Austin Radiological Association

MRI MSK Hospital Protocols

Adult 1.5T

Questions?

Last Update: 8/1/2024 9:11 AM

1.5T MSK Protocols

General Guidelines

MSK	

General	• NEVER hesitate to reach out to a radiologist for guidance!
	• All PEDI MSK arthritis exams should be performed using the standard adult protocols, unless specifically requested for pediatric radiologist to read
	• MSK Guidelines, portal page reference
	  ○ T1 & T2 weighted imaging is needed to accurately differentiate mass and infection (osteomyelitis, cellulitis, abscess)
	  ○ PD's are generally useful for tendons, ligaments, & joint spaces

Technique	• Use "Weak" FS (Siemens) or "Classic" FS (GE) on all sequences with FS

Protocol	• ALL MSK mass / infection exams should be performed using is T1 & T2 FS all 3 planes with appropriate T1 FS pre & post
	  ○ Always need
	  ▪ Mass / tumor exams - request prior x-ray study for comparison, if applicable
	  ▪ T1 FS pre – prior to contrast injection for direct comparison with post imaging
	  ▪ Generally short axis to the mass is the best option for pre/post imaging
	  ▪ T1 (generally Coronal) for ALL bone metastasis, infection or fracture cases
	  ▪ If contrast is contraindicated a T1 FS pre does not need to be performed
	• Metal Protocols
	  ○ Total joint replacements use T1 & IR series (TSE/FSE sequence types)
	  ○ Hardware such as pins, screws, etc. use standard protocols with metal reduction techniques
	  ○ Metal reduction techniques
	  ▪ Bandwidth 400 Hz or more with signal compensation, fast RF mode

	▪ E-line (3T & Aera) WARP on, VAT 100% • Pelvis vs Hip ○ Hip – evaluation of cartilage & labrum ○ Pelvis – evaluation of fractures, soft tissue & cancer ▪ AVN, Osteonecrosis or history of "steroid use with hip pain" ▪ Cancer (mass, tumor), metastasis, myeloma • Infection (osteomyelitis, cellulitis, abscess) ○ T1, STIR all 3 planes plus appropriate pre/contrast planes • Inflammatory Arthritis (rheumatoid arthritis, psoriatic arthritis, juvenile rheumatoid arthritis, reactive arthritis, gout, CPPD [calcium pyrophosphate deposition disease], or septic arthritis) ○ The entire hand and entire foot must be scanned for arthritis cases without any other indications such as a tear or mass ▪ Contrast is needed to differentiate joint fluid from synovitis ○ If a hand and wrist exam are ordered with a diagnosis of arthritis without any other indications, the wrist and hand need to be scanned together in the same FOV • History of pigmented villonodular synovitis (PVNS) ○ Add T1 Coronal for all joint studies
Contrast	• Delayed contrast required for all exams, perform at least 1 T2 weighted image immediately after injection to allow for sufficient uptake time. • Two planes post contrast are always needed on MSK exams • Not required for marrow disease or lesions (mass/tumor) unless in rare cases it extends into the soft tissues • X-ray / CT abdomen and pelvis imaging must be performed prior to MR contrast exams. • DatScans must be performed prior to MR contrast exams.

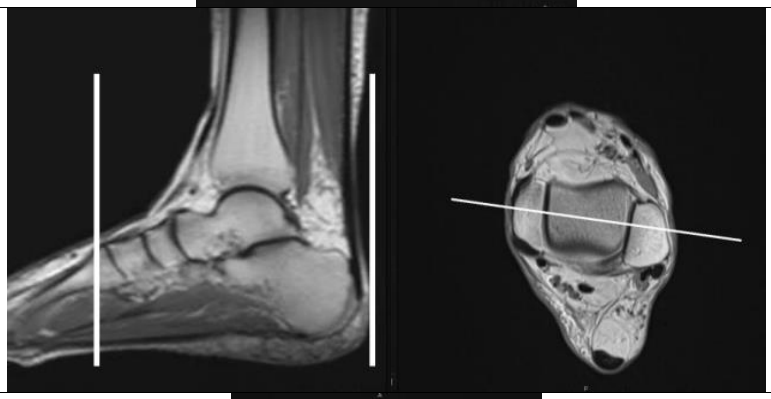
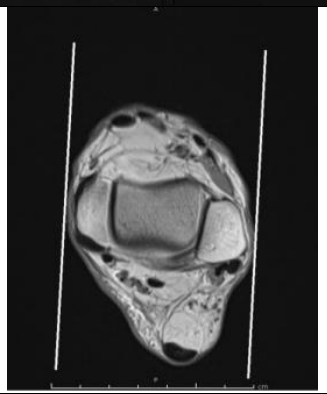
Arthrogram

GENERAL GUIDELINES	
Failed Exam	• Perform routine joint protocol for failed exams, i.e. no contrast within the joint space. Radiologist will interpret study or determine if patient needs to return.
Indirect Arthrogram of Any Joint	• Requires Radiologist consultation / approval • Inject IV gadolinium • Instruct patient to move the affected joint for 15 minutes in rotation, abduction, & adduction prior to scanning • Follow the applicable routine Arthrogram protocol

Arthrogram Ankle

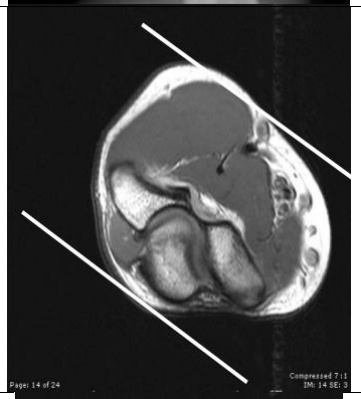
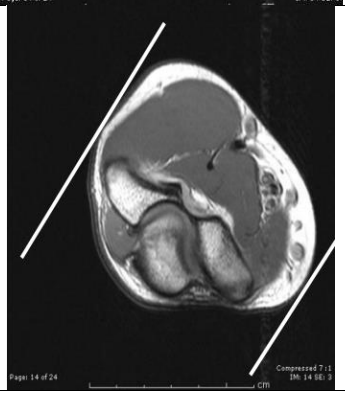
Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.

- Is the pain the same, improved or worsened since the procedure?

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T1 FS Ax T2 FS Ax	~140	3.5 x 1 ~24 slices		
T1 FS Cor	~140	3.5 x 1 ~32 slices	Perpendicular to lateral/medial malleoli	
T1 FS Sag T2 FS Sag	~140	3 x 1 ~21 slices	Parallel to lateral/medial malleoli	

Arthrogram Elbow

Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.
- Is the pain the same, improved or worsened since the procedure?

