

Austin Radiological Association

CT MSK Protocols

Questions?

Last Update: 1/29/2025 1:55 PM

PROTOCOLS

Image Orientation Guidelines.....

Routine Extremity.....

 Humerus

 Forearm

 Femur.....

 Knee.....

 Tib/Fib.....

Hi Resolution Extremity.....

 Ankle.....

 Foot/Calcaneus

 Toes

 Hand

 Wrist.....

 Fingers

 Elbow

Ultra Hi Resolution Extremity.....

 Carpal Bones/Scaphoid.....

Hip.....

 Hip ConforMIS.....

 Hip Stryker

 Hip Zimmer Biomet PMI

 Hip MAKO

 My Hip/Goldberg.....

Femoral Anteversion.....

Forearm Materialise Trusight.....

My Knee/Goldberg.....

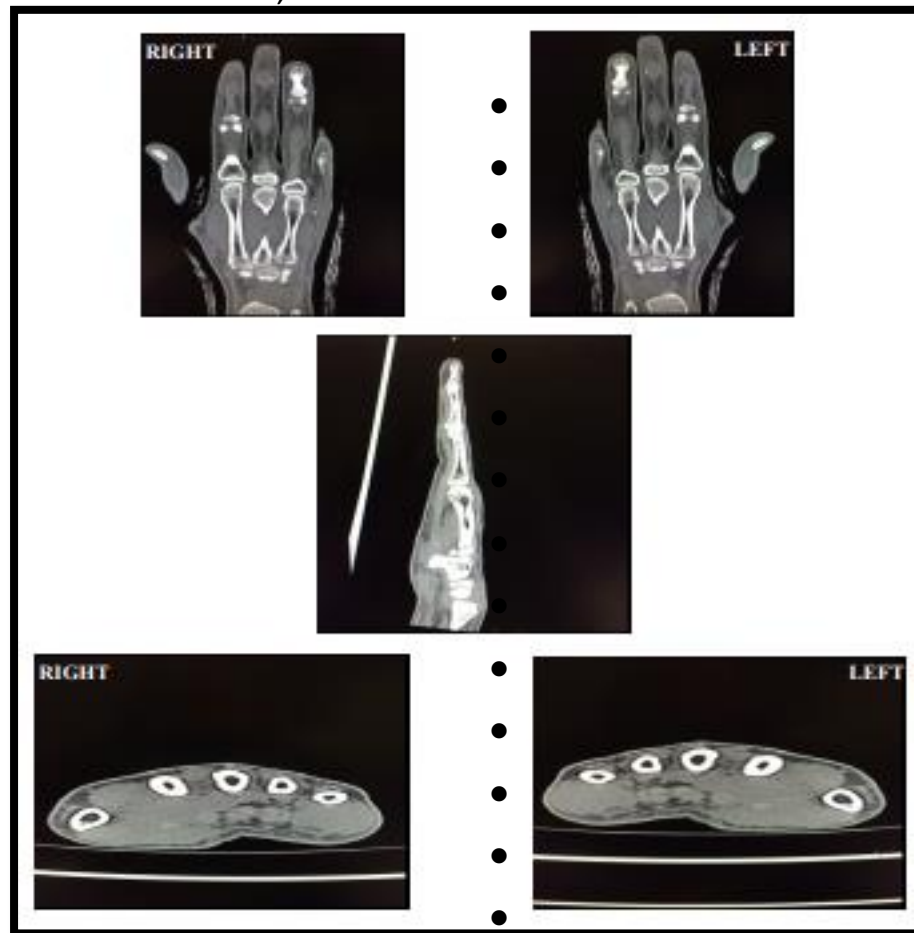
ConforMIS Knee.....
Zimmer-Biomet-Imperial Knee.....

MAKO Knee.....
Prophecy In-Bone.....
Leg Length.....
Bony Pelvis.....
Clavicle.....
Shoulder.....
 Shoulder Arthrex_VIP or Activate Match Point/DJO.....
 Shoulder Blueprint Tornier.....
 Shoulder Exactech GPS/Blue Ortho.....
 Shoulder Materialise Trusight.....
 Shoulder Routine Arthrogram.....
 Shoulder Zimmer BIOMET Signature One.....
 Shoulder Medacta My Shoulder.....
Sternoclavicular Joints.....
Sternum.....
Wrist Arthrogram.....
Wrist DRUJ.....
Protocol Review.....

CT IMAGE ORIENTATION FOR MSK CASES

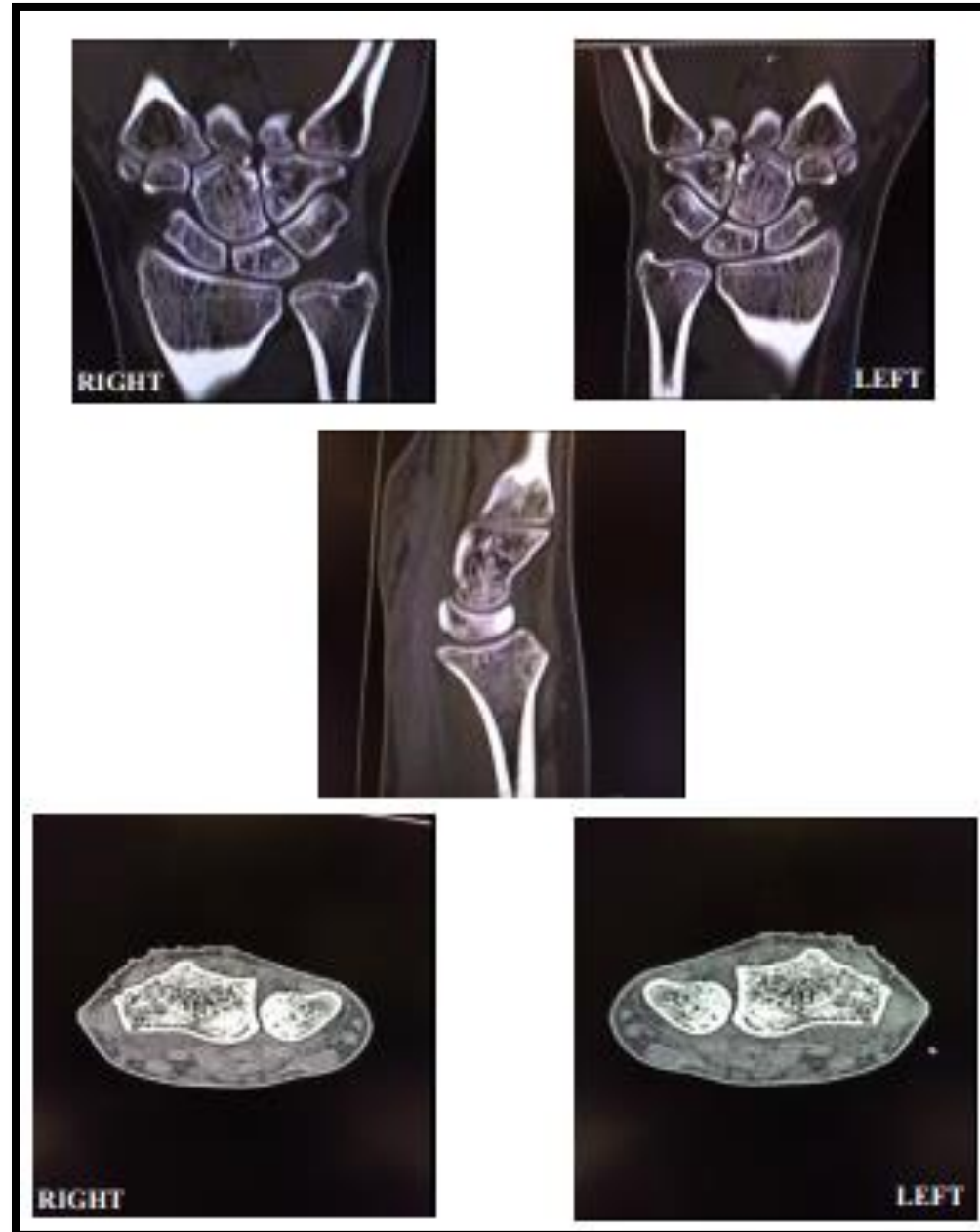
CT images on MSK cases frequently need to be manually re-oriented in order to display according to the Radiologist's preferences in PACS. The following is a guide to how images of various exams should appear in Synapse. When axial images are not obtained in the true plane, **axial reformats must be done.**

- **HAND / FINGER:** Coronal – Fingers up, Palm facing away from you. Sagittal – Fingers up, Palm facing to the left. Axial – Palm down, the thumb should be on the same side of the image as the Coronal images.



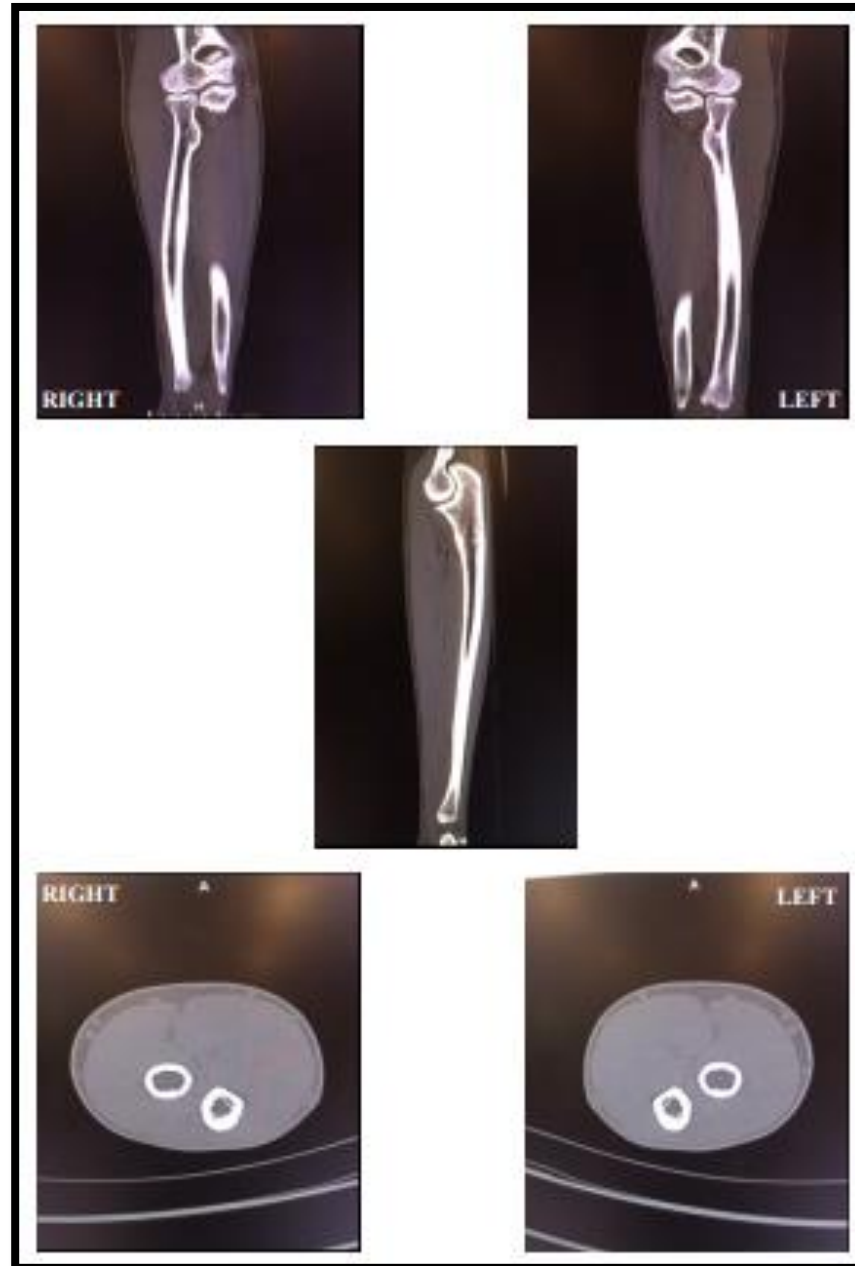
[*Back to MSK Protocol Page*](#)

- **WRIST:** Coronal – Fingers up, Palm facing away from you. Sagittal – Fingers up, Palm facing to the left. Axial – Palm down, the radius should be on the same side of the image as the Coronal images.



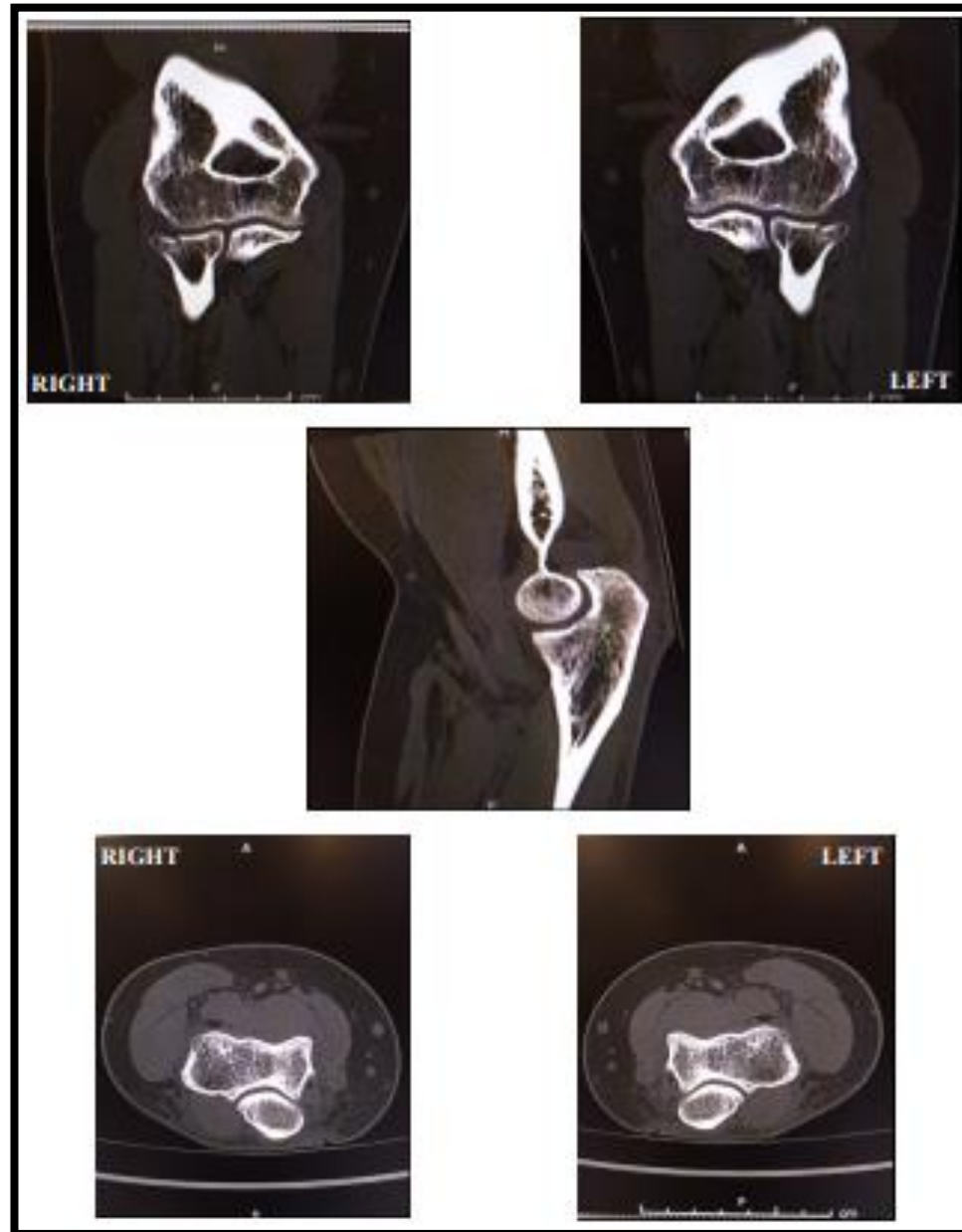
[*Back to MSK Protocol Page*](#)

- **FOREARM:** Coronal – Hand down, Palm facing toward you. Sagittal – Hand down, Palm facing to the left. Axial – Palm facing upwards, radius should be on the same side of the image as the Coronal images



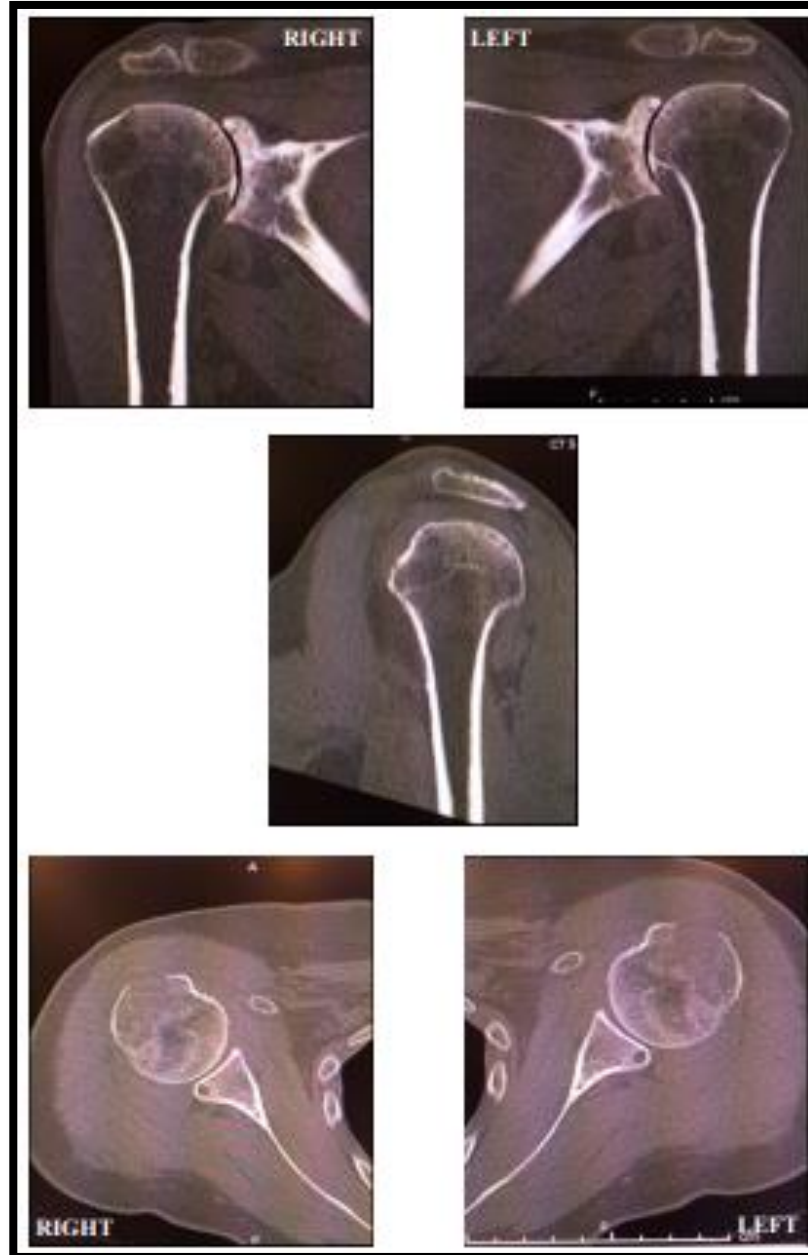
[*Back to MSK Protocol Page*](#)

- **ELBOW:** Coronal – Hand down, Palm facing toward you. Sagittal – Hand down, Palm facing to the left. Axial – Palm facing upwards, radius should be on the same side of the image as the Coronal images.



