

PenRad's Bone Density Reporting Module offers radiologists the ability to create, track and generate complete DEXA narrative reports to send to EHR/RIS/HIS, and/or distribute by; email, mail, fax, as well as produce a patient result letter. Optional import module automatically populates report with scan data extracted from DICOM SR data set.

The Bone Density screen accommodates capture of patient risk factors, FRAX values, clinical data, recommendations, change, impression, recall interval and optional patient letter. Screen also facilitates individual review of current and prior scan data, selection of comparison scans, and preview of report.

The Bone Density Scan screen captures BMD, T&Z scores, machine type and body region scanned, imaging tech, date and time. If the import module is activated, the scan data is automatically populated. Screen provides calculation of BMD risk level, value and percentage change from prior scans.

Technologist Workflow:

Technologist selects patient and initiates exam, then transfers to the reading worklist for immediate or deferred input of scan region data (manual entry or automatic import), selection of comparisons scans, indication of risk factors and clinical data for radiologist. The exam can be suspended multiple times to facilitate various workflow patterns to capture data. The DEXA import module directly imports the scan data from the imaging modality to eliminate manual data entry. If import is not available, then data is entered via the Bone Density Scan screen through a series of automated controls.

Radiologist Workflow:

When the radiologist selects a study from the worklist to interpret, the Bone Density screen appears facilitating selection of recommendations, overall change, recall interval, patient BMD letter (if applicable), and review and approval of report. Uncommon items not featured on the main screen can be accommodated by the various add text buttons by selection, or added for future use. Impression selector facilitates youth, male, and premenopausal.

Bone Density - Christine Jade Anderson, Penrad Main Clinic 3/20/2013 14:03:09
Sma Bones DOB: 01/31/1953 AGE: 60 F PID: A4151839

Risk Factors: Asian race, Advanced age, Early or surgical menopause, Long term use of corticosteroids, Maternal history of osteoporosis, Low height/weight ratio, Prolonged bed rest, History of previous fracture, High alcohol consumption, Diet low in calcium, Cigarette smoking, Diet high in protein/phosphates, High caffeine consumption.

Clinical Data: Postmenopausal, Perimenopausal, Estrogen deficient, Clinical risk for osteoporosis, Follow up to previous study, FU after initiating bone preserving meds.

Recommendations: Estrogen replacement therapy, Weight bearing exercises, Calcium & vitamin D supplements, Recheck of BMD in 1-2 years, Pt consult w/primary care provider, Further BMD testing, Post Menopausal BMD test.

BMD Change: n/a, Not Significant, Decrease, Increase.

Recall Interval: No Recall Mbg, 6 months, 1 year, 2 year.

Impression: Cannot be assessed, Normal BMD > -1, Medium Osteopenia BMD -1 to -2.499, High Osteoporosis BMD <= -2.5, Severe Osteoporosis BMD <= -2.5, Borderline Osteopenia BMD, BMD normal for age, BMD below for age.

Patient Letter: No Letter, Normal Exam Bone.

Toggle Risk: Major: 2.3%, Hip: 1.8%.

Radiologist	Date	Side	Region	BMD	stdT	T	Z	%Ref	Risk	Machine	Tech	Rad	Rpt
	3/20/13	AP	L1-L4 Spine	0.889	-2.10	-2.10	-0.80	80.0	91.0	med	Hologic	cja	Y
	3/20/13	Other	Dual Femur	0.881	-1.80	-1.80	-0.60	81.0	93.0	med	Hologic	cja	Y
Selected Comparisons:													
Add	2/16/12	Other	Dual Femur	0.857	-1.75	-1.76	-0.64	82.0	903.0	med	Hologic		N
Rem	2/16/12	AP	L1-L4 Spine	2.222	3.33	4.44	5.55	666.6	777.7	normal	Hologic	sta	cja

Buttons: Preview, Approve, Approve & Print, Modify/Dict & Approve, Approve Ext Transcription, Suspend, Import Scans, Add Text, Coding, Notes, Cancel, Help.

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BONE DENSITY EVALUATION: 1/15/2002

CLINICAL DATA: Post menopausal, Maternal history of osteoporosis.

RISK FACTORS: Patient currently on Thyroid treatment and calcium. Personal History of osteoporosis and arthritis.

COMPARISON:
1/22/2001 Right femur neck using a Norland unit from PenRad Clinic with reported high fracture risk, BMD of 0.635g/cm² and T-score of -3.17.
1/22/2001 AP L2-L4 region of spine using a Norland unit from PenRad Clinic with reported medium fracture risk, BMD of 0.808g/cm² and T-score of -2.02.

