Brigham and Women's Hospital
Founding Member, Mass General Brigham

Dana-Farber
Cancer Institute

MRI Protocol Guide: Head and Neck

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Protocols for Scanners with Only 2D Head/Neck Sequences

Face and Neck

Cranial Nerves 1
General / Trans-spatial
Larynx
Nasopharynx & Nasal Cavity
Optic Nerve
Orbits
Oropharynx & Oral Cavity
Parotid
Sinus
TMJ

Brain/Skull Base

Cranial Nerves 2
Internal Auditory Canal / Temporal Bones
Pituitary
Skull Base

Other

Brachial Plexus
Cervical MRA C+
Cervical MRA C-

Protocols for Scanners with 3D Head/Neck Sequences

Face and Neck

~~Cranial Nerves 1~~
General / Trans-spatial
~~Larynx~~
Nasopharynx & Nasal Cavity
~~Optic Nerve~~
Orbits
Oropharynx & Oral Cavity
~~Parotid~~
Sinus
~~TMJ~~

Brain/Skull Base

~~Cranial Nerves 2~~
~~Internal Auditory Canal / Temporal Bones~~
~~Pituitary~~
~~Skull Base~~

Other

~~Brachial Plexus~~
~~Cervical MRA C+~~
~~Cervical MRA C-~~

Protocols with only 2D Sequences

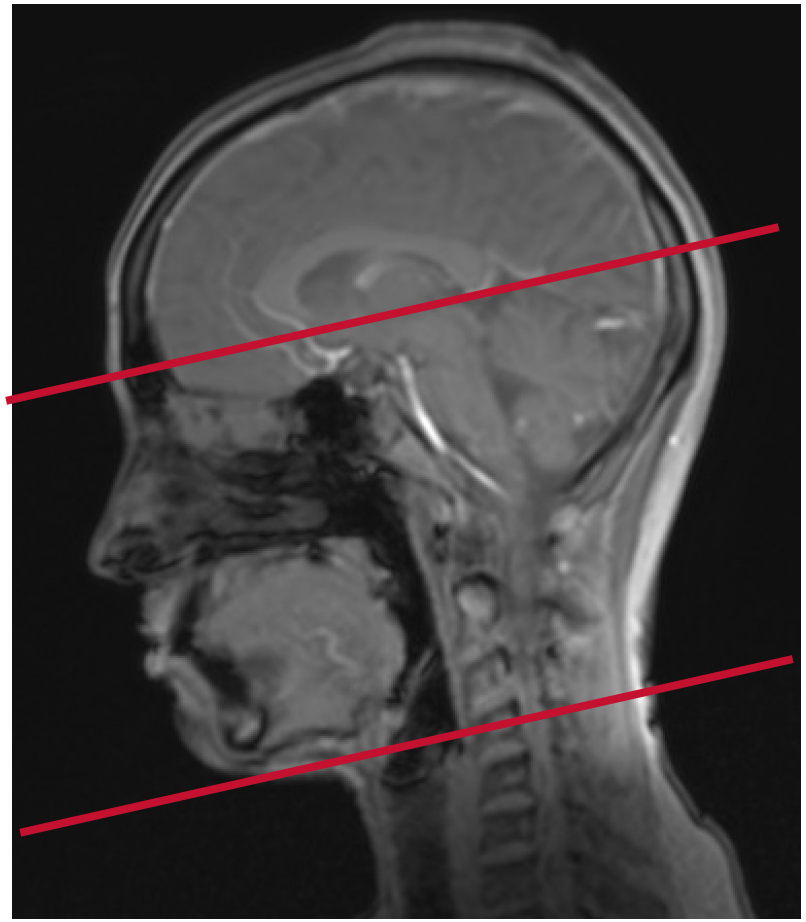
Face and Neck

Cranial Nerves 1 Perineural Tumor – Sequence List

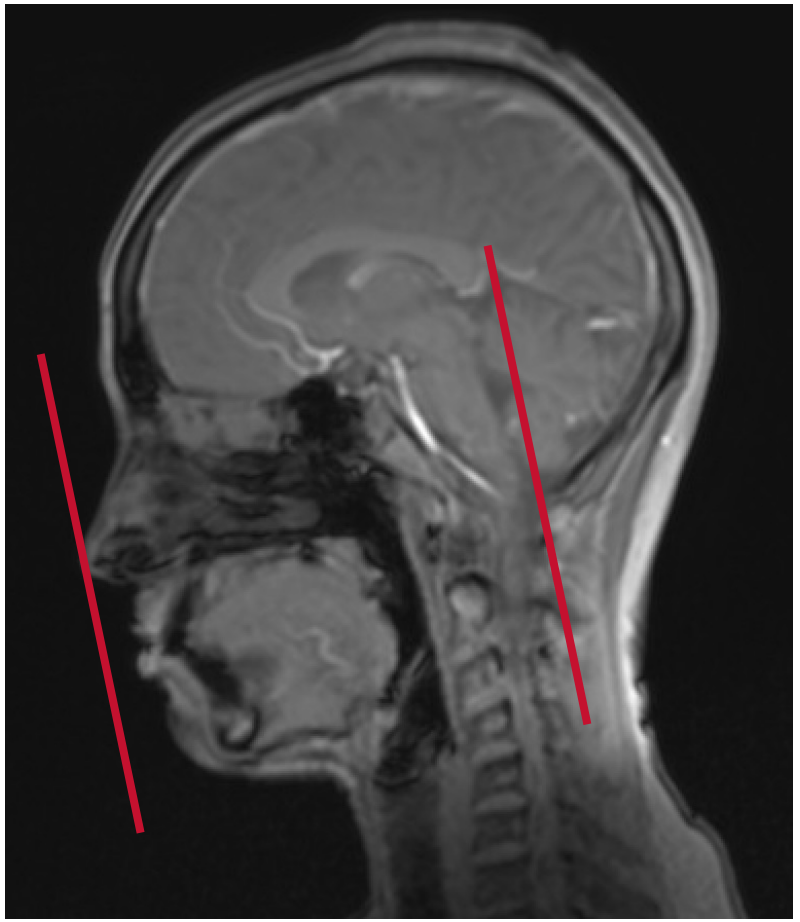
Ax STIR (top orbits through mandible) 4mm
Cor STIR (lips to vertebral bodies, face only FOV) 3mm high res
Ax T1 (top orbits through mandible) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res
Contrast
Ax T1 (top orbits through mandible) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res
Ax T1FS (top orbits through mandible) 4mm

Cranial Nerves 1 Perineural Tumor – Slice Selection

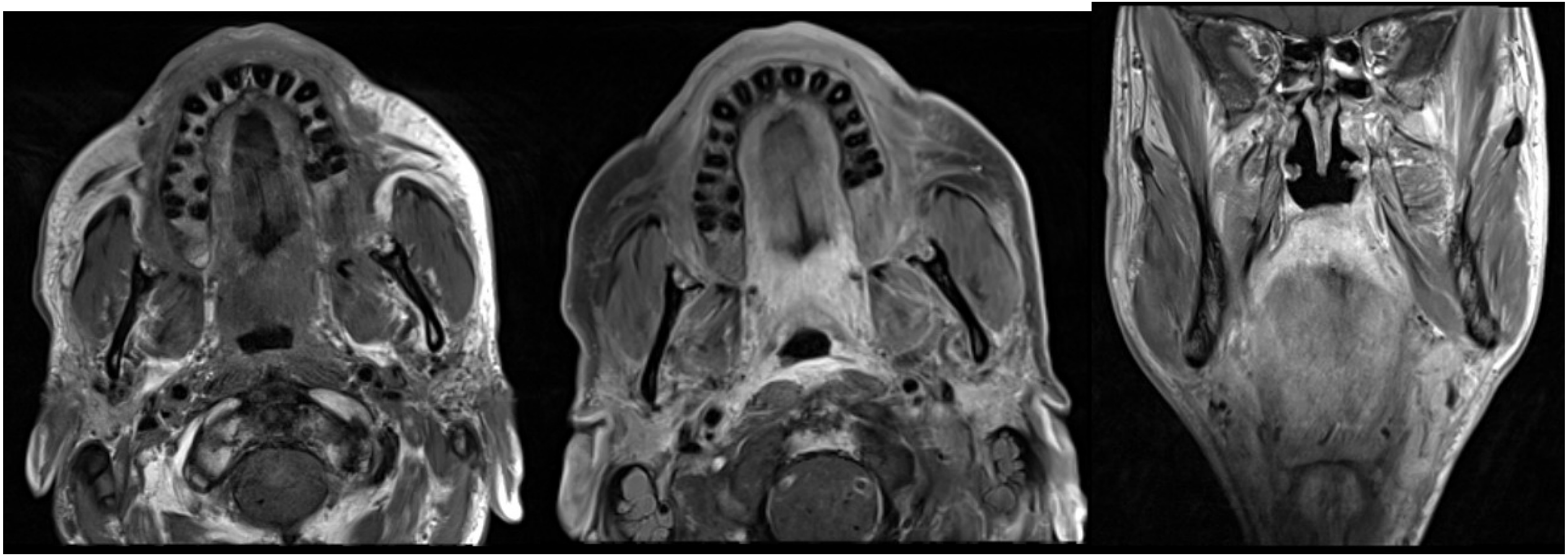
Axial Slice Selection (angle to hard palate)



Coronal Slice Selection / Axial FOV



Cranial Nerves 1 Perineural Tumor – Example Images

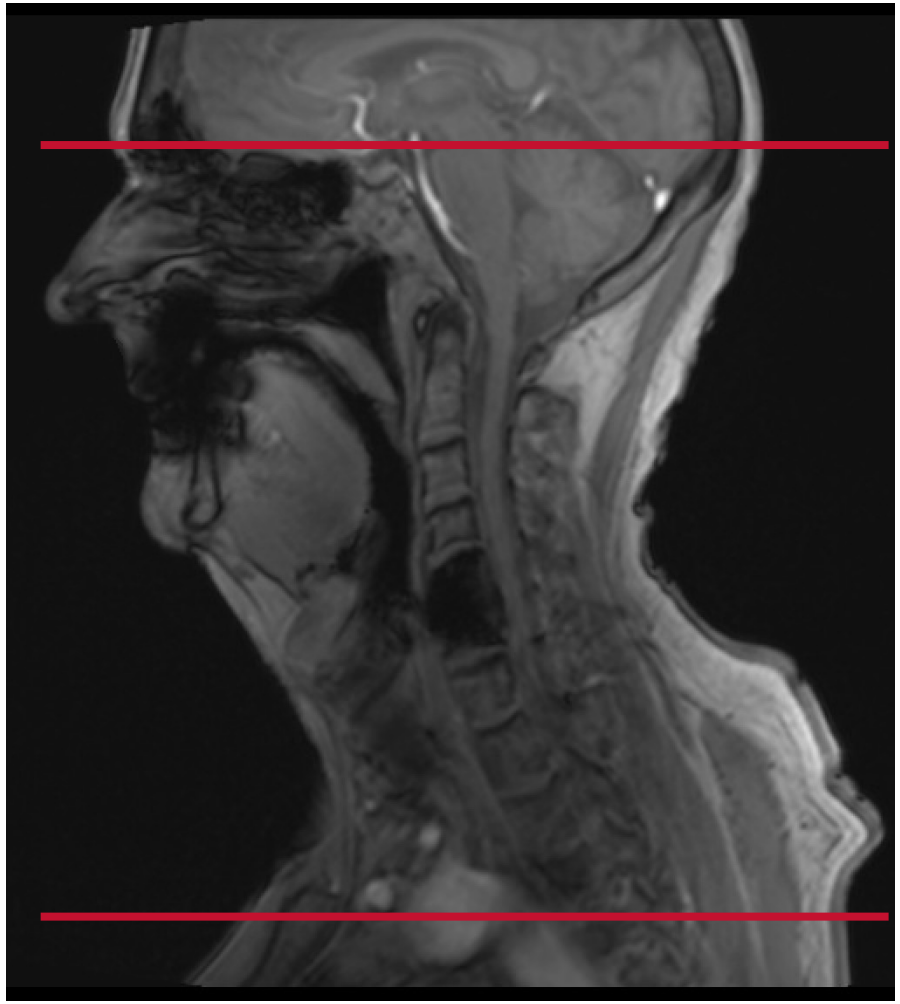


General / Trans-spatial – Sequence List

Cor STIR (mid orbits to manubrium) 4mm
Ax STIR (mid orbits to manubrium) 4mm
Ax T1 (mid orbits to manubrium) 4mm
Sag T1 (mid orbits to manubrium) 3mm
Contrast
Ax DWI (mid orbits to manubrium)
Cor T1FS (mid orbits to manubrium) 4mm
Ax T1FS (mid orbits to manubrium) 4mm