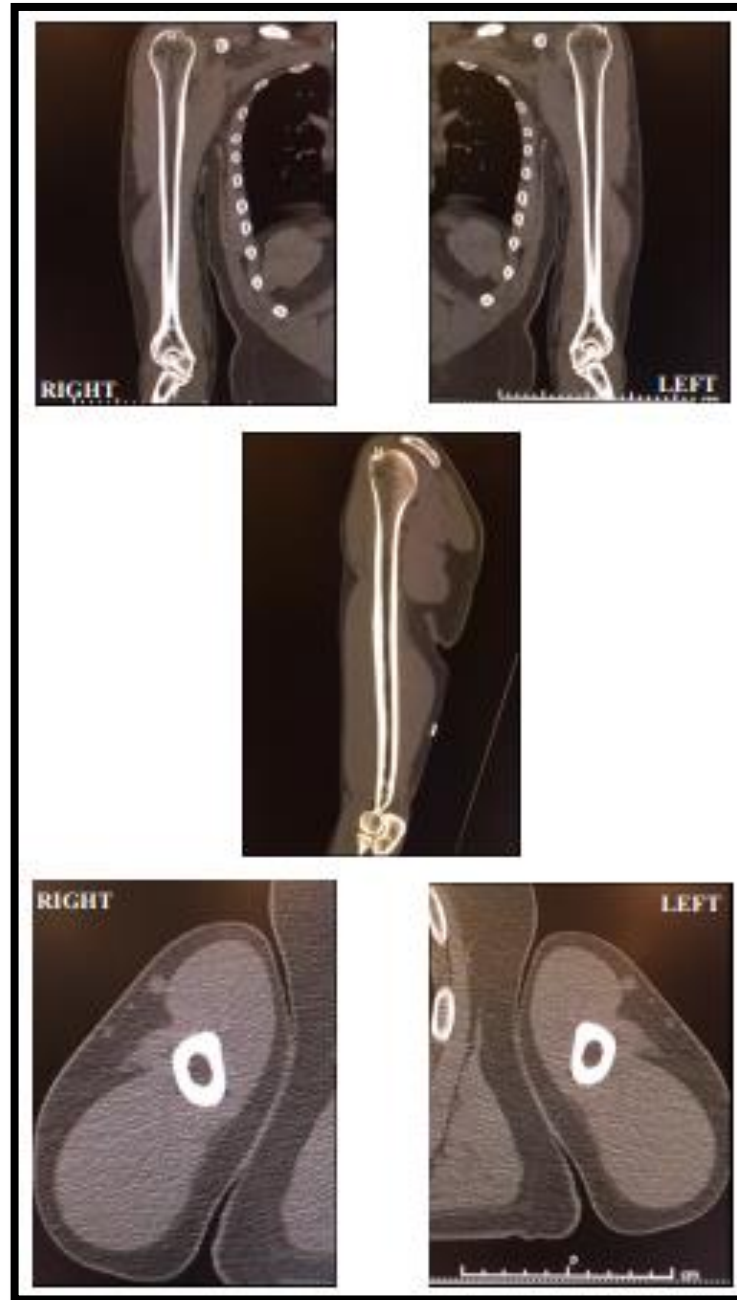
[*Back to MSK Protocol Page*](#)

- **SHOULDER:** Coronal – anatomical position with patient facing toward you. Sagittal – anterior side of the patient facing to the left. Axial – anterior side of the patient facing upwards, the head of the humerus should be on the same side of the image as the Coronal images.



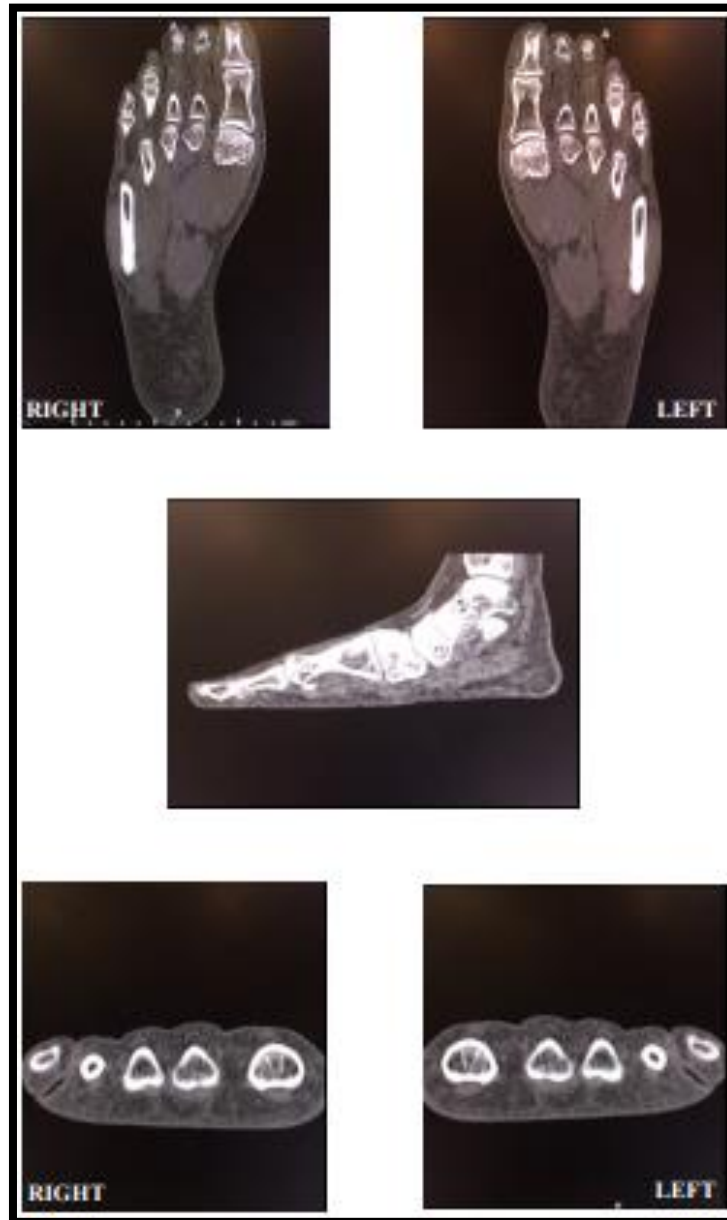
[*Back to MSK Protocol Page*](#)

- **HUMERUS:** Coronal – anatomical position with patient facing toward you. Sagittal – anterior side of the patient facing to the left. Axial – anterior side of the patient facing upwards, the humerus should be on the same side of the image as the Coronal images.



[*Back to MSK Protocol Page*](#)

- **FOOT:** Axial – Toes pointing up, plantar surface of the foot facing toward you. Sagittal – Toes pointing to the left. Coronal – plantar surface of the foot facing down, the big toe should be on the same side of the image as on the Axial images.



[*Back to MSK Protocol Page*](#)

CTDI: ~20 mGy per acquisition

Used for evaluation of:

- Humerus
- Forearm
- Femur
- Knee
- Tib/Fib

PT Positioning: Place anatomy of interest in true anatomical position (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above/below through above/below the anatomy of interest

DFOV: Focused DFOV ~10 to 15cm; appropriate for anatomy of interest.

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @ 3ml/sec
 - 50 second delay
- Scan from above/below through above/below the anatomy of interest
- Reconstruction left to right or anterior to posterior

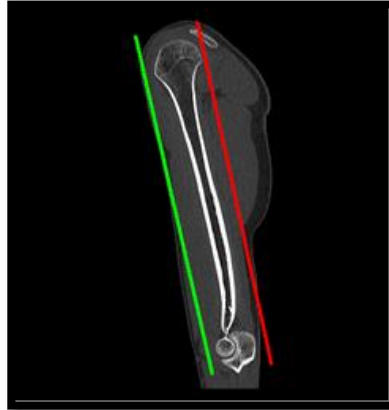
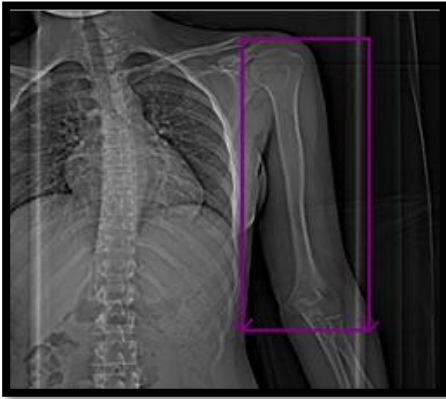
PACS series in order as performed:

- Topogram
- 2x2 Axial bone
- 2x2 Axial Soft Tissue
- 2x2 Coronal Bone/ST
- 2x2 Sagittal Bone/ST
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

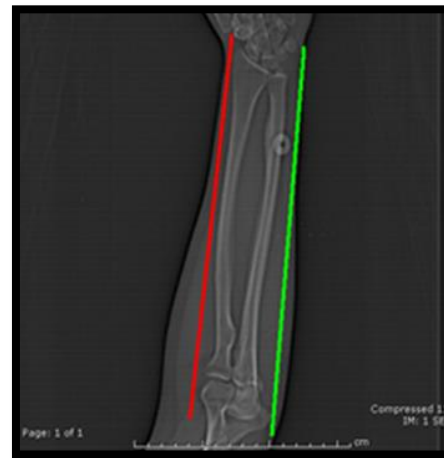
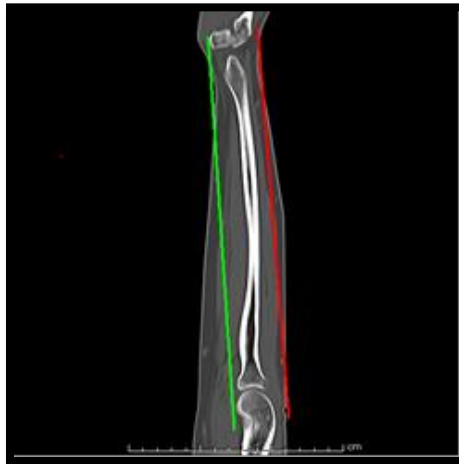
Humerus

Scan range- To above Acromium through elbow joint.
(Limited studies must include at least one joint)



Forearm

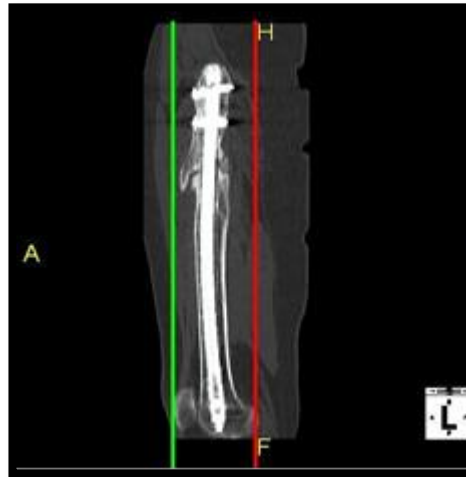
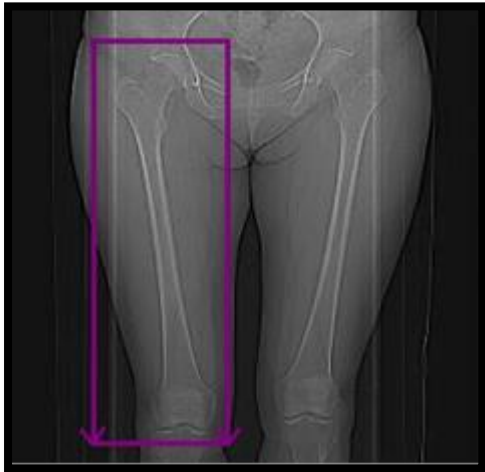
Scan range- To include above elbow joint through wrist.
(Limited studies must include at least one joint)



[*Back to MSK Protocol Page*](#)

Femur

Scan range- To include above Acetabulum through knee joint
(Limited studies must include at least one joint)

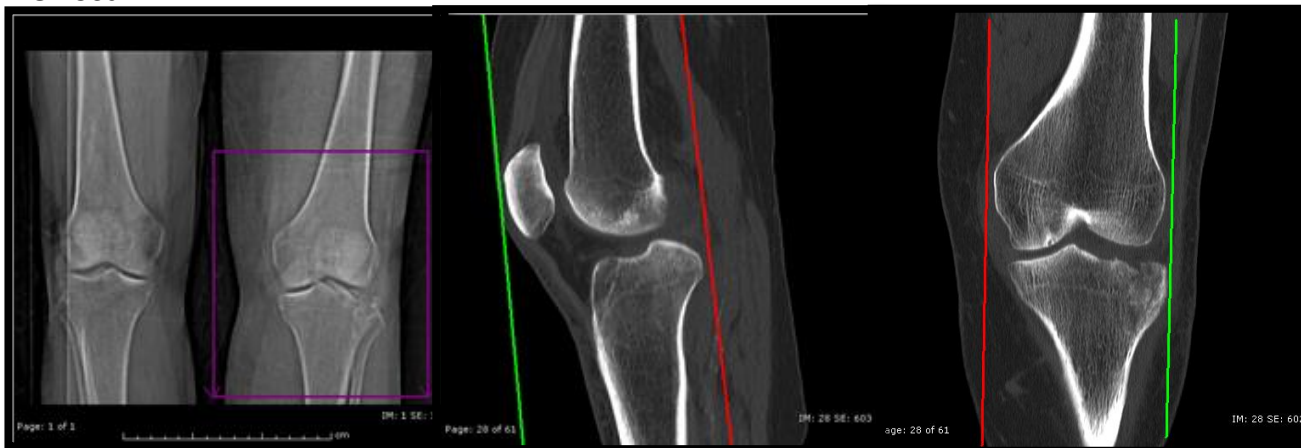


Knee

Scan range- To include distal femur through proximal tib/fib

Knee Arthrogram:

- Scan range to include affected knee
- If a patient presents with either a partial or total joint replacement it is necessary to provide a **pre and a post** arthrogram CT scan.

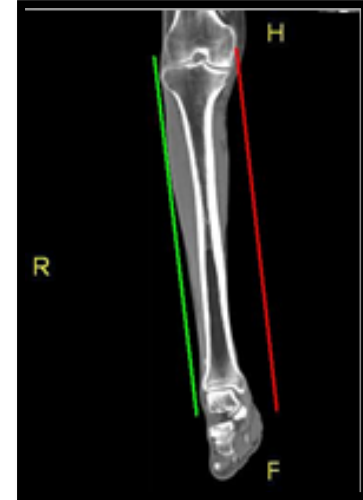
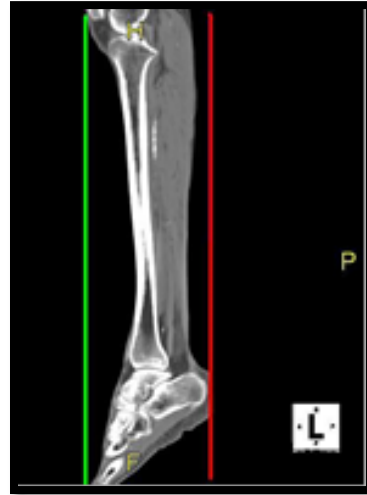
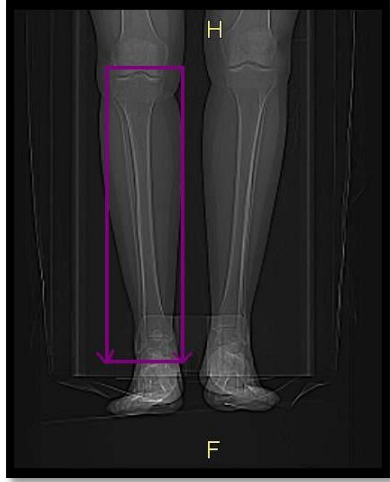


[*Back to MSK Protocol Page*](#)

Tibia/Fibula

Scan range- To include above knee joint through ankle joint.

(Limited studies must include at least one joint)



[*Back to MSK Protocol Page*](#)

ROUTINE EXTREMITY SCAN PROTOCOLS

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	Helical
Detector Configuration	12 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.8
Pitch	0.9	0.8	0.8	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Small Body
Quality ref mAs	70	60	60	Auto mA range	80-300
kVp	130			kVp	120
ref kVp		120	120	Smart mA	No
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	18
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
Recon 1 Bone Axial					
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Group 1 Bone	
Window	Osteo	Osteo	Osteo	Algorithm	Bone Plus
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	1500/450
Slice Thickness (mm)	2	2	2	Slice Thickness (mm)	2.5
Slice Increment (mm)	2	2	2	Slice Increment (mm)	2.5
Recon 2 ST				Type	Full
Kernel	I31s Med Smooth	I31s Med Smooth	I40s Medium	ASIR	None
Window	Mediastinum	Mediastinum	Extremity		
SAFIRE/ADMIRE	2	2	2	Recon 2 Bone Reform	
Slice Thickness (mm)	2	2	2	Algorithm	Bone Plus
Slice Increment (mm)	2	2	2	Window Width/ Level	1500/450
Coronal/ Sagittal Bone				Slice Thickness (mm)	0.625
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Slice Increment (mm)	0.625
Window	Osteo	Osteo	Osteo	Type	Full
SAFIRE/ADMIRE	0	0	0	ASIR	None
Slice Thickness (mm)	2	2	2		
Slice Increment (mm)	2	2	2	Recon 3 ST	
Coronal/Sagittal ST				Algorithm	Standard
Kernel	I41s Med Smooth	I41s Med Smooth	I40s medium	Window Width/ Level	350/40
Window	Mediastinum	Mediastinum	Extremity	Slice Thickness (mm)	2.5
SAFIRE/ADMIRE	2	2	2	Slice Increment (mm)	2.5
Slice Thickness (mm)	2	2	2	Type	Full
Slice Increment (mm)	2	2	2	ASIR	SS10

CTDI: ~13 mGy per acquisition

Used for evaluation of:

- Ankle
- Elbow
- Hand
- Wrist
- Foot/ Calcaneus
- Toes
- Fingers

PT Positioning: Place anatomy of interest in true anatomical position (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above/below through above/below the anatomy of interest

DFOV: Focused DFOV ~10 to 15cm; appropriate for anatomy of interest.

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above/below through above/below the anatomy of interest
- Reconstruction left to right or anterior to posterior

PACS series in order as performed:

- Topogram
- 1X1 Axial bone
- 1X1 Axial Soft Tissue
- 1X1 Coronal Bone/ST
- 1X1 Sagittal Bone/ST
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

ANKLE

Scan range- Scan to include distal tibia/fibula through entire calcaneus

Ankle Arthrogram:

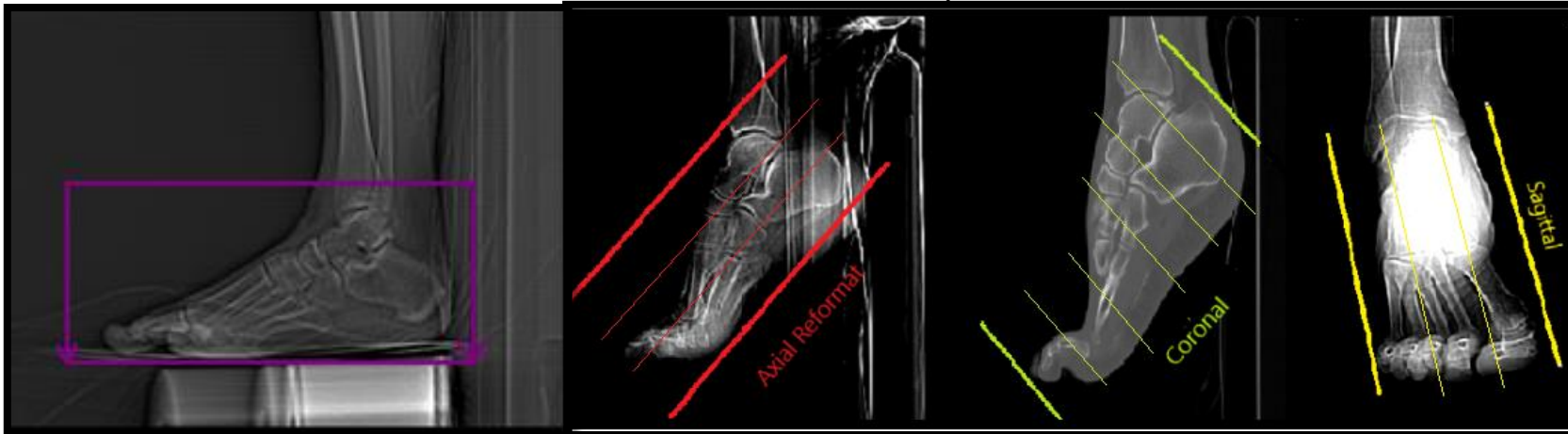
- Scan range to include affected ankle
- If a patient presents with either a partial or total joint replacement it is necessary to provide a **pre and a post** arthrogram CT scan.



