Austin Radiological Association

MRI Neuro Protocols

Adult 1.5T

Questions?

Last Update: 11/12/2024 9:29 AM

Contents

General Guidelines

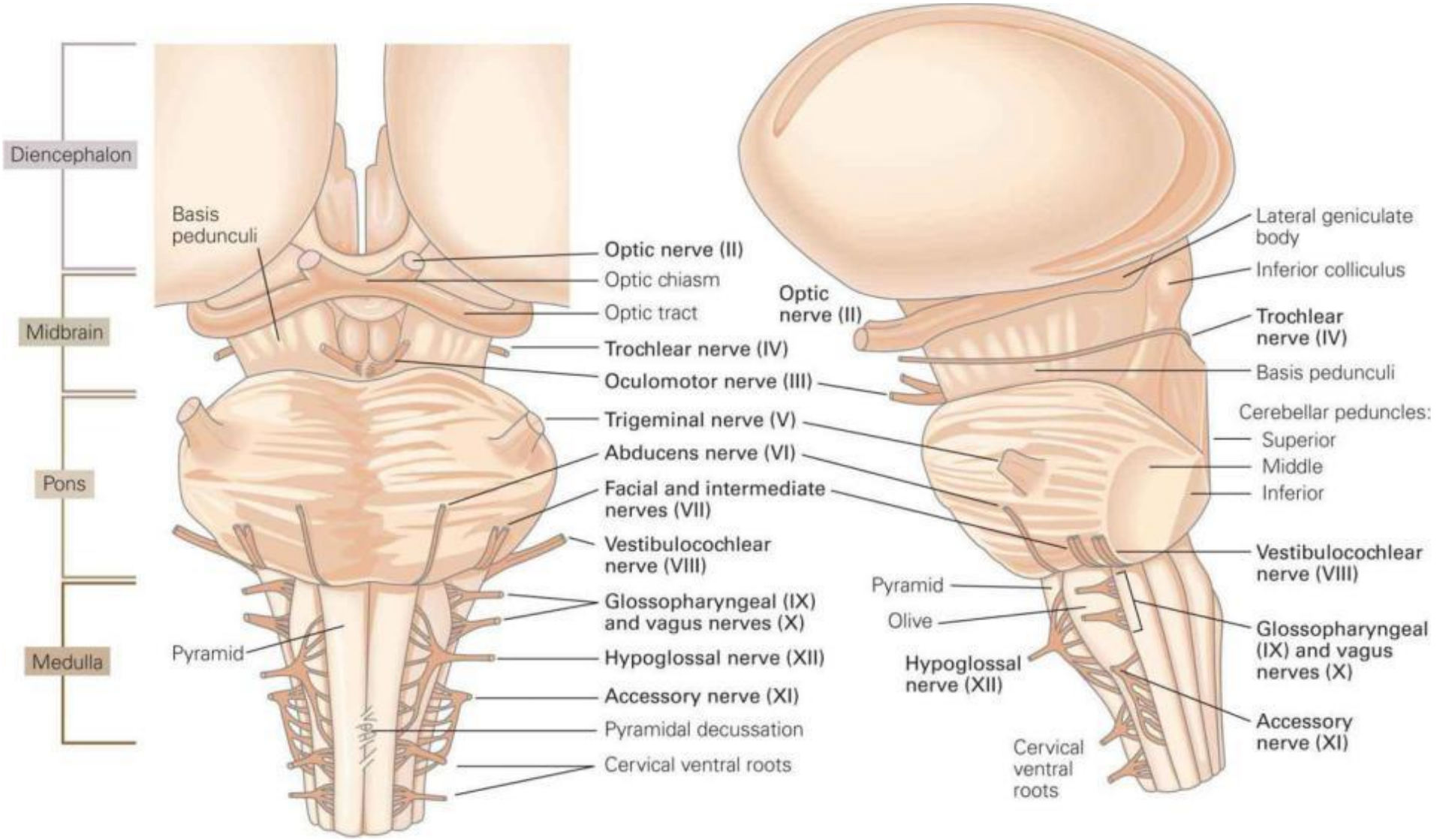
NEURO	

General	• NEVER hesitate to reach out to a radiologist for guidance!
	• Siemens / GE terminology, other abbreviations:
	  ○ CISS / Fiesta
	  ○ FLASH / SPGR
	• ARA performs SWI standard for susceptibility weighted imaging, replaces conventional GRE Cor
	• ***Recommended*** to remove eye makeup for all exams that include the orbital region.
	  ○ Eye makeup ***must be*** removed for dedicated MRI of the orbits.

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

Protocol	• Metal Reduction
	  ○ Non-FS, FSE/TSE technique
	• Multiple Sclerosis – UTHA Only. Brain, orbits, cervical or thoracic spine, 10/6/20
	• Post T1 3D VIBE not performed on Siemens A40 software level; SM, WLK, & WMC
	• SWI with motion
	  ○ Conventional GRE coronal may be performed instead of repeating SWI

Contrast	• X-ray / CT abdomen and pelvis imaging must be performed prior to MR contrast exams. • DatScan must be performed prior to MR contrast exams.


Diencephalon
Midbrain
Pons
Medulla
Basis pedunculi
Optic nerve (II)
Optic chiasm
Optic tract
Trochlear nerve (IV)
Oculomotor nerve (III)
Trigeminal nerve (V)
Abducens nerve (VI)
Facial and intermediate nerves (VII)
Vestibulocochlear nerve (VIII)
Glossopharyngeal (IX) and vagus nerves (X)
Pyramid
Hypoglossal nerve (XII)
Accessory nerve (XI)
Pyramidal decussation
Cervical ventral roots
Optic nerve (II)
Lateral geniculate body
Inferior colliculus
Trochlear nerve (IV)
Basis pedunculi
Cerebellar peduncles:
Superior
Middle
Inferior
Vestibulocochlear nerve (VIII)
Pyramid
Olive
Glossopharyngeal (IX) and vagus nerves (X)
Hypoglossal nerve (XII)
Accessory nerve (XI)
Cervical ventral roots

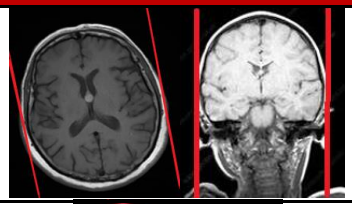
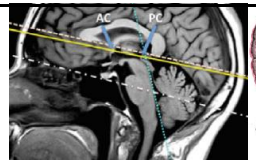
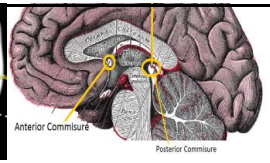
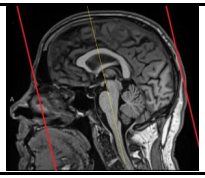
1.5T and 3T Preferred Exams

1.5T	3T
• Cholesteatoma • Brain Anosmia • Spine (Cervical / Thoracic / Lumbar)	• Brachial Plexus • Brain ARIA • Brain CSF Leak • Brain Neuroquant • Brain Perfusion • Brain Seizure (Adult/Pedi) • Brain Temporal Arteritis • Brain Vasculitis • Multiple Sclerosis – UTHA Referring Physician's Only - Brain - Orbits - Cervical Spine - Thoracic Spine • Neuro Pelvis / Sacral Plexus • Skull Base / Face (lesion staging) • Soft Tissue Neck (also available at GTN and SW Aera)
Updated 6/7/2024	

Brain – Routine

(HA, trauma, CVA, dizziness, AMS)

(Updated 4/26/23)

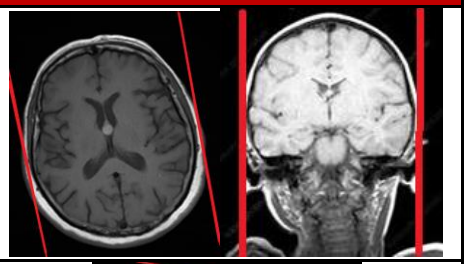
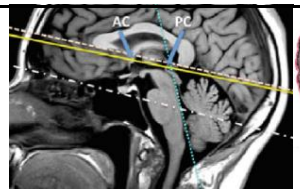
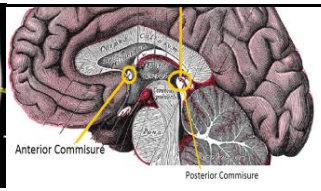
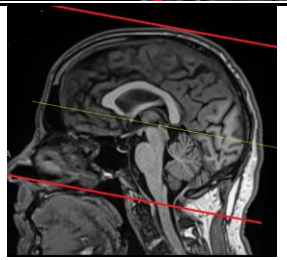
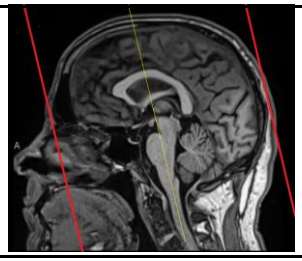
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)* *Administer contrast*	220	3 x 0 ~52 slices TE 30		
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post**ARA: A40 SM, WLK, WMC, GE*	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post**ARA: A40 SM, WLK, WMC, GE* 220	230 220	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to T2 FLAIR Ax

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified

Routine Non-contrast

(HA, trauma, CVA, dizziness, AMS)

(Updated 4/26/23)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
Diffusion Ax	230	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220			
T2 Ax T2 FS Ax**ARA: GE*				
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30		
T2 FS Cor GRE Cor**ARA: A40 SM, WLK, WMC, GE*	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
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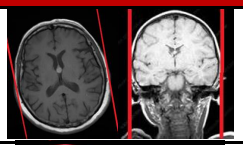
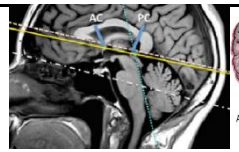
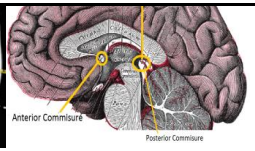
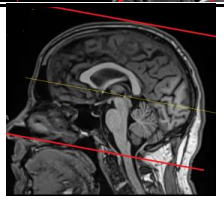
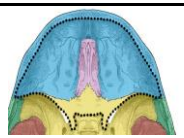
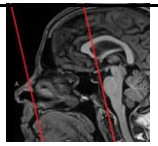
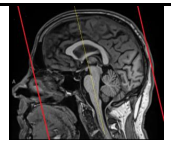
Anosmia*