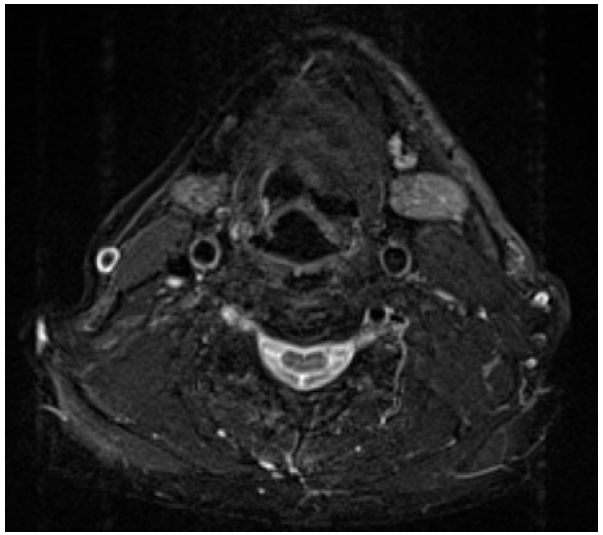
General / Trans-spatial – Slice Selection

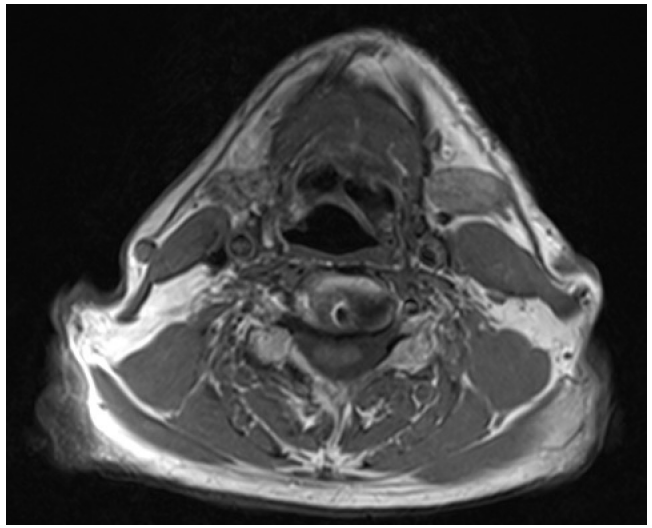
Axial Slice Selection

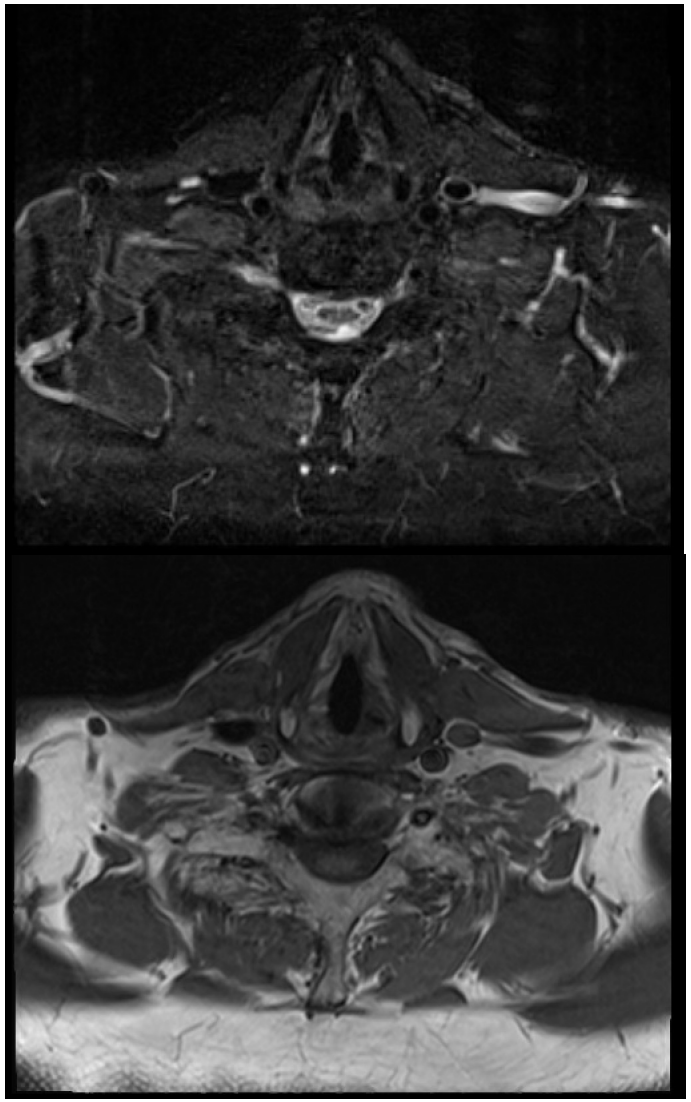


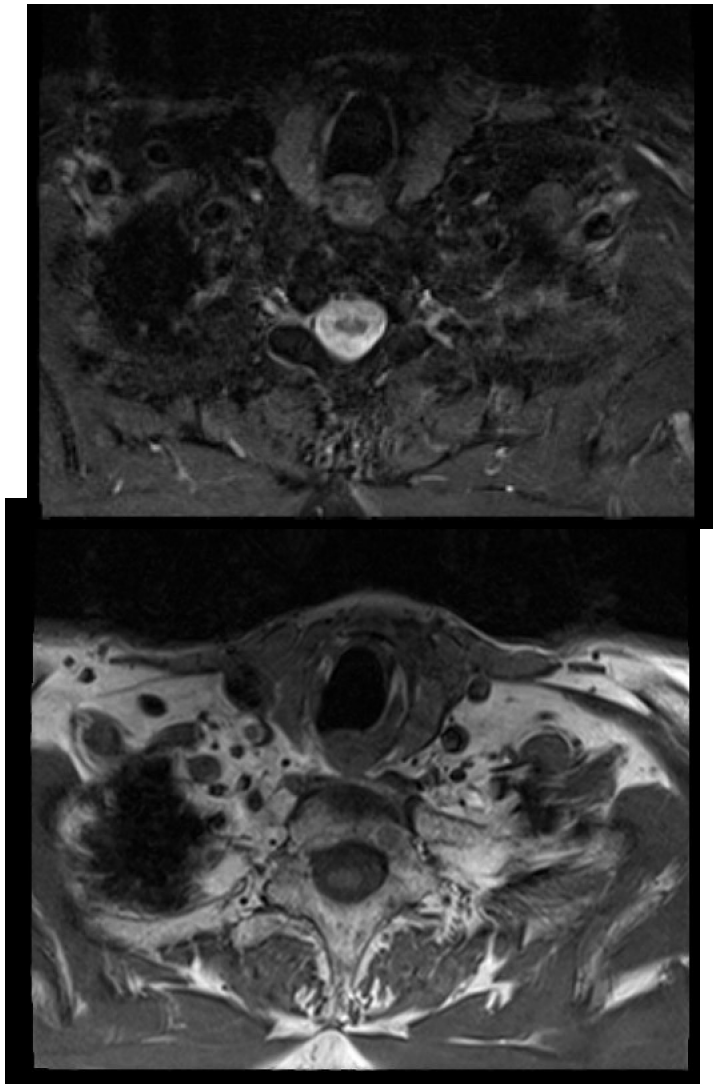
Coronal Slice Selection

General / Trans-spatial – Example Images







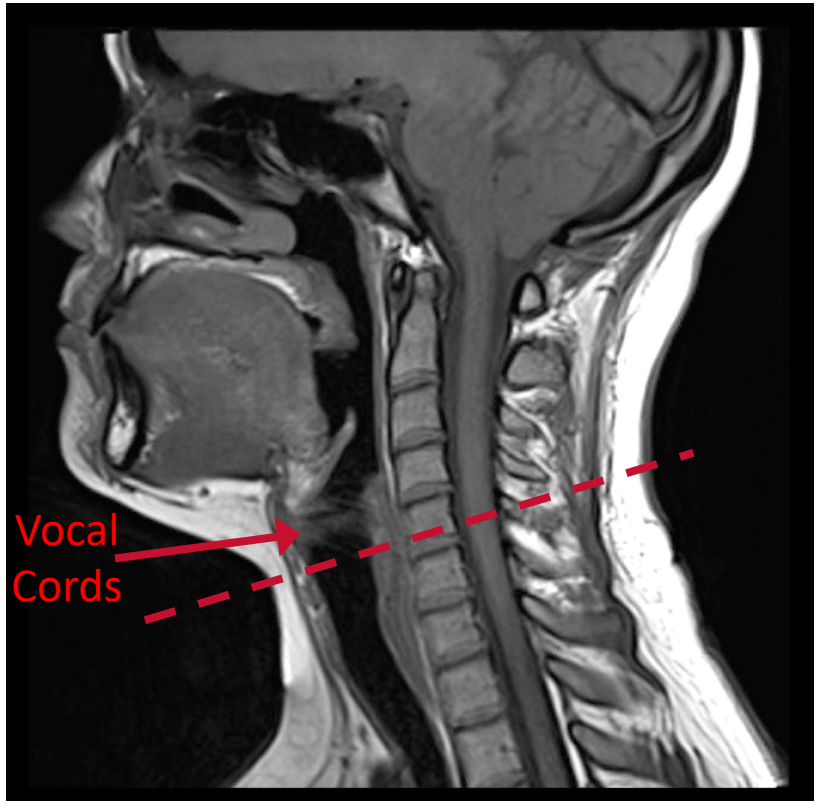


Larynx – Sequence List

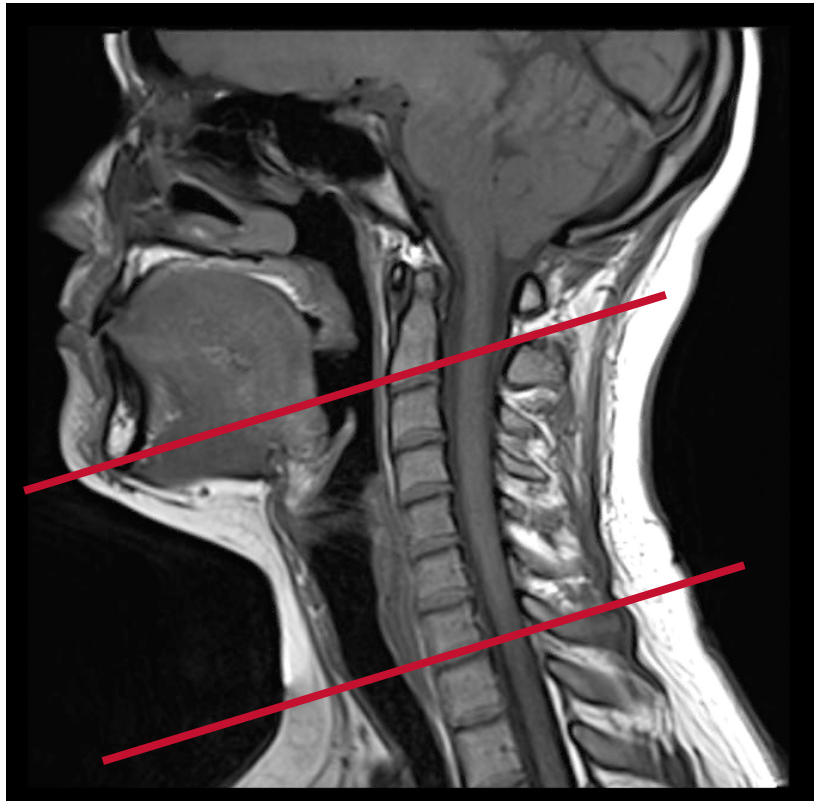
Sag T1 (mid orbits to manubrium) 3mm
Ax STIR (mid orbits to manubrium) 4mm
Ax T2 FS (larynx, angled) 3mm high res
Cor T1 (larynx, angled) 3mm high res
Ax T1 (larynx, angled) 3mm high res
Contrast
Ax T1 (larynx, angled) 3mm high res
Cor T1 (larynx, angled) 3mm high res
Ax T1 FS (larynx, angled) 4mm

Larynx – Slice Selection

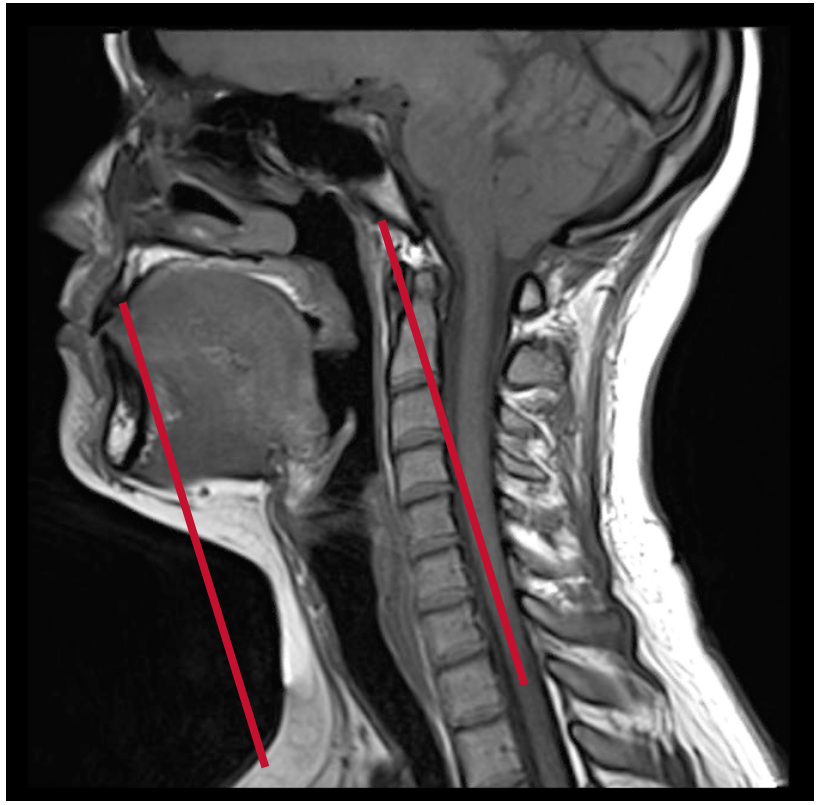
High Res Axials Angled Along Vocal Cords