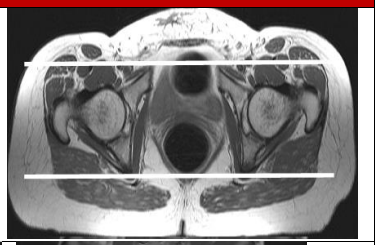
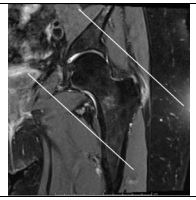
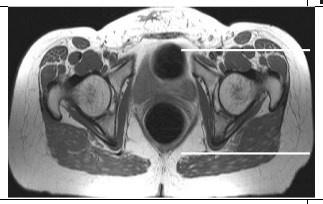
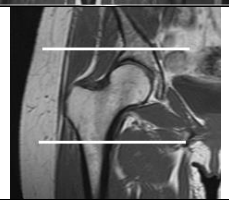
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 FS Ax	120	4 x 1 ~24 slices	Include the radial tuberosity to include the bicep tendon attachment	
T1 FS Cor T2 FS Cor Optional: T1 Cor (trauma/fracture)	~140	3 x 0 ~30 slices	• Parallel to the humeral epicondyles • Do not use a localizer to set the angle of the coronal series	
T1 FS Sag	~140	3 x 1 ~21 slices	• Perpendicular to the humeral epicondyles • Do not use a localizer to position the sagittal series	

Arthrogram Hip

Consider MSK Pelvis protocol with history of arthroplasty / total joint replacement, consult with MSK Radiologist.

Position:

- Tape or strap feet with internal rotation, note patient's inability to do so
- Legs need to be as flat as possible

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS Cor Bilat	~360	4 x 1 ~24 slices	Parallel to the anterior surfaces of the femoral heads	
T1 FS Obl Ax T1 FS Cor T1 FS Sag	~180	4 x 1 ~24 slices	Ax: above acetabulum through ischium	  
T1 Ax				

- Include the hamstring attachment on the ischial tuberosity on all sequences

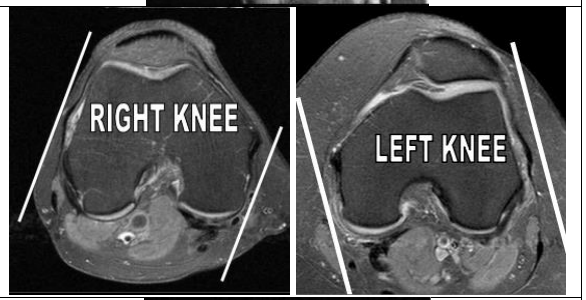
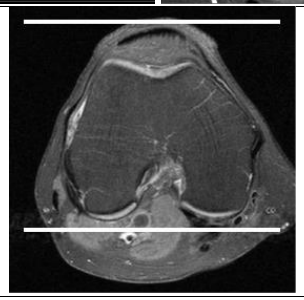
Tech Notes:

Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.

- Is the pain the same, improved or worsened since the procedure?

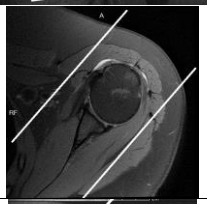
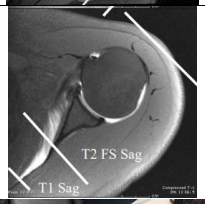
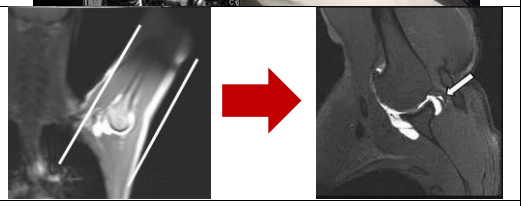
Arthrogram Knee

Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.
- Is the pain the same, improved or worsened since the procedure?

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 FS Ax	~140	4 x 1 ~24 slices		
T1 FS Sag PD Sag	~140	3 x 1 ~24 slices	Parallel to the outer surface of the lateral femoral condyle	
T1 FS Cor T2 FS Cor Optional: T1 Cor (trauma/fracture)	~140	3 x 1 ~24 slices	Parallel to the posterior surfaces of the femoral condyles	

Arthrogram Shoulder

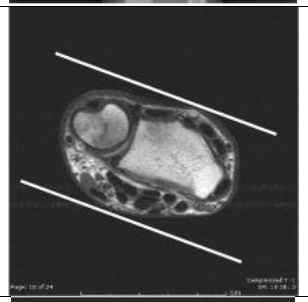
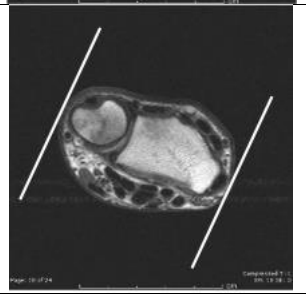
Position
- Supine with affected arm at side in external rotation (palm directed upward)
- Place sandbag on palm if necessary to help the patient maintain this position

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 FS Ax T2 FS Ax	~140	4 x 1 ~22 slices	Include AC joint	
T1 FS Cor T2 FS Cor	~140	3 x 1 ~18 slices	Perpendicular to the glenoid fossa	
T1 Sag	~140	4 x 1	Parallel to the glenoid fossa	
T2 FS Sag		3 x 1 ~24 slices		
Cor Localizer			• Position the affected arm above the patient's head with the elbow flexed and the palm of the hand under the patient's head. • Send the coronal localizer to PACS	
T1 FS ABER	~140	3 x 0.75 ~24 slices	Parallel to the long axis of the humerus and centered to the joint	

Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.
- Is the pain the same, improved or worsened since the procedure?

Arthrogram Wrist

Arthrogram protocols must include tech notes regarding the patient's pain post arthrogram "fluoro" procedure.
- Is the pain the same, improved or worsened since the procedure?