Foot/ Calcaneus

Scan range- Scan to include above ankle joint through entire foot

****Limit the DFOV to the hind foot if only concerned about the calcaneus****

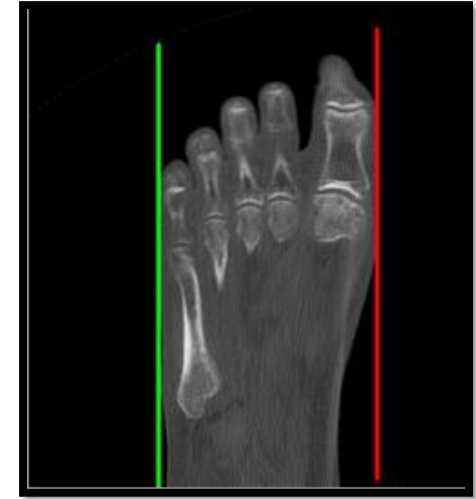
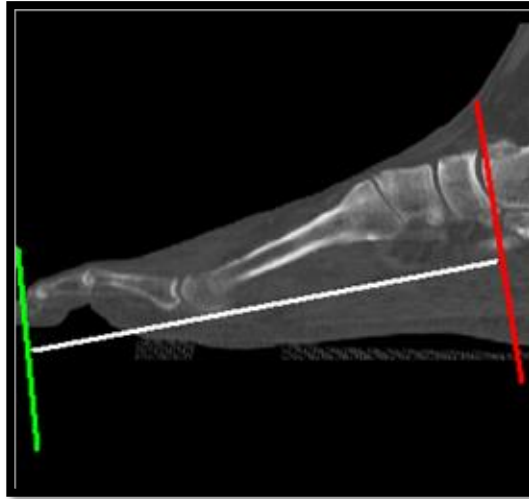


[*Back to MSK Protocol Page*](#)

Toes

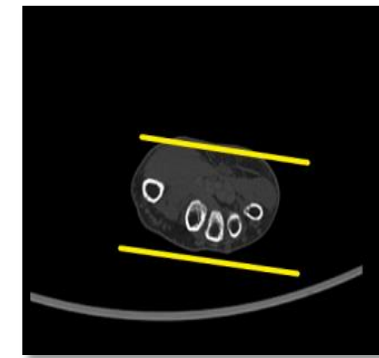
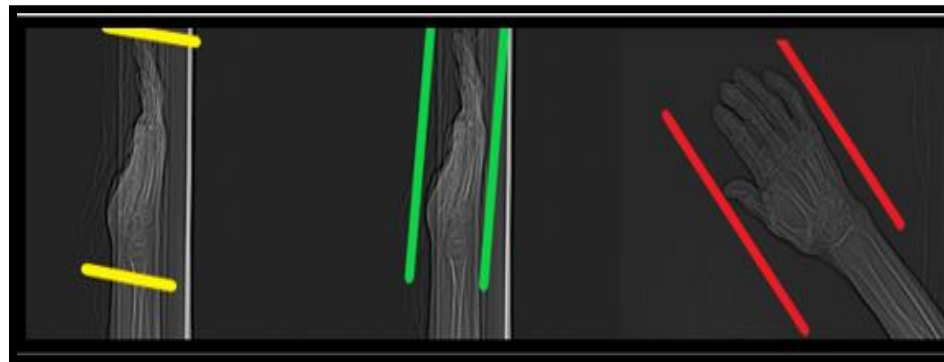
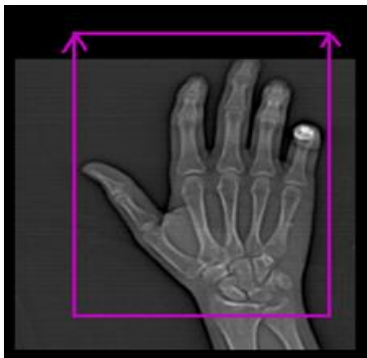
Scan range- Scan to include entire toes

****Limit the DFOV to the digit of concern and the adjacent digits****



Hand

Scan range- Scan to include entire carpals through fingertips

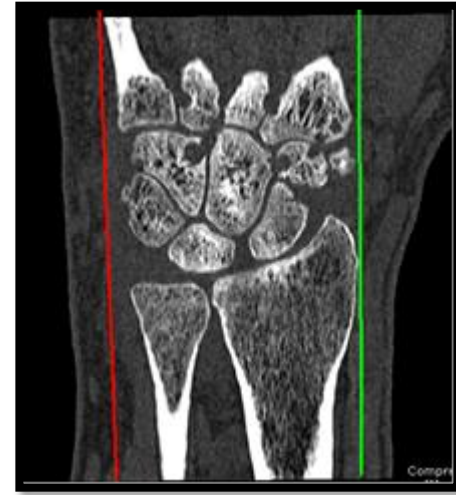
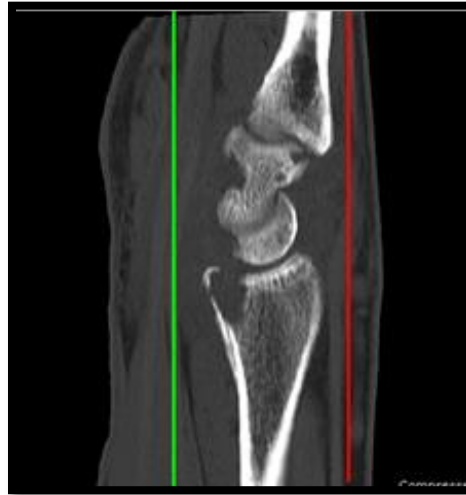


Align all planes, create axial reformat if patient is not in true anatomical position

[*Back to MSK Protocol Page*](#)

Wrist

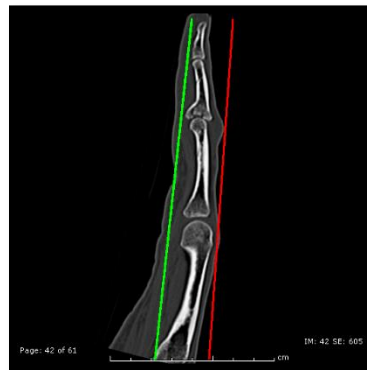
Scan range- Scan to include entire wrist



Fingers

Scan range- Scan to include entire fingers

****Limit the DFOV to the digit of concern and the adjacent digits****



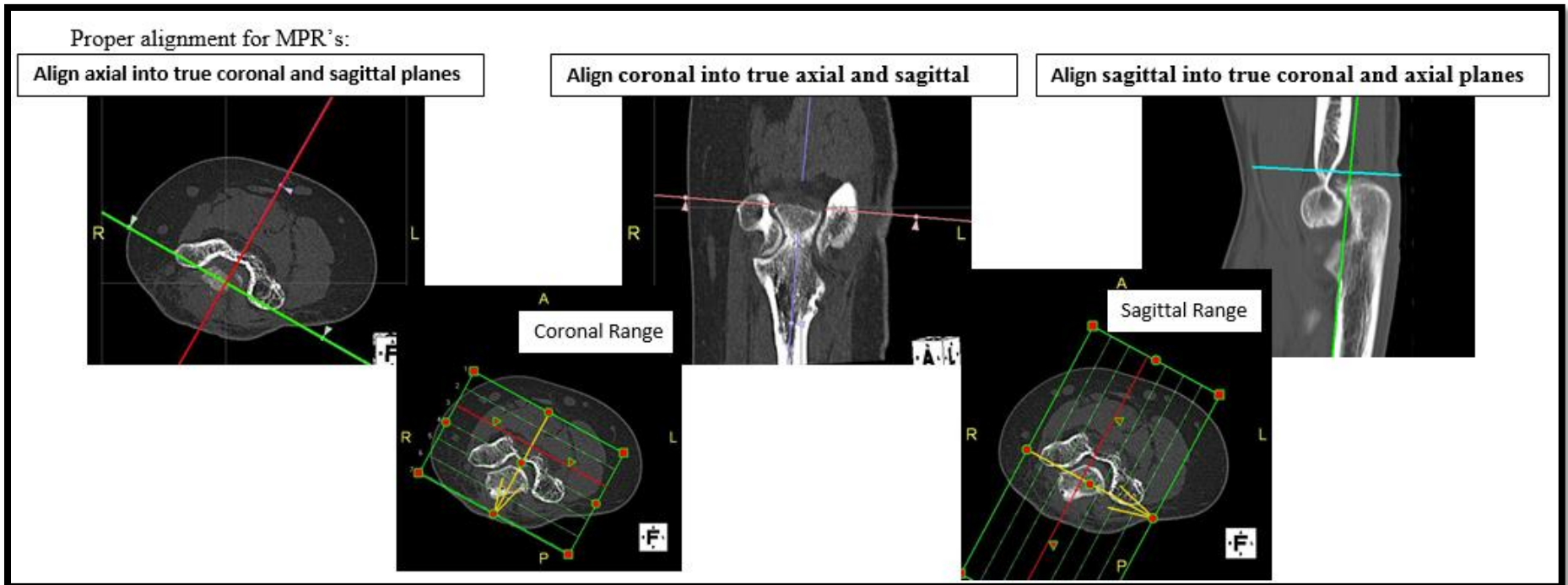
[*Back to MSK Protocol Page*](#)

Elbow

Scan range- Scan to include distal humerus through proximal forearm

Elbow Arthrogram:

- Scan range to include affected elbow
- If a patient presents with either a partial or total joint replacement it is necessary to provide a **pre and a post** arthrogram CT scan.



[*Back to MSK Protocol Page*](#)

HI-RESOLUTION EXTREMITY SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	Helical
Detector Configuration	12 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	40
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.8
Pitch	0.9	0.8	0.8	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	39.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	70	60	60	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
Recon 1 Bone Axial				Recon 1 ST Axial	
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Algorithm	Standard
Window	Osteo	Osteo	Osteo	Window Width/ Level	450/ 35
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	1	Type	Full
Recon 2 ST					
Kernel	I31s Med Smooth	I31s Med Smooth	I41s Medium		
Window	Mediastinum	Mediastinum	Extremity		
SAFIRE/ADMIRE	2	2	2		
Slice Thickness (mm)	1	1	1		
Slice Increment (mm)	1	1	1		
Coronal/ Sagittal Bone				Recon 2 Reformats	
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Algorithm	Standard
Window	Osteo	Osteo	Osteo	Window Width/ Level	450/ 35
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	0.625
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	0.625
Slice Increment (mm)	1	1	1	ASIR	SS50
Coronal/Sagittal ST					
Kernel	I41s Med Smooth	I41s Med Smooth	I40s Medium		
Window	Mediastinum	Mediastinum	Extremity		
SAFIRE/ADMIRE	2	2	2		
Slice Thickness (mm)	1	1	1		
Slice Increment (mm)	1	1	1		

CTDI: ~13 mGy per acquisition

Used for evaluation of:

- Carpal Bones
- Sub 1mm evaluation as requested

PT Positioning: Place anatomy of interest in true anatomical position (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above/below through above/below the anatomy of interest

DFOV: Focused DFOV ~10 to 15cm; appropriate for anatomy of interest.

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above/below through above/below the anatomy of interest
- Reconstruction left to right or anterior to posterior

PACS series in order as performed:

- Topogram
- 0.6 x 0.6 Axial bone
- 0.6 x 0.6 Axial Soft Tissue
- 0.6 x 0.6 Coronal Bone/ST
- 0.6 x 0.6 Sagittal Bone/ST
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

ULTRA HI-RESOLUTION EXTREMITY SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	Helical
Detector Configuration	12 x 0.6	32 x 0.6	16 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	1
Pitch	0.9	0.8	0.85	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Small Body
Quality ref mAs	70	60	60	Auto mA range	80-300
kVp	130			kVp	120
ref kVp		120	120	Smart mA	No
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	18
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	0%
Recon 1 Bone Axial				Recon 1 Bone Axial	
Kernel	B70s Sharp	B70s Sharp	U70u Sharp	Algorithm	Bone Plus
Window	Osteo	Osteo	Osteo	Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	0.625
Slice Thickness (mm)	0.6	0.6	0.6	Slice Increment (mm)	0.625
Slice Increment (mm)	0.6	0.6	0.6	Type	Full
Recon 2 ST				ASIR	None
Kernel	I31s Med Smooth	I31s Med Smooth	U70u Medium		
Window	Mediastinum	Mediastinum	Extremity	Recon 2 ST	
SAFIRE/ADMIRE	0	0	0	Algorithm	Standard
Slice Thickness (mm)	0.6	0.6	0.6	Window Width/ Level	350/50
Slice Increment (mm)	0.6	0.6	0.6	Slice Thickness (mm)	0.625
Coronal/ Sagittal Bone				Slice Increment (mm)	0.625
Kernel	B70s Sharp	B70s Sharp	B70s sharp	Type	Full
Window	Osteo	Osteo	Osteo	ASIR	SS20
SAFIRE/ADMIRE	0	0	0		
Slice Thickness (mm)	0.6	0.6	0.6	Recon 3 Bone Reformats	
Slice Increment (mm)	0.6	0.6	0.6	Algorithm	Bone Plus
Coronal/Sagittal ST				Window Width/ Level	1500/450
Kernel	I41s Med Smooth	I41s Med Smooth	U70u Medium	Slice Thickness (mm)	0.625
Window	Mediastinum	Mediastinum	Extremity	Slice Increment (mm)	0.625
SAFIRE/ADMIRE	2	2	2	Type	Full
Slice Thickness (mm)	0.6	0.6	0.6	ASIR	None
Slice Increment (mm)	0.6	0.6	0.6		

CARPAL BONES

PT Preparation: Place anatomy of interest in true anatomical position

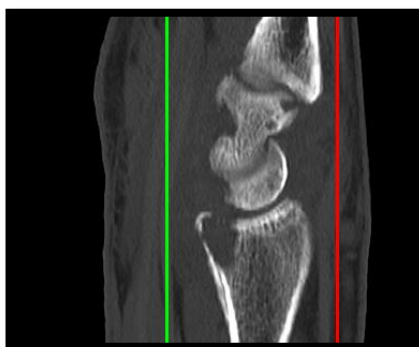
(Please note reason for protocol changes)

Setup:

- 1 AP scout to include entire wrist.

DFOV:

1. Focused DFOV appropriate for anatomy of interest
2. Scan to include entire wrist.



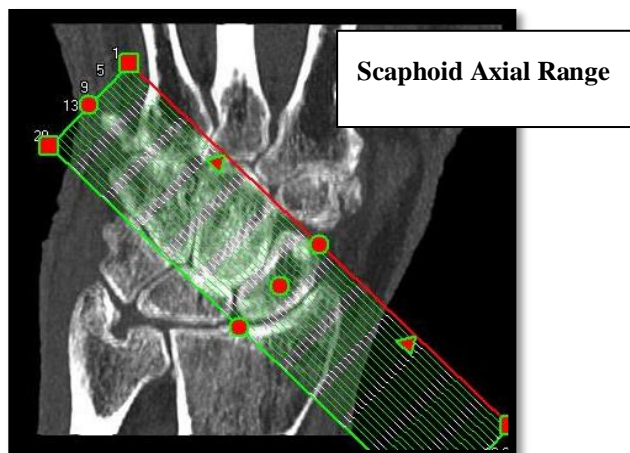
Coronal Range



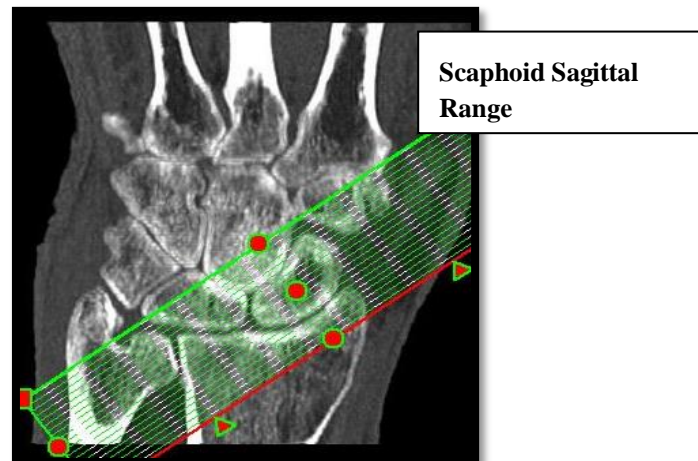
Sagittal Range

Perform additional focused MPR's for all scaphoid/

Navicular studies. Do not use smaller than 100 DFOV



Scaphoid Axial Range



Scaphoid Sagittal Range

CTDI: ~20 mGy per acquisition

PT Positioning: Place anatomy of interest in true anatomical position ; Turn patient's feet inward so that the feet are pointing toward each other
(Please note reason for protocol changes)

Setup: AP and lateral scouts from above the iliac crest through the symphysis pubis

DFOV: Focused DFOV ~15-20cm; appropriate for anatomy of interest.

Scan Parameter Routine Hip:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above the iliac crest through the proximal femur, include entire fracture/prosthesis
 - If a patient presents with a hip prosthesis it is necessary to provide an additional axial/coronal reconstruction that includes bilateral hips in the field of view

Arthrogram Hip:

- Scan range to include the affected hip joint with a DFOV of 15cm
 - If a patient presents with either a partial or total joint replacement it is necessary to provide **pre and post** arthrogram CT scan

PACS series in order as performed:

- Topogram
- 2x2 Axial bone
- 2x2 Axial Soft Tissue
- 2x2 Coronal/Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

When Patient presents with a Hip Prosthesis please send the following in addition to standard series

- **2X2 Axial Bilateral Hip Bone**
- **2X2 Coronal Bilateral Hip Bone**

[*Back to MSK Protocol Page*](#)

HIP SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral	Scan Type	Helical
Detector Configuration	32 x 1.2	32 x 1.2	16 x 1.2	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	0.5	Rotation Time (sec)	0.5
Pitch	0.95	0.95	1	Pitch	0.532:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	105	105	105	Auto mA range	80-300
kVp	130			kVp	120
ref kVp		140	140	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	0%
Recon 1 Bone				Recon 1 Axials	
Kernel	B70s Sharp	B70s Sharp	B70f Very Sharp	Algorithm	Bone plus
Window	Osteo	Osteo	Osteo	Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	2	2	2	Slice Increment (mm)	2.5
Slice Increment (mm)	2	2	2	Type	Full
				ASIR	None
Soft Tissue				Recon 2 Reformat Bone	
Kernel	I41s Medium +	I41f Medium +	I41f Medium	Algorithm	Bone plus
Window	Mediastinum	Mediastinum	Pelvis	Window Width/ Level	1500/450
SAFIRE/ADMIRE	2	2	2	Slice Thickness (mm)	0.625
Slice Thickness (mm)	2	2	2	Slice Increment (mm)	0.625
Slice Increment (mm)	2	2	1	Type	Full
				ASIR	None
Coronal/ Sagittal				Recon 3 ST	
Kernel	B70s Sharp	B70s Sharp	B70f Very Sharp	Algorithm	Standard
Window	Osteo	Osteo	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	2	2	2	Slice Increment (mm)	2.5
Slice Increment (mm)	2	2	2	Type	Full
				ASIR	SS20
				Recon 4 3D	

**Protocol designed to minimize the amount of radiation while maximizing the yield and produce diagnostically acceptable image quality*

PT Preparation:

- The patient must be in the supine position at iso-center in the gantry
- Legs in complete extension with toes internally rotated 15 degrees
- Immobilization is Essential to prevent motion, use the wooden foot board with straps
- No sponges or pillows

Setup:

1. Lateral/PA scout from above the iliac crest to below tibial plateau

*** When an implant or other device is present in the opposite hip or knee please use metal artifact reduction software or a metal artifact reduction technique increasing KVP by 15% to reduce the artifacts in the affected joint ***

Scan Parameters:

- Top of Pelvis to mid knee joint **38 - 45 cm DFOV**
- **mAs ~100-200**
- **Rotation 1**
- **Pitch 1**

PACS Series:

1. Topogram
2. 1 x 0.5 Axial
3. 1x1 Coronal MPR
4. 1x1 Sagittal MPR
5. Patient Protocol/Dose Report



ConforMIS Hip Scan Protocol

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral		Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1		Rotation Time (sec)	1
Pitch	1	1	1		Pitch	0.984:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	150	150	150		Auto mA range	100-500
kVp	130				kVp	120
ref kVp		140	120		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	8
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	0%
Recon 1 CD set					Recon 1 CD Set	
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Algorithm	Bone Plus
Window	Osteo	Osteo	Osteo		Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1		Slice Increment (mm)	0.625
Slice Increment (mm)	0.5	0.5	0.5		Type	Plus
					ASIR	none
Coronal/ Sagittal						
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Recon 2 Reformats	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	0.625
Slice Increment (mm)	1	1	1		Slice Increment (mm)	0.625
					Type	Plus
					ASIR	SS20

CTDI: ≤25 mGy per acquisition

Used for Femoroacetabular Impingement Analysis

PT Preparation: Positioning on CT Flat Table Top

Patient Supine, Feet First, legs flat on the table

- Ensure Hips, Knees and Feet are in NEUTRAL alignment
- No cushions/wedges under legs/feet
- Tape feet together for stability
- Ensure on scout images the relative heights of the ASIS are symmetric

Setup: LONG scout, PA/Lateral, above Pelvis thru upper Tib/Fib

General Scan Requirements/Recommendations:

- No motion artifact
- FOV ≤ 500mm
- Bone Kernel
- 120-140 kV / 200-250 mA

Scan Parameters:

- **Pelvis + Proximal Femur**
 1. Scan above the pelvis to at least 180mm below the lesser trochanter
- **Knee**
 1. Scan from the joint line between femur and tibia to include 100mm of proximal femur

Reconstructions:

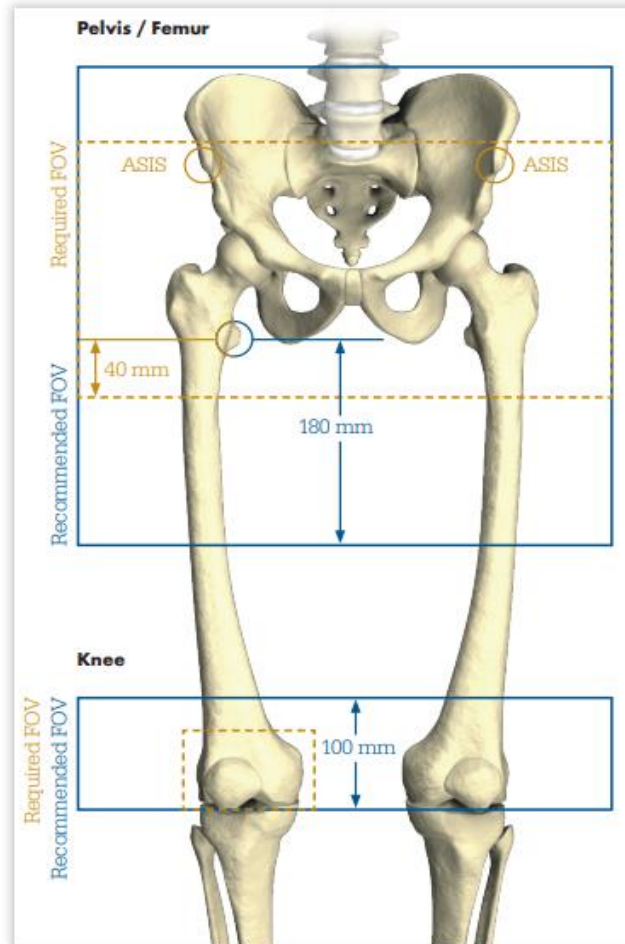
1. 1x1 mm Axial Pelvis/Trochanters
2. 1x1 mm Coronal Bone Pelvis/Trochanters
3. 1x1 mm Axial Knees
4. 1x1 mm Coronal Bone Knees

PACS Series: Topogram, Bilateral Pelvis/Trochanters, Coronal Pelvis/Trochanters, Bilateral Knees, Coronal Knees, Dose Report/Patient Protocol

*****SEE ATTACHED PAGES*****

[*Back to MSK Protocol Page*](#)

CT scanning protocol



Imaging requirements

A scan must include at least the bilateral pelvis and proximal femur. If a knee scan is included femoral torsion will be measured. In such a case the pelvis and knee need to be scanned in the same frame of reference.