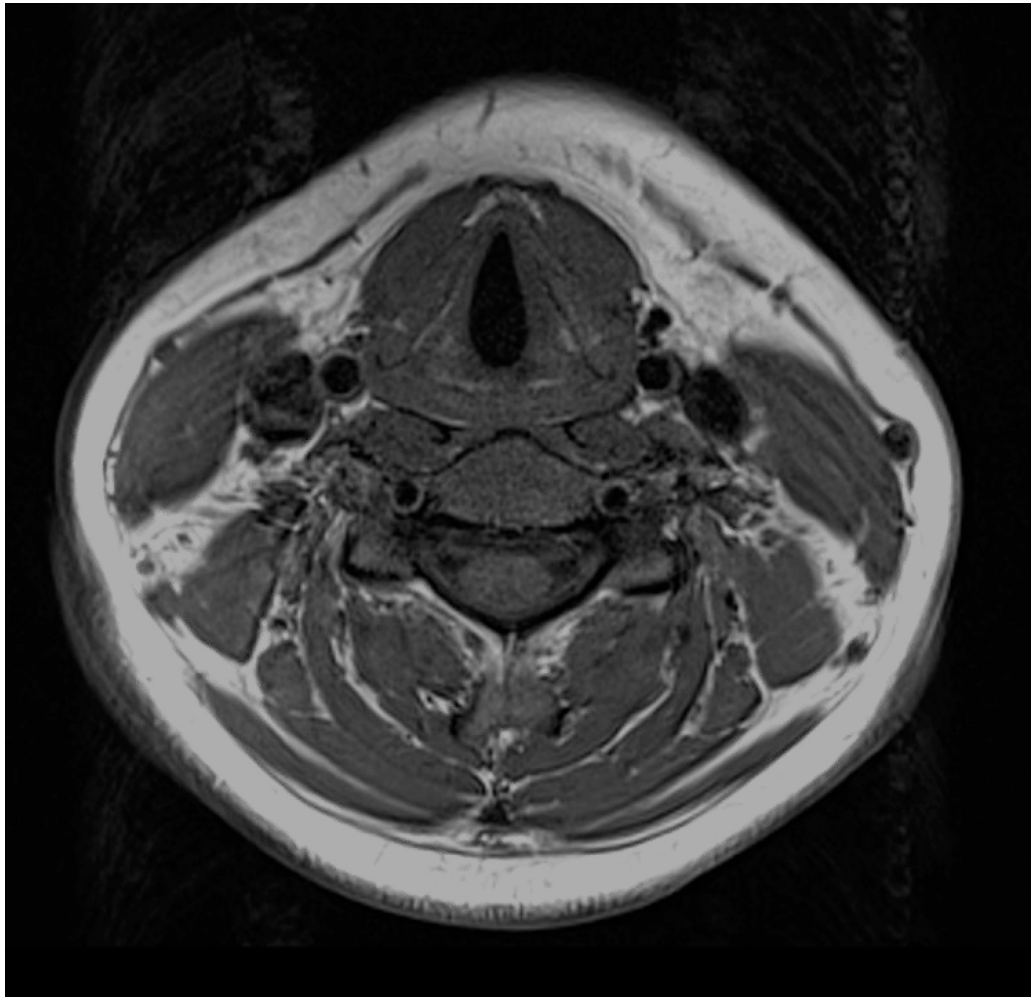
Angled Axial Slice Selection



Angled Coronal Slice Selection



Larynx – Example Images



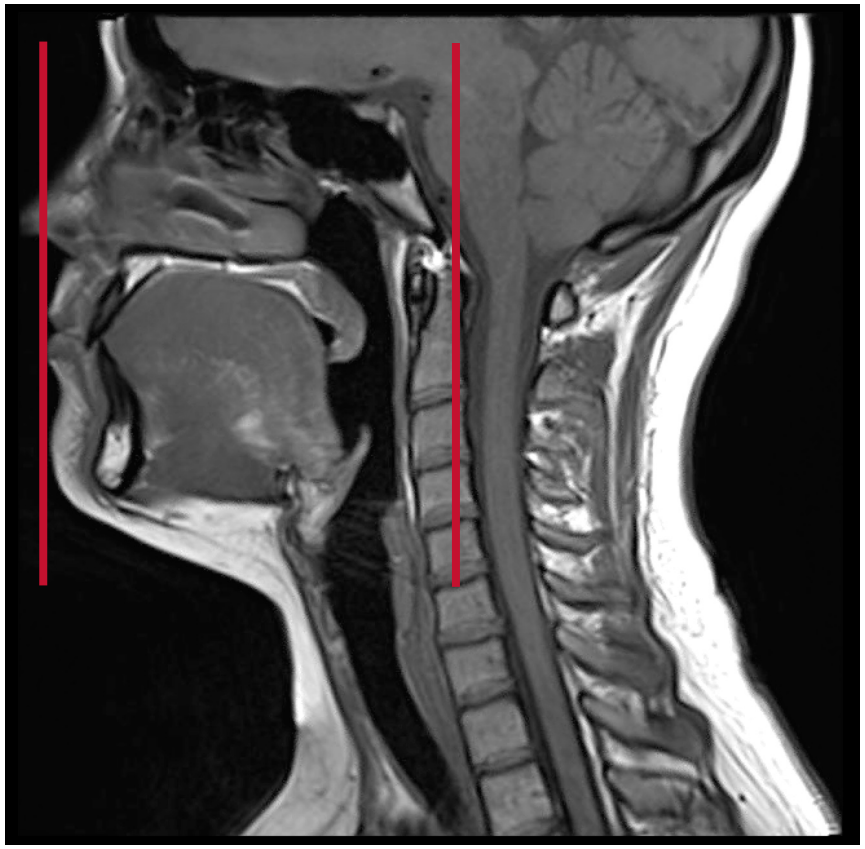
Nasopharynx & Nasal Cavity – Sequence List

Sag T1 (face) 3mm
Ax STIR (mid orbits to manubrium) 4mm
Ax T1 (mid orbits to mid tongue) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res
Contrast
Ax T1 (mid orbits to mid tongue) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res
Ax T1FS (mid orbits to mid tongue) 4mm

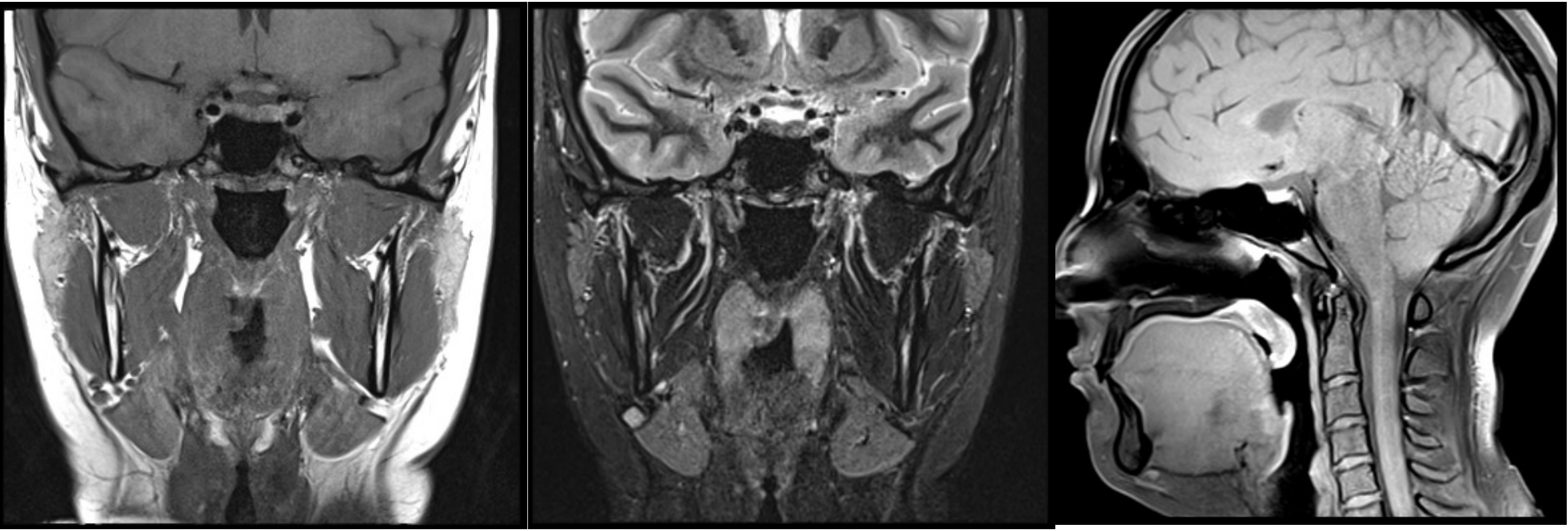
Nasopharynx & Nasal Cavity – Slice Selection

