the program but do not want to permanently disable the database.
- **Also permanently delete database**—removes the database name from the program and deletes the database file from the database folder.

4. Select one of the options and select **OK**.

NOTE: Patient image files are not deleted from the database folder when you use the Delete Entire Database option.

5.4 Edit Database

 Select **Edit Database** from Database sidebar in the Patient Directory screen. If the utility is not visible, click on the **More>>** button.

The **Edit Database** dialog box gives the options that follow:

- **Name–**Change the name of the active patient database used to store patient records.
- **Archive Drive–**Change the drive location that is used to archive files.
- **Archive Number–**Change the number that is given to the current archive disk. This number is used to identify the archive disk that contains your patient image files during the archive procedure.
- **Allow Archive from this workstation**–Change the archive and Backup permission for this workstation. A check mark in this box means archive is allowed on this workstation. This setting is important if your files are stored in a database that is used by several workstations. Only one workstation should be used to archive all of the files in the database. DO NOT allow files to be archived from more than one workstation.
- **Allow Backup from this workstation**–Change the Backup permission for this workstation. A check mark in this box means backup is allowed on this workstation. Every workstation should have its own backup.
- **Backup Drive**–Change the drive location that is used to backup the software configuration and database files.
- **Days Between Backup Prompt–**Change the number of days between display prompts to backup the patient database.

Note: The database maintenance tools are not displayed by default. Select the **More>>** button if you are unable to view the database maintenance tools.

5.5 New Database

 Select **New Database** (from Database sidebar) to create a new database of patient records and database files. Select the **More>>** button if you are unable to view the database maintenance tools.

The **New Database** dialog box gives the options that follow:

- **Name–**Record a name for the new database to be used to store patient records.
- **Microsoft Access** (2000, 2003, or 2007) OR **Microsoft SQL Server** (2000 or 2005) interface.
- **Location--**Designate a drive destination and a name for the new directory for the new database (the default is the hard drive).
- **Archive Drive-**Designate the drive to be used to archive files for the database.
- **Description-**Record a description of the new database if necessary.
- **Allow Archive from this workstation (only available with the multiple user option)**–Change the archive and restore permission for this workstation. A check mark in this box means archive and restore are allowed on this workstation. This setting is important if your files are stored in a database that is used by several workstations. Only one workstation should be used to archive all of the files in the database. DO NOT allow files to be archived from more than one workstation.
- **Backup Drive-Designate the drive to be used to backup database and configuration.**
- **Allow Backup from this workstation** –Change the backup permission for this workstation. A check mark in this box means backup is allowed on this workstation. Each workstation may be used to backup configuration files in the database.

5.6 Archive

 Select **Archive** to copy image files from your computer hard drive to an archive location.
Select the method of Archive.

- archive all exams for all patients
- archive all exams for all patients in the current search results
- archive all exams for selected patient
- archive selected exam

Refer to **Edit Database** to change the destination for the archive drive. Use the task scheduler found under **Tools/Task Scheduler** to set up automatic archiving.

The default **Archive** function is to **Copy** the image file to the Archive location**.** The original image file remains in the database directory.

You may choose the option to **Move the image files to the Archive location.** When **Move/Archive** is used, the image file is **moved** to its archive location then **deleted** off the local drive.
Select the **More>>** button to change the Archive behavior and view Advanced Settings.

5.6.1 Archive Advanced Settings

Select the Archive Style. The options are:

- **Incremental** option will only archive files that have changed since the last Archive operation.
- **Complete** option will re-archive all files whether or not they were previously archived.
- Check the "**Delete local file(s) after Archiving**" to delete all images from the original database location after Moving the images to the archive location.
- Click on the **Set as Default Advanced Settings** bar to keep the archiving preferences you have chosen.

5.7 Rebuild Database

5.7.1 Rebuild Database

Note: Import first, then rebuild.

