CT Mako Hip

Updated 03/09/25
Reviewed 05/15/25

Indications - pre surgical evaluation for hip joint replacement.
Bill under CT LE w/o Contrast charge. Do not include separate hip and knee charges.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Patient positioning:

Patient in supine position with feet first with both knees and ankles aligned.

Do not allow patient movement between or during the scans.

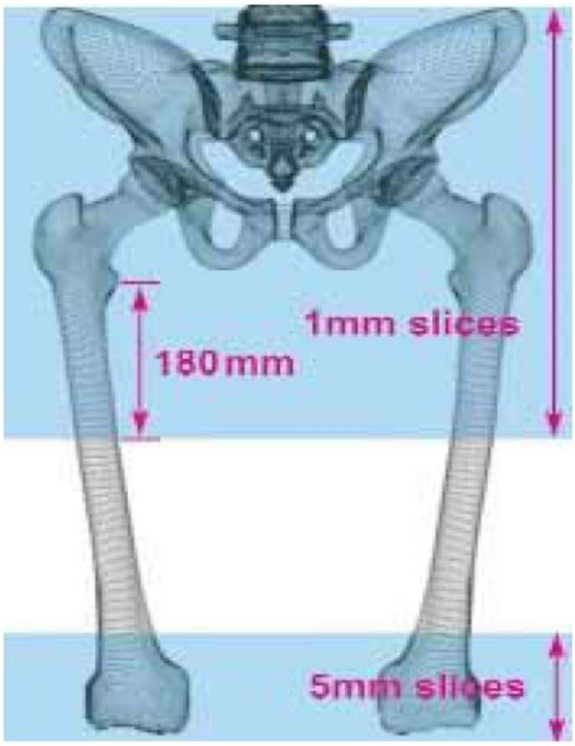
Topogram - iliac crests through mid lower leg.
Craniocaudal scan coverage (see image below):

Hip - iliac crests to 18 cm below lesser trochanter of femur. FOV to include both sides of pelvic bones.

Knee - 10 cm above knee joint to 10 cm below knee joint. FOV to include both knees.

FOV must be <500 mm and matrix must be 512 x 512 squared.

IV Contrast: not given for this protocol.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.
Prepare an uncompressed DICOM disc containing all images (without DICOM viewer).



Craniocaudal Scan Coverage

CT Mako Hip

SIEMENS PARAMETERS & RECONS

For both **Hip** and **Knee** scans:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time
Sensation 16	spiral	120	200	on	NA	0.80	16	0.75	0.5
Go Up 32	spiral	130	200	on	on 170	0.80	32	0.7	1.0
Sensation 64	spiral	120	200	on	NA	0.90	64	0.6	0.5
Definition 64	spiral	120	200	on	on	0.80	64	0.6	1.0
Go Top 64	spiral	120	200	on	on 170	0.80	64	0.6	1.0
Drive 128	spiral	120	200	on	on	0.80	128	0.6	1.0
Force 192	spiral	120	200	on	on	0.80	192	0.6	1.0

HIP RECONS

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX HIP BONE	3.0	3.0	Br59 / B60	bone/osteo	3	head/feet	
COR HIP BONE	3.0	3.0	Br59 / B60	bone/osteo	3	front/back	
SAG HIP BONE	3.0	3.0	Br59 / B60	bone/osteo	3	left/right	
AX HIP THINS	**1.0**	**1.0**	**Br59 / B60**	**abdomen**	**3**	**head/feet**	**Mako specific recon.**

KNEE RECONS

AX KNEE BONE	**3.0**	**3.0**	**Br59 / B60**	**bone/osteo**	**3**	**head/feet**	**Mako specific recon.**
COR KNEE BONE	3.0	3.0	Br59 / B60	bone/osteo	3	front/back	
SAG KNEE BONE	3.0	3.0	Br59 / B60	bone/osteo	3	left/right	