High Res Axial Slice Selection

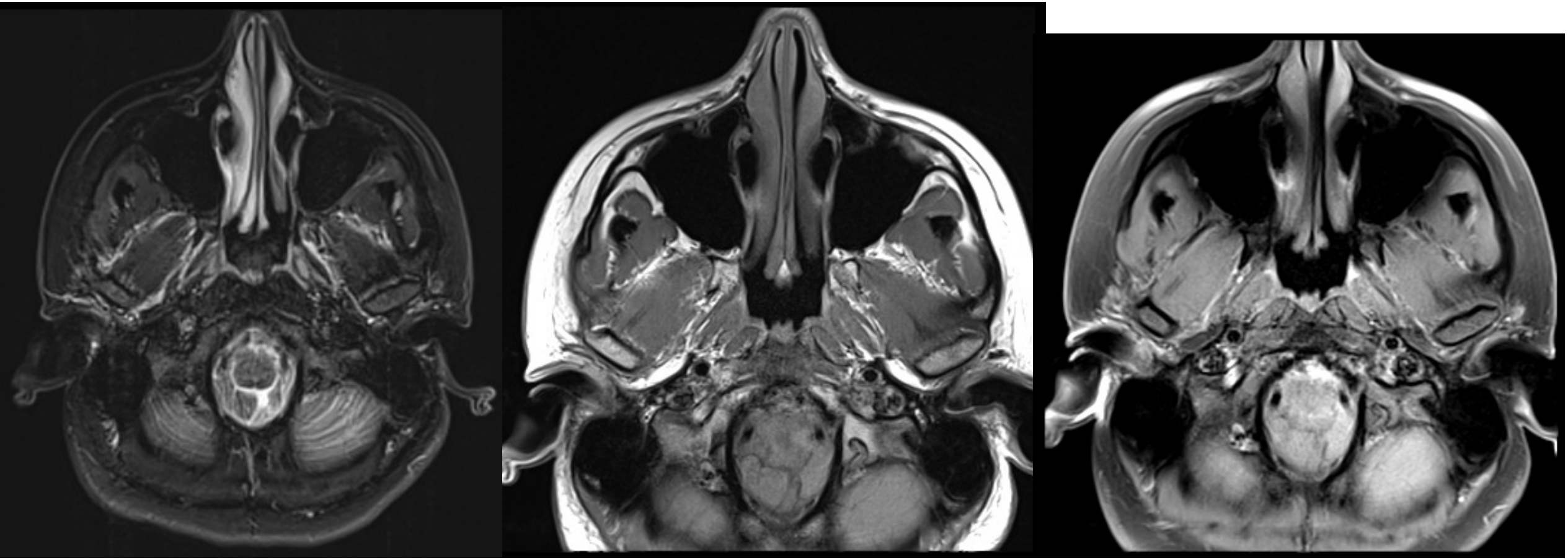
High Res Coronal Slice Selection



Nasopharynx & Nasal Cavity – Example Images



Nasopharynx & Nasal Cavity – Example Images

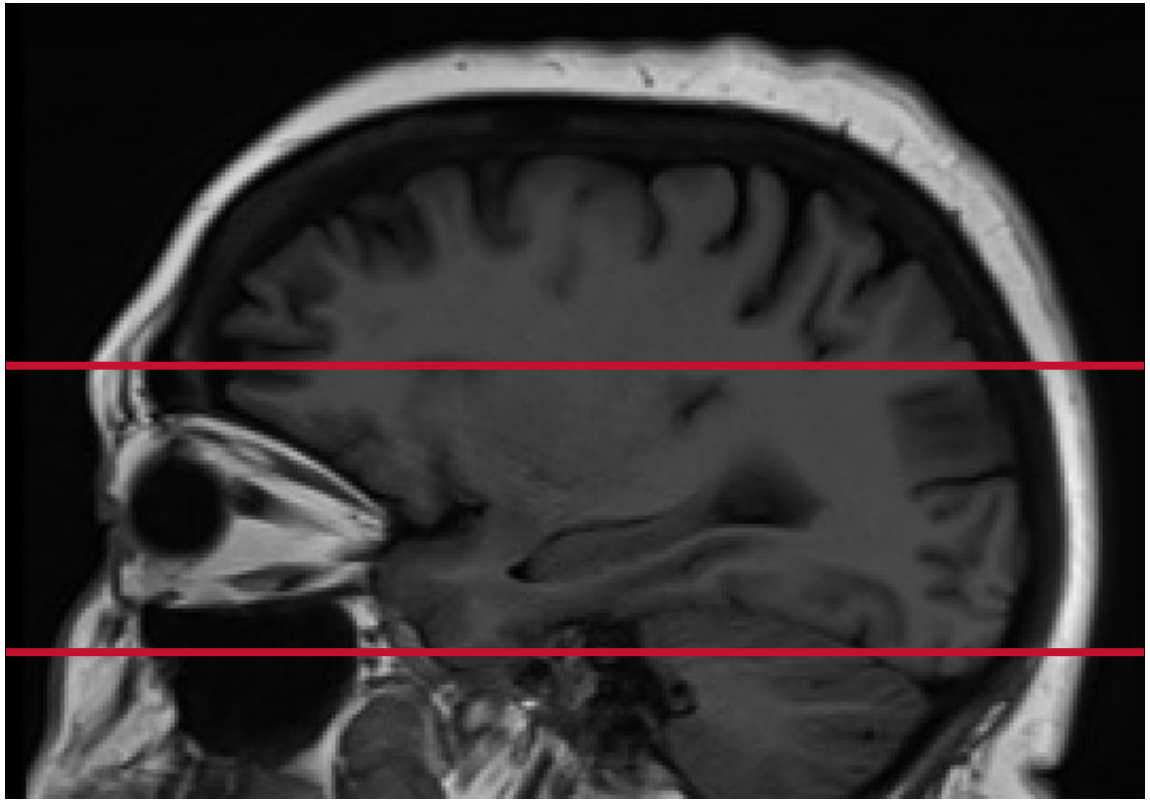


Optic Nerve – Sequence List

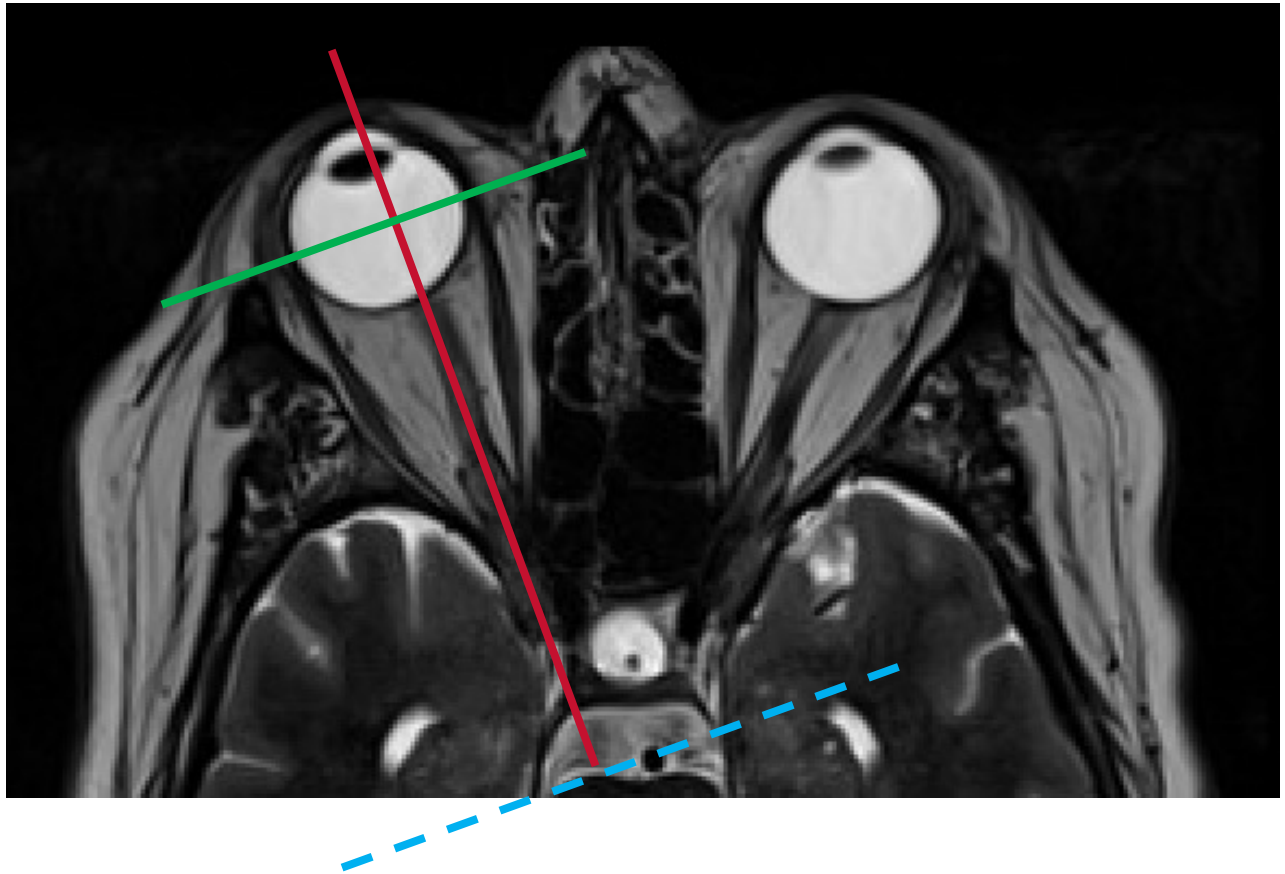
Ax T2 2mm (bilateral orbits)
Cor Obl T1 2mm (affected orbit)
Cor Obl STIR (affected orbit)
Contrast
Ax DWI (bilateral orbits)
Cor Obl T1FS (affected orbit)
Sag Obl T1FS (affected orbit)
Ax 3D VIBE (whole head)

Optic Nerve – Slice Selection

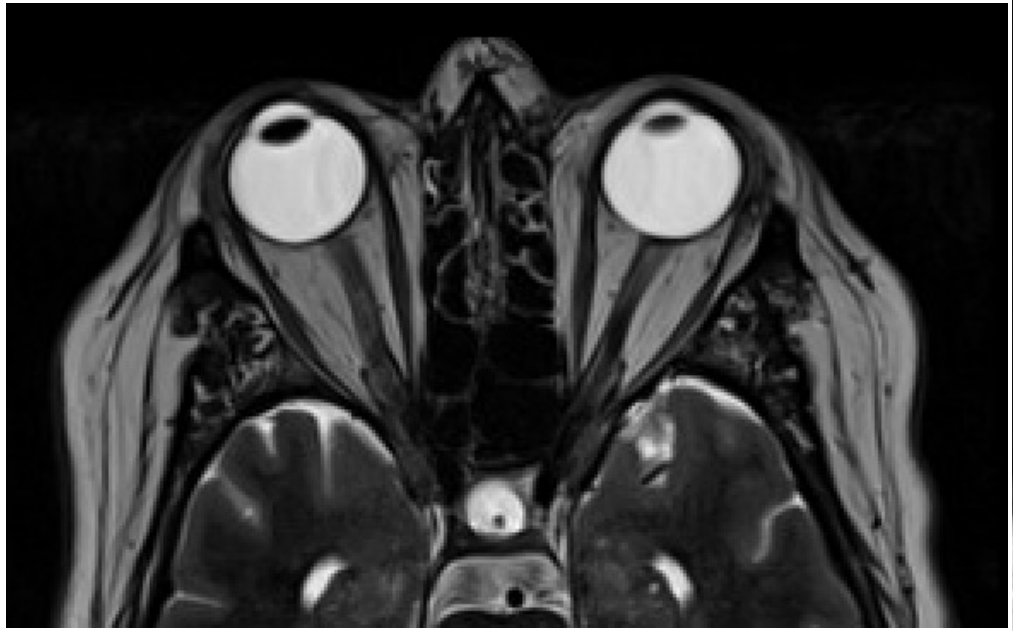
Axial Slice Selection

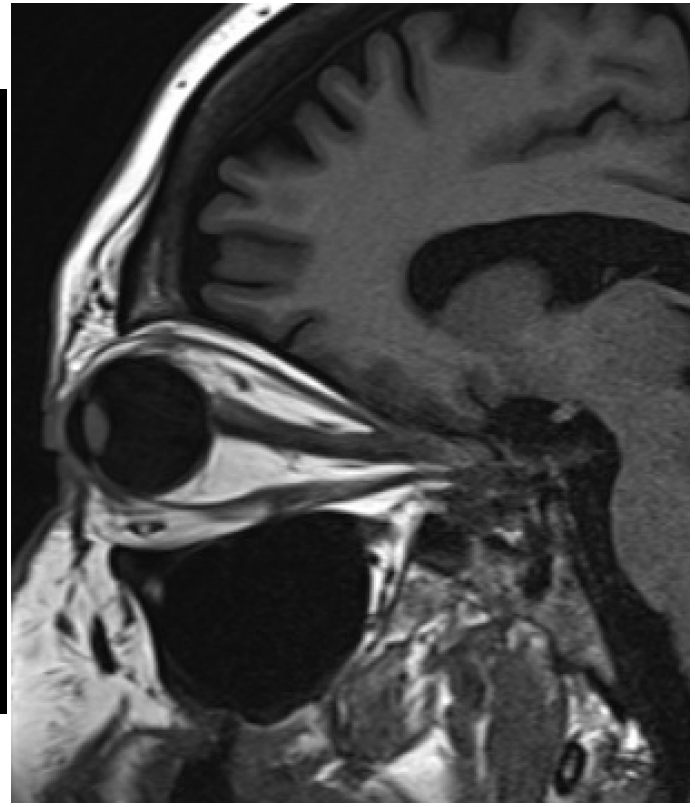


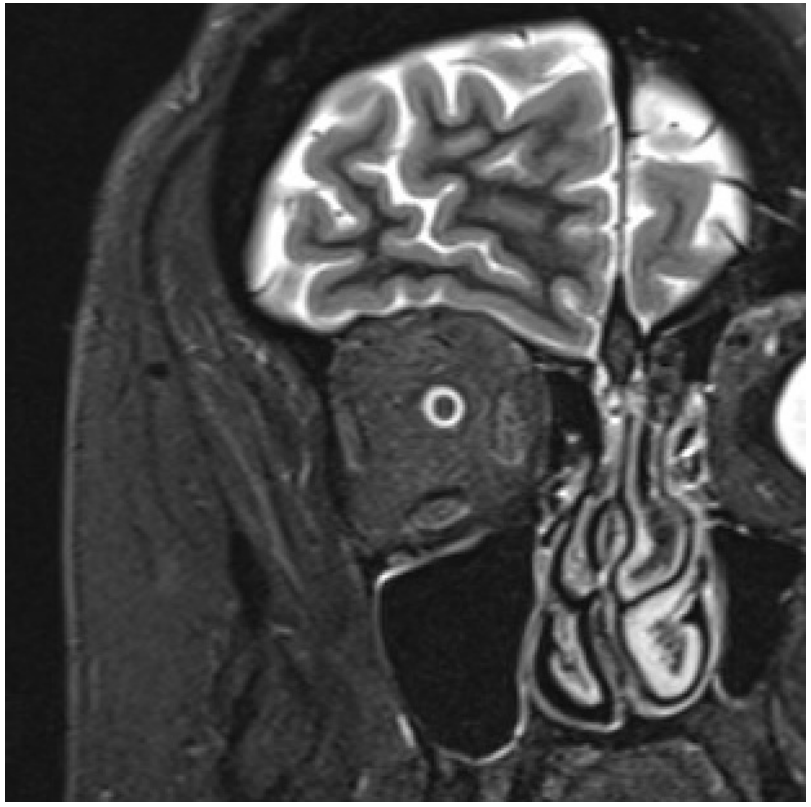
Sagittal Oblique Plane
Coronal Oblique Plane
FOV/Slice Selection Through Optic Chiasm