Pelvis + proximal femur

- Required slice increment / slice thickness: ≤ 1 mm.
No gap.
- Recommended field of view (FOV): Include the entire bilateral pelvis and at least 180 mm below the lesser trochanter.
- Minimally required FOV: Bilateral scan from at least the left and right anterior superior iliac spines (ASIS) to at least 40 mm below the lesser trochanter.

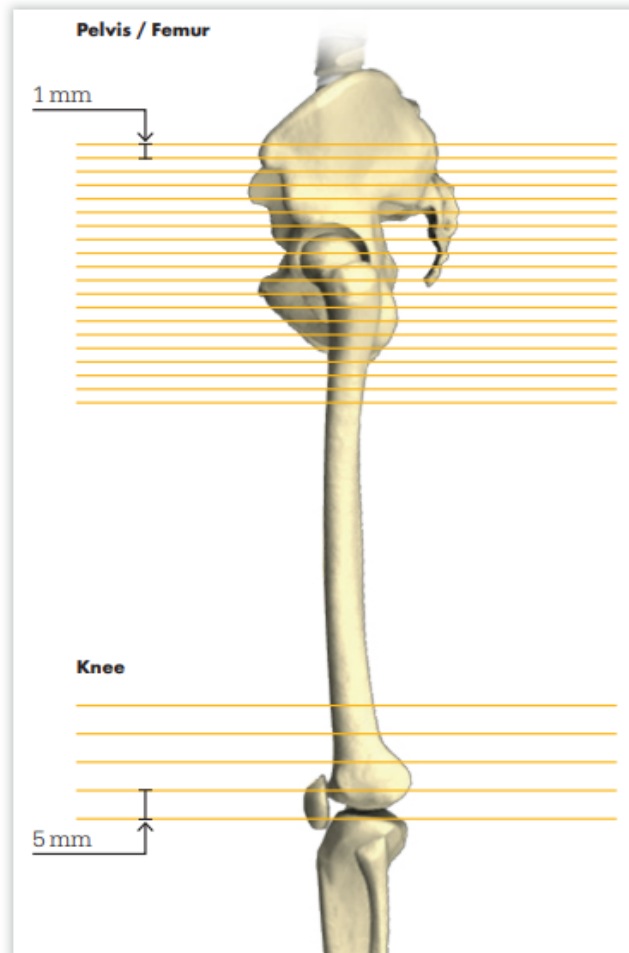
Knee

- Required slice increment / slice thickness: ≤ 5 mm.
No gap.
- Recommended FOV: Include bilateral knees from at least the joint line between the femur and the tibia to 100 mm proximal on the femur.
- Minimally required FOV: Unilateral knee scan.

Number of slices below lesser trochanter

Slice interval spacing, mm	Distance, mm	Number of slices
0.500	180	360
0.625	180	288
0.750	180	240
0.875	180	206
1.000	180	180

CT scanning protocol



General scan requirements

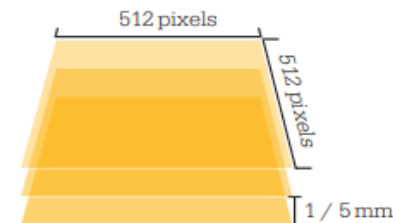
- Original axial slices using helical (spiral) scanning
- Data format: DICOM 3 compatible
- No compression
- No annotations embedded in the files
- No motion artifacts

General scan recommendations

- Field of view: ≤ 500 mm
- Reconstruction kernel: Bone
- Energy settings: 120-140 kV / 200-250 mA
- Patient position: supine
- No metal-induced image artifacts
- Minimize pelvic obliquity:
 - Ensure that the hips and knees are in NEUTRAL alignment: no excessive internal or external rotation
 - Ensure on the scout image that the relative heights of the ASIS are symmetric

Imaging acceptance

- Scans that fulfill the requirements and recommendations will be processed. Scans that deviate from recommendations are subject to further evaluation and may need to be rejected.



Hip Map Stryker Scan Protocol

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	Spiral	Spiral	Spiral		Scan Type	Spiral	
Detector Configuration	32 x 0.6	32 x 0.6	32 x 0.6		Detector Coverage (mm)	20	
Rotation Time (sec)	1	1	1		Rotation Time (sec)	0.8	
Pitch	1	1	1		Pitch	0.531:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	10.62	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	150	150	150		Auto mA range	100-500	
kVp	130				kVp	120	
ref kVp		140	140		Smart mA	On	
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15	
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%	
Hip/Pelvis					Recon 1 Pelvis		
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Algorithm	Bone Plus	
Window	Osteo	Osteo	Osteo		Window Width/ Level	1500/450	
SAFIRE/ADMIRE	0		0		Slice Thickness (mm)	0.625	
Slice Thickness (mm)	1	1	1		Slice Increment (mm)	0.625	
Slice Increment (mm)	1	1	1		Type	Full	
					ASIR	None	
Bilat knees							
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Recon 2 Knee		
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus	
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450	
Slice Thickness (mm)	2	2	2		Slice Thickness (mm)	1.25	
Slice Increment (mm)	2	2	2		Slice Increment (mm)	1.25	
					Type	Full	

CTDI: ≤ 25 mGy per acquisition

PT Preparation:

- The patient must be in the supine position at iso-center in the gantry
- Legs in complete extension so femurs are positioned parallel to the horizontal plane of table with toes internally rotated 15 degrees
- Immobilization is Essential to prevent motion, use the wooden foot board with straps
- No sponges or pillows

Setup:

2. Lateral/PA scout from above the iliac crest to below tibial plateau

*** When an implant or other device is present in the opposite hip or knee please use a metal artifact reduction technique increasing KVP by 15% to reduce the artifacts in the affected joint ***

Scan Parameters:

- Top of Iliac Crest to mid femurs or below existing femoral implant
- Perform two femoral condyle slices to show anteversion if patient does **NOT** have an existing implant
- **Do NOT change FOV or X and Y coordinates**
- **38 – 45 cm DFOV to include entire pelvis**
- **Standard or ST Algorithm**

PACS Series:

1. Topogram
2. 1x1 Axial
3. 1x1 Femoral Condyle Slices (if applicable)
4. 1x1 Coronal MPR
5. 1x1 Sagittal MPR
6. Patient Protocol/Dose Report



[*Back to MSK Protocol Page*](#)

Hip Zimmer Biomet PMI Scan Protocol

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral	Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.5
Pitch	1	1	1	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	150	150	150	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		140	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
Femur CD set				Recon 1 Femur CD Set	
Kernel	B41s Medium	B41s Medium	B40s Medium	Algorithm	BonePlus
Window	Abdomen	Abdomen	Abdomen	Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	2.5
Slice Increment (mm)	1	1	1	Type	Full
				ASIR	none
Coronal/ Sagittal					
Kernel	B41s Medium	B41s Medium	B40s Medium	Recon 2 Reformats	
Window	Abdomen	Abdomen	Abdomen	Algorithm	Bone Plus
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	0.625
Slice Increment (mm)	1	1	1	Slice Increment (mm)	0.625
				Type	Full
				ASIR	None
Condyle CD set					
Kernel	B41s Medium	B41s Medium	B40s Medium	Recon 1 Condyle CD Set	
Window	Abdomen	Abdomen	Abdomen	Algorithm	STND
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/45
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25

PT Preparation:

CTDI: ≤ 25 mGy per acquisition

The patient must be supine, feet first, iso-center in the gantry

- Position to minimize pelvic obliquity by:
 - Aligning both ankles and knees
 - Ensure in true supine position by palpating the anterior superior iliac spines and comparing relative height above the CT scanner bed
 - Align longitudinal axis of the body with longitudinal axis of CT scanning bed
- Ensure patient is comfortable and relaxed
- Move metallic components out of scan range

Setup:

1. PA/Lateral scout from above the iliac crest through the knees

Scan Parameters:

Pelvis and Proximal Femur

- FOV to include entire pelvis (medial/lateral/anterior/posterior/superior) and at least 180mm below the lesser trochanter on the femur
*****Do Not Exceed a 500mm FOV*****
- kV 120-140
- mA 200-250
- Pitch 1
- Slice of 1mm x 1mm (no gap/overlap)
- Bone Algorithm
- Don't include table on scan

Bilateral Knee

- Knee FOV to include bilateral knee-joint lines between femur and tibia and 10cm proximal to joint line on femur
*****Do Not Exceed a 500mm FOV*****
- kV 120-140
- mA 200-250
- Pitch 1
- Slice of 2 mm x 2 mm (no gap/overlap)
- Bone Algorithm
- Don't include table on scan

Reconstructions:

- Pelvis/Proximal Femur CD Data Set
- Coronal/Sagittal Pelvis Proximal Femur
- Knee CD Data Set
- Coronal/Sagittal Knee
- **PACS Series:** Pelvis/Proximal Femur CD Data Set, Coronal/Sagittal affected Hip, Knee CD Data Set, Coronal/Sagittal affected Knee *PROTECT SCAN*

1. PATIENT SETUP AND CONFIGURATION

- Scan patient in supine position feet first, anytime before MAKOplasty® THA procedure (up to 8 weeks in advance).
- Position patient to minimize pelvic obliquity through the following measures:
 - Align both ankles and both knees
 - Ensure patient is in true supine position by palpating the anterior superior iliac spines and comparing relative height above the CT scanner bed
 - Align longitudinal axis of the body with longitudinal axis of CT scanning bed

2. IMAGING REQUIREMENTS

Two regions:

- Continuous scan with regions (using one series or topogram with two groups)

Pelvis + Proximal Femur

- 0.5 - 1mm interval spacing throughout the scan. No gap / no overlap
- Axial slices (1:1 pitch) using helical (spiral) scanning
- FOV: Scan includes the entire bi-lateral pelvis (Medial/Lateral/Anterior/Posterior/Superior) and at least 180mm below the lesser trochanter on the femur
- Table not included in the scan
- Complete Scanning and Data reconstruction in bone
- 512 x 512 matrix: Image must be a square
- kV: 120 - 140
- mA: 200 - 250

Knee

- 2.0 - 5.0mm interval spacing throughout the scan
- Axial slices (1:1 pitch) using helical (spiral) scanning
- FOV: Scan includes bilateral knee - joint lines between femur and tibia and 10cm proximal to joint line on femur
- Complete scanning and data reconstruction in bone
- 512 x 512 matrix: Image must be a square
- kV: 120 - 140
- mA: 200 - 250

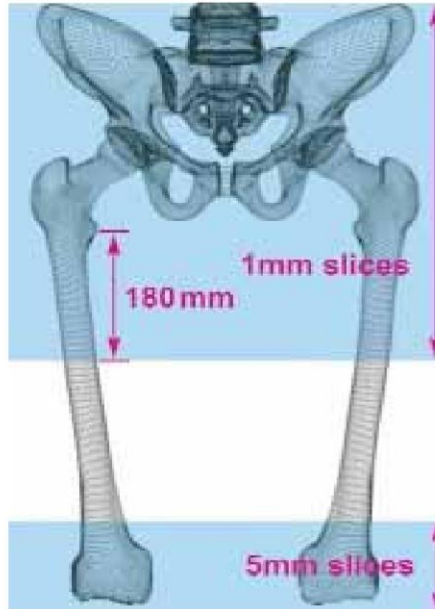


Figure 1. Scan Location and Characteristics

**FOV should not exceed
500 mm**

Slice Interval Spacing, mm	Distance mm	Number of Slices
0.500	180	360
0.625	180	288
0.750	180	240
0.875	180	206
1.000	180	180

3. POSITIONING THE PATIENT



During the scan, the pelvis and leg must remain motionless.

Imaging Artifacts

- Ensuring the patient is comfortable and relaxed is an important factor for achieving a motionless scan
- If metallic components are present in the pelvis or proximal femur, it may not be possible to obtain an image of significant quality to support a RIO® THA procedure
- Move metallic component away from scan region, if possible or use a metal suppression scan protocol

4. POST SCAN EXAMINATION

Scan Region

The physician and CT technologist should verify the following:

- Patient's orientation is correct
- Regions of interest in protocol are visible in dataset
- Image slice thickness resulted as required by the protocol
- Bone images in scan image are not degraded by metal-induced artifacts

5. DATASET TRANSFER

Archive all rendered images onto a single CD in DICOM 3 compatible format.

Include:

- Patient Name: (First and Last)
- Surgeon Name (Last)
- Operative Side (L,R or Bi)
- Gender (M or F)
- Date of Surgery xx/xx/xxxx

MAKO HIP SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral		Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1		Rotation Time (sec)	0.5
Pitch	1	1	1		Pict h	0.984:1
Scan FOV	Large	Large	Large		Speed	19.37
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	200	200	200		Auto mA range	100-500
kVp	120-140	120-140	120-140		kVp	120
ref kVp					Smart mA	On
Optimize Slider position		3	3		Noise Index	15
					ASIR	40%
Pelvis and femur						
Kernel	B70s Sharp	B70s Sharp	B30s Med smooth		Recon 1 Pelvis/Femur	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	2	2	0		Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	0.625
Slice Increment (mm)	1	1	1		Slice Increment (mm)	0.625
					Type	Full
					ASIR	None
Knee						
Kernel	B70s Sharp	B70s Sharp	B40s Medium		Recon Knee	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	2	2	2		Window Width/ Level	1500/450
Slice Thickness (mm)	2	2	2		Slice Thickness (mm)	1.25
Slice Increment (mm)	2	2	2		Slice Increment (mm)	1.25
					Type	Full
					ASIR	None

CTDI: ≤ 25 mGy per acquisition

PT Positioning:

- Patient is supine iso-center in the gantry with anatomy of interest in true anatomical position
- Both legs must be in complete extension
- The feet have to be perpendicular to the table with the toes pointing straight up and secured so motion is prevented
- No sponge or pillow should be placed beneath the knees or ankles
- All scans must be performed in the same coordinate system

Setup: AP and lateral scouts from above the crest through the toes

DFOV: See Scan Parameters

Scan Parameters:

- Pelvis + Proximal femurs 50 cm DFOV
 - 2 cm above the iliac crests and extend to 15 cm below the lesser trochanter
- Knees 50 cm DFOV
 - Both femoral and tibial parts of the knee joint must be included in knee series.
 - Include atleast 5 cm of the distal femur and extend atleast 5cm past beginning of fibula
- Ankle 50 cm DFOV
 - Include atleast 5 cm of distal tibia and extend past the lateral malleolus

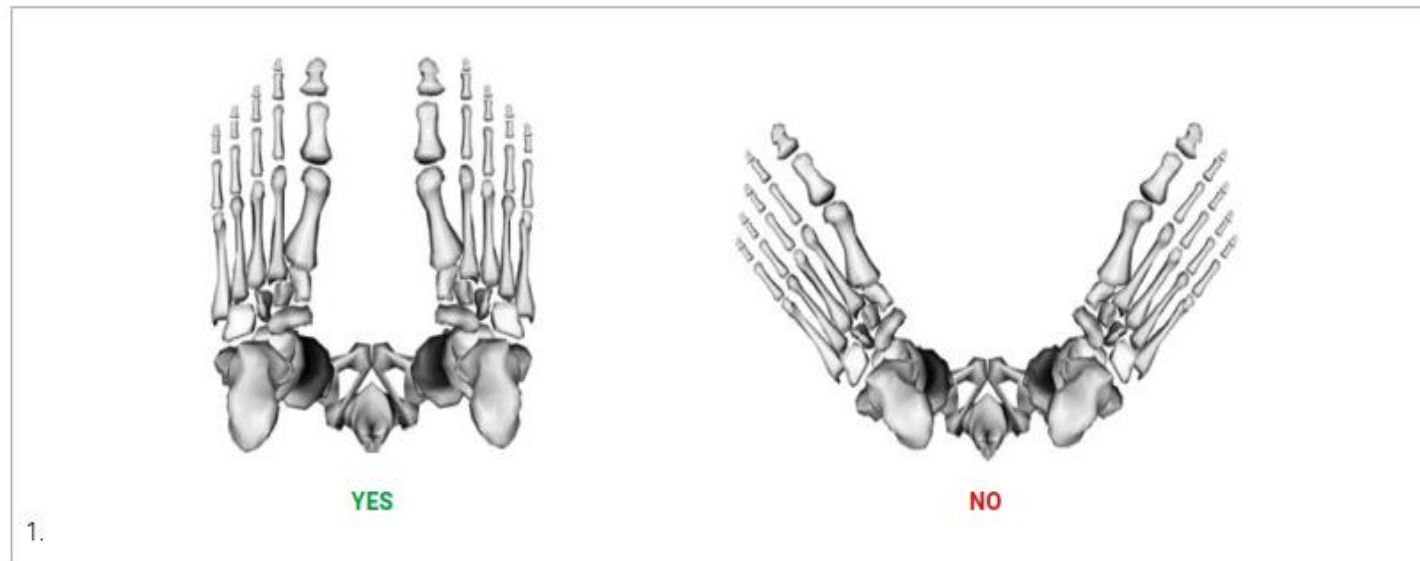
PACS series in order as performed:

- Topogram
- 1x1 Hip CD Data Set
- 1x1 Knee CD Data Set
- 1x1 Ankle CD Data Set
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

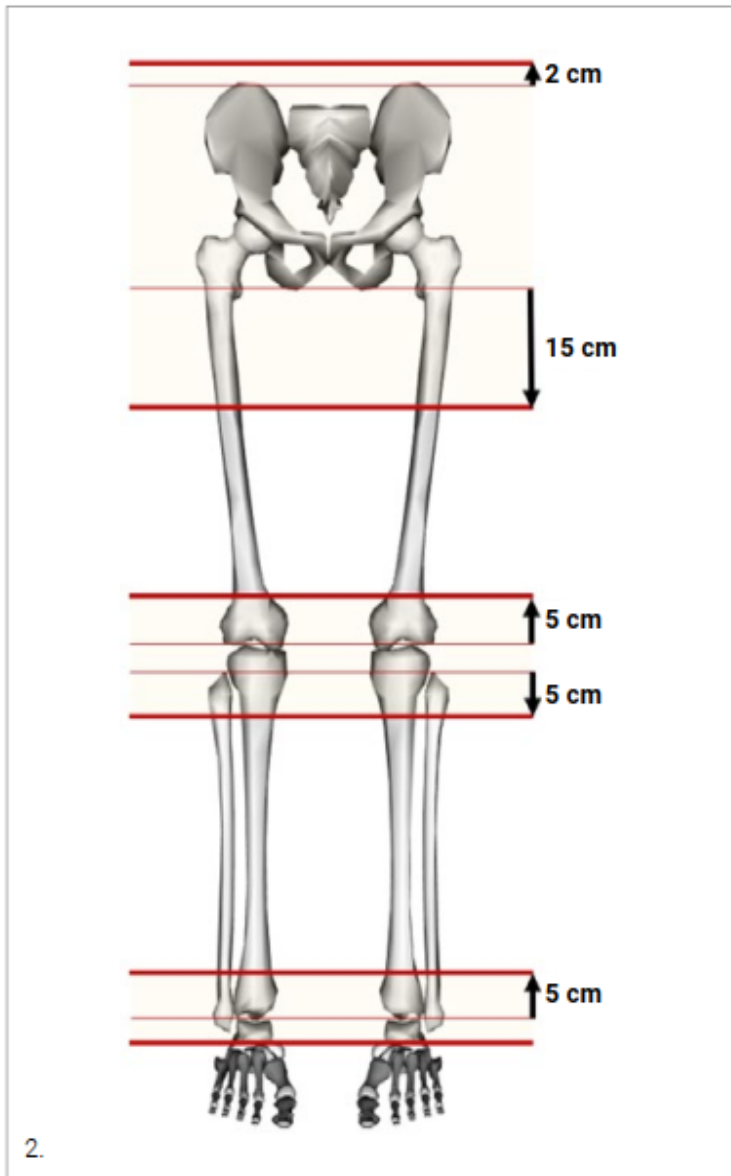
2. PATIENT POSITION

The patient must be in supine position at the isocenter in the gantry. The legs must be in complete extension. No sponge or pillow should be placed beneath the knee or ankle. The critical aspect is the position of the foot, which must be perpendicular to the table with the toe pointing straight up (see image below).