FINDINGS:
Bone density evaluation was performed 1/15/2002 on the AP L2-L4 region of spine using a Norland unit. The BMD average for the exam is 0.805 g/cm². The T-score is -2.22. Since the previous similar exam of 1/22/2001, there has been no change in bone density. This matches the World Health Organization's criteria for osteopenia and places the patient at a medium risk for fracture.
An additional bone density evaluation was performed 1/15/2002 on the right femur neck using a Norland unit. The BMD average for the exam is 0.590 g/cm². The T-score is -3.54. Since the previous similar exam of 1/22/2001, there has been a -0.045 or -7.1% change in the BMD value which represents no significant interval change in bone density. This matches the World Health Organization's criteria for osteopenia and places the patient at a high risk for fracture.

IMPRESSION: SEVERE OSTEOPOROSIS
Patient is at extremely high risk for fracture. Compared to BMD of prior exam, there has been a decrease in bone density. Recheck of BMD in 1-2 years is recommended.

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Current scanned regions are in upper spreadsheet. If other regions are necessary, tap the New button, select from list or to create new scan region, tap New scan button and enter data. All scan data is retained for future comparisons.

Lower spreadsheet displays comparison scans for study. To specify comparison scans, tap Add button and select scans from prior list. If prior not available, tap add new button prior scan, and enter data.

Various options allow automatic selection of comparison scans, scan region column and row report format output with percentage change of each scan region over time.

Capturing Scan Data:

The Bone Density Scan screen (below) facilitates data capture for an individual scan for new and/or prior scans. Values are referenced in the report for BMD, T, Z and standardized T-Score, % bone density young and age reference is inputted on individual column to create the full score value (works like a slider control). Extended decimal places are optional, as well as input for each score type. Exam scan date, imager/location, scan unit type, body side and region are also entered by a simple taps and are referenced in the narrative report. Scan data input is an automated task with the importer module, eliminating data entry.

Automated Assessment:

The BMD risk is computed from the T-Score. BMD change is automatically calculated and inserted into the narrative report reflecting the differences of value and % change from the most current comparison scan, from alike scan region and machine type. Change is first calculated from the BMD score, for similar manufactures, if not then the STD T-Score, if not, then the T-Score is used. If same region is scanned with dissimilar machines the universal STD T-Score is used. BMD change and risk can be manually overridden. Logic is imbedded to facilitate youth, premenopausal, and males.

Scan Data Logs:

The Bone Scanned List screen (right) lists a summary of previous recorded BMD scans, allows selection of BMD exams for comparison for new study, and provides ability to add/delete/view previous BMD scans. Bone scan data is also accessed via the add comparison button on the main bone screen or from the Patient/Prior Exams screen for exam preparation and planning prior to patient encounter.

Date	Side	Region	BMD	stdT	T	Z	%Ref	%Age	Risk	Machine	To
3/20/13	A	L1-L4 Spine	0.889	-2.10	-2.10	-0.80	80.0	91.0	med	Hologic	
3/20/13	O	Dual Femur	0.881	-1.80	-1.80	-0.60	81.0	93.0	med	Hologic	
2/16/12	O	Dual Femur	0.857	-1.75	-1.76	-0.64	82.0	903.0	med	Hologic	
2/16/12	A	L1-L4 Spine	2.222	3.33	4.44	5.55	666.6	777.7	norma	Hologic	sta

Buttons at the bottom: Add Prior Scan, Edit/View, Select, Delete, Close, Help.

Patient Result and Recall Notification:

The Bone Density module offers facilities the ability to generate a patient correspondence reflecting diagnosis, and the option to generate a reminder letter to recall patient based on the recall interval assigned during interpretation.

The Bone Density Module and importer is just an example of the PenRad's commitment to provide our clients with the most comprehensive Mammography Information System available by automating professional productivity and efficiency in the changing landscape of medical imaging.

PenRad's portfolio of software products include information systems for women's imaging and the vascular lab; providing fast, reliable, secure tracking, reporting and management of critical patient data, and patient notification.

Additional software products include PenView™ diagnostic reading station, Compass™ for breast MRI analysis, and DQC for QA/QC tracking for MQSA compliance. PenRad also offers and integrates with cancer risk analysis algorithms, breast density software, CAD, BMD analysis, softcopy synchronization and RIS/HIS/PACS systems.

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