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CT SCAN PROTOCOL

LEG 3 REGIONS

Important Information

This CT scanning protocol consists of a localizer and a detailed axial scan of the (bilateral) forearm.

The CT scan quality (with clear bony edges and details) is critical to the production of accurate patient-specific surgical instruments. Deviations from this protocol may result in an unusable scan and delay of surgery.

Please contact Materialise's support team if you require further clarification.

NOTE

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Patient Preparation

- Remove any non-fixed metal prosthesis, jewelry, 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.
- Position the patient as follows: supine, feet first (SFF), patellae pointing forward and the knees in maximal extension, toes pointing straight up.
- Always place a marker on the contra lateral knee (for indication of left or right). Use a marker that doesn't hinder the quality of the CT scan.
- If an implant is present in the contra lateral knee, elevate the contra lateral knee to prevent artifacts appearing in the joint line of interest.

TABLE POSITION

Set the table height so that the area to be scanned is centered in the scan field. **DO NOT** raise or lower the CT table between slices. **DO NOT** alter the X or Y centering between scans. Center points must be identical.

FIELD OF VIEW (FOV)

Use the smallest FOV possible (up to 25cm by 25cm maximum) to capture the whole of the required bone regions. This will require careful alignment of the leg to capture the femoral head, knee and talus.

Scan all slices with the same FOV, reconstruction center AND table height (coordinate system).

Capturing all of the soft tissue is unnecessary, only the bony regions are of interest.

NO GANTRY TILT

BILATERAL IMAGING

Bilateral imaging can be accomplished with a single acquisition.

RECONSTRUCTION

No secondary reconstructions; images must be scanned at the given parameters or smaller.

No obliqueness; no gantry tilt and no oblique reconstructions.

No reformatting into coronal or sagittal planes; no MPR's. **No** 3D reconstructions.

Scanning Parameters

Region of interest of Axial Scan 1	Hip region: from below to above the femoral head	
Collimation	Slice thickness: 1.25mm – 1.50mm Slice increment: 1.25mm - 1.50mm (contiguous slices)	
kVp	90 (120 for obese patients or metal hardware in hip region)	
mAs	As given by the automatic system	
Pitch	Use 2 or smaller	
Field of View (FOV)	Use 25cm or smaller (bilateral: max 32cm)	
Matrix	Use a 512 x 512 matrix	
Kernel / Algorithm	Moderate / soft tissue (DO NOT use 'bone')	
Region of interest of Axial Scan 2	Knee – 25cm above and below	
Collimation	Slice thickness: 1.25mm - 1.50mm Slice increment: 0.625mm – 0.7mm (50% overlap)	
kVp	120	
mAs	As given by the automatic system	
Pitch	Use 1 or smaller	
Field of View (FOV)	Use 25cm or smaller (bilateral: max 32cm)	
Matrix	Use a 512 x 512 matrix	
Kernel / Algorithm	Moderate / soft tissue (DO NOT use 'bone')	
Region of interest of Axial Scan 3	Ankle region: a few cm's below and above the ankle joint	
Collimation	Slice thickness: 1.25mm - 1.50mm Slice increment: 1.25mm - 1.50mm (Contiguous Slices)	
kVp	120	
mAs	As given by the automatic system	
Pitch	Use 2 or smaller	
Field of View (FOV)	Use 25cm or smaller (bilateral: max 32cm)	

Matrix	Use a 512 x 512 matrix
Kernel / Algorithm	Moderate / soft tissue (DO NOT use 'bone')

- We recommend building a 'Materialise 3 region leg' in your CT scanner(s) with the appropriate ranges and parameters.
- **GE users tip:** if you do not have a pre-defined protocol built: select 'repeat series' between scan ranges to scan the next range.
- **DO NOT select "add a group".**
- Localizer / Scout: From the ankle joint to above the femoral head of the hip (sagittal and coronal).

Very Important

- Provide the complete data set of **raw/original DICOM images** to the surgeon.
- **Lossy compression is NOT allowed** (ISO_10918_1, ISO_14495_1, ISO_15444_1 or ISO_13818_1).
- **Only send the images needed for our procedure: 1 localizer + 1 set of axial images.**
- Do not send any recons, reformats, viewer software, etc.

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Data Anonymisation

- Do not erase patient name and ID – Ensure necessary rights are obtained for transfer of data to Materialise.
- Data will be anonymized by Materialise on receipt of the data, after cross-check with prescription of the surgeon to ensure the images of the right patient are provided.

IMPORTANT

Retain a permanent archive (PACS) copy of the RAW data of images (as scanned by the original parameters and in the uncompressed format).

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