(Loss of sense of smell, smell disorder, 1st CN Olfactory nerve)

(Updated 10/26/23)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	 	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)* *Administer contrast*	220	3 x 0 ~52 slices TE 30	Axials parallel to AC-PC line	
T2 FS hr Cor	180	3 x .05 ~30 slices	 Include Anterior Cranial Fossa	
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post* *ARA: A40 SM, WLK, WMC, GE*	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post* *ARA: A40 SM, WLK, WMC, GE*	230	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to T2 FLAIR Ax

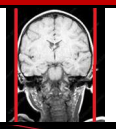
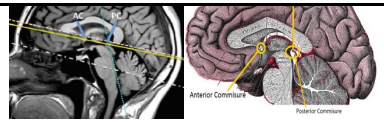
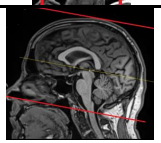
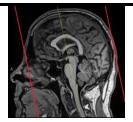
- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified

CSF Flow

(Updated 10/26/23)

Position

- Head straight, no tilt
- May be performed on 3T or the following 1.5T: CIC, CP MR1O Espree, GTN, SW MR3, VIL
- Ensure proper placement of the peripheral pulse unit on finger, a steady pulse is needed

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices		
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30	Axials parallel to AC-PC line	
FLASH 6 In Plane	180	6	• Mid sagittal plane • ECG gated	
T2 SPACE Sag *Administer contrast*	230	1 176 slices/slab		
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T1 Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post**ARA: A40 SM, WLK, WMC, GE*	200	5 x 1	Coronals parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post**ARA: A40 SM, WLK, WMC, GE*	230	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to T2 FLAIR Ax

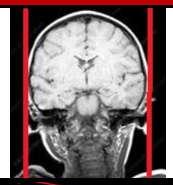
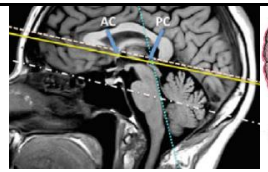
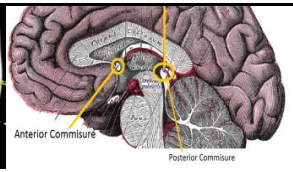
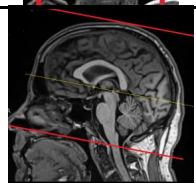
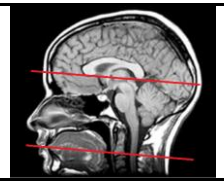
- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified
- An alternative for the peripheral pulse unit on finger is the ECG monitor
- If the flash 6 In plane sequence shows poor signal and little to no flow, try changing the flow velocity to 4 instead of 6

CSF Leak *3T Preferred

(Leak, rhinorrhea, otorrhea, cephalocele)

(Updated 1/24/23)

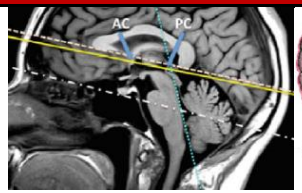
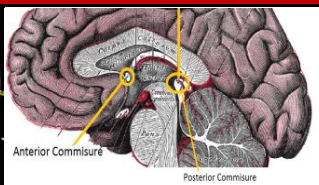
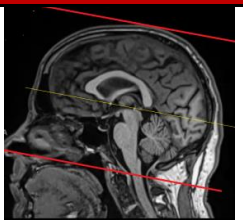
- May be performed on 3T or the following 1.5T: CIC, CP MR1O Espree, GTN, SW MR3, VIL

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
Diffusion Ax	230	5 x 1	  Parallel to AP_PC line	
T2 FS FLAIR Ax	220	4 x 1		
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30		
T2 CISS Ax *Administer contrast*	200	0.8	Post-processing • MPR – Sag 0.8mm • MPR – Cor 0.8mm	
T2 Ax T2 FS Ax**ARA: GE*	220	4 x 1		Copies to FLAIR Ax
T2 Cor	220	3 x 0	• Coronals parallel to the brainstem • Include mastoids through orbits	
T1 FS VIBE Ax post	230	1 x 0	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to T2 FLAIR Ax

Cholesteatoma *

(Updated 9/26/22)

- Perform on Aera, Avanto, Espree or TIM Symphony only. Do not perform on RCP MR1 GE, WLK, WMC, SM or 3T.
- Intended for recurrent or difficult to diagnose cholesteatomas by CT or otologic exam. Consult radiologist for any other indication.

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS FLAIR Ax	220	5 x 2	  Axials parallel to AC-PC line	
T2 FS hr Cor	180	3 x 0	Include from mastoid through anterior IAC	
T2 CISS Axial	180	1 x 0	Include from mastoid through IAC	
Diffusion HASTE Cor B1000	160	3 x 0.3		Copies center T2 FS Cor
Diffusion HASTE Ax B0 Diffusion HASTE Ax B1000	220	3 x 0.3		Copies center CISS Ax
T1 Ax Pre *Administer contrast* *T1 FS Ax Post*	160	3 x 0		Copies center CISS Ax
T1 FS Cor Post	160	3 x 0		Copies center T2 FS Cor

Note:

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.

Post Processing of Diffusion HASTE Ax ADC map:

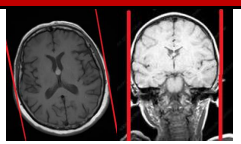
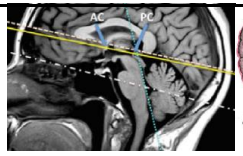
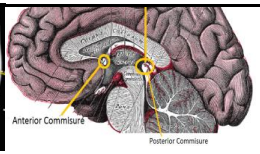
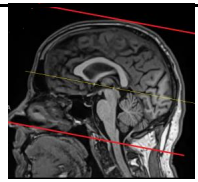
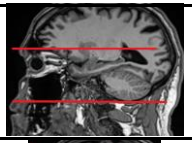
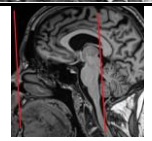
- Browser > Local, select both Diffusion HASTE Ax B0 & B1000 series.
- Click Evaluation > Dynamic Analysis > ADC, name series “diff haste axial adc”

Cranial Nerve

(Facial pain, facial tingling and numbness, 4th Trochlear nerve for nerve palsy, 5th Trigeminal nerve for trigeminal neuralgia, 6th Abducens nerve, 9th Glossopharyngeal nerve, 10th Vagus nerve, 11th Spinal accessory nerve, 12th Hypoglossal nerve)

(Updated 10/26/23)

- Do not perform on GE RCP MR1

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30		
T2 SPACE Ax	180	0.8 ~80 slices	Posterior fossa, foramen magnum through orbits	
T2 TSE FS Cor Hires *Administer contrast* T1 TSE FS Cor Hires Post	160	3 x 1 ~30 slices	Posterior to the pons through face	
T1 TSE FS Ax Hires Post	160	3 x 0 ~24 slices		Copies center slice T2 CISS Ax
T2 Ax T2 FS Ax**ARA: GE*	220			Copies to FLAIR Ax
T1 FS VIBE Ax post T1 FS SE Ax post* *ARA: A40 SM, WLK, WMC, GE*	230	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

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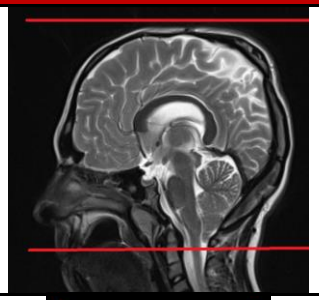
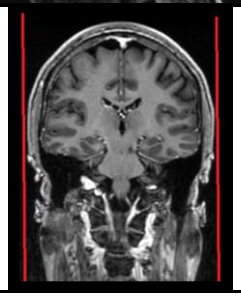
Fast Acquisition

- Typically performed for evaluation of Hydrocephalus. It is normal to see a ventriculoperitoneal (VP) shunt implanted in these patients.
- Programmable shunts may require an X-ray before and/or after MRI or a neurological follow-up appointment.
- Swaddle uncooperative children/infants. Use papoose at CIC, parents or other staff may help stabilize uncooperative patients

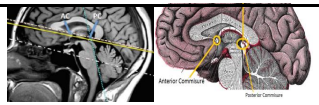
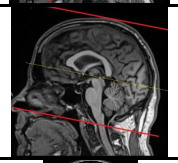
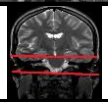
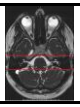
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 HASTE / SSFSE Ax	200	4 x 1.2		
T2 HASTE / SSFSE Sag	200	4 x 1.2		

IAC

(7th CN Facial nerve for cerebellopontine angle, 8th CN Vestibulocochlear nerve, tinnitus, hearing loss, dizziness / vertigo, facial drooping / spasms / twitching, acoustic neuroma, vestibular schwannoma, Bell's palsy)

(Updated 10/26/23)

- Routine brain MRI ordered from ENT/Otolaryngology for any of the above indications should follow the IAC protocol.
- Do not perform on GE, RCP MR1

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2		
GRE Cor	220	5 x 1		
Diffusion Ax	230	5 x 1 ~24 slices	 Axials parallel to AC-PC line	
T2 FS FLAIR Ax	220			
T2 CISS Ax (If wo contrast, MPR Cor 1mm)	200	0.8 x 0 (CIC, CP, GTN, MPT, QRY, RCP)	Posterior fossa	
T1 TSE Ax Pre *Administer contrast*	160	3 x 0	Posterior fossa	Copy center of slice with T2 CISS
T2 Ax	220	5 x 1		Copies to FLAIR Ax
T1 TSE FS Ax post	160	3 x 0		Copy slices with T1 TSE Ax Pre
T1 SE FS Cor post* **A40 SM, WLK, WMC*	150	3 x 0		
T1 FS VIBE Ax post T1 FS SE Ax post* **A40 SM, WLK, WMC*	230	1 x 0 5 x 1*	Post-processing • MPR – IAC Cor 1.0mm, 14CM FOV, ~28 slices • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