It is important to secure the position of the foot to prevent motion and the consequent loss of accuracy when assessing and correcting any misalignment of the knee.

The following figure shows the accepted scan ranges:



PELVIS + PROXIMAL FEMURS

The scan must start at least **2 cm** above the iliac crests and extend to **15 cm** below the lesser trochanter.

KNEES

Both femoral and tibial parts of the knee joint must be included in the knee series. The scan must include at least **5 cm** of the distal femur and must extend to at least **5 cm** past the beginning of the fibula.

ANKLES

The ankle series must include at least **5 cm** of the distal tibia and extend past the lateral malleolus.

3. IMAGE ACQUISITION

The acquisition consists of three (3) separate short **spiral axial scans**:

1. Both hips
2. Both knees
3. Both ankles

The mandatory acquisition consists of the short spiral axial scan of both hips. The knee and ankle series can be optionally added in order to obtain a complete evaluation. Please check with your surgeon the segments to scan.

All scans must be performed in the same coordinate system (frame of reference).

TIP FOR GE USERS

If no protocol has been predefined between scan ranges select "Repeat series" to scan the next range. **Do not** select "Add a group".

TIP FOR TOSHIBA USERS

Between scan ranges select "Quit series" and use original scout to scan the next range.

4

4. FIELD OF VIEW (FOV)

The **requested bone regions** must be captured completely as specified below:

- **Hip:** pelvis + proximal femur (left + right)
- **Knee:** distal femur, fibula, and proximal tibia contours (left + right)
- **Ankle:** medial and lateral malleolus (left + right)

CAUTION

Metal parts in the FOV or in its proximity may produce artifacts that may lead to inaccurate and/or unsuccessful segmentation and landmark detection. If metallic artifacts occur, it is useful to apply a MAR (Metal Artifact Reduction) algorithm.

MY HIP/GOLDBERG SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Axial	Axial	Axial	Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.8
Pitch	0.95	0.95	0.8	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Eff mAs	120			Auto mA range	100-500
kVp	110			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3	3	Noise Index	15
				ASIR	40%
Hip				Hip CD Data Set	
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Algorithm	Standard
Window	Osteo	Osteo	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	1	Type	Plus
				ASIR	SS40
Knee				Knee	
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Algorithm	Standard
Window	Osteo	Osteo	Extremity	Window Width/ Level	350/ 40
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	0.625
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	0.625
Slice Increment (mm)	1	1	1	Type	Full
				ASIR	None
Ankle				Ankle	
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Algorithm	Standard
Window	Osteo	Osteo	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	1	Type	Full
				ASIR	None

CTDI: ≤ 25 mGy per acquisition

PT Positioning:

- Patient is supine feet first legs flat on table
- Tape feet together
- Tape knees if extra stability is needed
- No sponge or pillow should be placed beneath legs or feet

Setup: AP and lateral scouts from above the crest through the toes

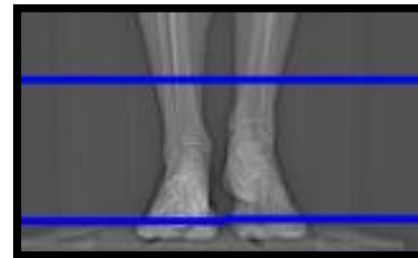
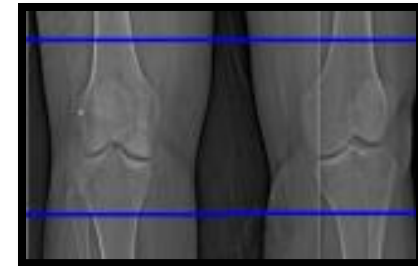
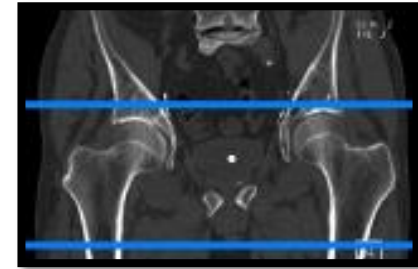
DFOV: Appropriate for patient body habitus

Scan Parameters:

- Hips
 - Above the femoral heads through the lesser trochanters
- Knees
 - Above the femoral physis through tops of tibia
- Ankles
 - Above the ankle syndesmosis through the talar domes

PACS series in order as performed:

- Topogram
- 3x3 Bilateral Hip
- 3x3 Bilateral Knee
- 3x3 Bilateral Ankle
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

FEMORAL ANTEVERSION SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Axial	Axial	Axial	Scan Type	Axial
Detector Configuration	32 x 1.2	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.5
Pitch	0.95	0.95	0.8	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Eff mAs	105			Auto mA range	80-300
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3	3	Noise Index	15
				ASIR	50%
Bilateral Hips				Bilateral Hips	
Kernel	I30s Med Smooth	I30s Med Smooth	B20s Med Smooth	Algorithm	Standard
Window	Mediastinum	Mediastinum	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	2	2	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	3	3	3	Slice Increment (mm)	2.5
Slice Increment (mm)	3	3	3	Type	Full
				ASIR	20
Bilateral Knees				Bilateral Knees	
Kernel	I30s Med Smooth	I30s Med Smooth	B20s Med Smooth	Algorithm	Standard
Window	Mediastinum	Mediastinum	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	2	2	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	3	3	3	Slice Increment (mm)	2.5
Slice Increment (mm)	3	3	3	Type	Full
				ASIR	None
Bilateral Ankles				Bilateral Ankles	
Kernel	I30s Med Smooth	I30s Med Smooth	B20s Med Smooth	Algorithm	Standard
Window	Mediastinum	Mediastinum	Extremity	Window Width/ Level	350/40
SAFIRE/ADMIRE	2	2	0	Slice Thickness (mm)	2.5
Slice Thickness (mm)	3	3	3	Slice Increment (mm)	2.5
Slice Increment (mm)	3	3	3	Type	Full
				ASIR	None

PT Positioning/Setup :

- Head first prone with **both arms** above head, palms in full supination
- If the above position is not achievable, please have patient position both arms so that the palms of the hands are facing each other
- If the patient is unable to lie prone, please have the patient lay supine with arms raised above the head
- No gantry tilt

DFOV: Using **110-120 kVp** scan from **above the elbow through the entire** carpometacarpal joint

PACS series in order as performed:

- Topogram
- 0.6 x 0.6 ****Axial Bone CD DATA SET DFOV of 20 cm (Bilateral)**
- 1 x 1 Axial RT forearm Bone/ST
- 1 x 1 Axial LT forearm Bone/ST
- 1 x1 Coronal RT forearm Bone/ST
- 1 x 1 Coronal LT forearm Bone/ST
- 1 x1 Sagittal RT forearm Bone/ST
- 1 x1 Sagittal LT forearm Bone/ST
- Patient Protocol/Dose Report

[*Back to MSK Protocol Page*](#)

Scanning Parameters

Region of interest / Axial Scan	From the elbow to the carpometacarpal joint
	Bilateral - prefer a single acquisition; individual scans are acceptable
Collimation	Slice thickness: 0.625mm or smaller
	Slice increment: Contiguous Slices
	No Gantry Tilt or Obliqueness or Oblique Reconstructions
kVp	90-120 (higher for obese patients or metal hardware in scan region)
mAs	As given by the automatic system
Pitch	Use 1 or smaller
Field of View (FOV)	200mm x 200mm or smaller. Use the smallest FOV possible to capture the required bone regions. Capturing all of the soft tissue is unnecessary.
Matrix	Use a 512 x 512 matrix
Kernel / Algorithm	Bone / Details
Table Position	Area to be scanned should be centered in the scan field. DO NOT raise or lower the CT table between slices, or alter the X or Y centering between scans. Center Points must be identical.
Reconstruction	NO secondary reconstructions, images must be scanned at the given parameters or smaller NO reformatting into coronal or sagittal planes, no MPR's or 3D reconstructions
Data Anonymization	Do not erase patient name and ID- ensure necessary rights are obtained for transfer of data to Materialise. Data will be anonymized by Materialise after cross-check with prescription of the surgeon to ensure the images of the right patient are provided.



General Scan Requirements :

- Remove any non-fixed metal prosthesis, jewelry, and zippers that might interfere with the region to be scanned.
- Make the patient comfortable and instruct him/her not to move during the procedure. If any movement is detected the patient will need to be rescanned as this will prevent the accurate development of the patient-specific model.
- **If possible, scan the forearms in the position of greatest deformity, with both limbs in as close to the same position as possible (ex. full supination to demonstrate subluxation of the radial head).** Otherwise, position the patient prone with arms in front of him/her and with palms facing each other in the neutral position. If this is not possible, position the patient in the supine position.
- Scan forearms with (both) arms above the head and the head out of the FOV, if possible. Make sure the patient's elbows are propped up, if needed, to allow for even scanning within the same plane. Place forearms as close together as possible to fit into the designated FOV. Scan each arm separately if both arms do not fit within the required FOV.

Provide the complete data set of **ONLY** the raw/original/axial DICOM images. Lossy Compression is **NOT** allowed (ISO_10918_1, ISO_14495_1, ISO_1544_1, or ISO_13818_1). Retain a permanent archive (PACS) copy of the RAW data of images (As scanned by the original parameters, uncompressed). We recommend building a "Materialise Forearm" in your CT scanner with the appropriate ranges & parameters.



FOREARM MATERIALISE SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	32 x 0.6	Detector Coverage (mm)	40
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.8
Pitch	0.8	0.8	0.8	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	39.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	60	60	60	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
CD Data set BILAT					
Kernel	B70s Sharp	B70s Sharp	B70s Sharp	Recon 1 CD Set	
Window	Osteo	Osteo	Osteo	Algorithm	Bone
SAFIRE/ADMIRE				Window Width/ Level	1500/450
Slice Thickness (mm)	0.6	0.6	0.6	Slice Thickness (mm)	0.625
Slice Increment (mm)	0.6	0.6	0.6	Slice Increment (mm)	0.625
ST right and ST left					
Kernel	I31s medsmooth	I31s medsmooth	I31s medsmooth	Type	Plus
Window	Mediastinum	Mediastinum	Mediastinum		SS40
SAFIRE/ADMIRE	2	2	2	Recon 2 Reformats	
Slice Thickness (mm)	1	1	1	Algorithm	Standard
Slice Increment (mm)	1	1	1	Window Width/ Level	450/ 35
Bone RT/Bone LT					
Kernel	B70s Sharp	B70s Sharp	B70s Sharp	Slice Thickness (mm)	0.625
Window	Osteo	Osteo	Osteo	Slice Increment (mm)	0.625
SAFIRE/ADMIRE				ASIR	SS50
Slice Thickness (mm)	1	1	1		
Slice Increment (mm)	1	1	1		
Coronal/Sagittal Bone					
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		
Window	Osteo	Osteo	Osteo		
SAFIRE/ADMIRE					
Slice Thickness (mm)	1	1	1		
Slice Increment (mm)	1	1	1		

CTDI: ≤ 25 mGy per acquisition

PT Positioning:

- Patient is supine iso-center in the gantry with anatomy of interest in true anatomical position
- Leg of interest must be in complete extension
- The foot has to be perpendicular to the table with the toes pointing straight up and secured so motion is prevented
- No sponge or pillow should be placed beneath the knee or ankle of interest
- If the patient presents with hardware in the contra-lateral leg it is crucial to try to move that leg out of the scan view by:
 - Place a pillow or sponge under the contra-lateral leg
 - Have the patient bend the contra-lateral knee so that the metal is as far away from the extremity of interest

Setup: AP and lateral scouts from above the crest through the toes

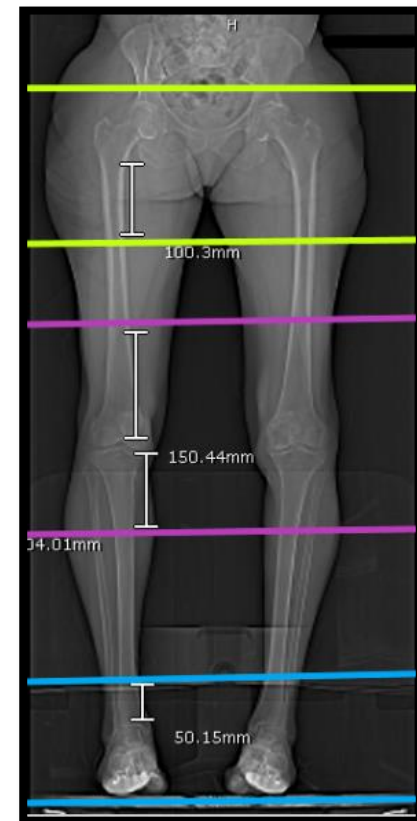
DFOV: See Scan Parameters

Scan Parameters:

- Hip 20-30 cm DFOV
 - Whole femoral head along with at least 10 cm of femur
- Affected Knee 20-25 cm DFOV
 - Scan must extend to at least 15 cm towards the hip and 10 cm towards the ankle
- Ankle 15-20 cm DFOV
 - Scan must include at least 5 cm of tibia and extend past the calcaneus

PACS series in order as performed:

- Topogram
- 1x1 Hip CD Data Set
- 0.6 x 0.6 Knee CD Data Set
- 1x1 Ankle CD Data Set
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

MY KNEE SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Axial	Axial	Axial	Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1	Rotation Time (sec)	0.8
Pitch	0.95	0.95	0.8	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Eff mAs	120			Auto mA range	100-500
kVp	110			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3	3	Noise Index	15
				ASIR	40%
Hip					
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Hip CD Data Set	
Window	Osteo	Osteo	Extremity	Algorithm	Standard
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/40
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25
				Type	Plus
				ASIR	SS40
Knee					
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Knee	
Window	Osteo	Osteo	Extremity	Algorithm	Standard
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/ 40
Slice Thickness (mm)	0.6	0.6	0.6	Slice Thickness (mm)	0.625
Slice Increment (mm)	0.6	0.6	0.6	Slice Increment (mm)	0.625
				Type	Full
				ASIR	None
Ankle					
Kernel	B20s Smooth	B20s Smooth	B20s Smooth	Ankle	
Window	Osteo	Osteo	Extremity	Algorithm	Standard
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/40
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25
				Type	Full
				ASIR	None

CTDI: ≤ 25 mGy per acquisition

PT Positioning:

- Patient is supine iso-center in the gantry with anatomy of interest in true anatomical position
- Leg of interest must be in complete extension
- The foot has to be perpendicular to the table with the toes pointing straight up and secured so motion is prevented
- No sponge or pillow should be placed beneath the knee or ankle of interest
- If the patient presents with hardware in the contra-lateral leg it is crucial to try to move that leg out of the scan view by:
 - Place a pillow or sponge under the contra-lateral leg
 - Have the patient bend the contra-lateral knee so that the metal is as far away from the extremity of interest

Setup: AP and lateral scouts from above the crest through the toes

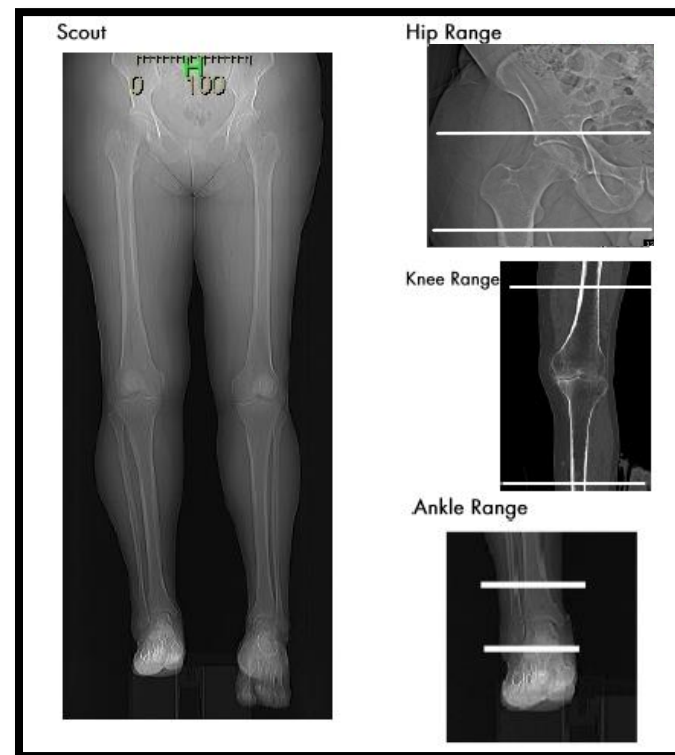
DFOV: See Scan Parameters

Scan Parameters:

- Hip 20-30 cm DFOV
 - Whole femoral head
- Affected Knee 20-25 cm DFOV
 - Scan must include at least 1/3 of the distal femur through 1/2 of proximal tibia
- Ankle 15-20 cm DFOV
 - Centered at the tibiotalar joint space the scan must include at least 2cm above the joint to 2 cm below

PACS series in order as performed:

- Topogram
- 2 x 2 Hip
- 1 x 0.5 Knee
- 1 x 1 Knee Coronal/Sagittal
- 2 x 2 Ankle
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

CONFORMIS KNEE SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral	Scan Type	Spiral
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	40
Rotation Time (sec)	0.6	0.6	0.5	Rotation Time (sec)	0.8
Pitch	1	1	1	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Eff mAs	60	60	60	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		140	120	Smart mA	On
Optimize Slider position		3	3	Noise Index	15
				ASIR	50%
Hip					
Kernel	B70s Sharp	B70s Sharp	B60f Sharp	Hip CD Set	
Window	Osteo	Osteo	Osteo	Algorithm	Standard
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/40
Slice Thickness (mm)	2	2	2	Slice Thickness (mm)	2.5
Slice Increment (mm)	2	2	2	Slice Increment (mm)	2.5
				Type	Full
Knee				ASIR	None
Kernel	B70s Sharp	B70s Sharp	B60f Sharp		
Window	Osteo	Osteo	Osteo	Knee	
SAFIRE/ADMIRE	0	0	0	Algorithm	Standard
Slice Thickness (mm)	1	1	1	Window Width/ Level	350/40
Slice Increment (mm)	1	1	0.5	Slice Thickness (mm)	1.25
				Slice Increment (mm)	0.625
Ankle				Type	Full
Kernel	B70s Sharp	B70s Sharp	B60f Sharp	ASIR	None
Window	Osteo	Osteo	Osteo		
SAFIRE/ADMIRE	0	0	0	Ankle	
Slice Thickness (mm)	2	2	2	Algorithm	Standard
Slice Increment (mm)	2	2	2	Window Width/ Level	350/40
				Slice Thickness (mm)	2.5
				Slice Increment (mm)	2.5
				Type	Full
				ASIR	None

CTDI: ≤ 25 mGy per acquisition

PT Positioning:

- Patient is supine iso-center in the gantry with anatomy of interest in true anatomical position
- Leg of interest must be in complete extension
- The foot has to be perpendicular to the table with the toes pointing straight up and secured so motion is prevented
- No sponge or pillow should be placed beneath the knee or ankle of interest
- If the patient presents with hardware in the contra-lateral leg it is crucial to try to move that leg out of the scan view by:
 - Place a pillow or sponge under the contra-lateral leg
 - Have the patient bend the contra-lateral knee so that the metal is as far away from the extremity of interest

Setup: AP and lateral scouts from above the crest through the toes

DFOV: See Scan Parameters

Scan Parameters:

- Hip 25-30 cm DFOV
 - Whole femoral head along with at least 5 cm of femur
- Affected Knee 20-25 cm DFOV
 - Scan must extend to at least 10 cm towards the hip and 10 cm towards the ankle
- Ankle 15-20 cm DFOV
 - Scan must include at least 5 cm of tibia and extend through the foot

PACS series in order as performed:

- Topogram
- 1x1 Hip CD Data Set
- 0.6 x 0.6 Knee CD Data Set
- 1x1 Ankle CD Data Set
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

KNEE: BIOMET-IMPERIAL SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral	Scan Type	Spiral
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	0.6	0.6	0.8	Rotation Time (sec)	0.8
Pitch	1	1	1	Pitch	0.531:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	10.62
CareDose4D	On	On	On	Scan FOV	Large Body
Eff mAs	60	60	60	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		140	120	Smart mA	On
Optimize Slider position		3	3	Noise Index	15
				ASIR	50%
Hip					
Kernel	B70s Sharp	B70s Sharp	B20s Smooth	Hip	
Window	Osteo	Osteo	Extremity	Algorithm	Standard
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	350/40
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25
				Type	Full
Knee				ASIR	None
Kernel	B70s Sharp	B70s Sharp	B20s Smooth		
Window	Osteo	Osteo	Extremity	Knee	
SAFIRE/ADMIRE	0	0	0	Algorithm	Standard
Slice Thickness (mm)	0.6	0.6	0.6	Window Width/ Level	350/40
Slice Increment (mm)	0.6	0.6	0.6	Slice Thickness (mm)	0.625
				Slice Increment (mm)	0.625
Ankle				Type	Full
Kernel	B70s Sharp	B70s Sharp	B20s Smooth	ASIR	None
Window	Osteo	Osteo	Extremity		
SAFIRE/ADMIRE	0	0	0	Ankle	
Slice Thickness (mm)	1	1	1	Algorithm	Standard
Slice Increment (mm)	1	1	1	Window Width/ Level	350/40
				Slice Thickness (mm)	1.25
				Slice Increment (mm)	1.25
				Type	Full
				ASIR	None

CTDI: ≤25 mGy per acquisition

****SEE ATTACHED FORMS****

PT Preparation:

- **Supine, feet first with foot secured in an upright position with a rolled towel/blanket wrapped around bottom of the foot to secure the ankle *see image below**
- **Elevate the knee of the patient slightly with a rolled towel or blanket**
- **Wrap the Velcro strap one complete revolution around the rod as shown *see image below Do this for both Velcro straps, one at the hip position and one at the ankle *see image below**
- **Set the motion rod on the patient to pass from just proximal of hip center to distal of ankle center**
- **Adjust femoral and tibial straps to secure the rod**
- **Verify the rod is in both anterior/posterior and medial/lateral field of view for all scan regions**
- **Ensure patient is comfortable and relaxed**
- **If metallic components are present in non-operative leg, attempt to isolate the non-operative leg from scan region.**
- **If metallic components are present in operative leg, it may not be possible to obtain an image of quality to support the MAKO procedure.**

Setup: PA/Lateral scout from above the iliac crest through the foot

Scan Parameters:

1. Hip

to include the entire femoral head and motion rod. Center around the femoral head.