Optic Nerve – Example Images





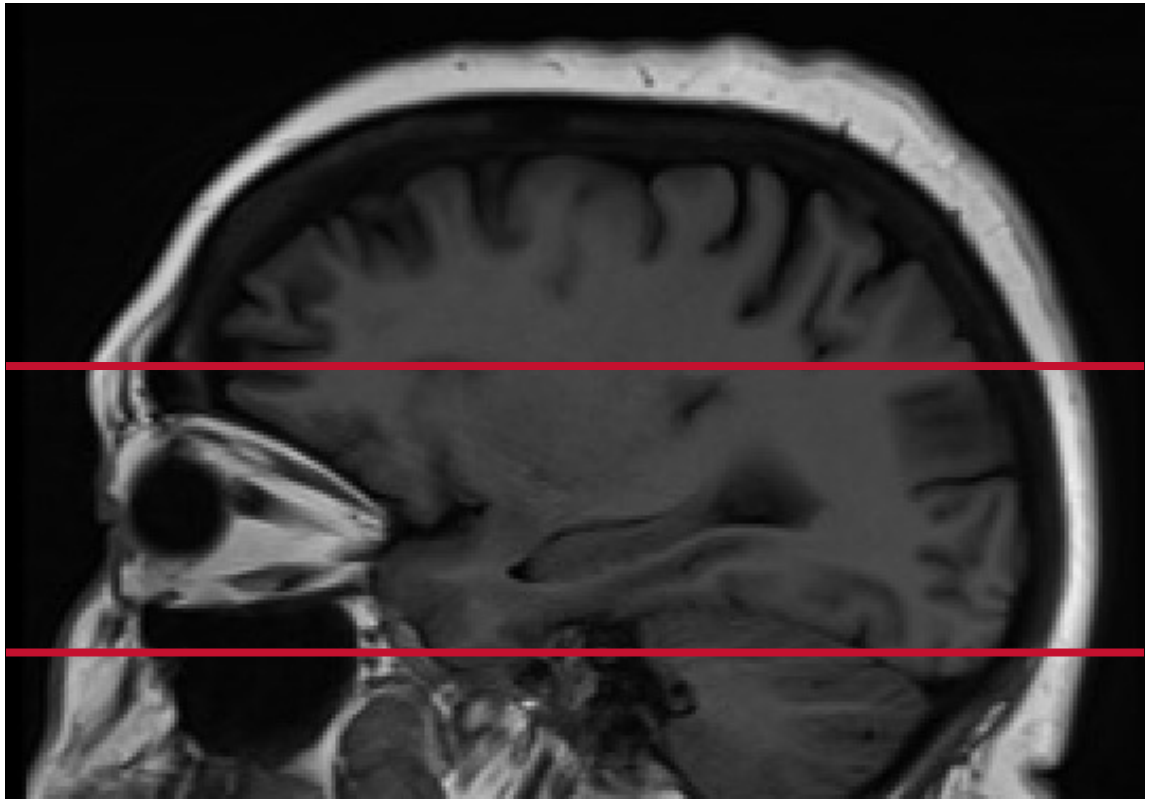


Orbits – Sequence List

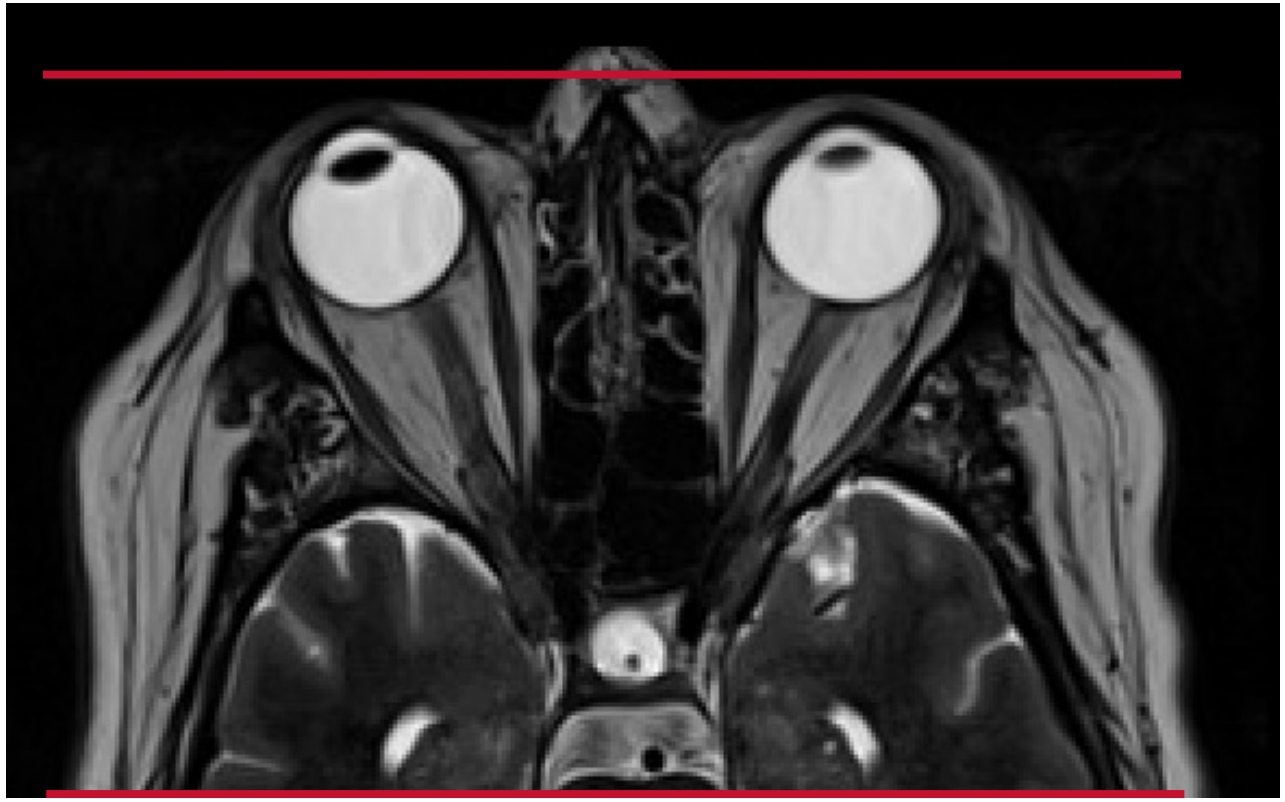
Cor T1 3mm high res (eyelid through orbit)
Cor STIR 3mm high res (eyelid through sella)
Ax T1 3mm high res
Axial T2 3mm high res
Contrast
Cor T1 3mm high res (eyelid through orbit)
Ax T1 3mm high res
Cor T1 FS 4mm (eyelid through brain stem)