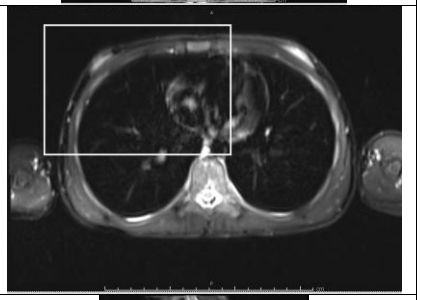
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS Ax	~100	3 x 0 ~24 slices		
T1 Cor T1 FS Cor T2 FS Cor	~100	3 x 0 ~14 slices		
T1 FS Sag	~100	3 x 0 ~24 slices		

Chest Wall

(mass, specific area of interest)

(Updated 10/15/20)

- If FS is bad, run STIR
- Tailor coverage to area of interest
- Run phase direction to best minimize motion artifact
- If contrast pick a second plane post that shows lesion the best

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax	250	4 x 0.5		
T1 Cor T2 FS Cor	250	5 x 1		
T1 Sag T2 FS Sag	250	5 x 1		
T1 FS AX Pre / Post Additional plane post				

Joint Contrast

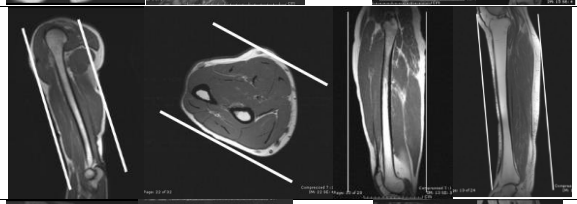
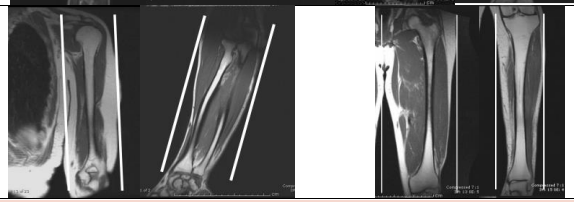
- Tailor FOV to body part

ADDITIONAL SEQUENCES	COMMENTS
synovitis, rheumatoid arthritis, inflammatory arthritis, or inflammatory arthropathy	
T1 FS Ax Pre / Post T1 FS Sag Post	Ankle, Foot
T1 FS Cor Pre / Post T1 FS Ax Post	Shoulder, Hand, Wrist
T1 FS Cor Pre / Post T1 FS Sag Post	Elbow, Knee
infection	
T1, 3 plane STIR, 3 plane Plus appropriate pre/post contrast planes	All exams

Long Bone

- Consult radiologist for mass, infection or post-op tumor
- Place skin marker to indicate area of concern
- Partial FOVs – focal pain, mass; must include either the proximal or distal joint
- Full FOVs – general pain, myositis, cellulitis; upper/lower as needed to include full long bone

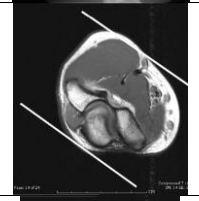
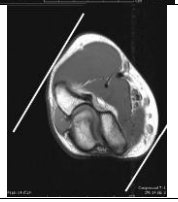
Position
- Humerus: anatomical with palm face up
- Forearm: arm down by side or superman with palm face up
- Femur: anatomical with toes pointing up
- Tib/Fib: anatomical with toes pointing up

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax STIR Ax	140 – 200	5 x 1	Humerus: Forearm: parallel to radius / ulna Femur: Tib/Fib:	
T1 Cor STIR Cor	200 - 300	6 x 1	Humerus: Forearm: parallel to radius / ulna Femur: parellel to femur Tib/Fib:	
T1 Sag STIR Sag	200 – 300	6 x 1		
Contrast: mass, infection or post-op, may consult with radiologist for appropriate planes				
T1 FS Ax Pre T1 FS Ax Post Additional plane post: T1 FS Cor Post T1 FS Sag Post				

Upper Extremity

Elbow
(biceps tendon tear)

- See shoulder positioning aid for external rotation of humeral head

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax T2 FS Ax	~120	4 x 1 ~24 slices	• Include radial tuberosity for bicep tendon attachment • Adjust in plane rotation for correct anatomical positioning	
PD Cor T2 FS Cor	~140	3 x 0 ~30 slices	Position off of PD FS Ax, parallel to humeral epicondyles	
T1 Sag STIR Sag	~140	3 x 1 ~21 slices	Position off of PD FS Ax, perpendicular to humeral epicondyles	

Finger

(pain in phalanges or metacarpals, excludes thumb)

- Tailor coverage to area of interest

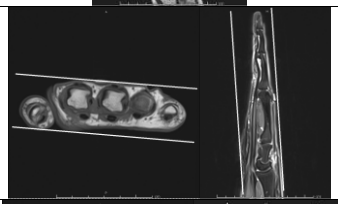
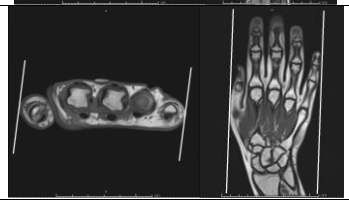
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax T2 FS Ax STIR Ax	100	3 x 0 ~22 slices	• Oblique to obtain true axial	
T1 Cor T2 FS Cor	130	2 x 0 ~21 slices	• Oblique to obtain true coronal	
PD Sag T2 FS Sag	130	2 x 0 ~21 slices	• Oblique to obtain true sagittal • Include adjacent 2nd – 5th finger for comparison, do not use thumb	

Hand

(pain / not for thumb)

(updated 8/1/24)

- Tailor coverage to area of interest, 3T often performs as partial hand
- Always place marker to indicate area of interest

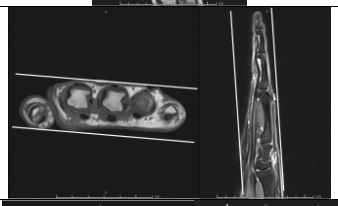
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 STIR Ax	120	4 x 1 ~40 slices	• Oblique to obtain true axial	
T1 Cor T2 STIR Cor	220	2.5 x 0 ~23 slices	• Oblique to obtain true coronal	
PD Sag T2 STIR Sag	220	4 x 1 ~24 slices	• Oblique to obtain true sagittal • Include adjacent 2nd – 5th finger for comparison, do not use thumb	

Hand: Mass / Infection

(pain / not for thumb)

(updated 8/1/24)

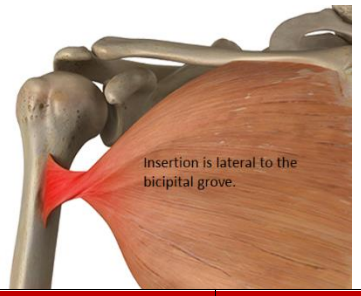
- Tailor coverage to area of interest, 3T often performs as partial hand
- Always place marker to indicate area of interest