 Select **Rebuild Database** (from Database sidebar) to recreate (rebuild) a database that has been lost due to a computer hardware malfunction. In addition, you can use this option to include additional files in your database. You can rebuild the database from files that you have copied into your working directory (system default) or from files stored on an archive disk. Select the **More>>** button if you are unable to view the database maintenance tools.

1. Select **Rebuild Database**. The Rebuild Database dialog box displays.

2. To rebuild the database from an archive disk, select "**Archive Directory**" as your Source Option. Otherwise, leave the Source Option set to the "Working Directory" default.

3. Select how you want the image files filtered in the **Filter By** dialog box.

4. Select the files you want to use to rebuild the database, or select **Select All** to use all of the files. (Use the Ctrl key to select multiple images.)

5. Select **OK** to rebuild the database.

5.7.2 Restore Backup

Restoring from Backup will also restore your enCORE software settings and Composer style sheets.

1. Select the **Directory** option from the window's tool bar in the directory screen.
2. Select **Database Utilities/ Restore Backup.**
3. **Browse to the backup.zip file location.**
4. Click **OK.**

Note: Files are restored to the local database automatically when an archived image is opened.
If the file is kept on remote media, the software will prompt the user for the appropriate archive disk.
If you desire to rearchive the file, you must select **Save** while the image is open. This will make the Archive operation available.

5.8 Database Importing

5.8.1 Manual Import

To manually import an individual scan select **Directory** at the top of the directory screen.

1. Select **Database Utilities**.
2. Select **Manual Import** from the list.

The current manual import options for manufacturers and scan type are as follows:

Hologic
Lunar DPX Series (IQ, MD)
Lunar enCORE Systems
Lunar Expert
Norland - note that Norland files need to be converted into Lunar format before importing. This cannot be accomplished in the enCORE software.

5.8.2 Import -Supported Scan Types

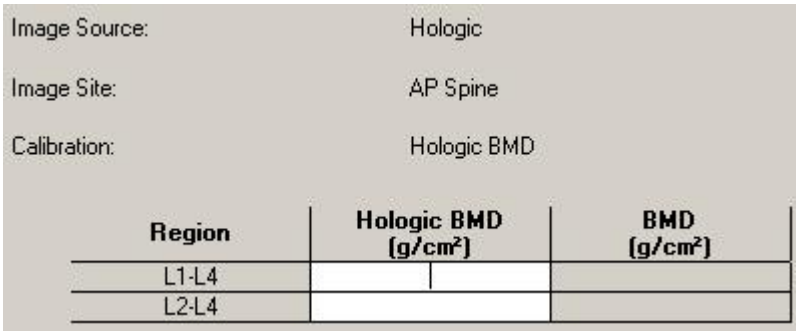
"**X**" = Supported
"**NA**" = Not available

	Hologic	Lunar DPX-IQ, DPX-MD	Lunar Expert	Lunar enCORE Systems	Norland
AP Spine	X	X	X	X	X
Left/ Right Femur	X	X	X	X	X
Dual Femur	NA	X	X	X	NA
Forearm	NA	X	X	X	NA
Total Body	NA	X	X	X	NA
Lateral/LVA Spine BMD	NA	X	X	X	NA
Orthopedic Hip	NA	X	X	X	NA
Hand	NA	X	X	X	NA

1. The Manual Import Wizard will prompt for the selection of an existing patient or select **New Patient** if the patient is not in the current database.

2. Select the Manufacturer and scan type from the drop down lists.
   - Enter the date of the imported scan
   - Enter Patient Height and Weight
   - Enter the manufacturer
   - Select the scan type
   - Select the calibration used

3. Conversion factors are not displayed when entering the import values for the analysis regions. Enter the scan BMD values into the blank field. The converted value is displayed as you enter a value.