- DFOV 500 mm
- kV 120-140
- mA 200-400mA *Auto Exposure Control if available
- Pitch 1
- Slice of 2 mm x 2 mm (no gap/overlap)
- Bone Algorithm

2. Knee

with a scan region of a minimum of 10cm above and 10cm below the distal femoral condyles. Include margin above the patellofemoral joint, margin below the distal boundary of the tibial tuberosity, and the motion rod. Center around the joint line.

- DFOV 250 mm
- kV 120-140
- mA 200-400mA *Auto Exposure Control if available
- Pitch 1
- Slice of 0.6 mm x 0.6 mm (no gap/overlap)
- Bone Algorithm

3. Ankle

to include the medial and lateral malleoli and motion rod. Center around the ankle joint.

- DFOV 500 mm
- kV 120-140
- mA 200-400mA *Auto Exposure Control if available
- Pitch 1
- Slice of 2 mm x 2 mm (no gap/overlap)
- Bone Algorithm

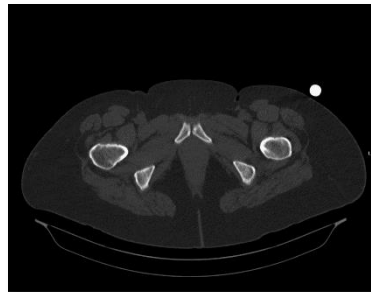
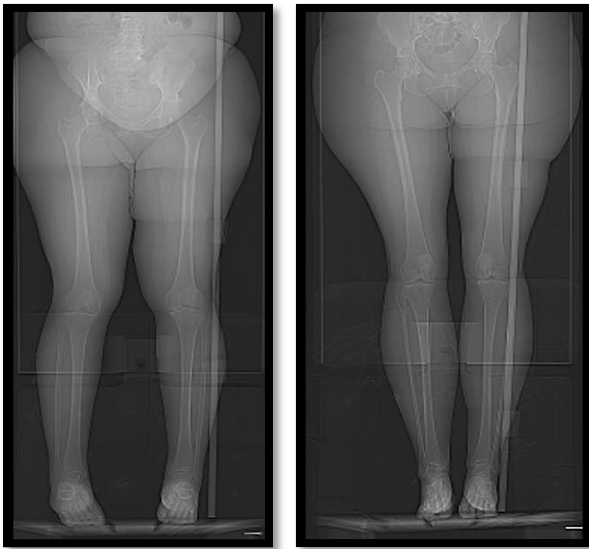
Reconstructions:

- Hip CD Data Set, Hip Coronal, Hip Sagittal
- Knee CD Data Set, Knee Coronal, Knee Sagittal
- Ankle CD Data Set, Ankle Coronal, Ankle Sagittal

PACS Series:

- Pelvis/Hip CD Data Set, Hip Coronal, Hip Sagittal, Knee CD Data Set, Knee Coronal, Knee Sagittal, Ankle CD Data Set, Ankle Coronal, Ankle Sagittal

******SEE ATTACHED FORMS******



A few examples of rod placement on different body habitus.

Anterior on the hip so the rod doesn't get cut off on axials, angled down to the ankle, but all the way through the foot

[*Back to MSK Protocol Page*](#)

1. KNEE SCAN PARAMETERS

Position/Landmark	Supine, Feet First																
Topogram (Scout) Direction	Cranio-Caudal. AP and Lateral scout																
kVp mA (*if available) Pitch	120-140kV (recommended 120 kVp) Auto Exposure Control* (200-400 mA) 1:1 (no gaps)																
Helical Set Slice Thickness, Spacing, Algorithm	<table border="1"> <thead> <tr> <th>Region</th> <th>Thickness</th> <th>Spacing</th> <th>Algorithm</th> </tr> </thead> <tbody> <tr> <td>Hip</td> <td>2-5 mm</td> <td>2-5 mm</td> <td>Bone</td> </tr> <tr> <td>Knee</td> <td>0.5-1 mm</td> <td>0.5-1 mm</td> <td>Bone</td> </tr> <tr> <td>Ankle</td> <td>2-5 mm</td> <td>2-5 mm</td> <td>Bone</td> </tr> </tbody> </table>	Region	Thickness	Spacing	Algorithm	Hip	2-5 mm	2-5 mm	Bone	Knee	0.5-1 mm	0.5-1 mm	Bone	Ankle	2-5 mm	2-5 mm	Bone
Region	Thickness	Spacing	Algorithm														
Hip	2-5 mm	2-5 mm	Bone														
Knee	0.5-1 mm	0.5-1 mm	Bone														
Ankle	2-5 mm	2-5 mm	Bone														
Image Resolution Matrix	512 x 512 Matrix: <u>Image must be a square</u>																
DFOV	Hip=500 mm, Knee=250 mm, Ankle=500 mm <u>Do not exceed limits.</u>																
Scan Plan	Scan in the Axial plane, for all 3 regions (Hip, Knee, and Ankle)																
Scan Start/End Locations	Begin scan at the Hip, through the Knee, ending at and including the Ankle joint.																
Hip Region	Include the entire femoral head and motion rod. Center around the femoral head.																
Knee Region	Scan a region a minimum of 10 cm above and 10 cm below the distal femoral condyles. Include margin above the patellofemoral joint, margin below the distal boundary of the tibial tuberosity, and the motion rod. Center around the joint line.																
Ankle Region	Include the medial and lateral malleoli and motion rod. Center around the ankle joint.																
Images required for transfer	Transfer all Axial bone images of the Hip, Knee, and Ankle including the AP Topogram in DICOM format, to PACS or CD.																

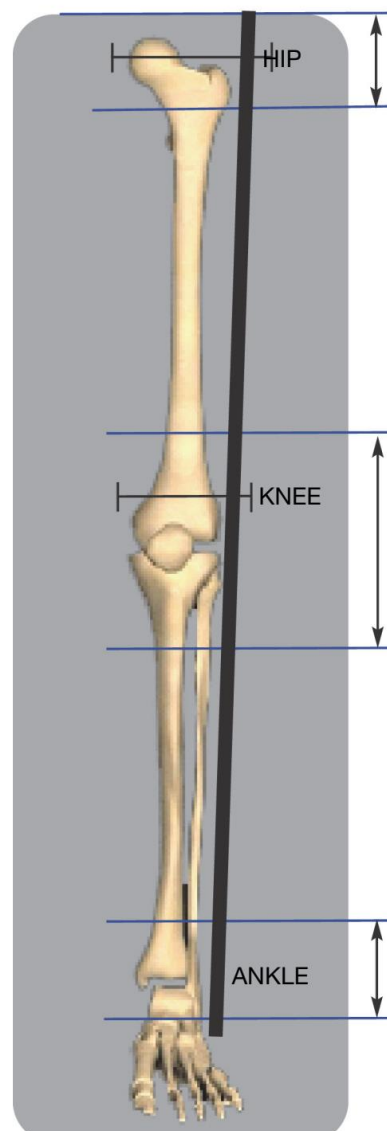


Figure. 1. Scan Location and Characteristics

[*Back to MSK Protocol Page*](#)

2. POSITIONING THE PATIENT



During the scan, the pelvis, leg, and Motion Rod must remain motionless.

1. Position patient supine, feet first with foot secured in an upright position with a rolled towel or blanket wrapped around the bottom of the foot to secure the ankle as shown.
2. Elevate the knee of the patient slightly with a rolled towel or blanket.
3. Wrap the velcro strap one complete revolution around the rod as shown in Figure 2. Do this for both Velcro straps, one at the hip position and one at the ankle position as shown.
4. Set the Motion Rod on the patient to pass from just proximal of Hip Center to distal of Ankle Center as shown in Figure 3.
5. Adjust the femoral and tibial straps to secure the rod.
6. Verify the rod is in both anterior/posterior and medial/lateral field of views for all scan regions.



Figure 2.



The velcro strap must be wrapped around the rod in one complete revolution, before wrapping around the leg. Straps should be snug, but not excessively tight.

3. CONSIDERATIONS

- Scan patient anytime before procedure (up to 8 weeks in advance)
- Ensure the patient is comfortable and relaxed. This is critical for achieving a motionless scan
- If metallic components are present in the operative leg, it may not be possible to obtain an image of significant quality to support a Mako procedure. If metal components are present in the non-operative leg (e.g. knee components), attempt to isolate the non-operative leg from the scan region.

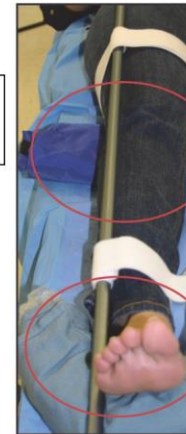


Figure 3.

CTDI: ≤25 mGy per acquisition

Used for Wright Medical Prophecy In-Bone Evaluation Only

PT Positioning:

- Patient must be in the supine position and as close to iso-center as possible in the gantry
- Leg of interest must be in complete extension in true anatomical position
- Foot perpendicular to the table, toes pointing straight up on the footboard, secured so motion is prevented
- No sponge or pillow should be used beneath the knee or ankle of interest
- If the patient presents with hardware in the contra-lateral leg, it is crucial to try to move that leg out of the scan field
 - Place a pillow or sponge beneath the contra-lateral leg
 - Have the patient bend the contra-lateral leg so metal is as far away from the extremity of interest
- Please contact a Lead CT Tech or Tech II for exam/image approval before the patient gets off the table or moves

Setup: Long scout, PA/Lateral from mid femur thru entire foot

Scan Parameters:

- Scans must maintain the same X and Y coordinates and the same DFOV for both axial scans ~28-40cm DFOV
- Affected Knee
 - Scan must extend to at least 5 centimeters towards the hip and 5 centimeters towards the ankle
- Affected Ankle
 - Scan must include at least 10 centimeters of the tibia (measuring from the top of the ankle joint) and extend past the bottom of the entire foot to include the toes (see image below)

PACS series in order as performed:

- Topogram
- LT or RT Knee CD Data Set
- LT or RT Knee Coronal/Sagittal
- LT or RT Ankle CD Data Set
- LT or RT Ankle Coronal/Sagittal
- Patient Protocol/Dose Report

Back to MSK Protocol Page

Sagittal Scout

Coronal Scout



PROPHECY IN-BONE SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	Spiral	Spiral	Spiral		Scan Type	Helical	
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	40	
Rotation Time (sec)	0.6	0.6	0.5		Rotation Time (sec)	0.5	
Pitch	1	1	1		Pitch	0.984:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	10.625	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	60	60	60		Auto mA range	100-500	
kVp	10				kVp	120	
ref kVp		120	120		Smart mA	On	
Optimize Slider position		3	3		Noise Index	15	
					ASIR	50%	
Knee					Knee CD		
Kernel	B70s Sharp	B70s Sharp	B60f Sharp		Algorithm	Bone Plus	
Window	Osteo	Osteo	Osteo		Window Width/ Level	1500/450	
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	1.25	
Slice Thickness (mm)	1	1	1		Slice Increment (mm)	1.25	
Slice Increment (mm)	1	1	1		Type	Full	
					ASIR	None	
Ankle							
Kernel	B70s Sharp	B70s Sharp	B70f Very Sharp		Knee Reformat		
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus	
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450	
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	0.625	
Slice Increment (mm)	1	1	1		Slice Increment (mm)	0.625	
					Type	Full	
					ASIR	None	
					Ankle CD		
					Algorithm	Bone Plus	

CT Leg Length is only performed on patients 2 yrs. of age and older

Patient Positioning:

Patient positioned so that both ankle mortises are clearly visible

Setup:

AP Topogram acquired from above the iliac crests
through bottom of the feet (Cranial Caudal)

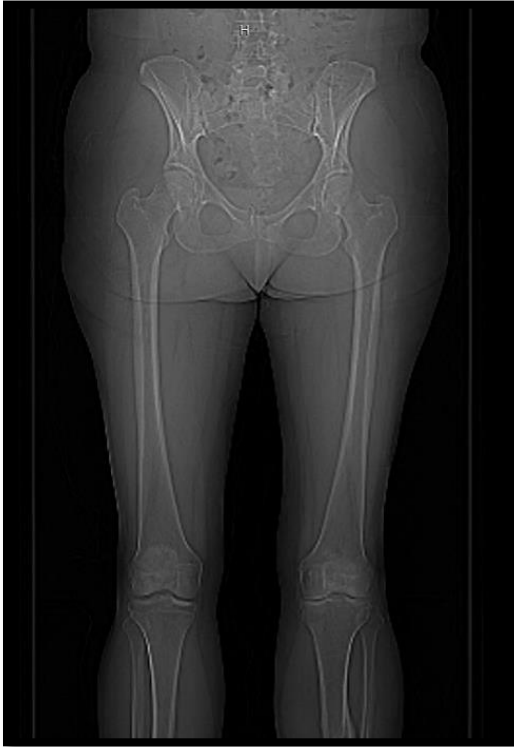


Lateral Topogram acquired from below the bottom
of feet through the iliac crests (caudal cranial)



[*Back to MSK Protocol Page*](#)

AP Topogram acquired from above the iliac crests through the bottom of the knees



AP Topogram acquired from above the knees through the bottom of the feet



[*Back to MSK Protocol Page*](#)

CTDI: ~10-20 mGy per acquisition

PT Positioning: Place anatomy of interest in true anatomical position ; Turn patient's feet inward so that the feet are pointing toward each other (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above the iliac crest through the symphysis pubis

DFOV: Appropriate for patient's body habitus. Use same DFOV as prior exam when available

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above the iliac crest through the ischial tuberosities

PACS series in order as performed:

- Topogram
- 2x2 Axial bone
- 2x2 Axial Soft Tissue
- 2x2 Coronal/Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

BONY PELVIS SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	Spiral	Spiral	Spiral		Scan Type	Spiral
Detector Configuration	32 x 1.2	32 x 1.2	16 x 1.2		Detector Coverage (mm)	20
Rotation Time (sec)	1	1	0.5		Rotation Time (sec)	0.8
Pitch	0.95	0.95	1		Pitch	0.984:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	105	105	105		Auto mA range	100-500
kVp	130				kVp	120
ref kVp		140	140		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%
Recon 1 Bone					Bone	
Kernel	B70s Sharp	B70s Sharp	B70f Very Sharp		Algorithm	Bone
Window	Osteo	Osteo	Osteo		Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	2.5
Slice Thickness (mm)	2	2	2		Slice Increment (mm)	2.5
Slice Increment (mm)	2	2	2		Type	Full
					ASIR	None
Soft Tissue					ST Axial	
Kernel	I31s Med Smooth	I31s Med Smooth	I41f Medium		Algorithm	Standard
Window	Mediastinum	Mediastinum	Pelvis		Window Width/ Level	450/ 35
SAFIRE/ADMIRE	2	2	2		Slice Thickness (mm)	2.5
Slice Thickness (mm)	2	2	2		Slice Increment (mm)	2.5
Slice Increment (mm)	2	2	2		Type	None
					ASIR	SS50
Coronal/ Sagittal					Bone Reformats	
Kernel	B70s Sharp	B70s Sharp	B70f Very Sharp		Algorithm	Bone Plus
Window	Osteo	Osteo	Osteo		Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	0.625
Slice Thickness (mm)	2	2	2		Slice Increment (mm)	0.625
Slice Increment (mm)	2	2	2		Type	Plus
					ASIR	None
					ST Reformats	

CTDI: ~20 mGy per acquisition

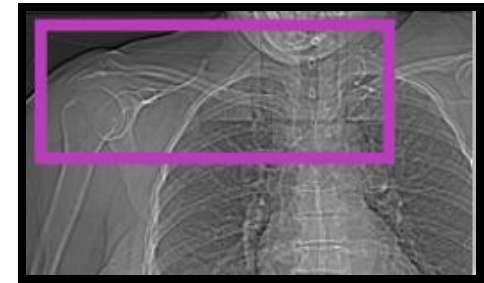
PT Positioning: Place anatomy of interest in true anatomical position, both arms positioned at patients side with both humerus supported to lie parallel to the table with palm supinated (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above to below the clavicle

DFOV: Appropriate for patient's body habitus ; Use same DFOV as prior exam when available

Scan Parameters:

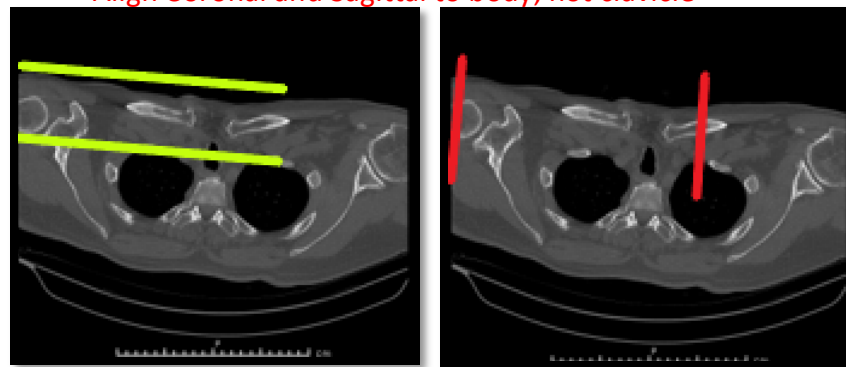
- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @ 3ml/sec
 - 45 second delay
- Scan from above the above the clavicle through the both sterno-clavicular joints and acromioclavicular joint
- Scan to be obtained during breath hold



PACS series in order as performed:

- Topogram
- 1x1 Axial Bone
- 1x1 Axial Soft Tissue
- 1x1 Coronal Bone
- 1x1 Coronal Soft Tissue
- 1x1 Sagittal bone only
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

Align Coronal and Sagittal to body, not clavicle



[*Back to MSK Protocol Page*](#)