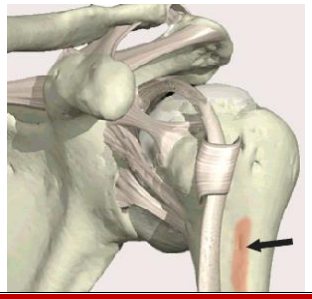
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 STIR Ax	120	4 x 1 ~40 slices	• Oblique to obtain true axial	
T1 Cor T2 STIR Cor	220	2.5 x 0 ~23 slices	• Oblique to obtain true coronal	
T1 Sag STIR Sag	220	4 x 1 ~24 slices	• Oblique to obtain true sagittal • Include adjacent 2nd – 5th finger for comparison, do not use thumb	
Contrast: mass, infection				
T1 FS Ax Pre *Administer contrast* T1 FS Ax Post Additional plane post				

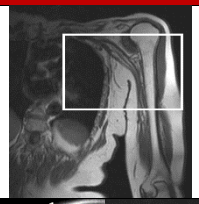
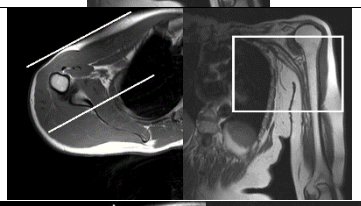
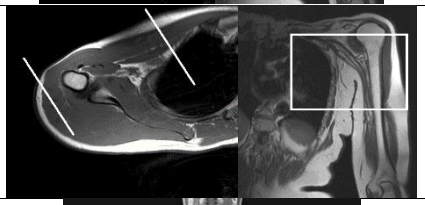
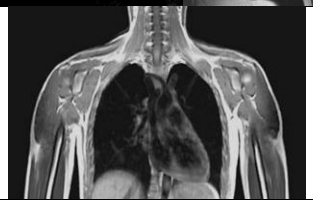
Pectoralis Tendon

Position:

- Patient prone with the affected arm as close to the patient's body as possible to achieve the 20cm FOV
- Affected side as close to isocenter as possible to ensure quality imaging through the humerus laterally



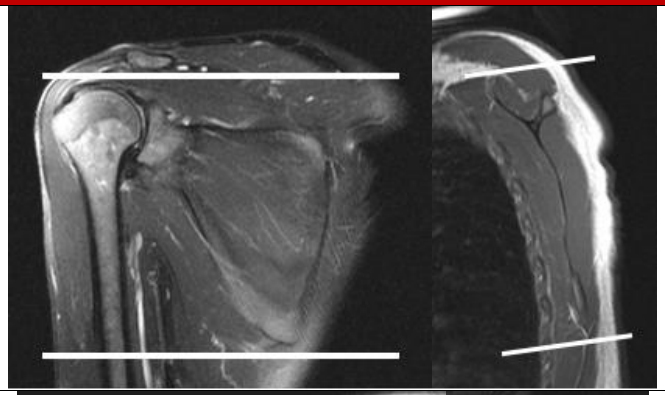
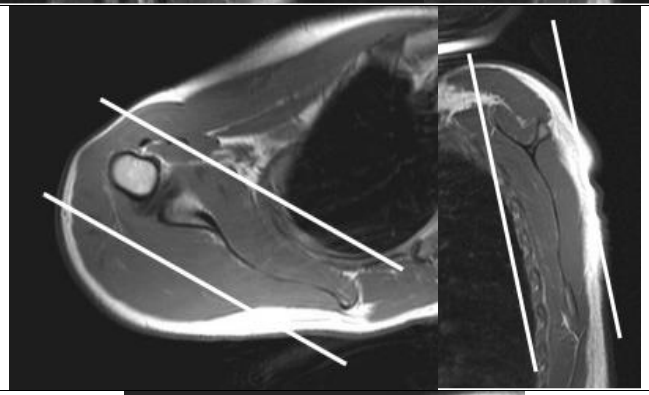


SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax STIR Ax	~200	4 x 0.5 ~40 slices	Scan affected side only	
T1 Cor T2 FS Cor	~200	4 x 0 ~24 slices	Parallel to the pectoral muscle/tendon and through the humeral shaft	
T1 Sag T2 FS Sag	~200	4 x 0.5 ~30 slices	Perpendicular to pectoral muscle/tendon and through humeral shaft	
STIR Ax Bilat	~400	5 x 1 ~32 slices	• Include both sides, both arms should be at the patient's side. • Espree magnets, right / left sides should be scanned separately due to the bore FOV limitations.	

- The small FOVs are designed to show tears of the pectoral tendon at its insertion on the humerus or at the junction of the pectoral muscle and pectoral tendon. A 20cm FOV should be achievable on most patients. Do not need to include the entire pectoral muscle.
  - L>R: mid pectoral muscle through humerus
  - I>S: top of the pectoral muscle through the deltoid tuberosity of the humerus
  - P>A: posterior to the humerus through the pectoral muscle anteriorly
- The large FOV STIR Axial sequence will show muscle tears that aren't seen on the small FOV sequences
  - Position patient prone with both arms down by side

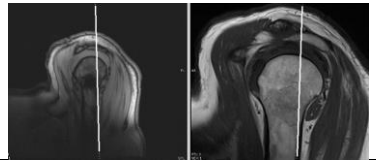
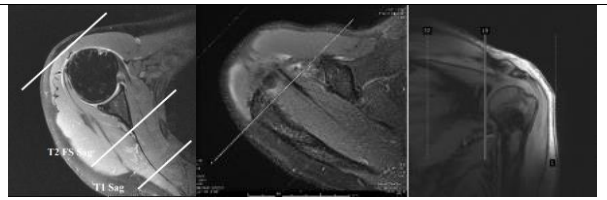
Scapula

(Updated 2/8/07)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax STIR Ax	220	6 x 1 ~24 slices	Oblique to obtain true axial	
T1 Cor T2 FS Cor	240	4 x 1 ~20 slices	Oblique to obtain true coronal	
T1 Sag T2 FS Sag	240	6 x 1 ~25 slices	Oblique to obtain true sagittal	

Shoulder

Position:
- Affected arm at side with external rotation, palm facing upward
- Place sandbag on palm if necessary to help the patient maintain this position