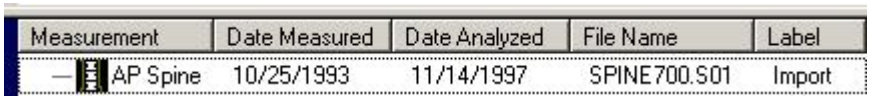
4. Select **Finish**.
   The import will be labeled in the directory as a **Manual Import..**

5.8.3 Image Support

The corresponding image files may be added to the database for viewing:

- **DPX-IQ** - AP Spine, DualFemur, Femur, Forearm, Total Body, and Ortho
- **EXPERT** - AP Spine, DualFemur, Femur, Forearm, Total Body, Ortho, and Hand

When an image has been added, the directory will provide the original File Name.



5.8.4 Importing Entire Databases

It is recommended that a new database be created prior to importing an entire database and that the reference data has been enabled under Tools/User Options.
Review ***Import-Supported Scan Types*** for more information.

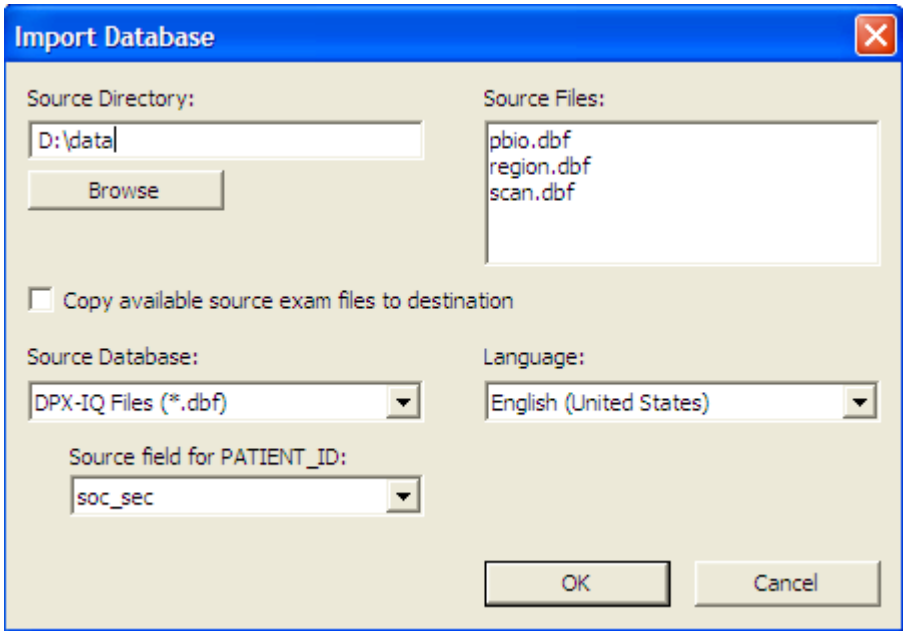
Note: Corrupted files/databases or unanalyzed scan data will not be imported.
Morphometry, Small animal and Hand is not available for import.

Required Files for Database Import

Hologic DOS	Hologic Windows	Lunar DPX-IQ, DPX-MD	Lunar NT, MD+	Lunar Expert	Lunar Prodigy & iDXA Series	Norland
Patient.dbf Genscan.dbf	Patscan.mdb	Region.dbf Scan.dbf Pbio.dbf	Lunar.mdb	Region.dbf Scan.dbf Pbio.dbf	Lunar.mdb	XR26 all *.fil files additional service conversion

	required

Create a folder on the enCORE computer directory to hold the import files.
In enCORE select **Directory/ Database Utilities / Import.**
Select the **Source Database.**
Click the **Browse** button and navigate to the folder that holds the import data.



The import files are listed under **Source Files**.