NOTE:

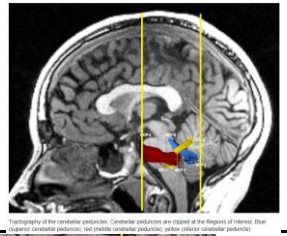
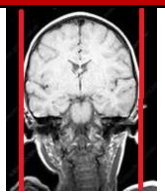
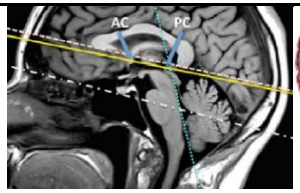
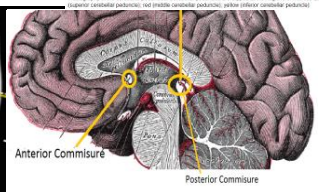
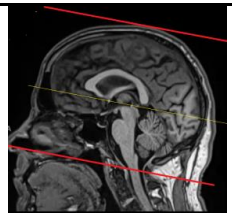
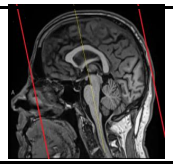
- Follow up or known schwannoma studies may be ordered without contrast, specifically Dr. Kemper
- Include T1 VIBE Ax Pre for non-contrast exams

Movement Disorder

(Middle Cerebellar Peduncle width)

(Updated 4/26/23)

- Specialty exam, only perform if specifically requested. Generally ordered by neurologist for neurodegenerative movement disorders
- Do not perform for general practice physicians.
- Keep head straight

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 3D VIBE Sag (MPR 1mm Cor)	230	1 x 0 ~160 slices	Coronal MPR – orthogonal, mid-cerebellum through the pons 	
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)* *Administer contrast*	220	3 x 0 ~52 slices TE 30		
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post**ARA: A40 SM, WLK, WMC, GE*	200	5 x 1	Coronals parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post**ARA: A40 SM, WLK, WMC, GE*	230	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

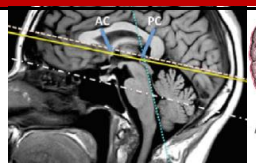
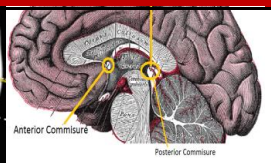
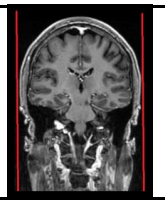
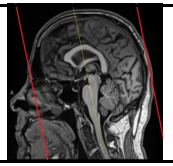
NOTE:

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial

NeuroQuant *3T Preferred

(Updated 4/26/23)

- If 3T contraindicated: CP MR1, CIC, GTN MR1, MPT MR2, MID, RCP MR2, SW MR3, or VIL.
- Keep head straight.
- Landmark must be at glabella for proper post processing of T1 MPRAGE Sag, even for multiple studies.

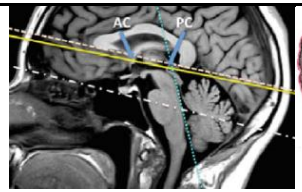
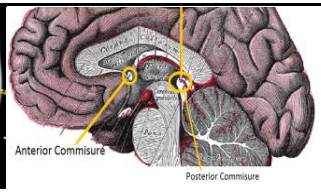
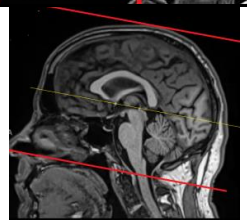
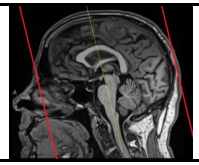
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS FLAIR Ax	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30		
T1 3D MPRAGE Sag, p2 *Administer contrast*	256 100% 192 base resolution	1.2 x 1.2 160 – 170 0% phase or slice over sampling	Do not adjust parameters, no angle. iPat: 2, Avg.: 1, Concatenations: 1 Gradient mode: Fast, RF Pulse Type: Fast Mag. Prep: Non-selective IR, Filters: None TR: 2400, TE: min, TI 1000, Flip Angle: 8, BW: 180	
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post**ARA: A40 SM, WLK, WMC, GE*	220	5 x 1	Parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post**ARA: A40 SM, WLK, WMC, GE*	230 220	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

NOTE:

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Send T1 MPRAGE to ClearCanvas
- Reserve study in "pending Documents" for 2 hours if done before 5 pm. If done after hours, reserve for appropriate time allowing for at least 2 hours of processing time the following day. Notify NQProcessing@ausrad.com to upload the T1 mprage sag to Neuroquant for report processing.
- Standard reports: General Morphometry and Age-Related Atrophy, other upon request: Brain Development, Hippocampal Volume Asymmetry, Multi-structure Atrophy and Triage Brain Atrophy

Multiple Sclerosis

(Updated 4/26/23)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2	Must include entire brain from left to right and superior edge of C2 through the skull vertex.	
T2 FS FLAIR Sag		5 x .05 ~25 slices		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	  • Axials parallel to AC-PC line • Must include entire brain from foramen magnum through the skull vertex	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)* *Administer contrast*		3 x 0 ~52 slices TE 30		
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post* *ARA: A40 SM, WLK, WMC, GE*	200	5 x 1	• Coronals parallel to the brainstem • Must include entire brain from posterior to anterior cranial vault	
T1 FS VIBE Ax post T1 FS SE Ax post* *ARA: A40 SM, WLK, WMC, GE*	230 220	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

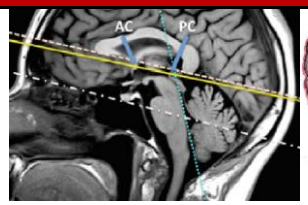
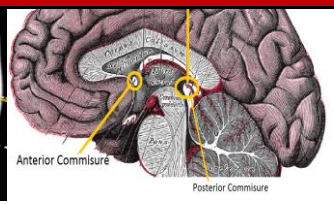
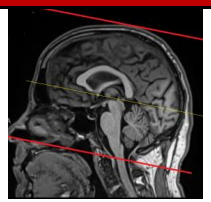
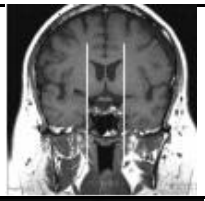
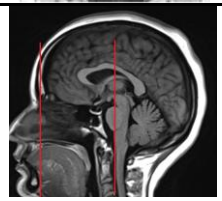
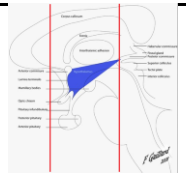
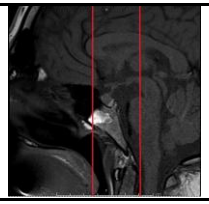
- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified.

ACR requirements

Pituitary: Adult / Pediatric

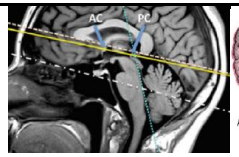
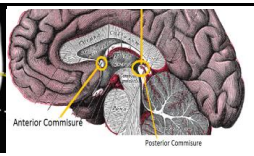
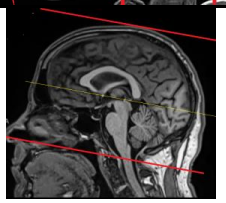
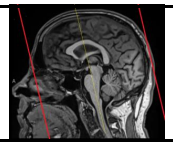
(Updated 9/26/22)

- Always to be scanned as an individual exam, separate ACC/charge.
- For multi-exams perform post contrast immediately after contrast injection.

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Diffusion Ax *(Pedi only)*	230	5 x 1	  Axials parallel to AC-PC line	
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1		
T1 hr Sag	140	2 x 0 ~16 slices *2.5 x 0** **A40 SM, WLK, WMC*		
T2 hr Cor	140	2 x 0 (Adult: ~16 slices) (Pedi: ~38 slices) *2.5 x 0* **A40 SM, WLK, WMC*	Adult – standard pituitary coverage Pediatric 0-17 y/o – include frontal lobes	
T1 hr Cor Pre *Administer contrast* T1 hr Cor Post	140	2 x 0 ~16 slices *2.5 x 0** **A40 SM, WLK, WMC*	Include mid-pons through pituitary and optic chiasm 	
T1 hr Sag Post	140	2 x 0 *2.5 x 0** **A40 SM, WLK, WMC*		Copies to T1 hr Sag

Spinks

(Updated 4/26/23)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE* T1 Ax	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)*	220	3 x 0 ~52 slices TE 30		
T1 3D MPRAGE / FSPGR Ax	220	1 x 0	Post-processing • MPR – Cor 1x0mm	Copies to T1 FLAIR Ax
T2 3D CISS / SPACE Sag *Administer contrast*	230	1 x 0	Post-processing • MPR – Ax 1x0mm • MPR – Cor 1x0mm	Copies center slice to T1 Sag
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor* T1 FS SE Cor post* *ARA: A40 SM, WLK, WMC, GE*	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	
T1 FS VIBE Ax post T1 FS SE Ax post**ARA: A40 SM, WLK, WMC, GE*	230 220	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

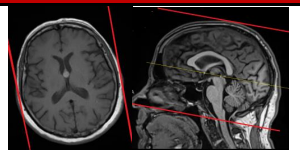
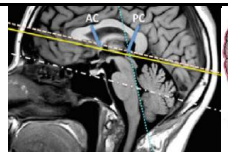
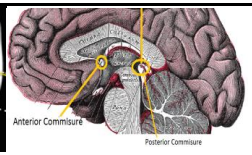
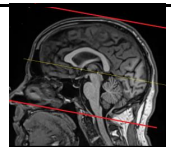
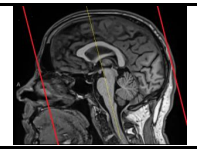
- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified

Tumor

(Mass, oncology, metastasis)

(Updated 4/26/23)

- ARA, do not perform on GE (RCP MR1) or Siemens A40 software level (SM, WLK, & WMC)
- If ordered without contrast perform routine brain. Pre 3D is not necessary if unable to compare with post 3D.