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD FS Ax (TE 40 – 45) STIR Ax	150	3 x 1 ~22 slices	• Scan through the AC joint • Sag loc – slices parallel with the acromion & coracoid • Cor loc – slices perpendicular to the glenoid	
PD Cor T2 FS Cor	140	3 x 1 ~18 slices	• Slices need to be perpendicular to the glenoid fossa • Sag loc – position slices perpendicular to scapular spine & coracoid • PD FS Ax – position slices parallel with supraspinatus tendon	
T1 Sag	140	4 x 1	T1 Sag: Include 6cm medial to the glenoid fossa • Slices need to be parallel to the glenoid fossa • PD FS Ax – position slices perpendicular to the supraspinatus tendon • PD Cor – position slices parallel with the glenoid fossa • Verify in plane rotation with sag localizer is orthogonal 	
T2 FS Sag	140	3 x 1		

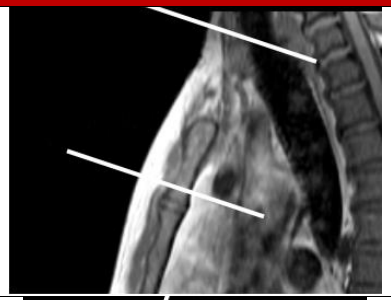
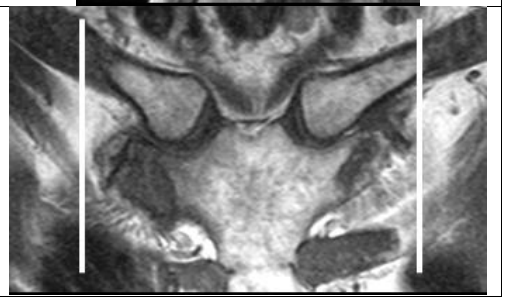
Sternoclavicular Joints

(Updated 5/29/08)

Position

- Prone when possible

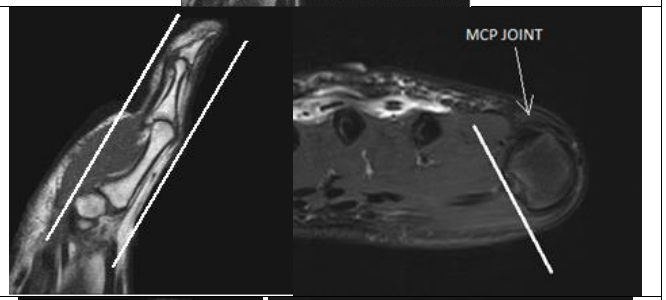
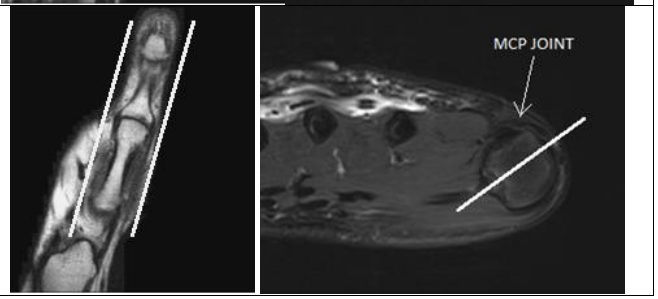
- Perform STIR for suboptimal FS
- Orient phase direction that best minimizes artifact

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax	~180	3 x 0 ~32 slices		
T1 Cor T2 FS Cor	~180	3 x 0 ~18 slices		
T1 Sag T2 FS Sag	~180	3 x 0 ~18 slices		

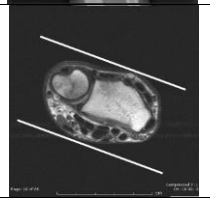
Thumb

(pain, excludes 2nd – 5th digits)

- Tailor coverage to area of interest

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax T2 FS Ax STIR Ax	90	3 x 0 ~22 slices	• Oblique to obtain true axial	
PD Cor T2 FS Cor	100	2 x 0 ~17 slices	• Oblique to obtain true coronal	
PD Sag T2 FS Sag	100	2 x 0 ~15 slices	• Oblique to obtain true sagittal • Include adjacent 2nd – 5th finger for comparison, do not use thumb	

Wrist

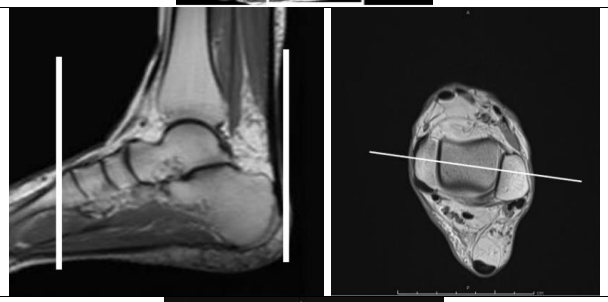
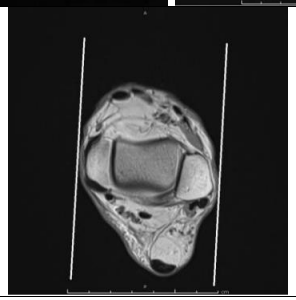
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax PD FS Ax (TE 40 – 45)	100 256 x 167	3 x 0 ~24 slices		
T2 FS Cor PD Cor	100 256 x 167	3 x 0 ~21 slices		
T2 3D Cor	120	1.5 x 0 ~36 slices		Copies center to T2 FS Cor
T1 Cor, *optional*	100	3 x 0 ~21 slices	Add for history of trauma or bright bone on T2	Copies to T2 FS Cor
STIR Sag	100 256 x 167	3 x 0 ~24 slices		
Contrast: pain				
T1 FS Cor Pre T1 FS Cor Post T1 FS Ax Post				
Contrast: mass protocol (T1, T2 FS protocol)				
T1 FS Ax Pre T1 FS Ax Post Additional plane to best demonstrates mass				
Contrast: inflammatory process				
Follow JOINT CONTRAST protocol				

Lower Extremity

Achilles Tendon

(Updated 12/13/18)

- Include all tarsal bones on all sequences

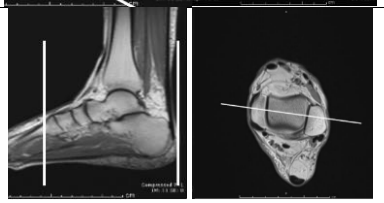
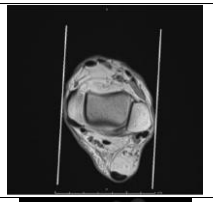
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax	~150	3.5 x 1 ~36 slices		
T2 FS Ax	~150	3.5 x 1 ~72 slices		
T1 Cor T2 FS Cor	~160	3.5 x 1 ~32 slices	Perpendicular to lateral/medial malleoli, see talar dome	
T1 Sag STIR Sag	~160	3 x 1 ~21 slices	Parallel to lateral/medial malleoli, see talar dome	

Increase FOV on sagittal series if the Achilles is torn and retracted outside of 160 FOV.

