Revised NOV 11 2019 RM

Musculoskeletal CT Protocols

B 1: Shoulder CT without contrast
B 1A: Shoulder CT arthrogram
B 2: Elbow CT without contrast
B 2A: Elbow CT arthrogram
B 3: Wrist CT without contrast
B 4: Pelvis CT without contrast
B 5: Hip CT without contrast
B 5A: Hip CT without contrast (arthroplasty version evaluation)
B 6: Knee CT without contrast (tibial plateau fracture protocol)
B6A: Knee CT arthrogram
B 7: Lower leg CT without contrast (Pilon/triplane fracture protocol)
B 8: Foot and ankle CT without contrast
B 9: Upper or lower extremity CT without contrast (long bone evaluation)
B 10: Upper or lower extremity CT with contrast (infection protocol)
B 11: Lower extremity CT without contrast (Zimmer protocol)
B 12: Lower extremity CT without contrast (ConforMis protocol)

B 1: Shoulder CT without contrast

Indications: humeral head fractures.

Contrast parameters	None
Region of scan	AC joint to bottom 1/3 of scapula
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1.0 or 1.5 mm axials; sagittal and coronal MPR
Filming	B30f, B60f kernels

Comments:

B 1: Shoulder CT arthrogram

Indications: internal derangement *and* contraindication to MRI.

Contrast parameters	12 mL 50% diluted iodinated contrast
Region of scan	AC joint to bottom 1/3 of scapula
Scan delay	Within 30 minutes of intra-articular contrast admin
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1.0 or 1.5 mm axials; sagittal and coronal MPR
Filming	B30f, B60f kernels

Comments:

B 2: Elbow CT without contrast

Indications: fractures, arthritis.

Contrast parameters	None
Region of scan	Humeral metaphysis to proximal ulna
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 or 1.5 mm axials; sagittal and coronal MPR
Filming	U90u kernel

Comments:

- Patient position: prone, with arm stretched above head, extended (preferred) or flexed 90 degrees, with thumb pointing towards ceiling.
- Siemens ExtrRoutineUHR package

B 2A: Elbow CT arthrogram

Indications: intra-articular bodies.

Contrast parameters	5 mL intra-articular air contrast
Region of scan	Humeral metaphysis to proximal ulna
Scan delay	Within 30 minutes of air contrast administration
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 or 1.5 mm axials; sagittal and coronal MPR
Filming	U90u kernels

Comments:

- Patient position: prone, with arm stretched above head, extended (preferred) or flexed 90 degrees, with thumb pointing towards ceiling.
- Siemens ExtrRoutineUHR package

B 3: Wrist CT without contrast

Indications: carpal fractures and dislocations.

Contrast parameters	None
Region of scan	Distal forearm to mid-metacarpal shafts
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 mm axials; 1.0 mm sagittal and coronal MPR
Filming	U90u kernels

Comments:

- Patient position: prone, with arm stretched above head, extended and palm down
- Siemens WristUHR package

B 4: Pelvis CT without contrast

Indications: pelvic ring and sacral fractures, metastases.

Contrast parameters	None
Region of scan	Iliac crests to ischial tuberosities
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	3 mm axials; coronal and sagittal MPR
Filming	B30f (axials), B70f kernels

Comments:

- Siemens HipVol package

B 5: Hip CT without contrast

Indications: hip pain, acetabular fractures, avascular necrosis.

Contrast parameters	None
Region of scan	1) Iliac crests to ischial tuberosities (entire pelvis) 2) Acetabular roof to proximal femur, affected side. Include bottom of any surgical hardware.
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1) 3 mm axials 2) 2 mm axials, small FOV; 2 mm sagittal and coronal reformats
Filming	B30f (axials), B70f kernels

Comments:

- Siemens Hip package

Revised NOV 11 2019 RM

B 5A Hip CT without contrast (Arthroplasty version evaluation)

Indications: hip pain, acetabular fractures, avascular necrosis.

Contrast parameters	None
Region of scan	1) Iliac crests to ischial tuberosities (entire pelvis) 2) Acetabular roof to proximal femur, affected side. Include bottom of any surgical hardware. 3) On Axial images only, distal femoral metaphysis to end of femur.
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1) 3 mm axials 2) 2 mm axials, small FOV; 2 mm sagittal and coronal reformats
Filming	B30f (axials), B70f kernels

Comments:

- Siemens Hip package
- Use metal reduction algorithm

B 6: Knee CT without contrast

Indications: tibial plateau fracture surgical planning.