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GE PARAMETERS & RECONS

For both **Hip** and **Knee** scans:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR
LS 16	helical	large	120	100-440	19.09	on	2.5	20	1.375	27.50	0.5	NA	NA
Opt 540	helical	large	120	100-440	19.09	on	2.5	20	1.375	27.50	0.5	NA	NA
LS VCT 64	helical	large body	120	120-450	11.50	on	2.5	40	0.984	39.37	0.5	30	70
Disc VCT 64	helical	large body	120	100-700	14.14	on	2.5	40	0.984	39.37	0.8	NA	NA

HIP RECONS

Name of Series	Thickness	Interval	Recon Algorithm/Mode	Window Width/Level	Recon Direction	
AX HIP BONE	**2.5**	**2.5**	**bone full**	**2500/480**	**head/feet**	**Must be first recon.**
COR HIP BONE	2.5	2.5	bone full	2500/480	front/back	
SAG HIP BONE	2.5	2.5	bone full	2500/480	left/right	
AX HIP THINS	**0.625**	**0.625**	**bone plus full**	**2500/480**	**head/feet**	**Mako specific recon.**

KNEE RECONS

AX KNEE BONE	**2.5**	**2.5**	**bone full**	**2500/480**	**head/feet**	**Must be first recon.**
COR KNEE BONE	2.5	2.5	bone full	2500/480	front/back	**Mako specific recon.**
SAG KNEE BONE	2.5	2.5	bone full	2500/480	left/right	

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PHILIPS PARAMETERS & RECONS

For both **Hip** and **Knee** scans:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time
Incisive 128	helical	120	285	29	**off**	1.00	64	0.625	0.75

HIP RECONS

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX HIP BONE	3.0	3.0	YC	bone	3	head/feet	
COR HIP BONE	3.0	3.0	YC	bone	3	front/back	
SAG HIP BONE	3.0	3.0	YC	bone	3	left/right	
AX HIP THINS	**1.0**	**1.0**	**YC**	**bone**	**3**	**head/feet**	**Mako specific recon.**

KNEE RECONS

AX KNEE BONE	**3.0**	**3.0**	**YC**	**bone**	**3**	**head/feet**	**Mako specific recon.**
COR KNEE BONE	3.0	3.0	YC	bone	3	front/back	
SAG KNEE BONE	3.0	3.0	YC	bone	3	left/right	

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

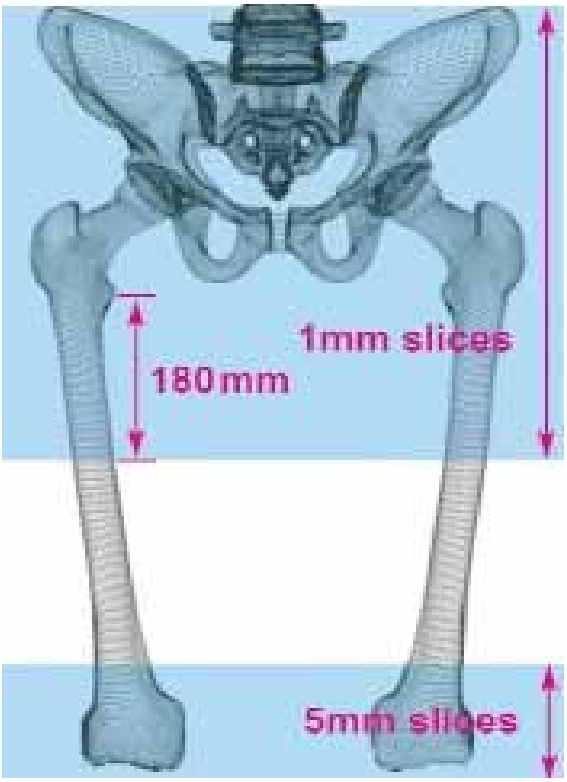

Figure 1. Scan Location and Characteristics

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