Ankle / Hindfoot

(pain, plantar fasciitis, posterior tibial tendon pathology)

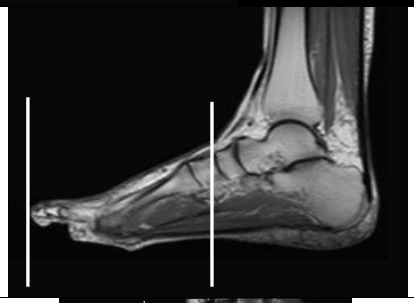
- Include all tarsal bones on all sequences

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax T2 FS Ax	~140	3.5 x 1 ~24 slices		
PD Obl Ax	~140	3.5 x 1 ~32 slices	Use angle of 35-45 degrees	
T1 Cor T2 FS Cor	~140	3.5 x 1 ~32 slices	Perpendicular to lateral/medial malleoli, see talar dome	
T1 Sag STIR Sag	~140	3 x 1 ~21 slices	Parallel to lateral/medial malleoli, see talar dome	
Must include Lisfranc joint in all planes				

Foot: Mid or Forefoot

(metatarsal pain, swelling or mass)

- Include all tarsal bones on all sequences
- Taylor FOV to area of interest

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax	240	3.5 x 0.5 ~24 slice		
T1 Cor T2 FS Cor	140	4 x 1 ~34 - 42 slices	Perpendicular to lateral/medial malleoli, see talar dome	
T1 Sag STIR Sag	240	3 x 1 ~23 slices	Angle to specific metatarsal as needed	
Must include Lisfranc joint in all planes				
Toe: osteomyelitis Whole foot: plantar nerve lesion				

Foot: Morton's Neuroma or Contrast

(metatarsal pain, swelling or mass)

- Morton's Neuroma – FOV to include mid-foot through end of toes, include all tarsal bones on all sequences
- Contrast – consult radiologist for coverage as needed

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax	140	3.5 x 0.5 ~24 slice		
T1 Cor T2 FS Cor	140	4 x 1 ~34 - 42 slices	Perpendicular to lateral/medial malleoli, see talar dome	
T1 Sag STIR Sag	140	3 x 1 ~23 slices	Angle to specific metatarsal as needed	
T1 FS Cor Pre *Administer contrast* T1 FS Cor Post				Copies to T1 Cor
T1 FS Ax Post				Copies to T1 Ax

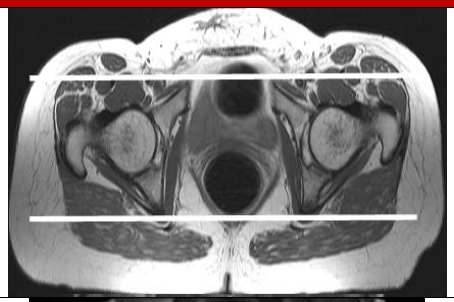
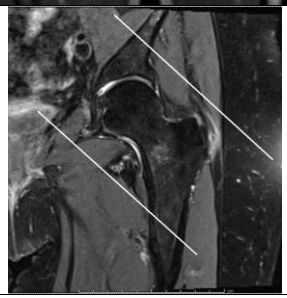
Hip: Bilateral

(Updated 11/6/20)

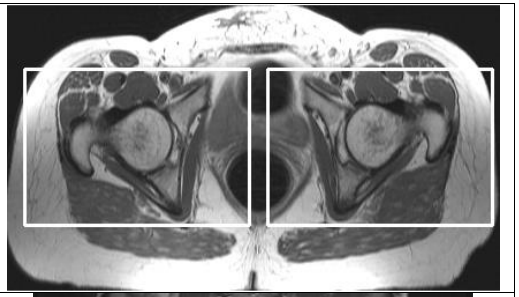
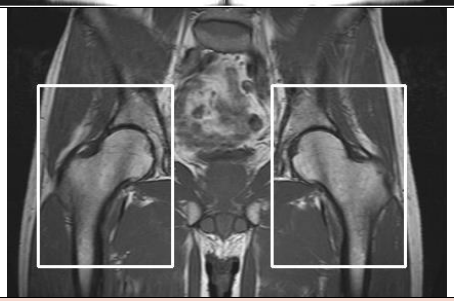
Perform for partial and total hip arthroplasty

Position:

- Tape or strap feet with internal rotation
- Legs need to be as flat as possible

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Cor Bilat STIR Cor Bilat	~360	4 x 0 28 slices	Parallel to the anterior surfaces of the femoral heads	
T1 Ax Bilat (TE 12 – 20) T2 FS Ax Bilat (STIR Espree or suboptimal FS)	~360	5 x 1 ~36 slices	• Parallel to the superior surfaces of the femoral heads • Include from above sacrum through the hamstring attachment on the ischium	
RT PD FS Obl Ax (TE 40 – 45) LT PD FS Obl Ax (TE 40 – 45)	~200	4 x 1 ~24 slices	Ax: above acetabulum through ischium	

- continued to next page -

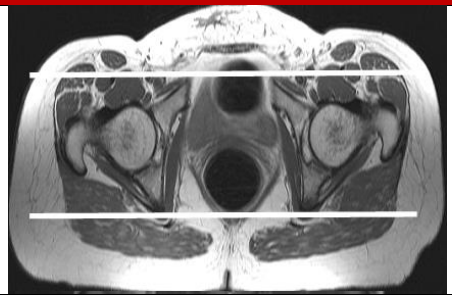
RT PD FS Cor LT PD FS Cor	~200	4 x 1 ~20 slices		
RT PD FS Sag LT PD FS Sag	~200	4 x 1 ~26 slices	TE 40 - 45	
Contrast: osteomyelitis, mass				
T1 FS Cor Pre / Post	~360	4 x 0 28 slices		Copies to T1 Cor
T1 FS Ax Post	~360	5 x 1 ~36 slices		Copies to T1 Ax

- Include the hamstring attachment on the ischial tuberosity on all sequences

Tech Notes:
Document patient's inability to internally rotate

Send to PACS:
Bilateral sequences to both folders

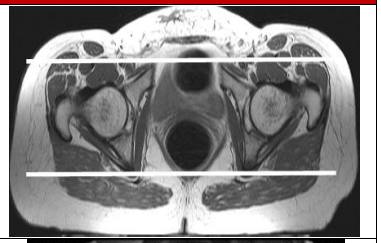
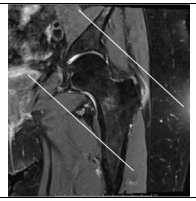
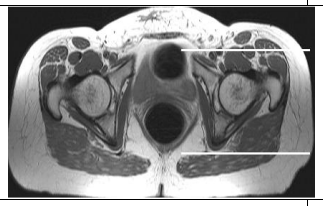
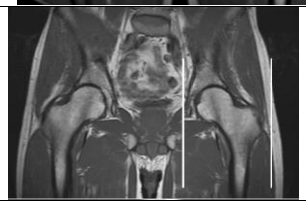
Hip: ER Limited
(fracture)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Cor Bilat STIR Cor Bilat	~360	4 x 0 28 slices	Parallel to the anterior surfaces of the femoral heads	

Hip: Unilateral

Consider MSK Pelvis protocol with history of arthroplasty / total joint replacement, consult with MSK Radiologist.