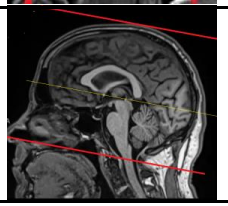
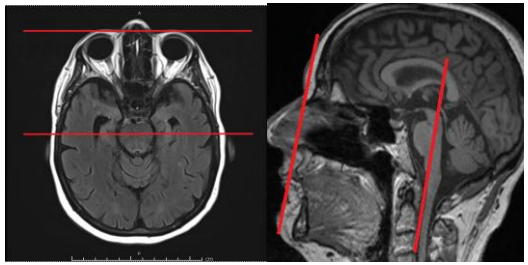
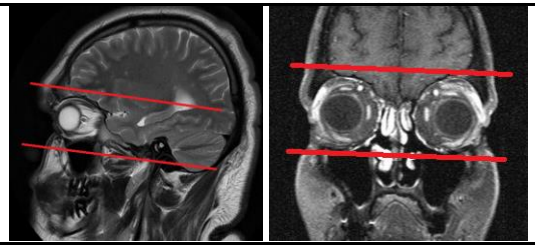
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 3D VIBE Ax pre	220	1 x 0	Post-processing • MPR – Sag 4x0mm, ~39 slices	
T2 FS FLAIR Ax T2 FLAIR Ax**ARA: GE*	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax	230			
SWI Ax *(Only send SWI & Phase series)* *Administer contrast*	220	3 x 0 ~52 slices TE 30		
T2 Ax T2 FS Ax**ARA: GE*	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor	200	5 x 1	Coronals parallel to the brainstem	
T1 FS VIBE Ax post	230	1 x 0	Post-processing • MPR – Sag 4x0mm, ~39 slices • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies to center to FLAIR Ax

- Patients with braces or other metallic implants causing susceptibility artifact – remove FS & perform GRE Cor instead of SWI.
- Conventional GRE coronal may be performed if motion is noted on SWI axial.
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified

Orbits

(Updated 5/16/22)

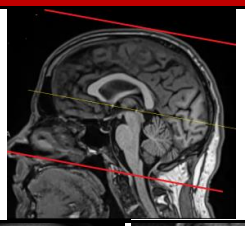
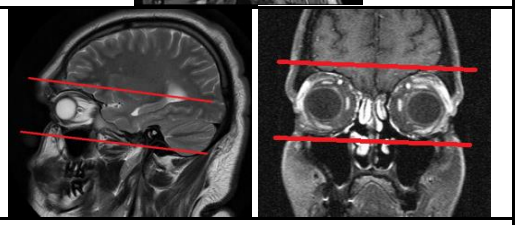
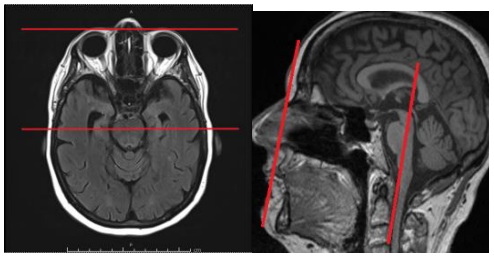
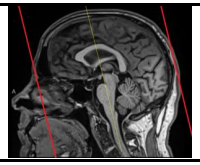
- Always to be scanned as an individual exam, separate ACC/charge
- Eye make-up must be removed prior to exam

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2		
Diffusion Ax	230	5 x 1		
T2 STIR hr Cor T1 hr Cor Pre *Administer contrast* T1 FS hr Cor Post	160	3 x 0 ~31 slices	Mid pons to through globe	
T2 FS hr Ax T1 FS hr Ax Post	160	3 x 0 ~15 slices	Slices parallel to the optic nerve	

Optic Glioma

(Updated 9/26/22)

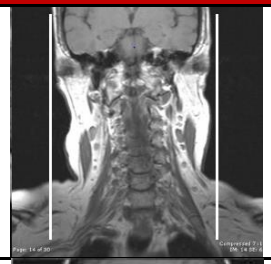
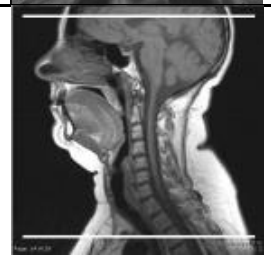
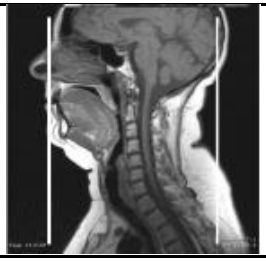
- Always to be scanned as an individual exam, separate ACC/charge
- Eye make-up must be removed prior to exam

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS FLAIR Ax T2 FLAIR Ax* *ARA: GE*	220	5 x 1		
T1 hr Ax	160	3 x 0		
T2 STIR hr Cor *Administer contrast*	160	3 x 0	Mid pons to through globe	
T1 FS hr Cor Post	160	3 x 0		
T2 FS hr Obl Ax	180	3 x 0		Copies to T1 hr Ax
T1 FS SE Cor post* *ARA: A40 SM, WLK, WMC, GE*	200*	5 x 1*		
T1 FS VIBE Ax post T1 FS SE Ax post* *ARA: A40 SM, WLK, WMC, GE* 220	230 220	1 x 0 5 x 1*	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	Copies center to FLAIR Ax

Soft Tissue Neck *3T Preferred

(Updated 10/3/23)

- May be performed at GTN TIM Symphony or SW MR3 Aera
- The FOV and # of slices used should be appropriate to the size of the patient. Included sternum to the orbital roof F to H on all sequences.
- Evaluate all Dixon sequences for "Dixon fail artifact"

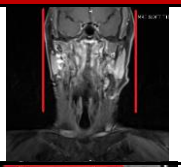
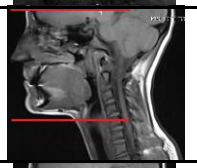
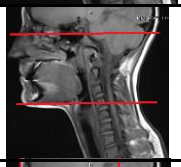
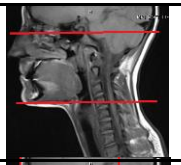
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag		5 x 1		
T1 Ax	220	4 x 1		
T2 FS Dixon Ax (Perform STIR Ax if Dixon fails)				
DIFF Ax B values – 0, 1000		5 x 1		
STIR Cor T1 Cor (if wo gad) *Administer contrast*		5 x 1		
T1 FS Dixon Ax Post immediate		4 x 1	For DIXON failures add T1 TSE FS	Copies to T1 Ax
T1 FS Dixon Cor Post *With in/out phase		4 x 1		Copies to STIR Cor

Send to PACS: Routine sequences, plus In Phase non-FS series from T1 FS Dixon Cor Post

*3T Specific

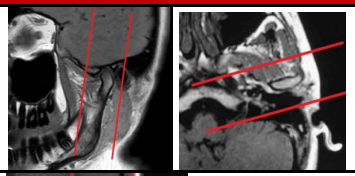
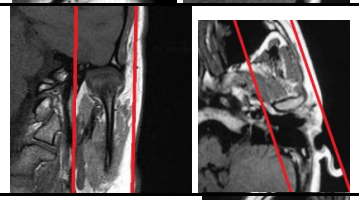
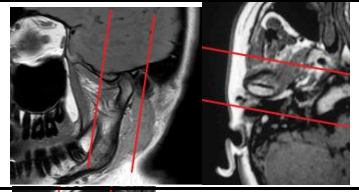
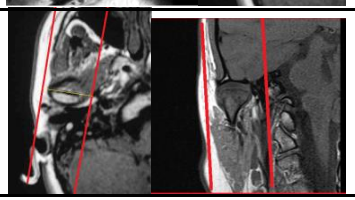
Sialogram

- Include orbits to mandible to ear lobes.
- Reserve read for Dr. Hassibi or Dr. Farhataziz

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	240	5 x 1		
T1 Ax T2 FS Dixon Ax	200	3 x 0.5		
T2 SPACE Ax (MPR 1.2 x 0 Cor to focus on salivary glands)	160	1.2 x 0		
STIR Cor *Administer contrast:*	180	3 x 0.5		
T1 FS Dixon Ax Post	200	2 x 0.5		
T1 FS Dixon Cor Post	180	2 x 0.5		

TMJ

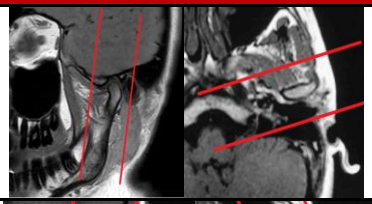
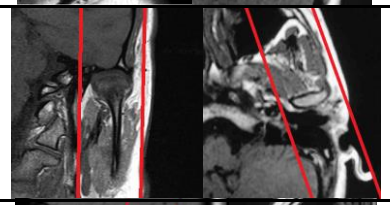
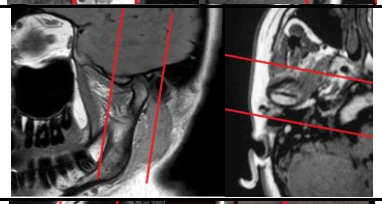
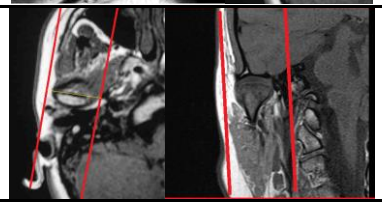
- Open series performed with patient in maximum open mouth. Measure how wide the patient can open their mouth in cm before starting.
- Document # of cm that the mouth was open.
- Contrast is not used for TMJ studies generally; however, contrast is recommended for RA, infection, abscess, etc.
- Acquire sequences in the following order

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
LT T1 Cor	130	3 x 0 ~11 slices		
LT PD Sag LT T2 FS Sag	130	3 x 0 ~11 slices		
RT T1 Cor	130	3 x 0 ~11 slices		
RT PD Sag RT T2 FS Sag	130	3 x 0 ~11 slices		
RT PD Sag Open LT PD Sag Open *Administer contrast, if needed*	130	3 x 0 ~11 slices		Copies prescription to Sag closed mouth as appropriate
LT T1 FS Cor Closed Post	130	3 x 0		Copies to LT T1 Cor
LT T1 FS Sag Closed Post	130	3 x 0		Copies to LT PD Sag
RT T1 FS Cor Closed Post	130	3 x 0		Copies to RT T1 Cor
RT T1 FS Sag Closed Post	130	3 x 0		Copies to RT PD Sag