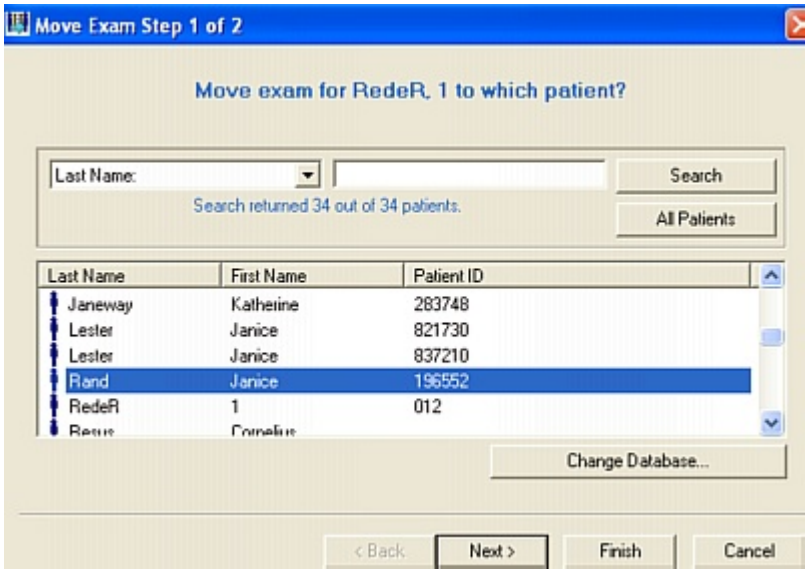
Click **OK** to complete the process.

Note: Large databases may take more than an hour to import. Stopping the import process by closing the application or rebooting the system, will likely corrupt data.

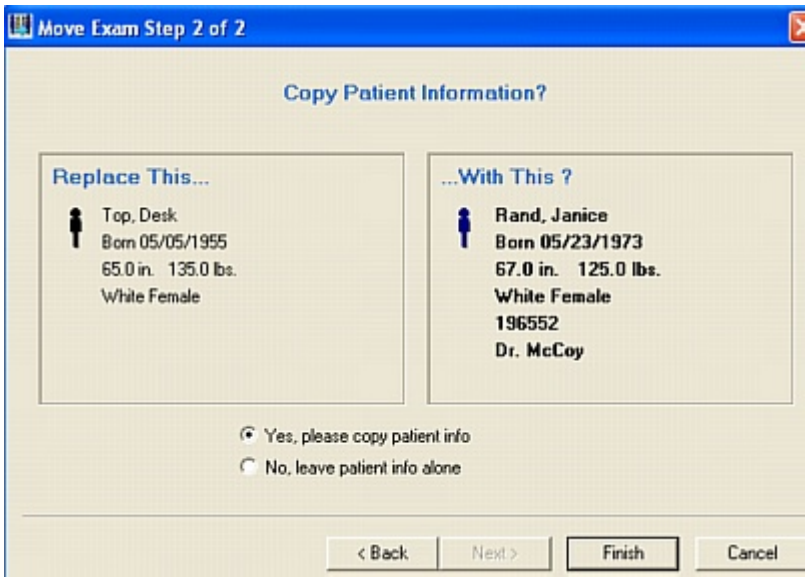
5.9 Move

Move lets you move image files/exams from one patient record to another.

1. Select the image file you want to move. Select more than one file by holding down the Ctrl key as you select files.
2. Select **Move** from the Directory toolbar**.**
3. Select the patient record to which you want to move the file. (Select **Change Database** if the patient record is located in a different database.)



4. Select **Next**.
5. Select **Yes** or **No** to replace the patient's information with the information from the image file.



6. Select **Finish**.

5.10 Copy exam file

Use the **Send Exam File** feature to copy an image file from the database to another location.
1. Select the image you want to copy.

2. From the **Directory** menu, select **Send Exam File To** and select **Disk.**

3. A **Compress Files** prompt will appear. The default is to compress files before copying to disk. This allows more files to be included on a single disk. The user may also configure the software to span multiple disks and will prompt the user to insert additional disks (at the appropriate time) if multiple image

files are being copied to disk. The HIPAA Secure Copy feature removes all patient information from the file. Select **OK** to proceed.
4. Select the drive and folder to which you want to copy the file.