Orbits – Slice Selection

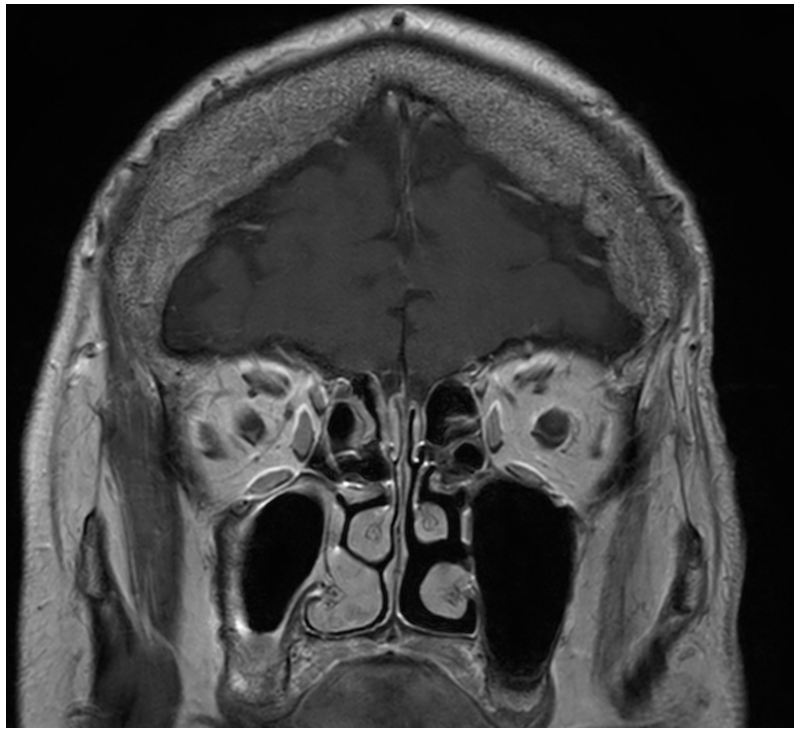
Axial Slice Selection

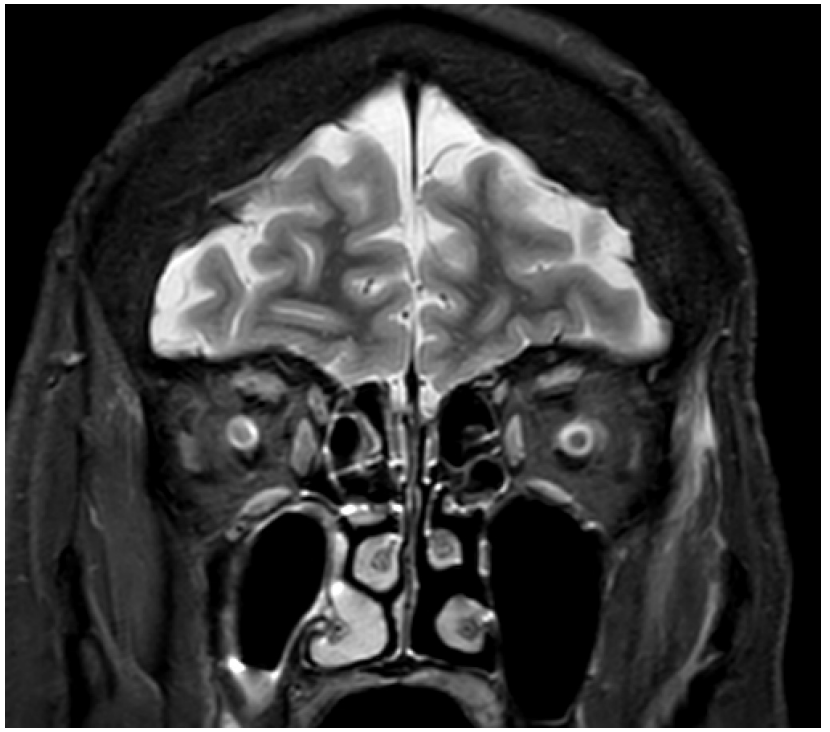


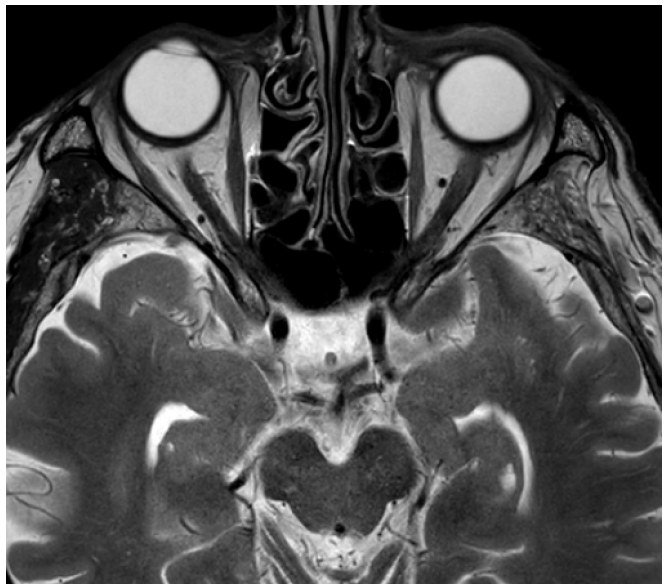
Coronal Slice Selection / Axial FOV



Orbits – Example Images





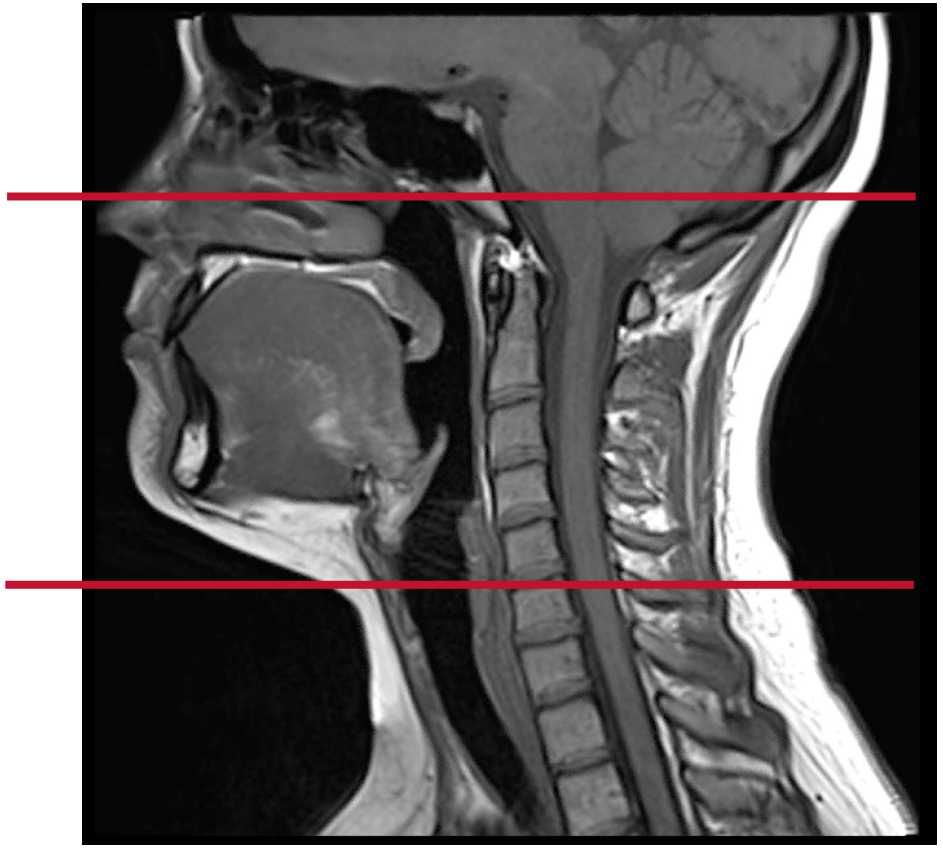


Oropharynx & Oral Cavity – Sequence List

Sag T1 (face) 3mm
Ax STIR (mid orbits to manubrium) 4mm
Cor STIR (lips to vertebral bodies, face only FOV) 3mm high res
Ax T1 (mid nose to larynx) 3mm high res
Cor T1 (lips to vertebral bodies, face only FOV) 3mm high res
Contrast
Ax T1 (mid nose to larynx) 3mm high res
Cor T1 (lips to vertebral bodies, face only FOV) 3mm high res
Ax T1FS (mid nose to larynx) 4mm

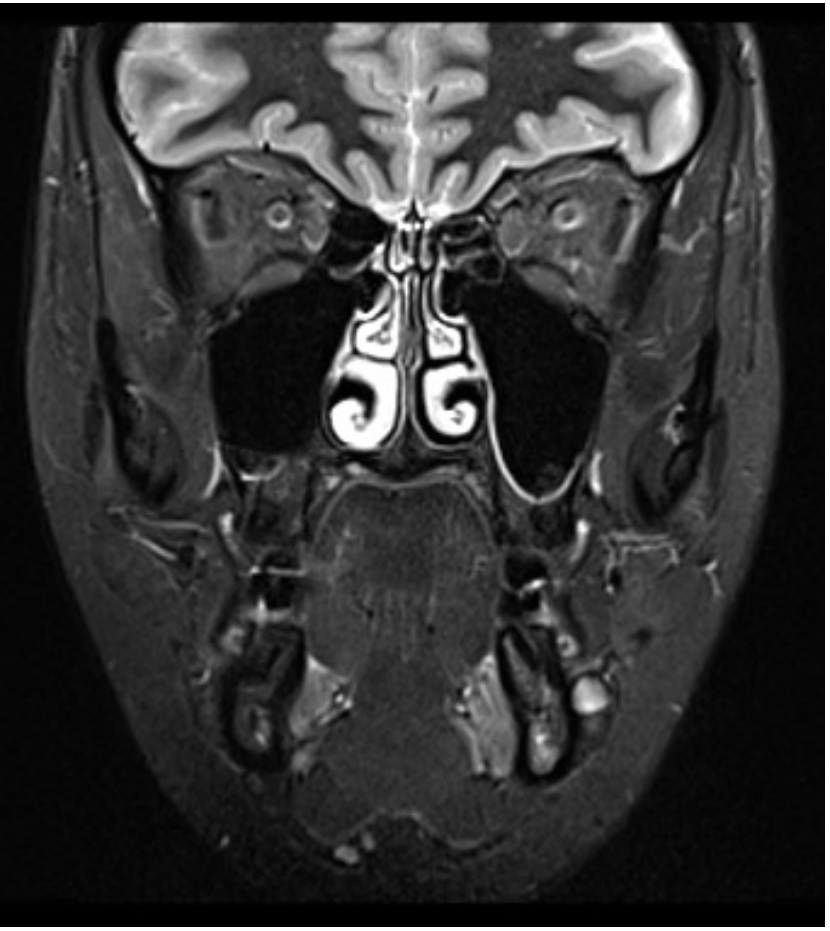
Oropharynx & Oral Cavity – Slice Selection

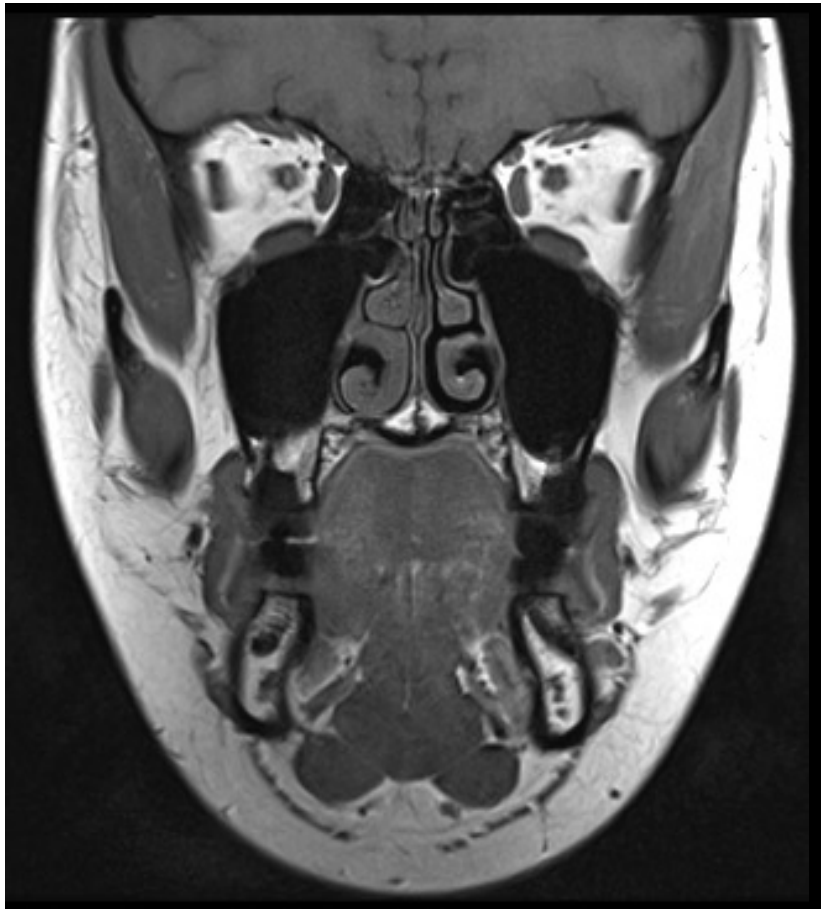
High Res Axial Slice Selection

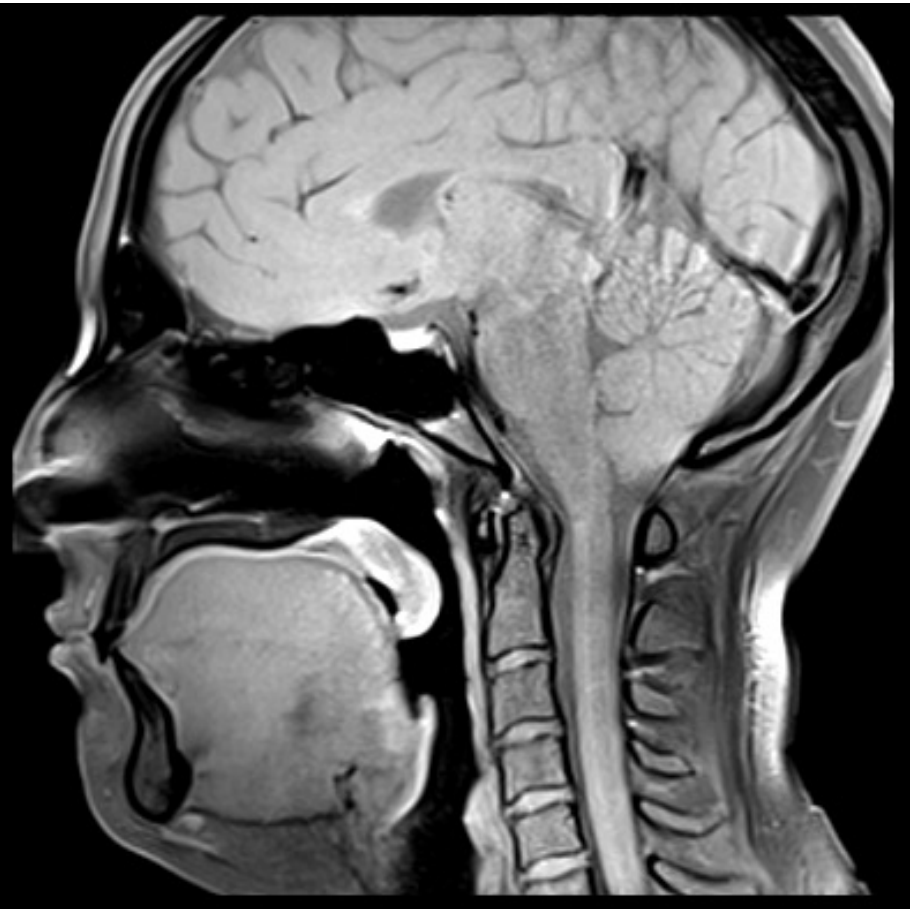


High Res Coronal Slice Selection

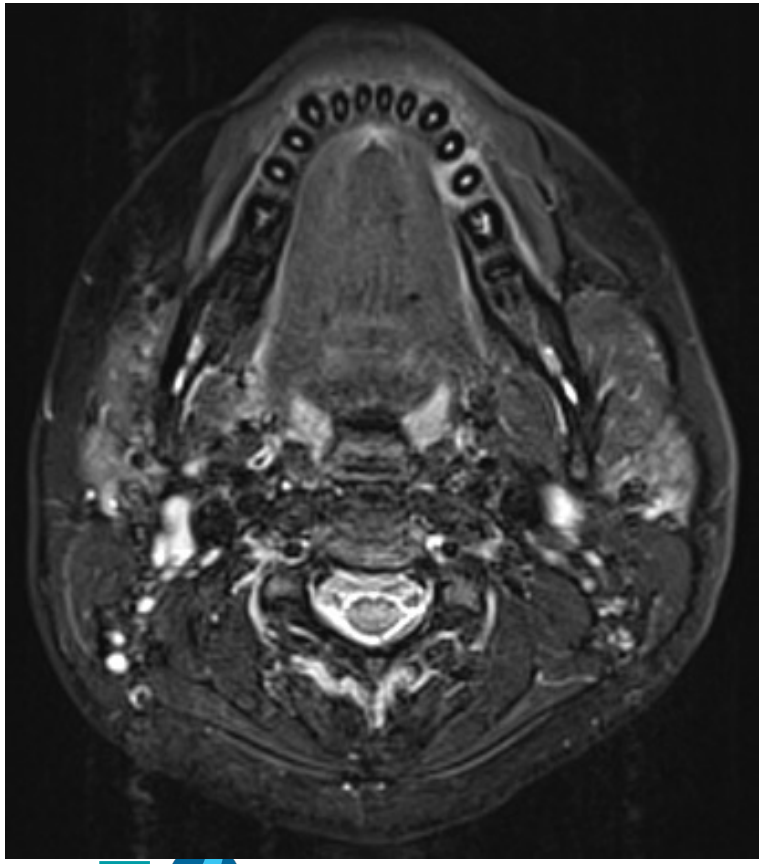
Oropharynx & Oral Cavity – Example Images