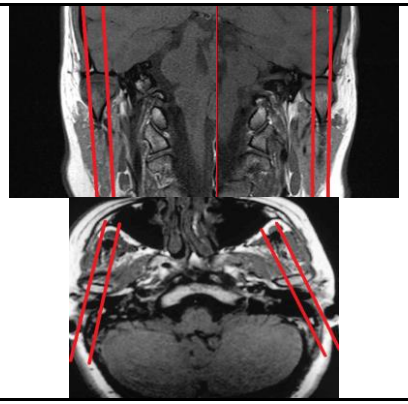
- Send axial localizer to PACS

Cine

- Open series performed with patient in maximum open mouth. Measure how wide the patient can open their mouth in cm before starting.
- Document # of cm that the mouth was open.
- Contrast is not used for TMJ studies generally; however, contrast is recommended for RA, infection, abscess, etc.
- On larger patients, spine coil or anterior head coil can be removed to easily fit the bite block. Not done on GE. Acquire sequences in the following order

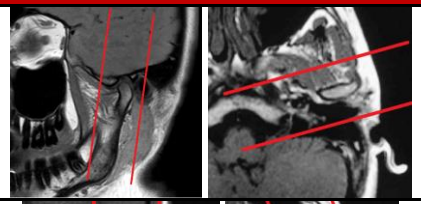
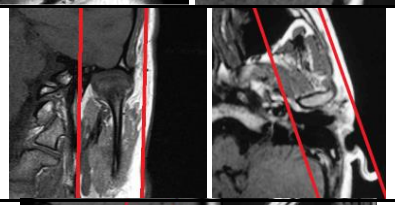
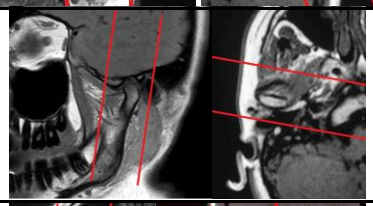
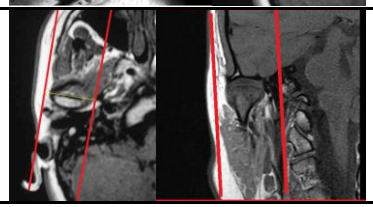
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
LT T1 Cor	130	3 x 0 ~11 slices		
LT PD Sag LT T2 FS Sag	130	3 x 0 ~11 slices		
RT T1 Cor	130	3 x 0 ~11 slices		
RT PD Sag RT T2 FS Sag	130	3 x 0 ~11 slices		
Open mouth RT PD Sag Open LT PD Sag Open	130	3 x 0 ~11 slices		Copies prescription to Sag closed mouth as appropriate

- continued on next page –

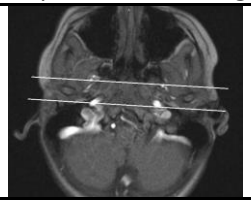
Do not send the dynamic sequences to PACS, only the resulting cine series. To create the cine, save the center slice from each of the 8 sequences into a separate sequence, named “RT PD Sag Cine” and/or “LT PD Sag Cine” in separate series. Once this is complete you will need to label each slice with the appropriate opening, “CLOSED” “BITE” “4MM”, etc. Additional instructions. • If patient is unable to complete cine up to the 24mm, document in Tech Notes as to why.				
PD Sag Bilat Closed PD Sag Bilat bite (biting down) PD Sag Bilat 4mm / 10mm PD Sag Bilat 8mm / 15mm PD Sag Bilat 12mm / 20mm PD Sag Bilat 16mm / 24mm PD Sag Bilat 20mm / 28mm PD Sag Bilat 24mm / 32mm PD Sag Bilat 36mm, optional patient dependent PD Sag Bilat 40mm, optional patient dependent *Administer contrast, if needed*	130	3 x 0.5	Both measurements listed for old & new device.	
LT T1 FS Cor Closed Post	130	3 x 0		Copies to LT T1 Cor
LT T1 FS Sag Closed Post	130	3 x 0		Copies to LT PD Sag
RT T1 FS Cor Closed Post	130	3 x 0		Copies to RT T1 Cor
RT T1 FS Sag Closed Post	130	3 x 0		Copies to RT PD Sag
• Send axial localizer to PA				

Pedi - JRA

- Open series performed with patient in maximum open mouth. Measure how wide the patient can open their mouth in cm before starting.
- Document # of cm that the mouth was open.
- Contrast is not used for TMJ studies generally; however, contrast is recommended for RA, infection, abscess, etc.
- Acquire sequences in the following order

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
LT T1 Cor	130	2.5 x 0.5		
LT PD Sag LT T2 FS Sag	130	2.5 x 0.5		
RT T1 Cor	130	2.5 x 0.5		
RT PD Sag RT T2 FS Sag	130	2.5 x 0.5		
Open mouth RT PD Sag Open LT PD Sag Open *Administer contrast*	130	2.5 x 0.5		Copies prescription to Sag closed mouth as appropriate

- continued on next page -

LT T1 FS Cor Closed Post	130	2.5 x 0.5		Copies to LT T1 Cor
LT T1 FS Sag Closed Post	130	2.5 x 0.5		Copies to LT PD Sag
RT T1 FS Cor Closed Post	130	2.5 x 0.5		Copies to RT T1 Cor
RT T1 FS Sag Closed Post	130	2.5 x 0.5		Copies to RT PD Sag
T1 FS Cor Bilat Closed Post				
• Send axial localizer to PACS				

Spine *

(Updated 10/3/23)

- If metal, repeat T1 FS without FS. Repeat T2 FS without FS instead of STIR.
- Follow referral requests for non-contrast/non-ARA orders. Consider the following for PRN orders:
  - Contrast is ***recommended*** for:
    - Cervical: history of cancer, myelopathy, MS, infection, abscess, or mass
    - Thoracic: history of cancer, myelopathy, MS, infection, abscess, mass, or prior surgery within 10 years
    - Lumbar: history of cancer, myelopathy, infection, abscess, mass, or prior surgery within 10 years
  - Contrast is ***required*** for:
    - Spinal cord lesions
    - Leptomeningeal disease
- New MS protocols for cervical and thoracic spine are to be performed for UTHA RPs only, 3T preferred, 10/6/20.

Diffusion

- Do not perform on A40 (WLK, WMC, SM)

- Add to routine protocol if specifically requested
- Consult rad for appropriate plane
- To evaluate spinal cord infarct, epidermoid cyst, osteomyelitis and metastasis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Thoracic				
DIFF Ax	230	5 x 1		
DIFF Sag Upper / Lower *no angle	260	5 x 1	• Perform upper & lower to avoid end of bore artifact. • Anterior & posterior sat bands to cover fat signal.	
Lumbar				
DIFF Ax	200	5 x 1		
DIFF Sag	280	5 x 1		

Radiation Treatment Planning

-

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES

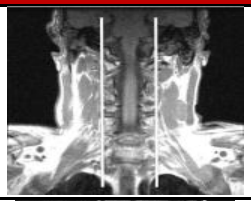
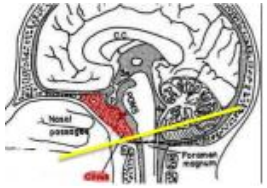
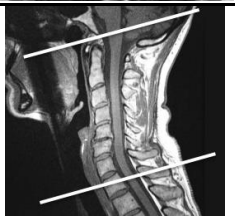
Scoliosis

- Add to routine protocol if exam specifically ordered for scoliosis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Adult: T1 Cor Pedi: T2 Cor				

Cervical

- Document presence or absence of radiculopathy (i.e., Neck pain with left arm radiculopathy for two months)
- If hardware limits the FS on post imaging, add non-FS series.
- Contrast is beneficial for history of cancer, myelopathy, MS, infection, abscess, or mass.
- Add a Cor T1 (3 x 1) if exam is ordered for scoliosis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 TSE Sag T2 TSE Sag STIR Sag	180	3 x 1 ~13 slices 256 x 224 min matrix	Limit FOV to include inferior half of the clivus to mid T2	
T2* GRE Ax	160	3 x 1 256 x 192 min matrix, if using rectangular FOV the # of phase encoding lines must be >/= pFOV	Inferior tip of clivus to mid T1 	
T2 FS TSE Ax T2 TSE Ax (add if hardware is present) *Administer contrast, if needed*		256 x 160 min matrix		
T1 FS TSE Sag Post T1 TSE Sag Post (if hardware is present)	180	3 x 1		Copies to T1 Sag
T1 TSE Ax Post	160	3 x 1		Copies coverage to T2* GRE Ax

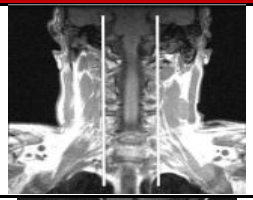
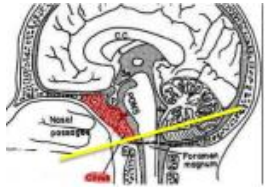
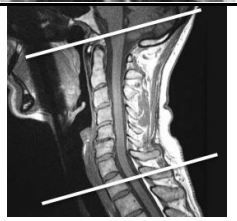
- Send coronal localizer for scoliosis, if not performing T1 Cor

Cervical with Flexion

(Hirayama)

(Updated 8/12/22)

- Document presence or absence of radiculopathy (i.e., Neck pain with left arm radiculopathy for two months)
- If hardware limits the FS on post imaging, add non-FS series.
- Contrast is beneficial for history of cancer, myelopathy, MS, infection, abscess, or mass.
- Add a Cor T1 (3 x 1) if exam is ordered for scoliosis