Contrast parameters	None
Region of scan	Distal femur to tibial metaphysis
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 or 1.5 mm axials, coronal and sagittal reformats
Filming	U90u kernels

Comments:

B 6A: Knee CT arthrogram

Indications: cartilage evaluation; knee arthroplasty surgical planning.

Contrast parameters	60mL intra-articular Isovue-300 (50% dilution)
Region of scan	Upper patella through tibial plateau
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 mm axials, 0.75 mm coronal and sagittal reformats
Filming	U90u kernels

Comments:

- Siemens KneeUHR package
- Use 120 kVp and 300mAs (64 and 128 slice scanners).

B 7: Lower leg CT without contrast (Pilon/triplane fracture protocol)

Indications: fracture characterization and surgical planning.

Contrast parameters	None
Region of scan	Distal tibial metaphysis to talar dome
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	2.0 mm axials, 2.0 mm coronal and sagittal reformats
Filming	U90u kernels

Comments:

B 8: Foot and ankle CT without contrast

Indications: calcaneal fractures, hindfoot coalition, subtalar DJD.

Contrast parameters	None
Region of scan	2 cm above tibiotalar joint to bottom of calcaneus
Scan delay	NA
Detector collimation	16 x 0.75 mm, 16 x 0.6 mm (64 and 128 slice)
Slice thickness	1.0 or 1.5 mm axials, 1.5 mm coronal and sagittal reformats
Filming	U90u kernels

Comments:

- Siemens FootUHR package

B 9: Upper or lower extremity CT without contrast (long-bone evaluation)

Indications: focal lesion characterization, bone pain.

Contrast parameters	None
Region of scan	To be specified by radiologist
Scan delay	NA
Detector collimation	16 x 0.75 mm; 64 x 0.6 mm OR 16 x 0.6 mm (64 and 128 slice)
Slice thickness	3 mm axials; coronal and sagittal reformats
Filming	B30s, B70s kernels

Comments:

- Reformatted image thickness to be specified by interpreting radiologist on a case-by-case basis.

B 10: Upper or lower extremity CT with contrast (infection protocol)

Indications: bone infection; peripheral abscesses

Contrast parameters	125 mL at 2.5 mL/sec; OR 100 mL @ 2.5 mL/sec, with 30 mL saline flush
Region of scan	To be specified by radiologist
Scan delay	60 seconds
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 16 x 0.6 mm (128 slice)
Slice thickness	3 mm axials; coronal and sagittal reformats
Filming	B30s, B70s kernels

Comments:

- Reformatted image thickness to be specified by interpreting radiologist on a case-by-case basis.

B 11: Lower extremity CT without contrast (Zimmer protocol)

Indications: knee replacement planning, contraindication to MRI

Contrast parameters	None.
Region of scan	Feet first: below talus to acetabular roof(s).
Scan delay	None.
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 16 x 0.6mm (128 slice)
Slice thickness	1.5 mm axials at 0.75 mm intervals (50% overlap); 0.75 mm axials at 0.4 mm intervals for coronal reformats
Filming	B30s kernels

Comments:

- Patient positioning: supine, feet first, toes pointing straight up.
- If contralateral knee has implant, elevate that knee to mitigate artifact.
- Max FOV: 25 x 25 cm for unilateral scan, 32 x 32 cm for bilateral scan. Peripheral *soft tissues* can be cut off.
- Use Kv of 120, pitch of 1, 512 x 512 matrix.

B 12: Lower extremity CT without contrast (Conformis protocol)

Indications: knee replacement planning, contraindication to MRI

Contrast parameters	None.
Region of scan	1) Hip: through femoral head only. 2) Knee: top of patella to 3 cm below tibial plateau. 3) Ankle: malleoli through talus.
Scan delay	None.
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 16 x 0.6 mm (128 slice)
Slice thickness	1) 2.5 mm at 2.5 mm intervals. 2) 1.5 mm at 0.5 mm intervals; 1 mm sagittal and coronal reformats. 3) 2.5 mm at 2.5 mm intervals.
Filming	B70s kernels

Comments:

- Patient positioning: supine, feet first, toes pointing straight up.
- If contralateral knee has implant, elevate that knee to mitigate artifact.
- Recommended FOV: 25-30 cm for hip, 20-25 cm for knee, 15-20 cm for ankle.