

Division of Nuclear Medicine Procedure / Protocol University Hospital and The American Center

Bone Scan Whole Body (routine)
UPDATED: March 2017

CPT CODE: 78306

Indications:

- Progression/regression of metastases
- Primary and secondary (metastases) cancer
- Benign bone tumors (may require flow)
- Arthritis and other orthopedic indications
- Avascular necrosis
- Trauma
- Sports injuries

Patient Prep:

For adult patients ages 12 and over, no preparation prior to injection is needed; however, patient should be instructed after injection to drink four 8-ounce glasses of liquid and void frequently before returning for the scan. Patient should be asked to empty their bladder before imaging. Patient should be asked to drink plenty of fluids for at least 24 hours after radiopharmaceutical administration to aide in the clearance.

Pediatric patients less than 12 years of age:

- Follow the same patient preparation as adults
- IV placement is needed at time of injection (schedule with Pediatric Day Treatment)
- A Foley catheter with collection bag should be in place at time of scan for sedated and non-toilet trained children

Scheduling:

Allow 15 minutes for time of injection and allow 60 minutes for imaging. Imaging should be scheduled at least 3 hours post-injection.

Note: Allow 90 minutes for imaging with sedated or general anesthesia cases for small children.

Radiopharmaceutical & Dose:

99mTc-MDP (99mTc-HDP can be substituted if requested)

Half Dose (standard, actual reduction is 40% lower than full dose)

- Pediatric (>40kg) and Adult
 - Prescribed dose 15.0 mCi +/- 20% and weight based per nomogram/NMIS

Pediatric \leq 40kg

- Prescribed dose formula is 0.25 mCi/kg +/- 20%; a minimum of 1.0 mCi.
- Children over 40kg see adult half dose above, 0.25 mCi/kg produces a higher dose than desired or needed when greater than 40 kg.

Full Dose Adult (when with dual isotope study)

- Prescribed dose is 25.0 mCi +/- 20% and weight based per nomogram/NMIS.

Imaging Devices:

GE Infinia Hawkeye 1, 2, 3, GE Millennium VG or GE Optima 640 with LEHR collimators

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Acquisition Parameters:

For GE Infinia Hawkeye cameras go to **USER**, then select **Bone Folder**, then select the **Whole Body Bone** protocol.

For the Millennium VG, follow prompt in red **VG Imaging Protocols** folder.

<u><i>Infinia Hawkeye 1, 2, 3, and Optima</i></u>	Whole Body Bone Parameters
<u>Whole Body Key Parameters</u>	
Detector 1 Label	RT ANT LT
Detector 2 Label	LT POST RT
Start Position	H
Patient Location	Feet First Supine
Use Body Contour	Yes
Range	From: 195 cm To: 0 cm (or adjust as needed)
Scan Mode	Continuous
Exposure Time Per Pixel	330 sec
Speed in cm/min	Infinia 10 / Optima 7.2
<u>Whole Body Corrections</u>	
Energy Session	Tc99m
Selected Collimator	LEHR
<u>Whole Body Location Parameters</u>	
Location	Default (Infinia 73.0 cm / Optima 90 cm)
<u>Whole body Admin Parameters</u>	
Auto Apply	Yes
NM	None
Body Part	Chest
Body Side	Other

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<u>Millennium VG</u>	Whole Body Bone Parameters
<u>Scan Tab</u>	
Label	Bone Scan
Pharmaceutical	MDP
Dose	15 mCi
Isotope	TC99M
Heads	Check Head 1 and Head 2
<u>Head 1</u>	
Collimator	VP45
View	R ANT L
<u>Head 2</u>	
Collimator	VP45
View	L POST R
<u>Scan Parameters</u>	
Scan Mode	Continuous
From	195.0 cm (adjust if needed)
To	0.0 cm (adjust if needed)
Bed Velocity	10.0 cm/min
Contour	Check
<u>Extended Tab</u>	
<u>Energy Window</u>	
Center	140.0
Low %	10.0
High %	10.0
<u>Corrections</u>	
Energy	Check
Linearity	Check
Sensitivity	Check
<u>Home Position</u>	
Factory	Check
Dropbox	Bone Scan
<u>Rate</u>	
Normal	Check
<u>Patient Position</u>	
Dropbox	Supine
<u>Personal Tab</u>	
Birthdate	Auto filled when patient is selected on the worklist
Sex	
Accession Number	

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Imaging Procedure:

1. A nuclear medicine technologist will verify the patient with 2 forms of identification (i.e. DOB, spelling the name, MR #). A brief description of the test will be explained to the patient.
2. The radiopharmaceutical can be directly injected into a vein using proper technique and flush well.
3. The patient will be instructed to return to the Radiology department at his/her scheduled imaging time.
4. When patient returns to the nuclear medicine department, he/she will first be instructed to use the bathroom to empty the bladder.
5. The nuclear medicine technologist will verify 2 forms of identification with the patient and instruct the patient to remove all large metal objects from pockets or body.
6. The patient will be instructed to lay supine on the imaging table with arms at the side. An arm strap will be used to help hold the arms in place during the scan. A cushion may be placed underneath the patient's knees for additional comfort. A strap should be placed around the patient's feet to keep them straight for the scan.
7. Adjust the range the camera will scan based on the patient's height and acquire the whole body bone images. **It is important to keep the collimator as close to the patient as possible.** Also take spots views as described below (See technique in "If patient is unable to lie down".)
 - a. If bladder is not mainly empty do a post void A/P pelvis image. If patient cannot empty bladder, consider oblique views.
 - b. If suspected contamination do a pants down A/P pelvis image
 - c. If scapula/ribs have a hot spot do an A/P Chest arms up view
 - d. If there is appearance of something overlying the bone take lateral or oblique image to delineate
 - e. Any skull hot spot do lateral skull views
8. Check images with a nuclear medicine staff or resident physician to see if any additional imaging is indicated prior to letting the patient leave.

If patient is unable to lie down:

1. Start with spot view of anterior chest for 800K counts. Use 600K counts or time for all other views.
2. Anterior spot views from head to toes
3. Posterior spot views from head to pelvis
4. Include spot views of arms, forearms and hands

Image Process/Display/PACS:

1. Select the anterior and posterior whole body images of the **patient** and click on
 - a. For Infinia 2 & Optima (or with Resolution Recovery software): **AMS**
 - b. For all other cameras: **WB & Spots Bone Review.**
2. Click the drop box to select **ALL**. Adjust (dual) intensities of the images so that you can clearly see the bones in all images.
3. **Screen capture (DatabaseStudy1024BW)** this file.
4. File, Save & Exit
5. Send the anterior and posterior raw data and the screen capture to the **ALIArchive** station.
6. If SPECT/CT images were obtained, be sure to send the CT and raw emission images to PACS.

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Interpretation:

In general, abnormalities on bone scans are “hot.” This represents reactive new bone formation, a nonspecific response to any bone injury . Occasionally abnormalities are “cold spots,” examples include hemangioma (can also be “hot”), tense packed lesion (e.g. osteomyelitis with abscess formation or tumor-no blood flow to this lesion). (Compare to other imaging examinations when reading the bone scans).

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