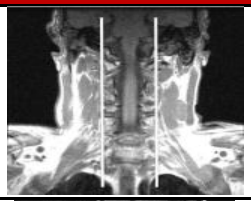
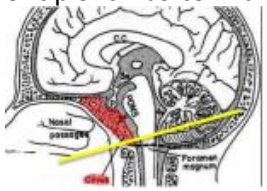
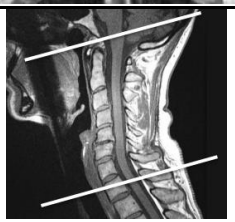
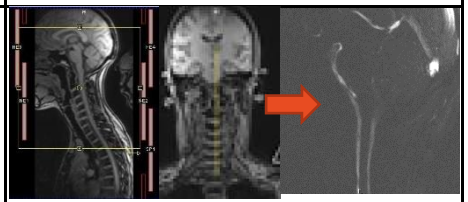
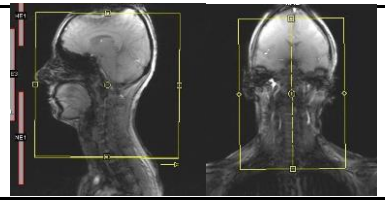
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 TSE Sag T2 TSE Sag STIR Sag	180	3 x 1 ~13 slices 256 x 224 min matrix	Limit FOV to include inferior half of the clivus to mid T2	
T2* GRE Ax T2 TSE Ax	160	3 x 1 256 x 192 min matrix, if using rectangular FOV the # of phase encoding lines must be >/= pFOV	Inferior tip of clivus to mid T1 	
T2 TSE Sag Flexion	180			Copies T1 Sag
T2 TSE Ax Flexion	160			Copies T2* GRE Ax

- Send coronal localizer for scoliosis, if not performing T1 Cor

Cervical CSF Flow

Positioning
- Set up patient with Peripheral Pulse Unit on index finger.

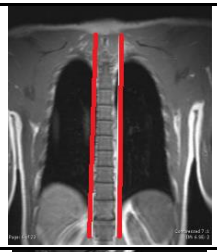
- Document presence or absence of radiculopathy (i.e., Neck pain with left arm radiculopathy for two months)
- If hardware limits the FS on post imaging, add non-FS series.
- Contrast is beneficial for history of cancer, myelopathy, MS, infection, abscess, or mass.
- Add a Cor T1 (3 x 1) if exam is ordered for scoliosis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 TSE Sag T2 TSE Sag STIR Sag	180	3 x 1 ~13 slices 256 x 224 min matrix	Limit FOV to include inferior half of the clivus to mid T2	
T2* GRE Ax	160	3 x 1 256 x 192 min matrix, if using rectangular FOV the # of phase encoding lines must be >/= pFOV	Inferior tip of clivus to mid T1 	
T2 FS TSE Ax T2 TSE Ax (add if hardware is present)		256 x 160 min matrix		
FLASH 6 In Plane **pulse gated*	180	6	• Mid sagittal plane	
T2 SPACE Sag *Administer contrast, if needed*	230	1 176 slices/slab	• Mid brain to C7 (to avoid shoulder wrap, do not include below C7)	
T1 TSE Ax Post	160	3 x 1		Copies coverage to T2* GRE Ax
• Send coronal localizer for scoliosis, if not performing T1 Cor				

Thoracic

(Updated 6/13/2004)

- Sagittal coverage includes mid C7 to mid L1 S-I and fully covering the vertebral bodies side to side. Axials to cover from mid C7 to mid L1.
- Document presence of radiculopathy (i.e., Upper back pain with radiating pain in the left chest-wall for two months)
- If hardware limits the FS on post imaging, add non-FS series.
- Contrast is beneficial for history of cancer, myelopathy, MS, infection, abscess, mass, and surgery within 10 years.
- Add a Cor T1 (3 x 1) if exam is ordered for scoliosis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc	~360	6 x 4 ~5 slices	See Additional Scout instructions	
T1 Sag T2 Sag STIR Sag	~320	4 x 0 ~13 slices 512 x 256		
T2 Ax Upper T2 Ax Lower *Administer contrast, if needed*	160	4 x 2 ~48 slices	Overlap at least 1 full vertebra between the upper and lower sections	
T1 Sag FS Post T1 Sag Post (if hardware is present)	~320	4 x 0		Copies to T1 Sag
T1 Ax Post Upper	160	4 X 2		Copies coverage to T2 Ax Upper
T1 Ax Post Lower	160	4 X 2		Copies coverage to T2 Ax Lower

- Send coronal localizer for scoliosis, if not performing T1 Cor

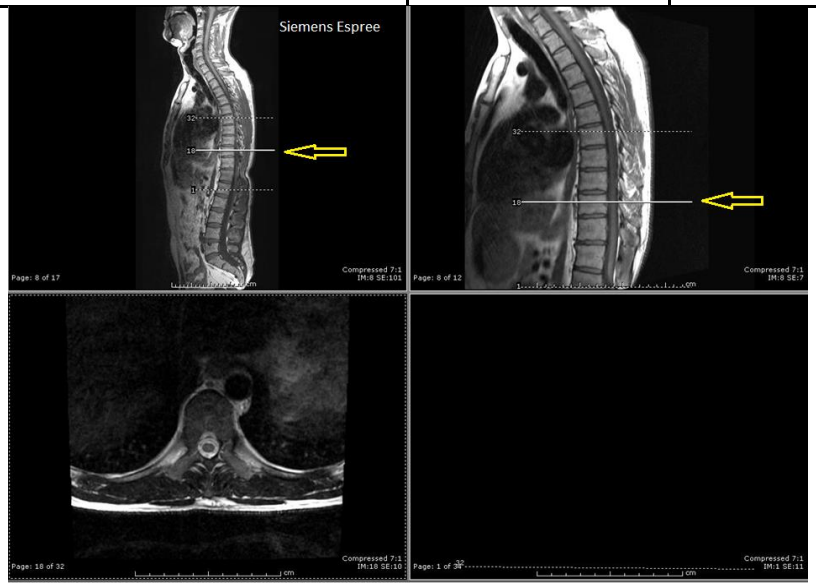
Thoracic Additional Scout

(Updated 10/2023)

Acquire a T1 Sag loc to visualize the vertebral bodies from T10 through S2 for accurate vertebral count. This additional scout allows for accurate identification of the vertebrae especially when L5 or S1 has a transitional appearance. This is especially important when patients are having interventional or surgical procedures of the spine.

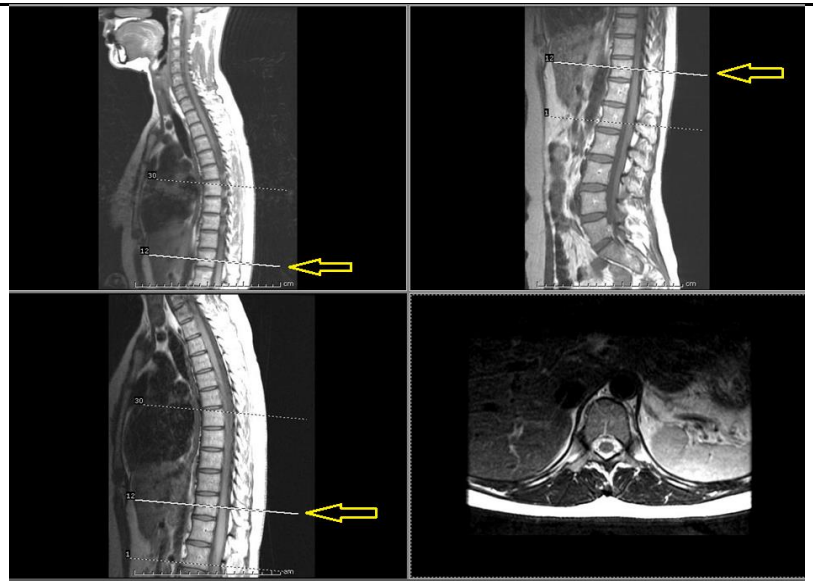
- PT positioned head-first supine.
- Sag cervicothoracic spine scout must include skull base through L1 so that it overlaps with the T1 Sag series. Combined series including from skull base through L5-S1
- Siemens Espree: acquire the C-T-L spine sag scout in separate sections with composed series.
- Use an anterior sat band to improve the image quality.
- If the scout images are unable to be obtained, document in the tech notes.

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc	~360	6 x 4 ~5 slices	• High bandwidth ~400 Hz to reduce edge of field artifacts	



Siemens Espree

- Composed full spine sag scout, 3 stations.
- Axial sequences will cross reference



GE,

Siemens Avanto, Symphony TIM

- Non-composed C-T, T-L sag scout, 2 stations
- Axial sequences will cross reference

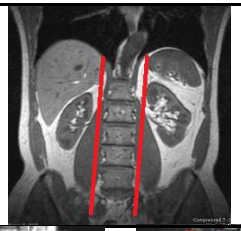
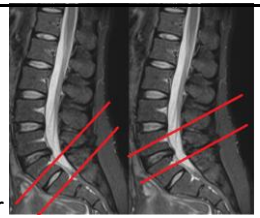
Siemens Symphony:

- Axial images acquired will not cross reference on sagittal series scanned at a different table location.
- Place a marker at the T12 level so that it is seen on both the C-T sagittal scout and the T1 Sag series

Lumbar

(Updated 6/13/2004)

- Sagittal coverage includes mid T11 to mid S3 S-I and fully covering the vertebral bodies side to side. Axials to cover from mid T12 to mid S1.
- Document presence of radiculopathy (i.e., lower back pain with left leg radiculopathy for two months)
- If hardware limits the FS on post imaging, add non-FS series.
- Contrast is beneficial for history of cancer, myelopathy, infection, abscess, mass, and surgery within 10 years.
- Add a Cor T1 (3 x 1) if exam is ordered for scoliosis