5. Select **OK** once the location has been specified.

Note: If you purchased the TeleDensitometry kit, you can also use Send Image File to email image files. Select **Email** in step 2 above. The program opens a new email message and attaches the image file to the message.

5.11 Change Image Type

Another tool available to help you correct mistakes is Change image type. This feature lets you change an image file from a left femur to a right femur, a femur to an AP spine, or an AP spine to a femur.
The image file must be closed before you can change the scan type.

1. Select the image you need to change.
2. Select **Change Image Type** from the **Directory** menu.
3. Select the scan type to which the selected image should be changed.
4. Select **OK**.

LUNAR does not guarantee valid results for images that were measured as the wrong site. You should measure the patient again using the correct measurement site to ensure accurate results.

5.12 Delete patient and Delete image

 Select **Delete patient or exam** to delete patient records and image files.

1. Complete one of the following:
   - In the Patient list, highlight the patient record and select **Delete**.
   - In the Image list, highlight the image file you want to delete and select **Delete**.
2. A message box is shown which gives you the option to:

- **"Delete Selected Patient and Associated Exams".** This option deletes the selected patient in the Patient lists and all images associated with the selected patient.
  or
- **"Delete Selected Exam"**. This option only deletes the exam selected in the list.
  or
- **"Delete Selected Image"**. This open only deletes the image selected in the list.

- **"Delete Database Record Only"**. This recommended option removes the connection of the image file from the database.
  or
- **"Delete Database Record and Exam File(s)."** This option permanently removes the patient and/or exam file and database connection.

3. Select the necessary option and select **OK**.

5.13 Edit Patient and Edit Image

 Select **Edit** to update patient exam records and image files.

1. **Complete one of the following:**
    - In the Patient list, highlight the patient record you want to edit and select **Edit**.
    - In the Image list, highlight the image file you want to edit and select **Edit**.
2. In the Edit Information dialog box that is shown, change the necessary patient information and select **OK**.

Note: For editing individual image files, patient information must be modified for each image.

5.14 External USB Hard Drive

USB external hard drive may be used with the enCORE system as an archive and/or backup device. Contact your local GE representative for assistance.

The USB drive must be formatted as NTFS.
The USB drive must never be unplugged while the computer is running *or* without disabling the remote drive first within the operating system.

Windows XP will automatically detect and assign a drive letter when the external drive is plugged in.
You may control the drive assignment by going to the Control Panel, switch to XP Classic View.
Click on Administrative Tools /Computer Management.
Click on Storage / Disk Management.
Right Click on the Removable Drive and select "**Change drive letter and paths**"
Click on the **Change** button.

Enter the drive letter that must always be used for archiving and click **OK**.

In enCORE, go to the Directory screen.
Select "**Edit Database**". Enter the applied drive letter in the Archive Drive and Backup fields.

Refer to the chapter on Archive for additional information.

5.15 SQL Database Interface

5.15.1 SQL Interface

Prepare for SQL Interface
1. Update to enCORE software version 10.0 or later.

2.SQL Customer Requirements
- Customer must have **SQLServer 2000** or 2005 installed on an available server. No special installation is necessary on the client(s).

- The version of SQLServer must be 2000 or 2005 -- this is not optional because we are using features of SQLServer that are not available in SQL's earlier releases.
- The site should be familiar with how to install and configure SQLServer. Lunar does not support this.
- They also need an account set up on SQLServer that has the authority to create and modify databases (typically an administrator account), because enCORE does do such operations for things like "New Database", "Backup/Restore", etc. Typical day to day operations, of course, can be done with an account that has much more limited authority.