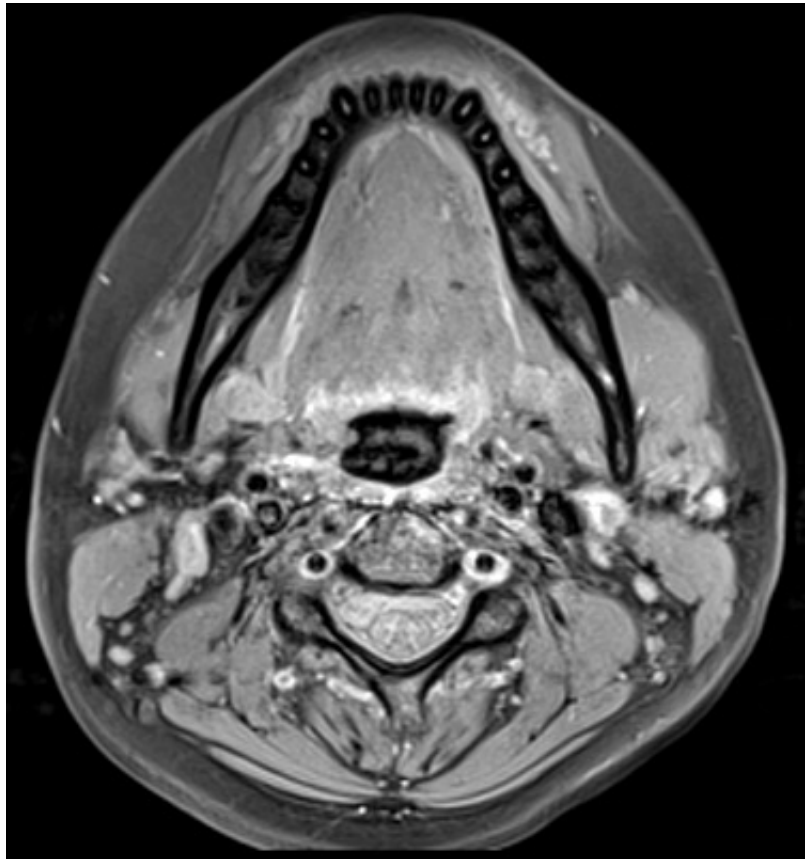






Oropharynx & Oral Cavity – Example Images





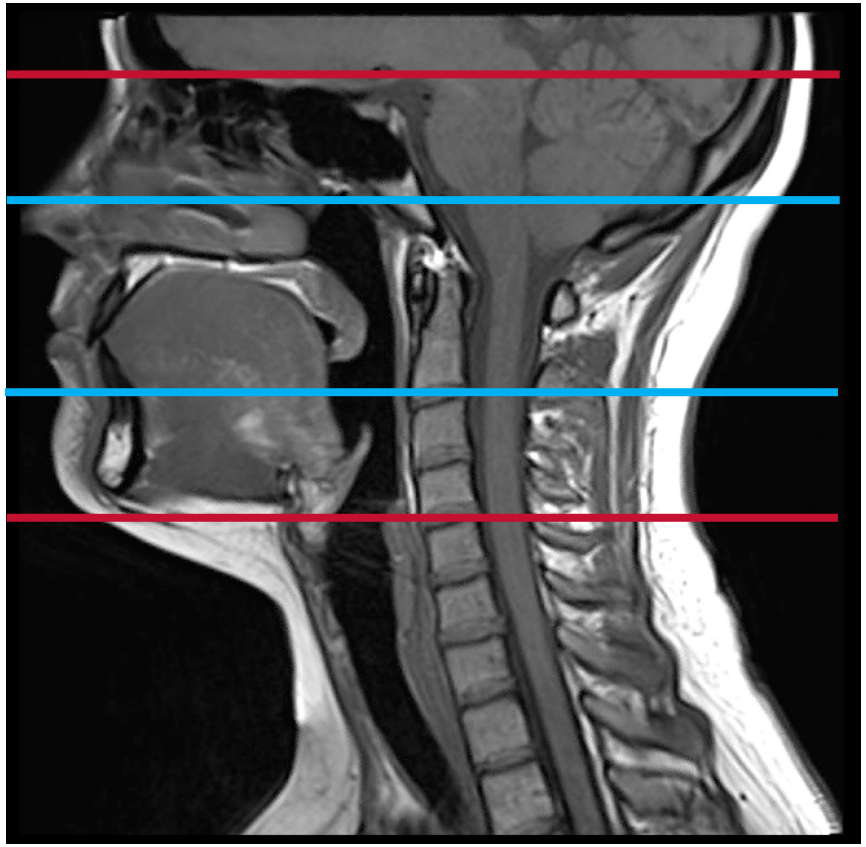
Parotid – Sequence List

Sag T1 (face) 4mm
Ax STIR (mid orbits to manubrium) 4mm
Cor STIR (lips to vertebral bodies, face only FOV) 4mm
Ax T1 (mandibular condyle to angle) 4mm
CISS (mid nasal cavity to mid tongue) 0.8mm isotropic
Contrast
Ax T1 (mandibular condyle to angle) 4mm
Cor T1 (lips to vertebral bodies, face only FOV) 4mm
Ax T1FS (mandibular condyle to angle) 4mm