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc	~360	6 x 4 ~5 slices	See Additional Scout instructions	
T1 Sag T2 Sag STIR Sag	~280	4.5 x 0.5 ~13 slices	• Must include inferior endplate of S2 through the superior endplate of T12. • Must include pedicle left to right	
T2 Ax T1 Ax	180 200* *A40, SM, WLK, WMC*	4 x 1 Pixel Area </- 1.5 mm² ~24 slices	Must include S1 superior endplate	 or 
T2 Obl Ax *Continue If contrast is needed:*	180	4 x 1 Pixel Area </- 1.5 mm² ~7+ slices	Add T2 Axial sequence at L3/4 or L4/L5 when the angle of those disk SPACEs requires a separate scan or pathology is seen.	 or 
T1 Sag FS Post T1 Sag Post (if hardware is present)	~260	4.5 x 0.5		Copies to T1 Sag
T1 Ax Post	180	4 X 1		Copies to T2 Ax
• For Dr. Wallis and Dr. Geibel: replace the T2 Ax Oblique with individual slice groups (5 slices each) through lumbar disc spaces. • For Dr. Bergeson extent coverage on T2 Ax Oblique to include mid L4-mid S1. Scan as one group parallel to these disc spaces.			 Dr. Geibel & Dr. Wallis	 Dr. Bergeson
• Send coronal localizer for scoliosis, if not performing T1 Cor ACR Requirement – Do Not Adjust				

Lumbar Additional Scout

(Updated 10/2023)

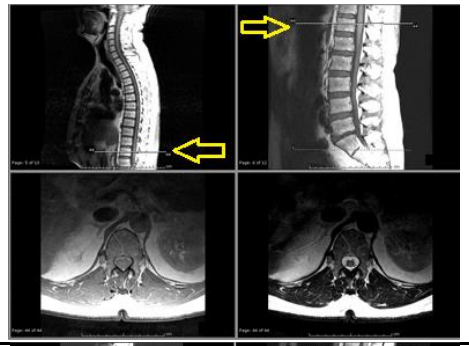
Acquire a T1 Sag loc to visualize the vertebral bodies from C2 through L1 for accurate vertebral count. This added scout allows for accurate identification of the vertebrae especially when L5 or S1 has a transitional appearance. This is especially important when patients are having interventional or surgical procedures of the spine.

- PT positioned head-first supine.
- Sag cervicothoracic spine scout must include skull base through L1 so that it overlaps with the T1 Sag series. Combined series including from skull base through L5-S1
- Siemens Espree: acquire the C-T spine sag scout in two sections with composed series.
- Use an anterior sat band to improve the image quality.
- If the scout images are unable to be obtained, document in the tech notes.

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc	~360	6 x 4 ~5 slices	• High bandwidth ~400 Hz to reduce edge of field artifacts	

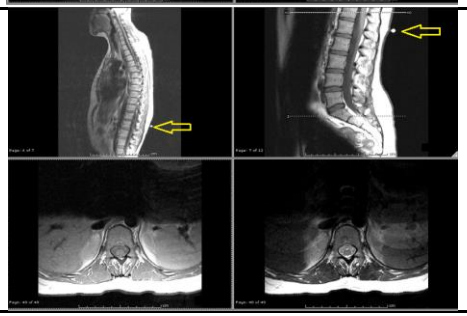
Top Row: GE, Siemens, Espree, Avanto, TIM Symphony

- Cross reference line overlaps both upper and lower loc



Siemens Symphony:

- Axial images acquired will not cross reference on sagittal series scanned at a different table location.
- Place a marker at the T12 level so that it is seen on both the C-T sagittal scout and the T1 Sag series



Radiation Treatment Planning

For RTP protocol, unless otherwise stated. Follow these guidelines:

- Do not angle images.
- Scan from inferior to superior
- Include entire brain skin to skin and hard palate to skull vertex.
- Do not cut off tip of nose, top of head, or ear lobes with the smallest FOV to include patient's external contours.
- 100% FOV with 100! pFOV, no rectangular FOV
- Slice thickness of 1x0 mm
- Matrix of 256x256
- Contrast full dose.

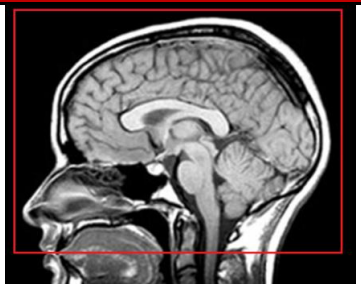
Routine Brain RTP

- Keep head straight, scan orthogonal, no angle.
- Scan I to S, include hard palate and skull vertex, include tip of nose, both ears, small FOV to include patient's external contours.

- Perform for TOPA (Texas Oncology Professional Association) includes Dr. Wu, Dr. Tierney, Dr. Sheinbein and others.
- Perform for ACC (Austin Cancer Center) includes Dr. Ghafoori and others.
- In the rare instance, if an ACC referral specifies Dr. Ghafoori protocol, perform ACC Dr. Ghafoori protocol that has four sequences.

- If a brain RTP referral states W & W/O, contact office for verbal order for with only.

- Do not perform on GE or Symphony A40 scanners: SM, WLK, WMC

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Administer contrast T2 3D FLAIR SPACE FS Ax Post (MPR 1x0mm Cor/Sag)	230 100% pFOV	1 x 0 256 x 174	• Interpolation ON • Dark fluid = CSF suppressed	
T1 3D FLASH Ax Post (MPR 1x0mm Cor/Sag)	230 100% pFOV	1 256 x 206	• Interpolation ON	

Send all original series and reformats to PACS

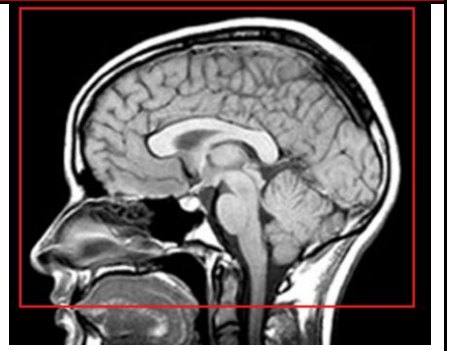
Cranial Nerve RTP

- Keep head straight, scan orthogonal, no angle.
- Scan I to S, include hard palate and skull vertex, include tip of nose, both ears, small FOV to include patient's external contours.

- Perform for TOPA (Texas Oncology Professional Association) includes Dr. Wu, Dr. Tierney, Dr. Sheinbein and others.
- Perform for ACC (Austin Cancer Center) includes Dr. Ghafoori and others.
- In the rare instance, if an ACC referral specifies Dr. Ghafoori protocol, perform ACC Dr. Ghafoori protocol that has four sequences.

- If a brain RTP referral states W & W/O, contact office for verbal order for with only.

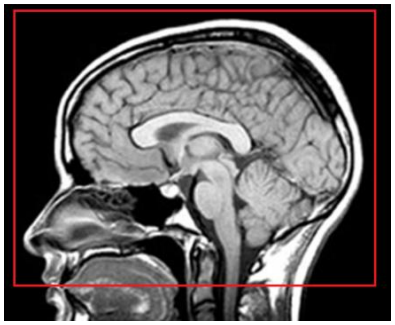
- Do not perform on GE or Symphony A40 scanners: SM, WLK, WMC

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Administer contrast T2 3D CISS Ax Post (MPR 1x0mm Cor/Sag)	230	1 x 0 256 x 256	• Interpolation ON • Bright fluid	
T1 3D FLASH Ax Post (MPR 1x0mm Cor/Sag)	230	1 256 x 206	• Interpolation ON	
Send all scanned series and reformats to PACS				

Brain or Pituitary Austin Cancer Center (ACC) Therapy Planning

(Dr. Ghafoori)

- Keep head straight, scan orthogonal; no angle, Scan I to S, include hard palate and skull vertex, include tip of nose, both ears, small FOV to include patient's external contours, 100% FOV-phase, slice thickness 1x0mm.
- Run this protocol only if referral specifies Dr. Ghafoori protocol.
- Do not perform on GE or Symphony scanners

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 FS VIBE Ax T1 3D MPRAGE Ax (MPR 1x0 Cor/Sag) *Administer contrast*	250	1 256 x 256		
T2 3D SPACE/CISS Ax post (MPR 1x0mm Cor/Sag)	250	1 256 x 256		
T1 3D MPRAGE Ax post (MPR 1x0mm Cor/Sag)	250	1 256 x 256		

Stealth

(Updated 10/3/23)

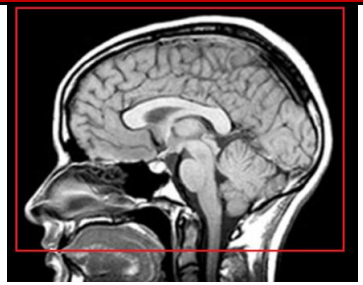
- Keep head straight, scan orthogonal; no angle, Scan I to S, include hard palate and skull vertex, include tip of nose, both ears, small FOV to include patient's external contours, 100% FOV-phase, slice thickness 1x0mm.
- Do not perform on GE or Symphony scanners: SM, WLK, WMC

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Administer contrast T2 3D CISS Ax T1 3D MPRAGE Ax Post	250	1 x 0 256 x 256		
Optional, Dr. Tumu				
FLAIR FS Cor	220	3 x 0.5		

Send all scanned series and reformats to PACS

Stryker / CyberKnife / Stereotactic Radiosurgery (SRS)

- Keep head straight, scan orthogonal; no angle, Scan I to S, include hard palate and skull vertex, include tip of nose, both ears, small FOV to include patient's external contours, 100% FOV-phase, slice thickness 1x0mm.
- SRS commonly ordered by Dr. Dzuik and Dr. Thatikonda
- Do not perform on GE or Symphony scanners: SM, WLK, WMC

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 3D CISS Ax T1 3d MPRAGE Ax Pre *Administer contrast* T1 3D MPRAGE Ax Post	250	1 x 0 256 x 256		

Send all scanned series and reformats to PACS

Soft Tissue Neck Austin Cancer Center (ACC) Therapy Planning

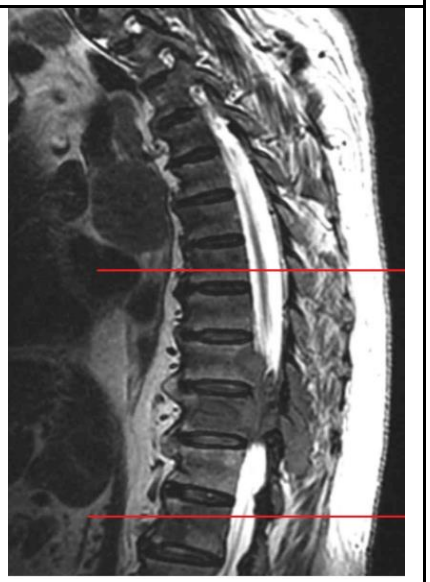
- The FOV and # of slices used should be appropriate to the size of the patient. Included sternum to the orbital roof F to H on all sequences.
- Evaluate all Dixon sequences for “Dixon fail artifact”