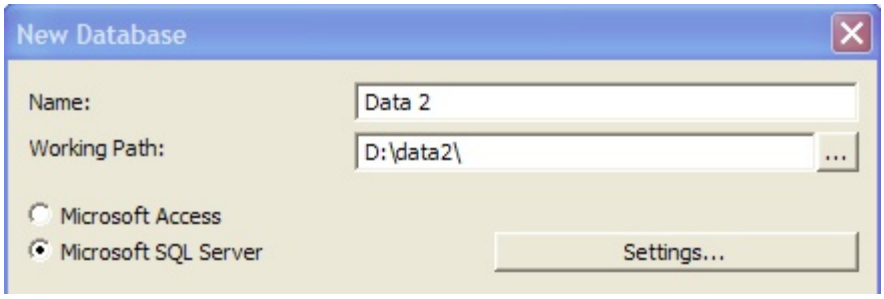
3.**Network speed requirement:** Expected network speeds for a database of 10,000 patients is approximately:

Directory Search for 1 patient = 1 sec
Directory search for all patients= 44 sec
Open single image (300Kb Prodigy or 3Mb iDXA) = 9 sec
Save single image = 23 sec

- Cat5-enhanced rated cables to handle Base100.
- No external programs write/update the shared database.
- No external programs reading encore database while the enCORE program is running on any system.
- All systems sharing the database must be upgraded simultaneously.

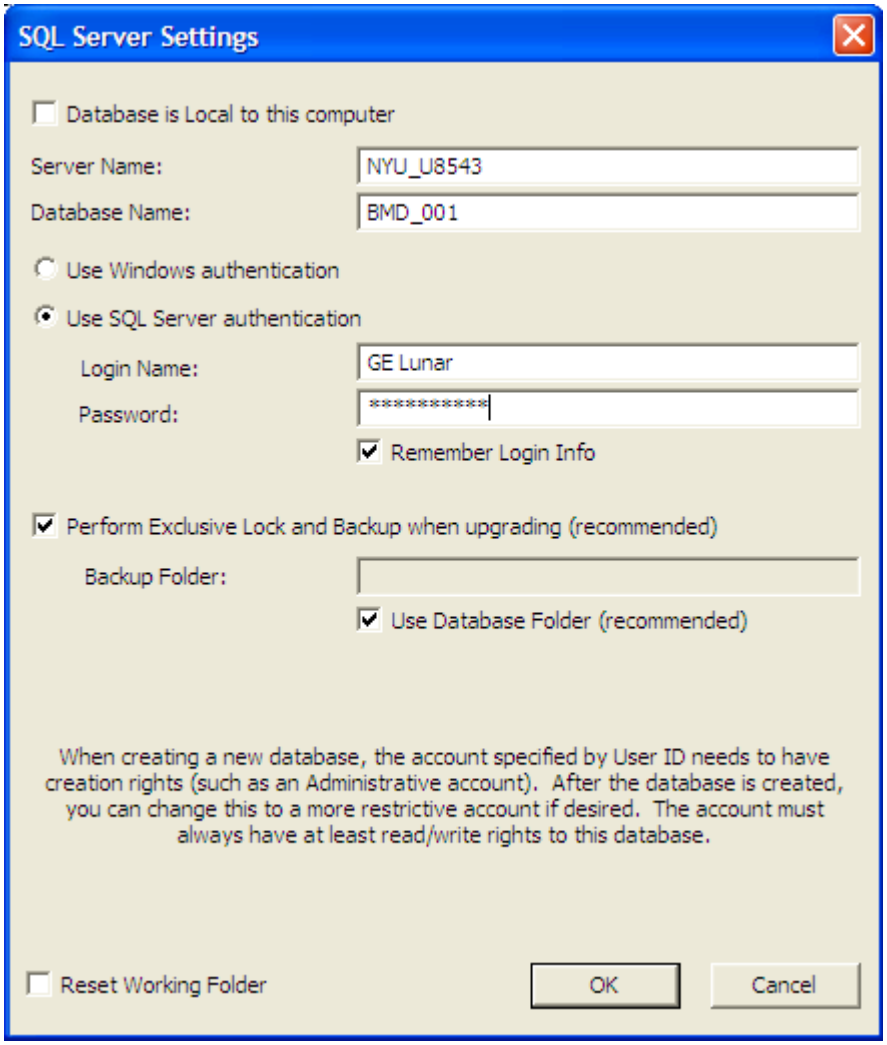
5.15.2 Integrate Existing enCORE Database with SQL Service

