

Spiral CT Protocols
Musculoskeletal

Wrist: R/O fx; R/O fx or disloc; Eval fx heal

Specific Anatomic Region	Wrist
Application	1. R/O fracture, R/O Fx/dislocation 2. Evaluate fracture healing
Area Scanned	Entire wrist
Scan Delay	None
Length of Spiral (time)	15-25 sec
Slice Thickness	2 mm
Table Speed/Pitch	2-3 mm
Reconstruction Interval	1-2 mm
3D Technique Used	Volume rendering
Comment: The best plan to scan in is with the patient's arm in the scanner parallel to the x-ray beam.	

Patient Position:

Prone with arm over head.

Axial Images:

Patient should be positioned with arm fully extended overhead, palm flat on table.

Coronal Images:

Position patient with arm over head, elbow bent at 90 degrees. The patient's forearm should be parallel to the x-ray beam. Position the patient's hand/wrist resting on ulnar side with thumb pointing up.

Sagittal Images:

Position patient with arm over head, elbow bent at 90 degrees. Place the patient's hand flat on table, palm down.

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Shoulder: Trauma to shoulder joint

Specific Anatomic Region	Shoulder
Application	Trauma to shoulder joint (includes scapula and humerus)
Area Scanned	From just above acromioclavicular joint through scapular tip
Scan Delay	None
Length of Spiral (time)	40 sec
Slice Thickness	3 mm
Table Speed/Pitch	3-5 mm
Reconstruction Interval	2 mm
3D Technique Used	Volume rendering and multiplanar obliques
Comment: The technique can be modified if only the humeral head is injured. In cases with complex trauma IV contrast may be used to exclude a vascular injury to the mediastinum. The protocol used would use 120 ml of contrast injected at 2-3 ml/sec with a 30 sec delay.	

Patient Position:

Arm at side with thumb up (neutral)

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Knee: Trauma

Specific Anatomic Region	Knee
Application	Trauma
Area Scanned	Tibial plateau (1 cm above patella through tibial plateau)
Scan Delay	None
Length of Spiral (time)	30-40 sec
Slice Thickness	2-3 mm
Table Speed/Pitch	2 mm/sec
Reconstruction Interval	1 mm
3D Technique Used	None
Comment: The authors felt that multiplanar reconstruction in coronal and sagittal planes were ideal in this group of patients.	

NOTE: If obtaining coronal and sagittal reconstruction, 1 mm thick slices should be performed.

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Bone: Suspected Metastases

Specific Anatomic Region	Bone
Application	Suspected metastases, bone mass
Area Scanned	Generous coverage of area of suspected pathology
Scan Delay	None
Length of Spiral (time)	20-40 sec
Slice Thickness	3-5 mm
Table Speed/Pitch	3-6 mm (usually pitch of 1-1.6)
Reconstruction Interval	2-3 mm
3D Technique Used	Volume rendering
Comment: Wide window width/window center may be needed in these cases. (ww 2500/ wl 500)	

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Bone/Muscle: Possible muscle abscess

Specific Anatomic Region	Bone/Muscle
Application	Possible muscle abscess
Injection Rate	2ml/sec
Contrast Volume and Type	120 ml of Omnipaque 350
Area Scanned	Variable and based on clinical exam and history
Scan Delay	30 sec
Length of Spiral (time)	Up to 40 sec
Slice Thickness	3-5 mm
Table Speed/Pitch	5-10 mm/sec or up to a pitch of 2
Reconstruction Interval	3-8 mm
3D Technique Used	Volume rendering as needed
Comment: IV contrast is critical in the detection of smaller abscesses which often enhance less than muscle. Peripheral rim enhancement may also occur. Without contrast an abscess can easily be overlooked.	

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Acetabulum/pelvis: Evaluate suspected fracture

Specific Anatomic Region	Acetabulum/Pelvis
Application	Evaluate suspected fracture
Area Scanned	From iliac crest through ischium
Scan Delay	None
Length of Spiral (time)	40 sec
Slice Thickness	3 mm through acetabulum; 5 mm through remainder of pelvis
Table Speed/Pitch	1.6 pitch
Reconstruction Interval	2 mm
3D Technique Used	Volume rendering
Comment: IV contrast can be used to create vascular maps to exclude vascular injury. In these cases a delay of 30 sec till scanning is ideal. A CT cystogram may also be useful in these cases.	

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Ankle: Evaluate suspected fracture

Specific Anatomic Region	Ankle
Application	Evaluate suspected fracture
Area Scanned	Several cm above the talotibial joint through the midfoot
Scan Delay	None
Length of Spiral (time)	30-40 sec
Slice Thickness	3 mm
Table Speed/Pitch	Usually 3mm/sec or a pitch of 1
Reconstruction Interval	1 or 3 mm
3D Technique Used	Volume rendering and MPR
Comment: This technique relies on a single CT acquisition in a plane parallel to the foot with MPR and 3D reconstructions done to provide all views. Another school of thought is to get a second set of images in a direct coronal plane with the foot flat. This ideal in cases where calcaneal pathology is extensive.	

Axial Images:

Should be obtained with leg extended, ankle at 90 degrees (neutral position).

Coronal Images:

Should be obtained with knee bent, foot flat on CT table. CT Gantry should be aligned with long axis of tibial/fibula.

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Foot: Pain/coalition/trauma

Specific Anatomic Region	Foot
Application	Pain/coalition/trauma
Area Scanned	Tailor exam to area of interest
Scan Delay	None
Length of Spiral (time)	Up to 30 sec
Slice Thickness	2 mm
Table Speed/Pitch	2-3 mm
Reconstruction Interval	1 mm
3D Technique Used	None
Comment: <ol style="list-style-type: none">1. It is important to reconstruct the data with the high-resolution bone filter.2. Multiplanar reconstructions may be helpful in these cases.3. Patient is positioned with knees flexed and feet flat on the scanner table. A second set of scans may be obtained in the plane parallel to the foot.	

NOTE: Obtain both axial and coronal images.

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Elbow

Positioning:

Prone with elbow extended above head, if possible

Coverage:

Supracondylar region of humerus to 5 cm distal to radiocapitellar joint

Scan:

Slice Thickness: 2-3 mm
Pitch: 1
SFOV: Large (48 cm)
DFOV: 18 cm
Algorithm: STD

Retro: Interval: 1 mm

DFOV: 18 cm (Use 48 cm FOV in addition if elbow at patient's side)
Algorithm: Bone (STD if at patient's side)

Reformat:

Spacing: 2mm
Planes: Coronal, sagittal (must be obliqued appropriately. Have MD do reformats if needed)

Filming:

Plane	Window	Format	Images	Filmed
Axial	Bone	12 on 1	Every other	Retro
Axial	Soft Tissue	20 on 1	Every other	
Coronal	Bone	20 on 1	All	
Sagittal	Bone	20 on 1	All	

If obtaining coronal and sagittal reconstruction, 1 mm axial images should be performed.