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 FS Dixon Ax (Perform STIR Ax if Dixon fails) T2 3D CISS Ax *Administer contrast*		3 x 0 ~65 slices		
T1 2D FLASH Ax Post T1 3D FSPGRR / MPRAGE Ax Post		3 x 0		

Spine Stereotactic Therapy Planning

(Dr. Dziuk and Dr. Thatikonda)

- Full spine localizers are not needed for cervical spine.
- Do not angle scans

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc			3T Auto composing; include all the vertebrae. Might have to repeat with more slices in patients with scoliosis. Must be able to count from C1-S2.	
T2 3D Ax T1 3D Pre T1 3D Post	180	1 – 2	Thickness depending on requested coverage. Do not angle. If area of coverage is not specified, include one vertebra above and below area of interest	

Spine Stryker

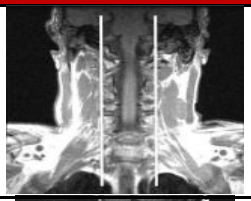
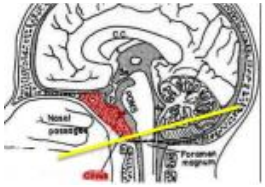
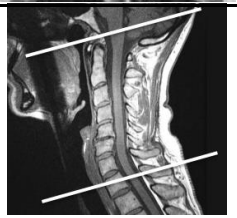
- Full spine localizers are not needed for cervical spine.
- Position feet first, spine
- Do not angle scans, scan inferior to superior

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag Total Spine Loc			3T Auto composing; include all the vertebrae. Might have to repeat with more slices in patients with scoliosis. Must be able to count from C1-S2.	
T2 Ax T1 Ax Pre T1 Ax Post	180	3 x 0 256 x 256 100% pFOV	Include one vertebra above and below area of interest	

Hospital Specific Protocols

Cervical – Trauma

- Limit FOV includes inferior half of the Clivus to mid T2 on sagittal planes and inferior tip of Clivus to mid T1 on axial series.
- Document presence or absence of radiculopathy (i.e., Neck pain with left arm radiculopathy for two months)

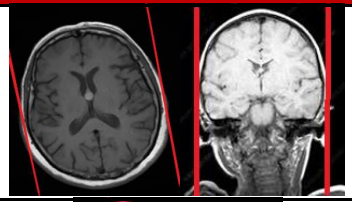
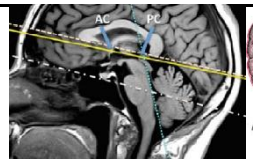
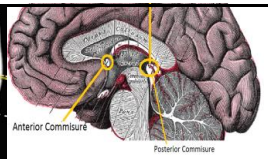
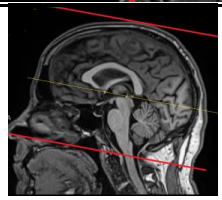
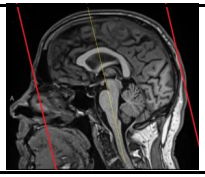
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 TSE Sag	180	3 x 0.3		
T2 TSE Sag				
STIR Sag				
T2* GRE Ax	160	3 x 0.3	Inferior tip of Clivus to mid T1 	
T2 FS TSE Ax T2 TSE Ax (if hardware is present)				
PD 3D Axial	140	1 x 0	Craniocervical junction	

Christus

Brain – Routine

(HA, trauma, CVA, dizziness, AMS)

(Updated 6/21/23)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices		
T2 FLAIR Ax	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax *Administer contrast*	230			
T2 FS Ax	220			
GRE Cor T2 FS Cor T1 FS SE Cor post	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	
T1 FS SE Ax post	220	5 x 1		Copies center to T2 FLAIR Ax

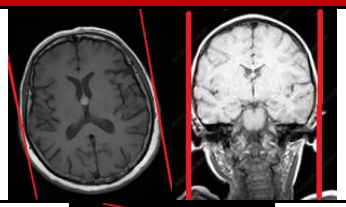
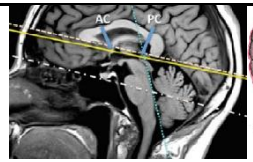
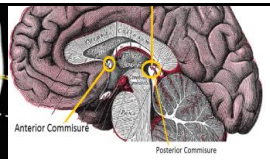
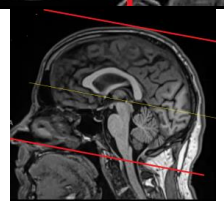
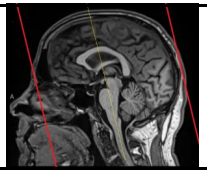
- Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified

CPRMC

Brain – Routine

(HA, trauma, CVA, dizziness, AMS)

(Updated 6/21/23)

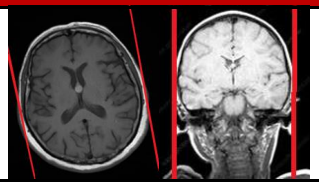
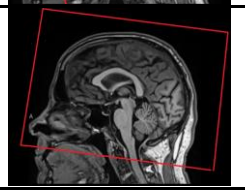
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	230	5 x 2 ~19 slices	Tumor – perform T1 3D FS Ax pre, 1mm Post-processing • MPR – Sag, 4x0mm, ~39 slices	
T2 FLAIR Ax	220	5 x 1 ~24 slices	  Axials parallel to AC-PC line	
Diffusion Ax *Administer contrast*	230			
T2 FS Ax	220			
GRE Cor T2 FS Cor T1 FS SE Cor post	200	5 x 1 ~28 slices	Coronals parallel to the brainstem	
T1 FS SE Ax post	220	5 x 1	Tumor – perform T1 3D FS Ax, 1mm Post-processing • MPR – Sag 4x0mm, ~39 slices • MPR - Cor 4x0mm, ~49 slices	Copies center to T2 FLAIR Ax
• Consult a radiologist for PRN gad orders or ARA referrals where gad is not specified				

Seton

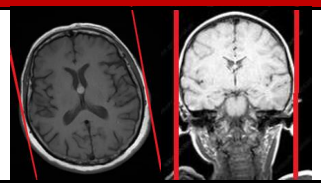
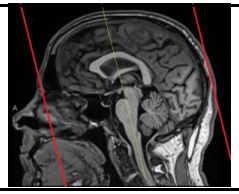
NEURO	
Brain	Pediatric @ DSMC UT • MPRs: 1x1mm Axial 1x1mm Cor • Thin MIP: 6x1mm Axial

Brain – Routine

(Headache, trauma, CVA, dizziness, altered metal status, etc.)

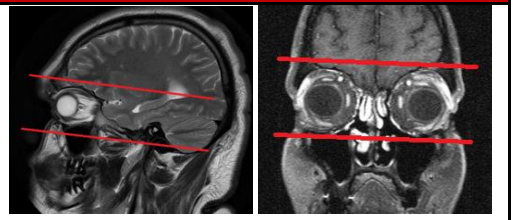
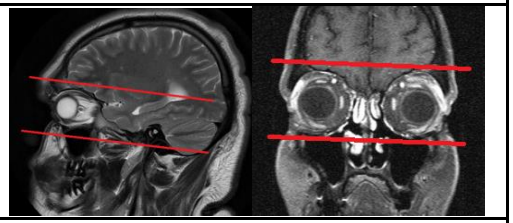
SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	220			
Diffusion Axial	230	5 x 1		
T2 FLAIR Axial *Administer Contrast*	220	5 x 1		
T2 FS Axial GRE Axial	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor	220	5 x 1	Coronals parallel to the brainstem	
T1 FS Axial post			Post-processing • MPR – Sag 4x0mm, ~39 slices • MPR - Cor 4x0mm, ~49 slices	
• Patients with **braces** or other metallic implants causing susceptibility artifact, perform T2 Ax, Cor, and T1 SPACE post **without fat suppression**				

Brain – Non-Contrast

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T1 Sag	220	5 x 2		
Diffusion Axial	230	5 x 1		
T2 FLAIR Axial	220	5 x 1		
T2 FS Axial GRE Axial	220	5 x 1		Copies to T2 FLAIR Ax
T2 FS Cor GRE Cor	220	5 x 1	Coronals parallel to the brainstem	
• Patients with **braces** or other metallic implants causing susceptibility artifact, perform T2 Ax, Cor, and T1 SPACE post **without fat suppression**				

Orbits – Retinoblastoma

- Eye make-up must be removed prior to exam

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
T2 SPACE hr Ax	200	1 x 0		
T1 hr Ax Pre *Administer contrast*	160	3 x 0		
T2 SPACE Sag	250	1.5 x 0		
T2 FS Ax	220	4 x 1		
T2 hr Ax	160	3 x 0		
T2 StarVIBE Ax	160	1 x 0		
T1 MPRAGE Sag Post	250	1		
RT T1 FS hr Sag Post LT T1 FS hr Sag Post	160	3 x 0		

St. David's

Brain for Seizure / ICTAL

(Updated 9/30/20)

SEQUENCE	FOV (mm)	SLICE (mm)	COMMENTS	IMAGES
Diffusion Ax	230	5 x 1		
T1 3D FSPGR/MPRAGE Ax (MPR 1x0 Cor & Sag – mandatory for MIM software)		1 x 0		
T2 FLAIR Ax	220	4 x 1		
FLAIR Obl hr Cor *Administer Contrast*	180	2.5 x 0.5 ~26 slices	Include entire temporal lobe	
T2 Obl Cor hires (include entire temporal lobe, 26+ slices)				
T2 FS Axial	220	4 x 1		
GRE Cor	220	5 x 1		
T1 FS SPACE Axial post	256	1 x 0	Post-processing • MPR - Cor 4x0mm, ~49 slices • Thin MIP – Ax 6x1mm, ~157 slices	