1. Make note of the working path
   With the database still selected, look at the "Working Path" line under "Active Database".
   Write down the working path for future reference.
2. Remove the connection to the Access database
   With the database still selected, select **Directory / Database Utilities / Delete Entire Database**
   Select **OK**
   Leave the selection on "Just remove database connection" and press **OK**
3. Create a new SQL Server database
   Select **New Database** in Directory
   Select the **Microsoft SQL Server** option
   Enter the Working Path (that you wrote down above).



Click on **Settings**.
Select SQL Server. In the SQL Server Settings dialog.

- Enter **Server Name** of the server on which SQL Server resides
- Enter a new **Database Name** of your choice
- Enter **User ID** and **Password** of an ID with creation rights (such as an Administrative account). Change permissions to a more restrictive account later if desired.



Select **OK** on all the dialogs

6. **At the SQL Server 2000**
    1. Import the Data into your SQLServer
        a. Using **SQL Server Enterprise Manager**, right click on the new database, select **All Tasks /Import Data**.
        b. Select **Next.**
        c. Select Data Source Type of "Microsoft Access."
        For "File name" enter the path and filename of the Access Database (you can find this by selecting the Access database in enCORE and looking at the "Database:" line under "Active Database.") Alternatively, copy the Access lunar.mdb file to the server first, then select the copied file. The transfer will be faster if the file is already on the server.
        d. Select **Next.**
    2.. Select Destination of "Microsoft OLE DB Provider for SQL Server"
        Enter the Authentication method of your choice (for example, select "Use SQL Server Authentication" and enter Username and Password for a user with Admin rights to SQL Server).
    3. Select your new database as "Database".
        a. Select **Next.**
        b. Select **Copy tables and views** from the source database.
        c. Select **Next.**
        d. Check every table in the list except "Version" which should stay unchecked.
        e. Select **Next** twice, then **Finish**.

5.16 Task Scheduler

5.16.1 Task Scheduler Tools

Select **Tools/Task Scheduler**. The Task Scheduler window appears. Use the tools to **Add**, **Edit**, or **Delete** a task and then click OK.

Icon	Tool	Description
	Add	Click the **Add** button to add a new task.
	Edit	Click to highlight the task to edit and then click the **Edit** button. *This button is only available when a task is available in the list.*
	Delete	Click to highlight the task to delete and then click the Delete button. *This button is only available when a task is available in the list.*

5.16.2 Adding and Editing Tasks

A Task window appears after clicking the **Add** or **Edit** button. Complete the fields as described below and then click OK.

Field	Description
Task	Type the task name in the **Task** field or use the **Choose from List** button to select from a list of common task names.
Time	Use the **Time** field to set the time for the task to be performed.
Every	Use the **Every** field to set the task frequency. Choose between Day(s), Week(s), or Month(s).
When it's time for this task...	Click the **When it's time for this task...** drop down menu to choose the task action. Choose between Prompt me, Perform Archive All, or Perform Backup. Check the **Ask me before proceeding** box to receive a message containing the **Reminder Text** before the task begins. Edit the **Reminder Text** as desired.

5.17 Batch Exam File Operations

5.17.1 Exam File Export/Report

Select **File/Batch Exam File Operations**. The Export window appears.

1. Select between Working or Archive as the **Source Directory**. Change to another database to change the Working Directory.
2. Use the **Filter By** drop down menu to filter the **Source Directory**.
3. Click on the exam(s) to export/report or click **Select All** to export/report all exams in the **Source Directory**.
4. Choose Printer or DICOM from the Destination drop down menu.
5. Click OK.

If Printer is selected for the destination, a report will be sent to the default printer based on the default configuration.

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