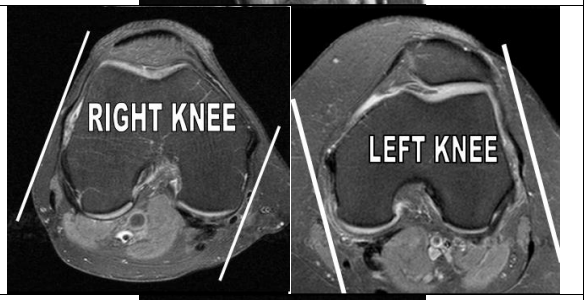
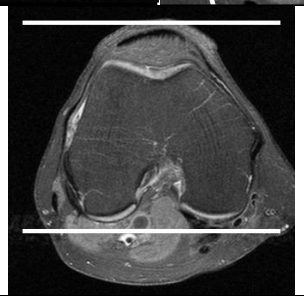
Position:
- Tape or strap feet with internal rotation
- Legs need to be as flat as possible

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Cor Bilat STIR Cor Bilat	~360	4 x 0 28 slices	Parallel to the anterior surfaces of the femoral heads	
T1 Ax Bilat (TE 12 – 20) T2 FS Ax Bilat (STIR Espree or suboptimal FS)	~360	5 x 1 ~36 slices	• Parallel to the superior surfaces of the femoral heads • Include from above sacrum through the hamstring attachment on the ischium	
PD FS Obl Ax (TE 40 – 45) PD FS Cor PD FS Sag	~200	4 x 1 ~24 slices	Ax: above acetabulum through ischium	  
Contrast, if needed T1 FS Cor Pre / Post	~360	4 x 0 28 slices		Copies to T1 Cor
T1 FS Ax Post	~360	5 x 1 ~36 slices		Copies to T1 Ax

- Include the hamstring attachment on the ischial tuberosity on all sequences

Tech Notes:
Document patient's inability to internally rotate

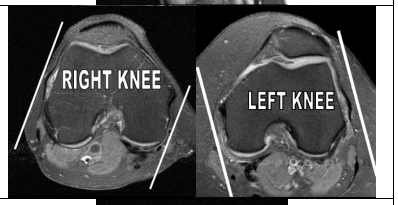
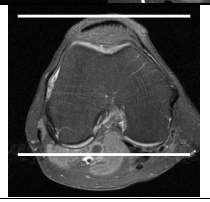
Knee

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD FS Ax (TE 40 – 45)	140	4 x 1 ~24 slices		
PD Sag (TE 15, not above 20) PD FS Sag (TE 40 – 45)	140	3 x 1 ~24 slices	Parallel to the outer surface of the lateral condyle	
PD Cor (TE 15, not above 20) T2 FS Cor	140	3 x 1 ~24 slices	Parallel to the posterior surfaces of the femoral condyles	
T1 Cor, *optional*			• Add for history of trauma or bright bone on T2 • Add for PVNS (pigmented villonodular synovitis)	Copies to PD Cor

Knee: Metal

(pin / screw vs total replacement)

Select protocol based on hardware, pin/screw vs total joint

PIN / SCREWS		TOTAL JOINT		COMMENTS	IMAGES
SEQUENCE	PARAMETERS	SEQUENCE	PARAMETERS		
PD FS IR Ax	140 FOV 4 x 1 mm ~24 slices	T1 Ax IR Ax	150 FOV 4 x 1.3 mm		
PS Sag PD FS IR Sag	140 FOV 3 x 1 mm ~24 slices	T1 Sag IR Sag	150 FOV 3.5 x 1.2 mm	Parallel to the outer surface of the lateral condyle	
PD Cor T2 FS Cor	140 FOV 3 x 1 mm ~24 slices	T1 Cor IR Cor	150 FOV 4 x 1.3 mm	Parallel to the posterior surfaces of the femoral condyles	
T1 Cor, *optional*				• Add for history of trauma or bright bone on T2 • Add for PVNS (pigmented villonodular synovitis)	Copies to PD Cor

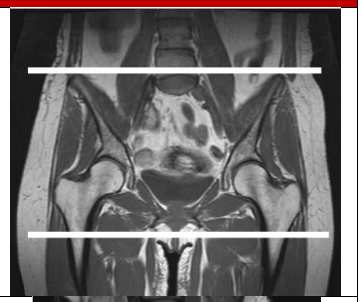
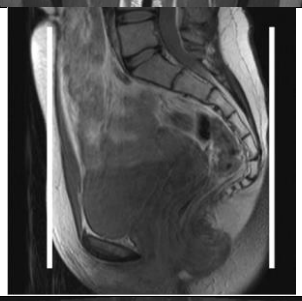
Pelvis

(inguinal hernia, coccyx or sacrococcygeal, hip for AVN)

Consider hip protocol if the diagnosis or patient history (particularly when the patient is under the age of 60) indicates possible hip pathology such as labral tear, cartilage abnormality, consult with MSK Radiologist.