CLAVICLE SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	spiral	spiral	spiral		Scan Type	spiral	
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	40	
Rotation Time (sec)	1.5	1.5	1		Rotation Time (sec)	0.8	
Pitch	1.3	1.3	0.8		Pitch	0.984:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	120	120	120		Auto mA range	100-500	
kVp	130				kVp	120	
ref kVp		120	120		Smart mA	On	
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	20	
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%	
Recon 1 Bone Axial							
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Bone Axial		
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus	
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450	
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	1.25	
Slice Increment (mm)	1	1	1		Slice Increment (mm)	1.25	
Recon 2 ST					Type	Full	
Kernel	I31s medsmooth	I31s medsmooth	I31s medsmooth		ASIR	None	
Window	Shoulder	Shoulder	Shoulder				
SAFIRE/ADMIRE	3	3	2		Recon 2 Reformats		
Slice Thickness (mm)	1	1	1		Algorithm	Bone	
Slice Increment (mm)	1	1	1		Window Width/ Level	1500/450	
Coronal/ Sagittal Bone					Slice Thickness (mm)	0.625	
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Slice Increment (mm)	0.625	
Window	Osteo	Osteo	Osteo		Type	Full	
SAFIRE/ADMIRE	0	0	0		ASIR	None	
Slice Thickness (mm)	1	1	1				
Slice Increment (mm)	1	1	1		ST		
Coronal ST					Algorithm	Standard	
Kernel	I31s medsmooth	I31s medsmooth	I31s medsmooth		Window Width/ Level	350/45	
Window	Shoulder	Shoulder	Shoulder		Slice Thickness (mm)	1.25	
SAFIRE/ADMIRE	3	3	2		Slice Increment (mm)	1.25	
Slice Thickness (mm)	1	1	1		Type	Full	
Slice Increment (mm)	1	1	1		ASIR	SS20	

CTDI: ~25 mGy per acquisition

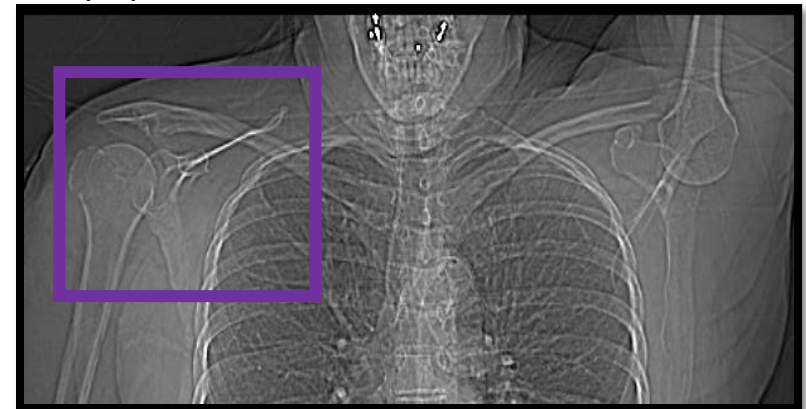
PT Positioning: Patient in true anatomical position, humerus supported to lie parallel to the table and palm supinated, opposite arm raised above head

Setup: AP and lateral scouts from above the clavicle through the area of interest

DFOV: 18cm

Scan Parameters Routine Shoulder:

- IV Contrast: IV access to be obtained in arm contra-lateral to patient's symptoms
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @ 3ml/sec
 - 45 second delay
- Scan from above the clavicle through the area of interest during breath hold



PACS series in order as performed:

- Topogram
- 2x2 Axial bone/soft tissue
- 2x2 Coronal/Sagittal Bone
- 2x2 Coronal/Sagittal ST
- 3D Images (if needed)
- Dose report and/or Patient Protocol Page

****Alignment for true Coronal and Sagittal Planes****



[*Back to MSK Protocol Page*](#)

SHOULDER SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	spiral	spiral	spiral		Scan Type	spiral	
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	20	
Rotation Time (sec)	1.5	1.5	1		Rotation Time (sec)	1	
Pitch	1	0.6	0.8		Pitch	0.984:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	120	120	120		Auto mA range	100-500	
kVp	130				kVp	120	
ref kVp		120	120		Smart mA	On	
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15	
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%	
Recon 1 Bone Axial							
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Shoulder		
Window	Osteo	Osteo	Osteo		Algorithm	Standard	
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	300/35	
Slice Thickness (mm)	2	2	2		Slice Thickness (mm)	2.5	
Slice Increment (mm)	2	2	2		Slice Increment (mm)	2.5	
Recon 2 ST					Type	Full	
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		ASIR	SS10	
Window	Shoulder	Shoulder	Shoulder				
SAFIRE/ADMIRE	2	2	2		Bone		
Slice Thickness (mm)	2	2	2		Algorithm	Bone Plus	
Slice Increment (mm)	2	2	2		Window Width/ Level	1500/450	
Coronal/ Sagittal Bone					Slice Thickness (mm)	2.5	
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Slice Increment (mm)	2.5	
Window	Osteo	Osteo	Osteo		Type	Full	
SAFIRE/ADMIRE	0	0	0		ASIR	None	
Slice Thickness (mm)	2	2	2				
Slice Increment (mm)	2	2	2		Bone Reformats		
Coronal ST					Algorithm	Bone Plus	
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		Window Width/ Level	1500/450	
Window	Shoulder	Shoulder	Shoulder		Slice Thickness (mm)	1.25	
SAFIRE/ADMIRE	2	2	2		Slice Increment (mm)	0.625	
Slice Thickness (mm)	2	2	2		Type	Full	
Slice Increment (mm)	2	2	2		ASIR	None	

CTDI: ≤ 25 mGy per acquisition

PT Positioning: Patient is supine with humerus along the trunk of the scan table, opposite arm raised, No gantry tilt

Setup: AP and lateral scouts from above the clavicle through the scapula

DFOV: 20-25cm for the CD Data Set, 18cm for other recons

Scan Parameters:

- 130-140 kVP
- Scan from above the clavicle though the entire scapula during breath hold

PACS series in order as performed:

- Topogram
- DFOV 20-25cm ; 0.6 x 0.6 Axial ST CD Data Set
- DFOV 18 cm ; 2x2 Axial Bone
- DFOV 18 cm ; 2x2 Axial ST
- DFOV 18 cm ; 2x2 Coronal Bone
- DFOV 18 cm ; 2x2 Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



ARTHREX VIP OR ACTIVATE MATCH POINT/DJO SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	spiral	spiral	spiral		Scan Type	spiral	
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	20	
Rotation Time (sec)	1.5	1.5	1		Rotation Time (sec)	0.8	
Pitch	1	0.6	0.8		Pitch	0.984:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	120	120	120		Auto mA range	100-500	
kVp	130				kVp	140	
ref kVp		120	120		Smart mA	On	
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15	
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%	
CD Data Set							
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		Bone		
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus	
SAFIRE/ADMIRE	2	2	0		Window Width/ Level	1500/450	
Slice Thickness (mm)	0.6	0.6	0.6		Slice Thickness (mm)	2.5	
Slice Increment (mm)	0.6	0.6	0.6		Slice Increment (mm)	2.5	
Shoulder Bone					Type	Full	
Kernel	B80s Sharp	B80s Sharp	B70s Very Sharp		ASIR	SS40	
Window	Shoulder	Shoulder	Shoulder				
SAFIRE/ADMIRE	0	0	0		ST		
Slice Thickness (mm)	2	2	2		Algorithm	Standard	
Slice Increment (mm)	2	2	2		Window Width/ Level	450/35	
ST Axial					Slice Thickness (mm)	2.5	
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		Slice Increment (mm)	2.5	
Window	Shoulder	Shoulder	Shoulder		Type	Plus	
SAFIRE/ADMIRE	2	2	2		ASIR	None	
Slice Thickness (mm)	2	2	2				
Slice Increment (mm)	2	2	2		CD Set		
Coronal/Sagittal Bone					Algorithm	Standard	
Kernel	B80s Sharp	B80s Sharp	B70s Very Sharp		Window Width/ Level	450/35	
Window	Shoulder	Shoulder	Shoulder		Slice Thickness (mm)	0.625	
SAFIRE/ADMIRE	0	0	0		Slice Increment (mm)	0.625	
Slice Thickness (mm)	2	2	2		Type	Plus	
Slice Increment (mm)	2	2	2		ASIR	None	

CTDI: ≤ 25 mGy per acquisition

PT Positioning: Patient is supine with humerus along the trunk of the scan table, opposite arm raised, No gantry tilt

Setup: AP and lateral scouts from above the clavicle through the scapula

DFOV: 25cm for the CD Data Set, 18cm for other recons

Scan Parameters:

- 130-140 kVP
- Scan from above the clavicle though the entire scapula during breath hold

PACS series in order as performed:

- Topogram
- DFOV 25cm ; 1x0.6 Axial Bone CD Data Set
- DFOV 18 cm ; 2x2 Axial Bone
- DFOV 18 cm ; 2x2 Axial ST
- DFOV 18 cm ; 2x2 Coronal Bone
- DFOV 18 cm ; 2x2 Sagittal Bone/ST
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

BLUEPRINT SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	40 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1.5	0.5	1	Rotation Time (sec)	0.8
Pitch	1	0.6	0.8	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	19.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	120	50	120	Auto mA range	100-500
kVp	130			kVp	140
ref kVp		120	140	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	20
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	30%
CD Data Set					
Kernel	B31s Med Smooth	B31s Med Smooth	B70s Very Sharp	Bone	
Window	Osteo	Osteo	Osteo	Algorithm	Bone
SAFIRE/ADMIRE	2	2	0	Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	2.5
Slice Increment (mm)	1	1	0.6	Slice Increment (mm)	2.5
Shoulder Bone/Cor/Sag					
Kernel	B80s Very Sharp	B80s Very Sharp	B70s Very Sharp	Type	Full
Window	Osteo	Osteo	Osteo	ASIR	SS40
SAFIRE/ADMIRE	0	0	0	ST	
Slice Thickness (mm)	2	2	2	Algorithm	Standard
Slice Increment (mm)	2	2	2	Window Width/ Level	350/40
ST Axial					
Kernel	B31s Med Smooth	B31s Med Smooth	I31s Med Smooth	Slice Thickness (mm)	2.5
Window	Shoulder	Shoulder	Shoulder	Slice Increment (mm)	2.5
SAFIRE/ADMIRE	2	2	2	Type	Full
Slice Thickness (mm)	2	2	2	ASIR	SS40
Slice Increment (mm)	2	2	2	Bone Reformat/CD Data Set	
Sagittal ST					
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth	Algorithm	Bone
Window	Shoulder	Shoulder	Shoulder	Window Width/ Level	1500/450
SAFIRE/ADMIRE	2	2	2	Slice Thickness (mm)	1.25
Slice Thickness (mm)	2	2	2	Slice Increment (mm)	0.625
Slice Increment (mm)	2	2	2	Type	Full
				ASIR	None

**Protocol designed to minimize the amount of radiation while maximizing the yield and produce diagnostically acceptable image quality*

PT Positioning: Patient is supine with humerus along the trunk of the scan table, opposite arm raised, No gantry tilt

Setup: AP and lateral scouts from above the clavicle through the scapula

DFOV: 25cm for the CD Data Set, 18cm for other recons

Scan Parameters:

- 130-140 kVP
- Scan from above the clavicle though the entire scapula during breath hold

PACS series in order as performed:

- Topogram
- DFOV 25 cm; 1x1 Axial Bone CD Data Set
- DFOV 18 cm; 1x1 Axial Bone
- DFOV 18 cm; 1x1 Axial ST
- DFOV 18 cm; 1x1 Coronal Bone
- DFOV 18 cm; 1x1 Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

Pre-requisites for the CT scan examination:

Date

- CT exam should be performed **less than 6 months** prior to the surgery.

Format

- DICOM Format
- Modality = 'CT'
- Hounsfield encoding
- Uncompressed images
- Non-encrypted and non-anonymized images (*patient sex and birthdate can be fake but must be present*)

Resolution

- Pixels are square and constant for all the images
 - o The minimal resolution for an image is 0.3 x 0.3 mm/pixel (i.e. 512 pixels represent at least 154 mm)
 - o **The maximal resolution for an image is 0.8 x 0.8 mm/pixel** (i.e. 512 pixels represent no more than 410 mm)
- The interspace distance between consecutive slices is constant for the whole exam.
 - o Minimum distance: 0.3 mm
 - o **Maximum distance : 1 mm**
- The CT-scan images are pure **axial** slices (gantry tilt = 0°)



Dimension

- The examination includes the entire scapula, complete to medial border and distal tip:



Recommendations

- The CT-scan will typically contain between 200 and 450 images.
- The patient must not move during the exam.
- Injectable contrast must not be used, as it can occlude imaging and reconstruction of the CT scan.
- Recommendation for machine settings: kilo volt peak (KVP) ≥ 120
- Exam can be rejected if images quality is altered. This can be caused by:
 - o Patient motion during examination
 - o Metallic artifacts

The CT-scan must be stored on a CD-ROM or a USB stick.

INFORMATION

Exactech GPS was CE approved in 2010, Total Shoulder Arthroplasty application was CE approved in 2016.
For additional product information, please contact:

Manufacturer:
Blue Ortho
6 Allée de Bethléem
33610 Gâres – FRANCE
e-mail: gps@blueortho.com



EXACTECH GPS SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	40 x 0.6	64 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1.5	0.5	1	Rotation Time (sec)	0.8
Pitch	1	0.6	0.8	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	19.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	120	50	50	Auto mA range	100-350
kVp	130			kVp	140
ref kVp		120	140	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	20
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	30%
CD Data Set				Bone	
Kernel	I31s Med Smooth	I31s Med Smooth	B70s Very Sharp	Algorithm	Bone Plus
Window	Osteo	Osteo	Osteo	Window Width/ Level	1500/ 450
SAFIRE/ADMIRE	2	2	0	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	0.75	Type	Full
				ASIR	SS40
Soft Tissue				Recon 2 ST	
Kernel	I31s Med Smooth	I31s Med Smooth	I31s Med Smooth	Algorithm	Standard
Window	Shoulder	Shoulder	Shoulder	Window Width/ Level	350/ 45
SAFIRE/ADMIRE	2	2	2	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	1	Type	Full
				ASIR	SS40
Bone/Cor/Sag				CD Data Set	
Kernel	B80s Very Sharp	B80s Very Sharp	B70s Very Sharp	Algorithm	Bone
Window	Osteo	Osteo	Osteo	Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0	Slice Thickness (mm)	1.25
Slice Thickness (mm)	1	1	1	Slice Increment (mm)	1.25
Slice Increment (mm)	1	1	1	Type	Full
				ASIR	None
				ST Reformat	
				Algorithm	Standard
				Window Width/ Level	400/40
				Slice Thickness (mm)	1.25
				Slice Increment (mm)	0.75
				Type	Full
				ASIR	SS40
				Bone reformat	
				Algorithm	Bone Plus
				Window Width/ Level	1500/ 450
				Slice Thickness (mm)	1.25

CTDI: ≤ 25 mGy per acquisition

Setup: AP and lateral scouts from above the clavicle through the scapula

- Head first supine
- Place **both arms** along the trunk on the scan table
 - If a shoulder implant is present in the contralateral arm it is **required** to raise that arm above the head
- Palm of hands should be facing the body sides
- No gantry tilt

DFOV: 25cm for the CD Data Set, 18cm for other recons

Scan Parameters:

- 130-140 kVP
- Scan from above the clavicle though the entire scapula during breath hold
 - If both shoulders are requested, reconstruct them independent of one another



PACS series in order as performed:

- Topogram
- DFOV 25 cm ; 1 x 0.5 Axial ST CD Data Set
- DFOV 18 cm ; 2x2 Axial Bone
- DFOV 18 cm ; 2x2 Axial ST
- DFOV 18 cm ; 2x2 Coronal Bone
- DFOV 18 cm ; 2x2 Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

MATERIALISE TRUSIGHT SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	spiral	spiral	spiral		Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	20
Rotation Time (sec)	1.5	1.5	1		Rotation Time (sec)	0.8
Pitch	1	0.6	0.8		Pitch	0.984:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	120	120	120		Auto mA range	100-500
kVp	130				kVp	140
ref kVp		120	140		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%
CD data set						
Kernel	I31s Med Smooth	I31s Med Smooth	B70s Very Sharp		Recon 1 Bone	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	2	2	0		Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	2.5
Slice Increment (mm)	0.5	0.5	0.6		Slice Increment (mm)	2.5
Shoulder Bone						
Kernel	B80s Sharp	B80s Sharp	B70s Very Sharp		Type	Full
Window	Osteo	Osteo	Osteo		ASIR	SS40
SAFIRE/ADMIRE	0	0	0		ST	
Slice Thickness (mm)	2	2	2		Algorithm	STND
Slice Increment (mm)	2	2	2		Window Width/ Level	450/35
Soft Tissue						
Kernel	I31s Med Smooth	I31s Med Smooth	I31s Med Smooth		Slice Thickness (mm)	2.5
Window	Shoulder	Shoulder	Shoulder		Slice Increment (mm)	2.5
SAFIRE/ADMIRE	2	2	2		Type	Plus
Slice Thickness (mm)	2	2	2		ASIR	None
Slice Increment (mm)	2	2	2		CD SET	
Coronal/ Sagittal Bone						
Kernel	B80s Sharp	B80s Sharp	B70s Very Sharp		Algorithm	STND
Window	Osteo	Osteo	Osteo		Window Width/ Level	450/35
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	1.25
Slice Thickness (mm)	2	2	2		Slice Increment (mm)	0.625
Slice Increment (mm)	2	2	2		Type	Plus
					ASIR	None
					REFORMAT	
					Algorithm	Bone Plus
					Window Width/ Level	1500/450

CTDI: ~25 mGy per acquisition

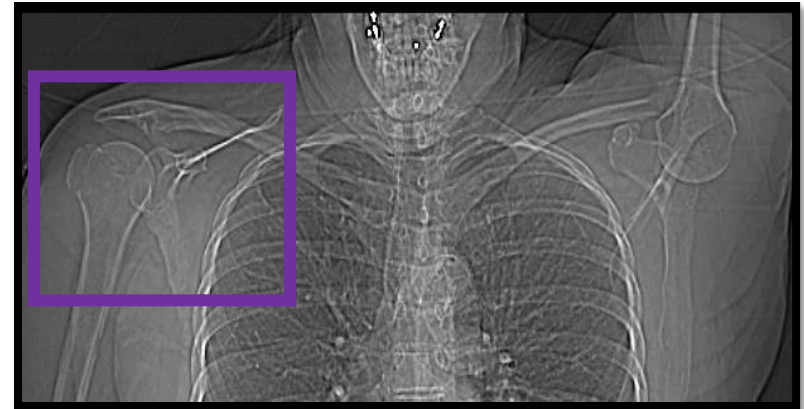
PT Positioning: Patient in true anatomical position, humerus supported to lie parallel to the table and palm supinated, opposite arm raised above head
Setup: AP and lateral scouts from above the clavicle through the area of interest

DFOV:

- Arthrogram Should 14cm

Scan Parameters:

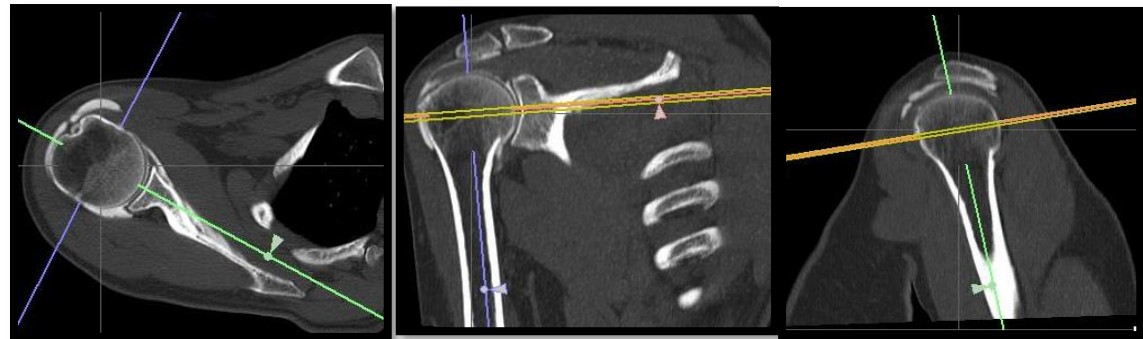
- Scan range to include the affected shoulder joint during breath hold
- Pre-Imaging needed if patient has metal



PACS series in order as performed:

- Topogram
- 2x2 Axial bone/soft tissue
- 2x2 Coronal/Sagittal Bone
- 2x2 Coronal/Sagittal ST
- 3D Images (if needed)
- Dose report and/or Patient Protocol Page

****Alignment for true Coronal and Sagittal Planes****



[*Back to MSK Protocol Page*](#)

