

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

Bone Scan Limited & Multiple (Specific Regions)
UPDATED: March 2017

CPT CODE: Limited 78300
Multiple 78305

Definitions:

Limited is limited to one body part. (e.g. one foot or hand, skull only, pelvis only with no independent views of the hips, chest only)

Multiple is more than one body part and less than a whole body. (e.g. 2 feet, 2 hands, lumbar spine and pelvis or sacrum, pelvis and femurs)

Indications:

This scan is requested for examination of a specific region.

Typical examples include:

- Trauma or sports injuries (e.g. stress fracture)-no flow study required
- Infection (acute osteomyelitis or septic arthritis)
- Benign primary tumor (e.g. osteoid osteoma, simple cyst, aneurysmal bone cyst, giant cell tumor)-may require flow to determine if a lesion is likely to be malignant. Any expected localized lesion where there is no need to do a whole body scan

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 before returning for the scan. Patient should be asked to urinate immediately before imaging. Patient should be asked to drink plenty of fluids for at least 24 hours after radiopharmaceutical administration.

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. **Only necessary if pelvis is region of interest.**

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 & Dispensed Dose:

^{99m}Tc-MDP (^{99m}Tc-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 ≤ 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.

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

Imaging Device:

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

Data Acquisition:

For GE Infinia Hawkeye cameras go to **USER**, then select **Basic Folder** and then select the **Static** protocol.

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

Acquisition Parameters:

<u><i>Infinia Hawkeye 1, 2, 3 & Optima</i></u>	Bone Scan Parameters
<u>Static Key Parameters</u>	
Detector 1 Label	Label According to Body Part/Annotation
Detector 2 Label	Label According to Body Part/Annotation
Stop on Time	300 sec
Stop on Counts	0
Mode	H
Start Angle	0
Patient Location	Feet First Supine
Use Body Contour	Uncheck
Matrix	256x256
Zoom	1.0 (Adjust as needed)
Pan X	0.0
Pan Y	0.0
<u>Static Corrections</u>	
Energy Session	Tc99m
Selected Collimator	LEHR
Detector 1 & 2 +/- (%)	10.0
Detector 1 & 2 Peak	140.0
Detector 1 & 2 +/- (%)	10.0
<u>Static Admin Parameters</u>	
Body Part	Chest
Body Side	Other
<u>Static Location Parameters</u>	
Table Height (Absolute)	73.0 cm

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

<i>Millennium VG Bone Scan Parameters</i>					
<i>Scan Tab</i>		<i>Extended Tab</i>		<i>Personal Tab</i>	
Label	Bone	<i>Energy Window</i>		Birthdate	Autofilled when patient is selected on the worklist
Pharmaceutical	MDP	Center	140.0	Sex	
Dose	15 mCi	Low %	10.0	Accession Number	
Isotope	TC99M	High %	10.0		
Heads	Check Head 1 and Head 2	<i>Corrections</i>			
<i>Head 1</i>		Energy	Check		
Collimator	VP45	Linearity	Check		
View	Label Accordingly	Sensitivity	Check		
<i>Head 2</i>		<i>Home Position</i>			
Collimator	VP45	None	Check		
View	Label Accordingly	Dropbox	Leave Blank		
<i>Stop Conditions</i>		<i>Rate</i>			
Count	Choose Appropriately	Normal	Check		
Heads	Choose Head Accordingly	<i>Frame Size</i>			
Time	Choose Appropriately	Dropbox	256		
		<i>Mirror</i>			
		No	Check		
		<i>Transform</i>			
		Center X	0.0		
		Center Y	0.0		
		Zoom	1.0 (Adjust if needed)		
		Rotation	0 (Adjust if needed)		
		<i>Patient Position</i>			
		Dropbox	Supine		

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

Procedures:

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. If the area of interest is an upper extremity do not inject in the afflicted extremity.
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 frequently.
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 the area of interest.
6. Position the area of interest, ensuring the affected area (and opposite extremity for "Multiple") is in the field of view. **It is important to keep the collimator as close to the patient as possible.** Tape can be used to immobilize the area of interest.
7. Place a radioactive marker on the collimator next to the lateral aspect of the right extremity.
8. Obtain tangential and orthogonal views of the lesion site (and the opposite extremity for "Multiple"). Minimum of 2 different views are needed to best define area of interest.
9. When imaging the distal extremities, image at 4-6 hours post injection (the preferred imaging time).
10. If pinhole views are needed, obtain 100K counts, with a 3 mm pinhole, 2-4 cm from region of interest.
11. Check images with a nuclear medicine staff or resident physician to see if any additional imaging is indicated prior to letting the patient leave.

Special Considerations:

If patient has:

- A history of cancer: Be sure to include whole body scan as well as the limited/multiple regions
- Stress fracture, sports injury, or trauma of lower extremities: Include views from the pelvis to the toes.
- Knee or hip pain: Image the lower back and pelvis, as well as the knees.
- Foot pain: Always acquire plantar and appropriate orthogonal views in addition to dorsal/anterior views.
- If pediatric patient presents with hip, wrist, knee, or foot pain, consider pinhole views. Occasionally this may be used in adults. Consult with Faculty to determine the need for pinhole images. When imaging the hips for children, frog leg position is preferred. SPECT/CT is also considered for hip imaging.
- If imaging the pelvis, be sure the bladder is empty.

Image Processing & PACS:

1. Select all static images of the **patient** and click on **Load to New**.
2. Adjust the intensities of the images so that the bones can be seen clearly. Annotate and label each image.
3. **Screen capture (DatabaseStudy1024BW)** this file.
4. File, Exit
5. Send all raw data and the screen capture(s) to the **ALIArchive** station.

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

Health Link Note:

You may need to change the order based on the exam definitions above before ending the exam in Health Link.

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).

Reviewed By:

Scott B. Perlman, MD, MS
Chief, Nuclear Medicine

Derek Fuerbringer, CNMT
Manager, Nuclear Medicine
University Hospital

Kandace Nowakowski
Manager, Nuclear Medicine
The American Center

John Vetter, PhD, DABR
Medical Physicist

Scott Knishka, RPh, BCNP
Radiopharmacist