Position:

- Tape or strap feet with internal rotation
- Legs need to be as flat as possible

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax (STIR for Espree)	~360 (minimum FOV to include entire boney pelvis)	6 x 1 ~36 slices	Parallel to the superior surfaces of the femoral heads	
T1 Cor STIR Cor	~360 (minimum FOV to include entire boney pelvis)	5 x 1 ~32 slices		
T2 FS Sag T1 Sag	~320	6 x 1 (include entire boney pelvis)	T2 FS Sag: include entire boney pelvis T1 Sag: only include for sacrum/coccyx fracture	

- Include the hamstring attachment on the ischial tuberosity on all sequences

Tech Notes:
Document patient's inability to internally rotate

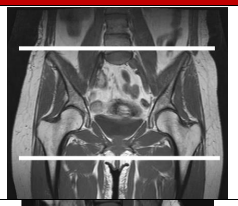
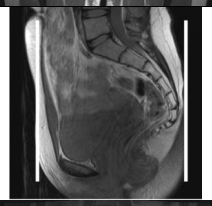
Pelvis: Contrast

(sacroiliitis, arthritis, mass)

(updated 9/3/21)

Position:

- Tape or strap feet with internal rotation
- Legs need to be as flat as possible

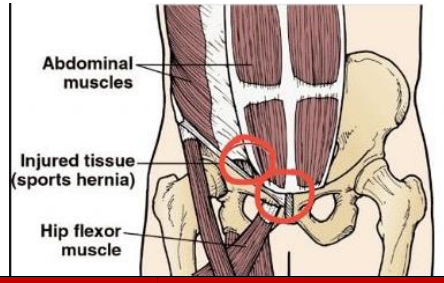
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax STIR Ax	~360 (minimum FOV to include entire boney pelvis)	6 x 1 ~36 slices	Parallel to the superior surfaces of the femoral heads	
T1 Cor STIR Cor	~360 (minimum FOV to include entire boney pelvis)	5 x 1 ~32 slices		
T2 FS Sag T1 Sag	~320	6 x 1 (include entire boney pelvis)	T2 FS Sag: include entire boney pelvis T1 Sag: only include for sacrum/coccyx fracture	
Contrast: sacroiliitis, arthritis				
T1 FS Cor Pre *Administer contrast* T1 FS Cor Post T2 FS Ax Post				
Contrast: mass				
T1 FS Ax Pre *Administer contrast* T1 FS Ax Post T1 FS Cor Post				

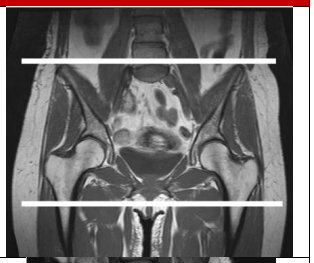
Pelvis: MSK Athletic Pubalgia

(sports hernia, osteitis pubis, groin pain, adductor muscle/tendon, core muscle injury)

Prep:
- Empty bladder

Position:
- Tape or strap feet with internal rotation
- Legs need to be as flat as possible



SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax T2 FS Ax	~360 (minimum FOV to include entire boney pelvis)	6 x 1 ~40 slices	Parallel to the superior surfaces of the femoral heads	
T1 Cor STIR Cor		5 x 1 ~32 slices		
T1 Sag		6 x 1 (include entire boney pelvis)	• T1 Sag: include entire boney pelvis • T2 FS Sag: only include for sacrum/coccyx fracture	
T2 FS Sag	240	4 x 0 ~30 slices		

Tech Notes:
Document patient's inability to internally rotate

Sacroiliac Joints

(Updated 7/23/19)

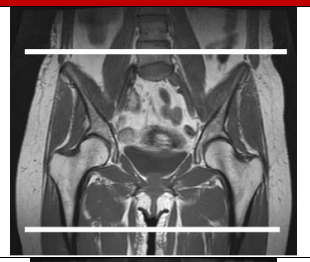
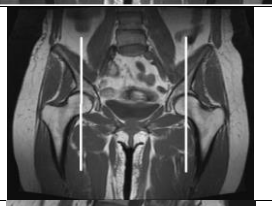
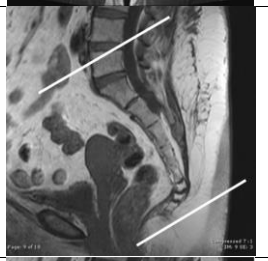
Only perform if exam is specifically ordered as SI Joint protocol.

Prep:

- Empty bladder

Position:

- Tape or strap feet with internal rotation
- Legs need to be as flat as possible

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS Ax	~360 (minimum FOV to include entire boney pelvis)	6 x 1	Parallel to the superior surfaces of the femoral heads	
T2 FS Sag T1 Sag, include for coccyx or sacrococcygeal indications	~240	6 x 1	Include sacrum only	
T1 Ax Hires T2 FS Ax Hires	~240	5 x 1 ~30 slices	Perpendicular to Sacrum	
T1 Cor STIR Cor *Administer contrast, if needed* T1 FS Cor Pre / Post	~240	5 x 1	• Parallel with Sacrum • Extend coverage to include cyst or posterior soft tissue, as needed	

Send to PACS: Localizers

Great Toe

(1st MPT joint, turf toe)

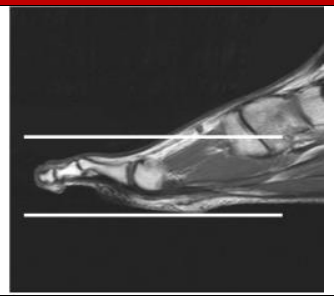
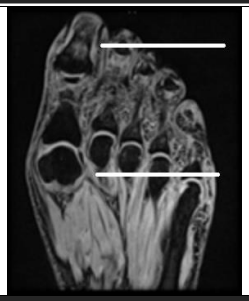
Place marker on area of interest

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
PD Ax PS FS Ax (TE 30-45)	~100 - 140	3 x 0		
PD Cor STIR Cor	~100 - 140	3 x 0		
PD Sag T2 FS Sag	~100 - 140	3 x 0		

Toe

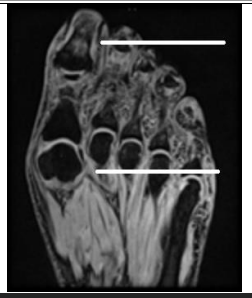
(turf toe, plantar plate)

Place marker on area of interest

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax STIR Ax	140	3 x 0 ~22 slices		
T1 Cor STIR Cor	140	3 x 0 ~30 slices		
T1 Sag STIR Sag	140	3 x 0	Affected toe and adjacent 2^{nd} – 4^{th} toes for comparison	

Toe: Mass / Infection

- Place marker on area of interest
- Perform forefoot for DX of osteomyelitis, ulcer, or infection

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Ax STIR Ax	140	3 x 0 ~22 slices		
T1 Cor STIR Cor	140	3 x 0 ~30 slices		
T1 Sag STIR Sag	140	3 x 0 ~22 slices	Affected toe and adjacent 2^{nd} – 4^{th} toes for comparison	
Contrast: mass				
T1 FS Cor Pre *Administer contrast* T1 FS Cor Post T1 FS Sag Post				