SHOULDER ARTH SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660	
Scan Type	spiral	spiral	spiral		Scan Type	spiral	
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	40	
Rotation Time (sec)	1.5	1.5	1		Rotation Time (sec)	0.8	
Pitch	1	0.6	0.8		Pitch	0.984:1	
Scan FOV	Large	Large	Large		Speed (mm/rot)	19.37	
CareDose4D	On	On	On		Scan FOV	Large Body	
Quality ref mAs	120	120	120		Auto mA range	100-500	
kVp	130				kVp	120	
ref kVp		120	120		Smart mA	On	
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15	
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%	
Recon 1 Bone Axial							
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Bone		
Window	Osteo	Osteo	Osteo		Algorithm	Bone	
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450	
Slice Thickness (mm)	2	2	2		Slice Thickness (mm)	1.25	
Slice Increment (mm)	2	2	2		Slice Increment (mm)	1.25	
Recon 2 ST					Type	Full	
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		ASIR	SS40	
Window	Shoulder	Shoulder	Shoulder				
SAFIRE/ADMIRE	2	2	2		ST		
Slice Thickness (mm)	2	2	2		Algorithm	Standard	
Slice Increment (mm)	2	2	2		Window Width/ Level	350/40	
Coronal/ Sagittal Bone					Slice Thickness (mm)	1.25	
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp		Slice Increment (mm)	1.25	
Window	Osteo	Osteo	Osteo		Type	Full	
SAFIRE/ADMIRE	0	0	0		ASIR	SS40	
Slice Thickness (mm)	2	2	2				
Slice Increment (mm)	2	2	2		Bone Reformat		
Coronal ST					Algorithm	Bone	
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth		Window Width/ Level	1500/450	
Window	Shoulder	Shoulder	Shoulder		Slice Thickness (mm)	1.25	
SAFIRE/ADMIRE	2	2	2		Slice Increment (mm)	0.625	
Slice Thickness (mm)	2	2	2		Type	Full	
Slice Increment (mm)	2	2	2		ASIR	none	

PT Positioning:

- Patient must be in supine position at iso-center in the gantry
- Place the affected arm extended along the side of the body with the wrist externally rotated (at least 45 degrees) with palm up, place the opposite arm over head

Setup: AP and lateral scouts from above the clavicle through the scapula

DFOV:

- 25cm for the CD Data Set
- 18cm for other recons

Scan Parameters:

- 120 kVP ; 0.625mm slice thickness or smaller ; ST Algorithm with no edge enhancement
- Scan from above the acromion process to below inferior angle of scapula
 - If patient presents with humeral implant please extend the scan 3cm below the implant

PACS series in order as performed:

- Topogram
- DFOV 25 cm ; 0.625 x 0.625 Axial ST CD Data Set
- DFOV 18 cm ; 2x2 Axial Bone
- DFOV 18 cm ; 2x2 Axial ST
- DFOV 18 cm ; 2x2 Coronal Bone
- DFOV 18 cm ; 2x2 Sagittal Bone
- DFOV 18 cm ; 2x2 Sagittal ST
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



ZIMMER-BIOMET SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	40 x 0.6	64 x 0.6	Detector Coverage (mm)	40
Rotation Time (sec)	1.5	0.5	0.5	Rotation Time (sec)	0.8
Pitch	1	0.6	0.6	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	39.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	120	50	50	Auto mA range	100-350
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	20
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	30%
				Recon 1 RT/LT	
CD Data Set				Algorithm	Bone Plus
Kernel	I31s Medsmooth	I31s Medsmooth	I31s Medsmooth	Window Width/ Level	1500/450
Window	Shoulder	Shoulder	Shoulder	Slice Thickness (mm)	1.25
SAFIRE/ADMIRE	2	2	2	Slice Increment (mm)	1.25
Slice Thickness (mm)	0.6	0.6	0.6	Type	Full
Slice Increment (mm)	0.6	0.6	0.6	ASIR	SS40
				ST	
Soft Tissue				Algorithm	STND
Kernel	I31s Medsmooth	I31s Medsmooth	I31s Medsmooth	Window Width/ Level	450/35
Window	Shoulder	Shoulder	Shoulder	Slice Thickness (mm)	1.25
SAFIRE/ADMIRE	2	2	2	Slice Increment (mm)	1.25
Slice Thickness (mm)	2	2	2	Type	Full
Slice Increment (mm)	2	2	2	ASIR	ss40
				Biomet Set	
Bone				Algorithm	STND
Kernel	B80s very sharp	B80s very sharp	B80s very sharp	Window Width/ Level	350/45
Window	Osteo	Osteo	Osteo	Slice Thickness (mm)	0.625
SAFIRE/ADMIRE	1	1	1	Slice Increment (mm)	0.625
Slice Thickness (mm)	2	2	2	Type	Plus
Slice Increment (mm)	2	2	2	ASIR	None
				ST Reformat	
Coronal/Sagittal				Algorithm	STND
Kernel	B80s very sharp	B80s very sharp	B80s very sharp	Window Width/ Level	400/40
Window	Osteo	Osteo	Osteo	Slice Thickness (mm)	1.25
SAFIRE/ADMIRE	0	0	0	Slice Increment (mm)	0.75
Slice Thickness (mm)	2	2	2	Type	Full
Slice Increment (mm)	2	2	2	ASIR	SS40
				Bone Reformat	
Soft Tissue Sagittal				Algorithm	Bone Plus
Kernel	I31s Medsmooth	I31s Medsmooth	I31s Medsmooth	Window Width/ Level	1500/450
Window	Shoulder	Shoulder	Shoulder	Slice Thickness (mm)	1.25
SAFIRE/ADMIRE	2	2	2	Slice Increment (mm)	0.625
Slice Thickness (mm)	2	2	2	Type	Full
Slice Increment (mm)	2	2	2	ASIR	SS40

***** Do NOT perform arthro CT scan as Medacta will reject contrasted scans due to inaccurate 3D modeling*****

PT Positioning:

- Patient must be in supine position at iso-center of the gantry
- The arm of interest must be in neutral rotation, as close to gantry center as possible, the interested forearm must be in complete extension.
- No sponge or pillows placed under arm
- Opposite arm is above the head

Setup: AP and lateral scouts from above the clavicle through the elbow

DFOV:

- Shoulder 15-30 cm to include entire scapula
- Elbow 15-20 cm
- Recon sets 180cm



Scan Parameters:

- 120 kVP ; 0.625mm slice thickness or smaller , no larger than 1.0
- **Shoulder**- Craniocaudal direction, start above the acromioclavicular joint and stop around:
 - 10 cm below the lesser tubercle in case of a primary arthroplasty. Make sure that the whole scapula is scanned (inferior angle included)
 - 20 cm below the lesser tubercle in case of a revision arthroplasty
- **Elbow**- The scan must start atleast 5cm above the epicondyles and stop at about 5 cm below the epicondyles

PACS series in order as performed:

- Topograms
- CD Data Set shoulder
- CD Data Set elbow
- Coronal/Sagittal Bone shoulder and elbow
- Coronal/Sagittal ST shoulder and elbow
- Dose report and Patient Protocol Page

[*Back to MSK Protocol Page*](#)

MEDACTA MY SHOULDER SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6	Detector Coverage (mm)	40
Rotation Time (sec)	1.5	1.5	1	Rotation Time (sec)	0.8
Pitch	1	0.6	0.8	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	19.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	120	120	120	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
Recon 1/2 Shoulder & elbow					
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Recon 1/2 Shoulder & elbow	
Window	Osteo	Osteo	Osteo	Algorithm	Bone
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25
Recon 2 ST					
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth	Type	Full
Window	Shoulder	Shoulder	Shoulder	ASIR	SS40
SAFIRE/ADMIRE	2	2	2	ST	
Slice Thickness (mm)	2	2	2	Algorithm	Standard
Slice Increment (mm)	2	2	2	Window Width/ Level	350/40
Coronal/ Sagittal Bone					
Kernel	B70s Sharp	B70s Sharp	B70s Very Sharp	Slice Thickness (mm)	1.25
Window	Osteo	Osteo	Osteo	Slice Increment (mm)	1.25
SAFIRE/ADMIRE	0	0	0	Type	Full
Slice Thickness (mm)	2	2	2	ASIR	SS40
Slice Increment (mm)	2	2	2	Bone Reformat	
Coronal ST					
Kernel	B31s Med Smooth	B31s Med Smooth	B31s Med Smooth	Algorithm	Bone
Window	Shoulder	Shoulder	Shoulder	Window Width/ Level	1500/450
SAFIRE/ADMIRE	2	2	2	Slice Thickness (mm)	1.25
Slice Thickness (mm)	2	2	2	Slice Increment (mm)	0.625
Slice Increment (mm)	2	2	2	Type	Full
				ASIR	none

CTDI: ~10-20 mGy per acquisition

PT Positioning: Patient is supine with arms down (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above to below the SC joints

DFOV: Appropriate for patient's body habitus. Use same DFOV as prior exam when available

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above the the SC joints to below the SC joints during breath hold to Include BOTH SC joints
 - Okay to use the Sternum protocol on the scanner

PACS series in order as performed:

- Topogram
- 1x1 Axial bone
- 1x1 Axial Soft Tissue
- 1x1 Coronal/Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

STERNOCLAVICULAR JOINTS SCAN PROTOCOL

Scanner	Perspective	Definitlon AS 40	Definitlon AS 64		Scanner	Optima 660
Scan Type	spiral	spiral	spiral		Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	32 x 0.6		Detector Coverage (mm)	40
Rotation Time (sec)	1.5	1.5	1.5		Rotation Time (sec)	0.8
Pitch	1.3	1.3	1.3		Pitch	0.984:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	39.37
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	120	120	120		Auto mA range	100-500
kVp	130				kVp	120
ref kVp		120	120		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%
Recon 1 Bone Axial					Recon 1 ST Axial	
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Algorithm	Standard
Window	Osteo	Osteo	Osteo		Window Width/ Level	450/ 35
SAFIRE/ADMIRE					Slice Thickness (mm)	5
Slice Thickness (mm)	1	1	1		Slice Increment (mm)	5
Slice Increment (mm)	1	1	1		Type	Full
Recon 2 ST						
Kernel	131s medsmooth	131s medsmooth	131s medsmooth			
Window	Shoulder	Shoulder	Shoulder			
SAFIRE/ADMIRE	3	3	3			
Slice Thickness (mm)	1	1	1			
Slice Increment (mm)	1	1	1			
Coronal/ Sagittal Bone						
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Recon 2 Reformats	
Window	Osteo	Osteo	Osteo		Algorithm	Standard
SAFIRE/ADMIRE					Window Width/ Level	450/ 35
Slice Thickness (mm)	1	1	1		Slice Thickness (mm)	2.5
Slice Increment (mm)	1	1	1		Slice Increment (mm)	1.25

CTDI: ~10-20 mGy per acquisition

PT Positioning: Patient is supine with arms above head (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above the manubrium through the xyphoid process

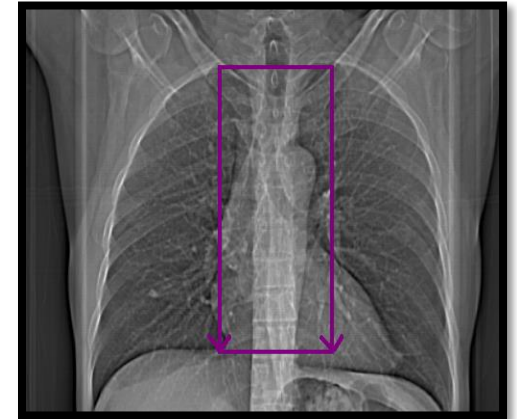
DFOV: Appropriate for patient's body habitus. Use same DFOV as prior exam when available

Scan Parameters:

- IV Contrast:
 - At the discretion of the radiologist
 - 75 ml of 350 mg/dl non-ionic contrast @3ml/sec
 - 50 second delay
- Scan from above the manubrium through the xyphoid process during breath hold

PACS series in order as performed:

- Topogram
- 1x1 Axial bone
- 1x1 Axial Soft Tissue
- 1x1 Coronal/Sagittal Bone
- 1x1 Coronal/Sagittal Soft Tissue
- 3D images (if needed)
- Dose report and/or Patient Protocol Page



[*Back to MSK Protocol Page*](#)

STERNUM SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64	Scanner	Optima 660
Scan Type	spiral	spiral	spiral	Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	32 x 0.6	Detector Coverage (mm)	20
Rotation Time (sec)	1	1.5	1.5	Rotation Time (sec)	0.5
Pitch	0.65	1.3	1.3	Pitch	0.984:1
Scan FOV	Large	Large	Large	Speed (mm/rot)	19.37
CareDose4D	On	On	On	Scan FOV	Large Body
Quality ref mAs	135	120	120	Auto mA range	100-500
kVp	130			kVp	120
ref kVp		120	120	Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast	Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast	ASIR	50%
Recon 1 Bone Axial					
Kernel	B70s Sharp	B70s Sharp	B70s Sharp	Bone	
Window	Osteo	Osteo	Osteo	Algorithm	Bone
SAFIRE/ADMIRE	0	0	0	Window Width/ Level	1500/450
Slice Thickness (mm)	1	1	1	Slice Thickness (mm)	1.25
Slice Increment (mm)	1	1	1	Slice Increment (mm)	1.25
Recon 2 ST				Type	Full
Kernel	I31s Med Smooth	I31s Med Smooth	I31s Med Smooth	ASIR	SS20
Window	Shoulder	Shoulder	Shoulder		
SAFIRE/ADMIRE	3	3	3	ST	
Slice Thickness (mm)	1	1	1	Algorithm	Standard
Slice Increment (mm)	1	1	1	Window Width/ Level	350/40
Coronal/ Sagittal Bone				Slice Thickness (mm)	1.25
Kernel	B70s Sharp	B70s Sharp	B70s Sharp	Slice Increment (mm)	1.25
Window	Osteo	Osteo	Osteo	Type	Full
SAFIRE/ADMIRE	0	0	0	ASIR	SS20
Slice Thickness (mm)	1	1	1		
Slice Increment (mm)	1	1	1	Reformat	
Coronal ST				Algorithm	Bone Plus
Kernel	I31s Med Smooth	I31s Med Smooth	I31s Med Smooth	Window Width/ Level	1500/450
Window	Shoulder	Shoulder	Shoulder	Slice Thickness (mm)	1.25
SAFIRE/ADMIRE	3	3	3	Slice Increment (mm)	1.25
Slice Thickness (mm)	1	1	1	Type	Plus
Slice Increment (mm)	1	1	1	ASIR	None

CTDI: ~13 mGy per acquisition

PT Positioning: Place anatomy of interest in true anatomical position (*Please note reason for protocol changes*)

Setup: AP and lateral scouts from above/below anatomy of interest

DFOV: Focused DFOV ~ 7 cm; appropriate for anatomy of interest. (FOV should be narrowed to include intra-articular contrast only)

Scan Parameters:

- Scan from above to below the anatomy of interest

PACS series in order as performed:

- Topogram
- 0.6 x 0.6 Axial bone
- 0.6 x 0.6 Axial Soft Tissue
- 0.6 x 0.6 Coronal Bone
- 0.6 x 0.6 Sagittal Bone
- 3D images (if needed)
- Dose report and/or Patient Protocol Page

[*Back to MSK Protocol Page*](#)

WRIST ARTHROGRAM SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	spiral	spiral	spiral		Scan Type	Helical
Detector Configuration	32 x 0.6	32 x 0.6	32 x 0.6		Detector Coverage (mm)	20
Rotation Time (sec)	1	1	1		Rotation Time (sec)	1
Pitch	0.8	0.8	0.8		Pitch	0.531:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	10.62
CareDose4D	On	On	On		Scan FOV	Small Body
Quality ref mAs	60	60	60		Auto mA range	100-500
kVp	130				kVp	120
ref kVp		120	120		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	0%
Bone						
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Recon 1 Bone Axial	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	0	0	0		Window Width/ Level	1500/450
Slice Thickness (mm)	0.6	0.6	0.6		Slice Thickness (mm)	0.625
Slice Increment (mm)	0.6	0.6	0.6		Slice Increment (mm)	0.625
Soft Tissue						
Kernel	I31s Med Smooth	I31s Med Smooth	I31s Med Smooth		Type	Full
Window	Mediastinum	Mediastinum	Mediastinum		ASIR	None
SAFIRE/ADMIRE	0	0	0		ST	
Slice Thickness (mm)	0.6	0.6	0.6		Algorithm	Standard
Slice Increment (mm)	0.6	0.6	0.6		Window Width/ Level	350/50
Coronal/ Sagittal Bone						
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Slice Thickness (mm)	0.625
Window	Osteo	Osteo	Osteo		Slice Increment (mm)	0.625
SAFIRE/ADMIRE	0	0	0		Type	Full
Slice Thickness (mm)	0.6	0.6	0.6		ASIR	SS20
Slice Increment (mm)	0.6	0.6	0.6		Bone Reformats	
Coronal/Sagittal ST						
Kernel	I41s Med Smooth	I41s Med Smooth	I41s Med Smooth		Algorithm	Bone Plus
Window	Mediastinum	Mediastinum	Mediastinum		Window Width/ Level	1500/450
SAFIRE/ADMIRE	0	0	0		Slice Thickness (mm)	0.625
Slice Thickness (mm)	0.6	0.6	0.6		Slice Increment (mm)	0.625
Slice Increment (mm)	0.6	0.6	0.6		Type	Full
					ASIR	None

CTDI: ~ 13 mGy per acquisition

Used for evaluation of Distal Radial Ulnar Joint

PT Positioning: Place anatomy of interest in true anatomical position, please note reason for protocol change

Setup: AP and lateral scouts from above to below anatomy of interest ; **Mark symptomatic wrist with a BB**

DFOV: To display bilateral wrists on axial recons

Scan Parameters: ****PT lying prone in superman position with arms above the head****

- Pronation
 - Scan acquired with patient's hands in the prone position below the radial ulnar joint thru the carpal bones
- Supination
 - Scan acquired with patient's hands in the supine position below the radial ulnar joint thru the carpal bones
 -

*****It is crucial to position the hands in such a manner that they are symmetric with one another. We are looking for symmetry so both wrists need to mirror each and be acquired, reconstructed and displayed together with the same FOV used for both acquisitions*****

PACS series in order as performed:

- Topogram
- Bilateral Axial Prone
- Bilateral Axial Supine
- Symptomatic Supine Coronal
- Symptomatic Supine Sagittal
- Dose report and/or Patient Protocol Page

WRIST DRUJ SCAN PROTOCOL

Scanner	Perspective	Definition AS 40	Definition AS 64		Scanner	Optima 660
Scan Type	spiral	spiral	spiral		Scan Type	spiral
Detector Configuration	32 x 0.6	32 x 0.6	64 x 0.6		Detector Coverage (mm)	40
Rotation Time (sec)	1	1	0.5		Rotation Time (sec)	0.6
Pitch	0.8	0.8	0.5		Pitch	0.531:1
Scan FOV	Large	Large	Large		Speed (mm/rot)	10.62
CareDose4D	On	On	On		Scan FOV	Large Body
Quality ref mAs	60	60	60		Auto mA range	100-500
kVp	130				kVp	120
ref kVp		120	80		Smart mA	On
Optimize Slider position		3 w/o contrast	3 w/o contrast		Noise Index	15
Optimize Slider position		7 w/ contrast	7 w/ contrast		ASIR	50%
Bone						
Kernel	B70s Sharp	B70s Sharp	I70f Very Sharp AS		Prone bilateral Wrist	
Window	Osteo	Osteo	Osteo		Algorithm	Bone Plus
SAFIRE/ADMIRE	0	0	1		Window Width/ Level	1500/450
Slice Thickness (mm)	0.6	0.6	1		Slice Thickness (mm)	1.25
Slice Increment (mm)	0.6	0.6	1		Slice Increment (mm)	1.25
Soft Tissue						
Kernel	I31s Med Smooth	I31s Med Smooth	I30f Med Smooth		Type	Full
Window	Mediastinum	Mediastinum	Extremity		ASIR	none
SAFIRE/ADMIRE	0	0	1		Reformat Prone wrist	
Slice Thickness (mm)	0.6	0.6	1		Algorithm	Bone Plus
Slice Increment (mm)	0.6	0.6	1		Window Width/ Level	1500/450
Coronal/ Sagittal Bone						
Kernel	B70s Sharp	B70s Sharp	B70s Sharp		Slice Thickness (mm)	0.625
Window	Osteo	Osteo	Osteo		Slice Increment (mm)	0.3
SAFIRE/ADMIRE	0	0	1		Type	Full
Slice Thickness (mm)	0.6	0.6	0.6		ASIR	none
Slice Increment (mm)	0.6	0.6	0.6			
Coronal/Sagittal ST						
Kernel	I41s Med Smooth	I41s Med Smooth	I41s Med Smooth		ST Prone	
Window	Mediastinum	Mediastinum	Mediastinum		Algorithm	Soft
SAFIRE/ADMIRE	0	0	1		Window Width/ Level	350/45
Slice Thickness (mm)	0.6	0.6	0.6		Slice Thickness (mm)	1.25
Slice Increment (mm)	0.6	0.6	0.6		Slice Increment (mm)	1.25
					Type	Full
					ASIR	SS20