Parotid – Slice Selection

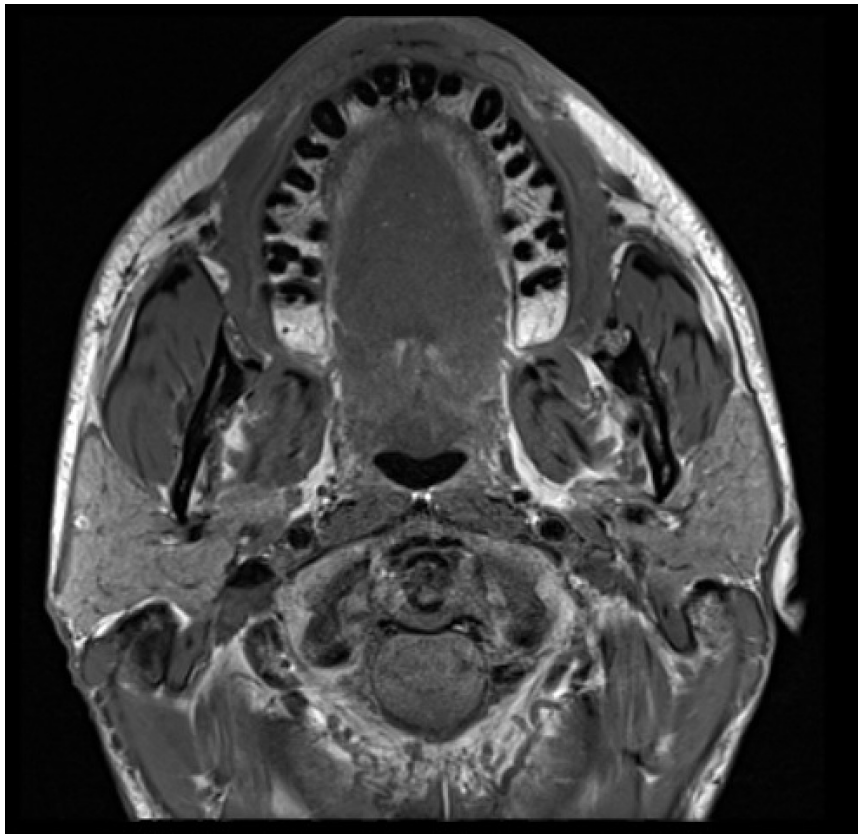
Axial T1 Slice Selection

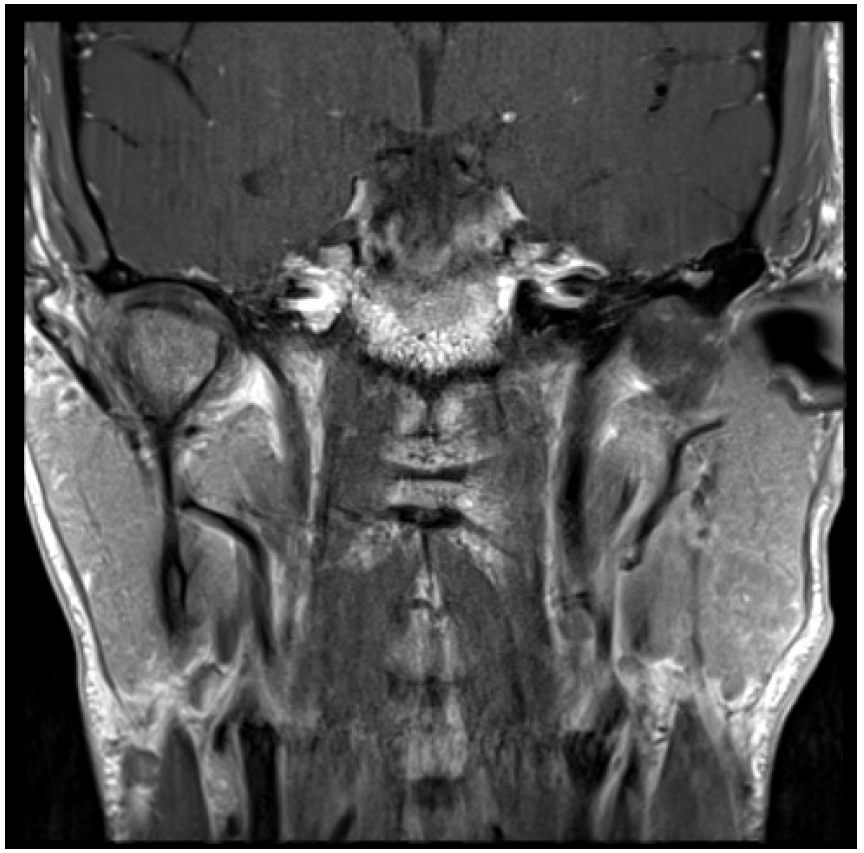
CISS Slice Selection

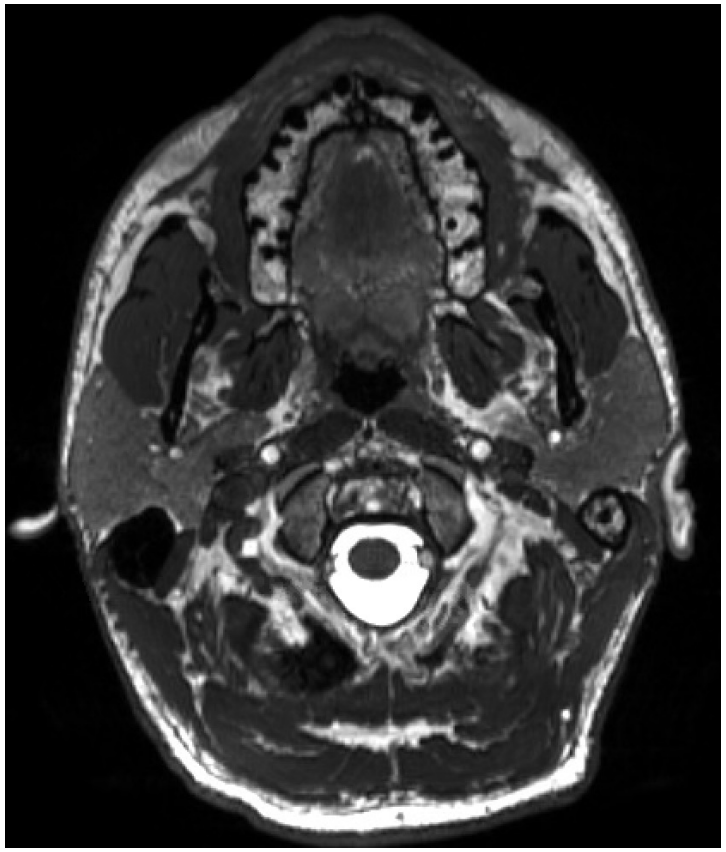


Coronal Slice Selection

Parotid – Example Images







Sinus – Sequence List

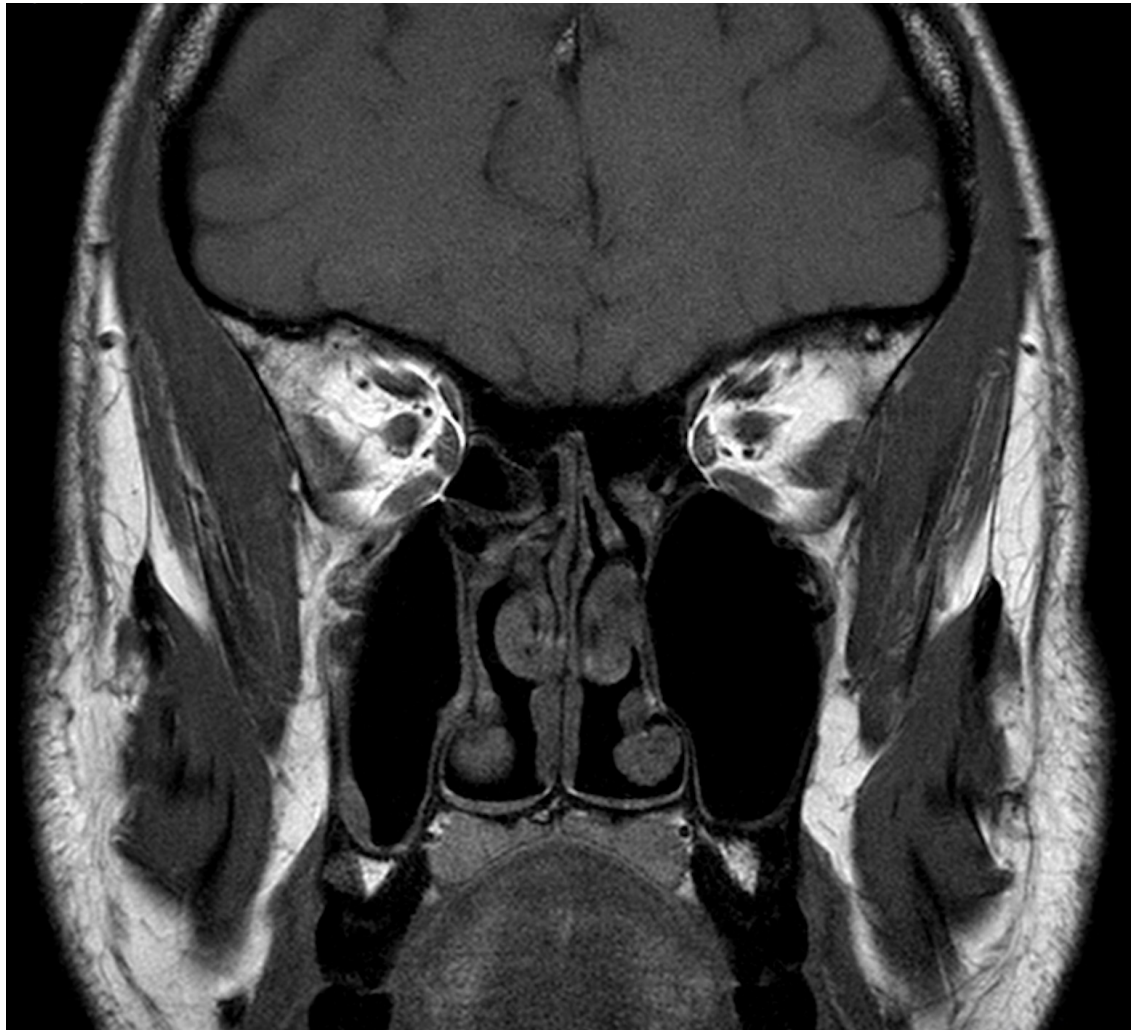
Cor T1 3mm high res (nose to brain stem)
Cor T2 3mm high res (nose to brain stem)
Ax T1 3mm high res (frontal sinus to hard palate)
Contrast
Cor T1 3mm high res (nose to brain stem)
Ax T1 3mm high res (frontal sinus to hard palate)
Ax T1 FS 3mm (frontal sinus to hard palate)

Sinus – Slice Selection

Axial Slice Selection (angle to hard palate)

Coronal Slice Selection / Axial FOV

Sinus – Example Images



TMJ – Sequence List

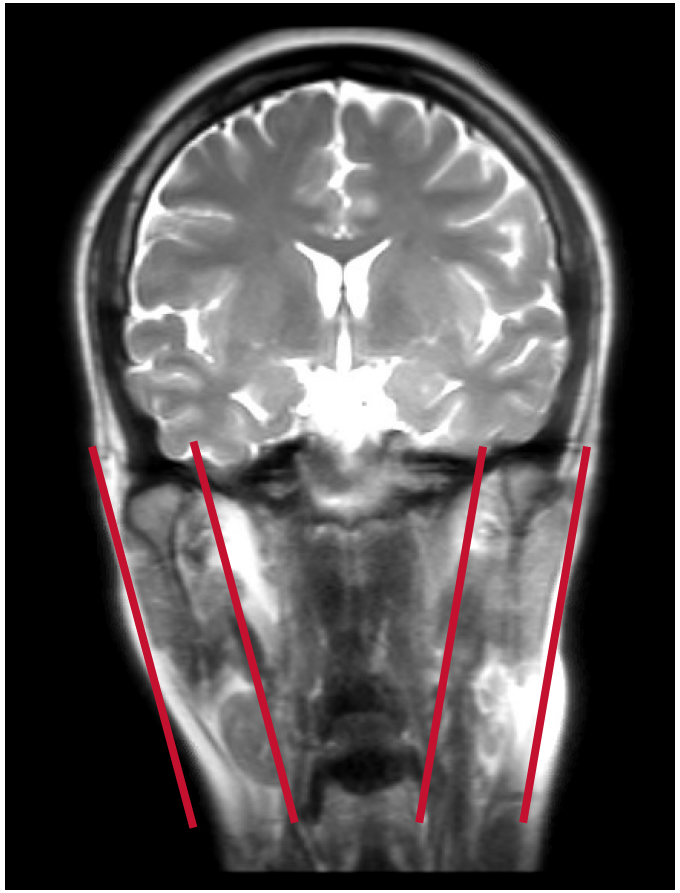
Closed Mouth
Cor Oblique T1 2mm high res (TMJ)
Sag Oblique T2 Fat Suppressed 2mm high res (TMJ)
Sag Oblique PD 2mm high res (TMJ)
Open Mouth
Sag Oblique T2 Fat Suppressed 2mm high res (TMJ)
Sag Oblique PD 2mm high res (TMJ)

If bilateral perform each side separately.

TMJ – Slice Selection

Sagittal Oblique Slice Selection

Coronal Oblique Slice Selection



TMJ – Example Images

Brain/Skull Base

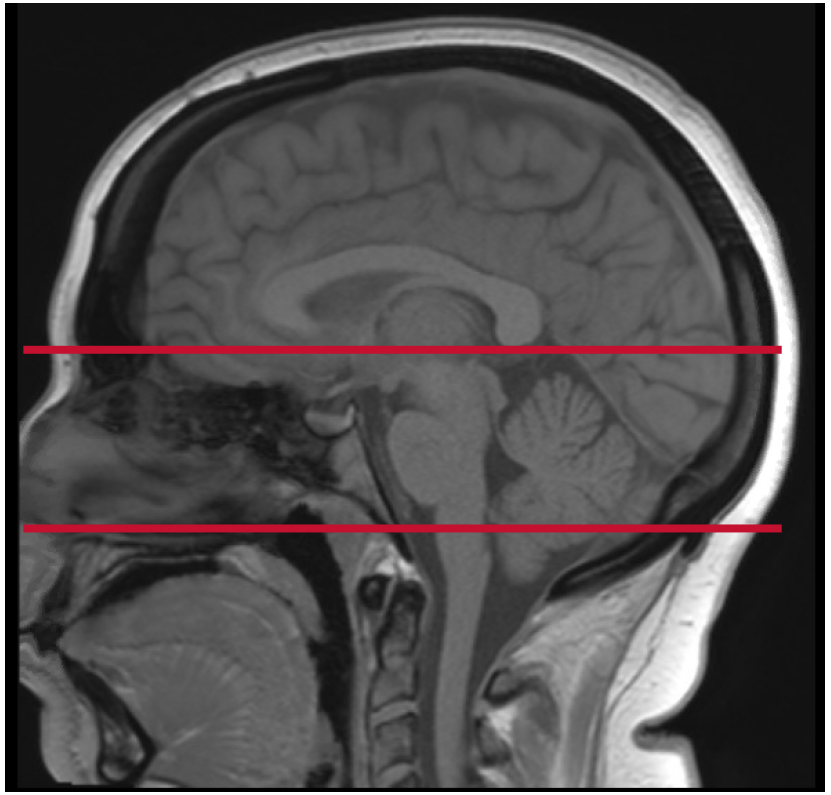
Cranial Nerves 2 Palsy/Neuralgia – Sequence List

Ax FLAIR (brain)
Ax DWI (brain)
CISS (skull base cranial nerves)
Ax T1 (top orbits through mandible) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res
Contrast
Ax T1FS (top orbits through mandible) 3mm high res
Cor T1 (lips to spinal cord, face only FOV) 3mm high res

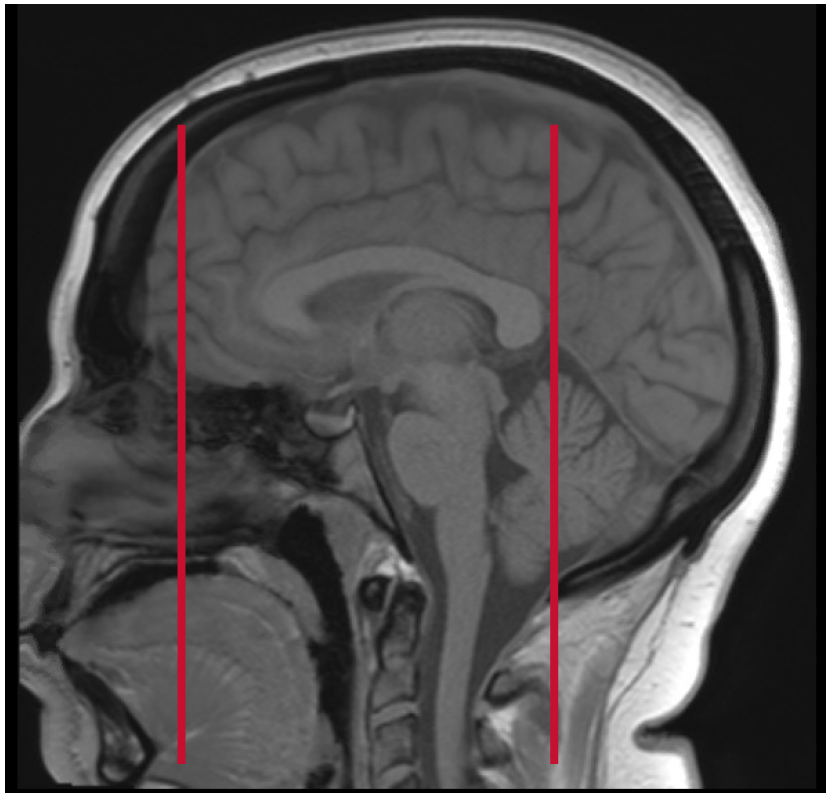
Cranial Nerves 2 Palsy/Neuralgia – Slice Selection

Axial T1 Slice Selection

CISS Slice Selection



Coronal Slice Selection

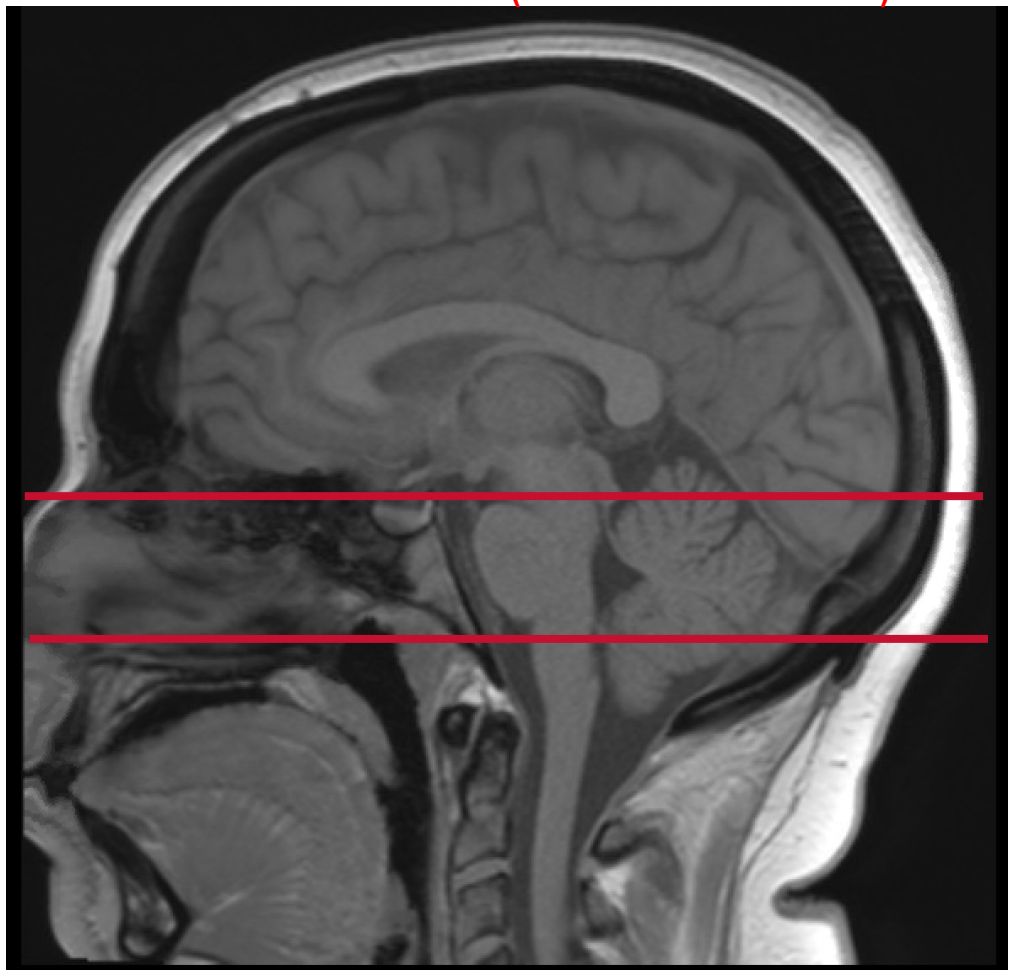


Internal Auditory Canal / Temporal Bones – Sequence List

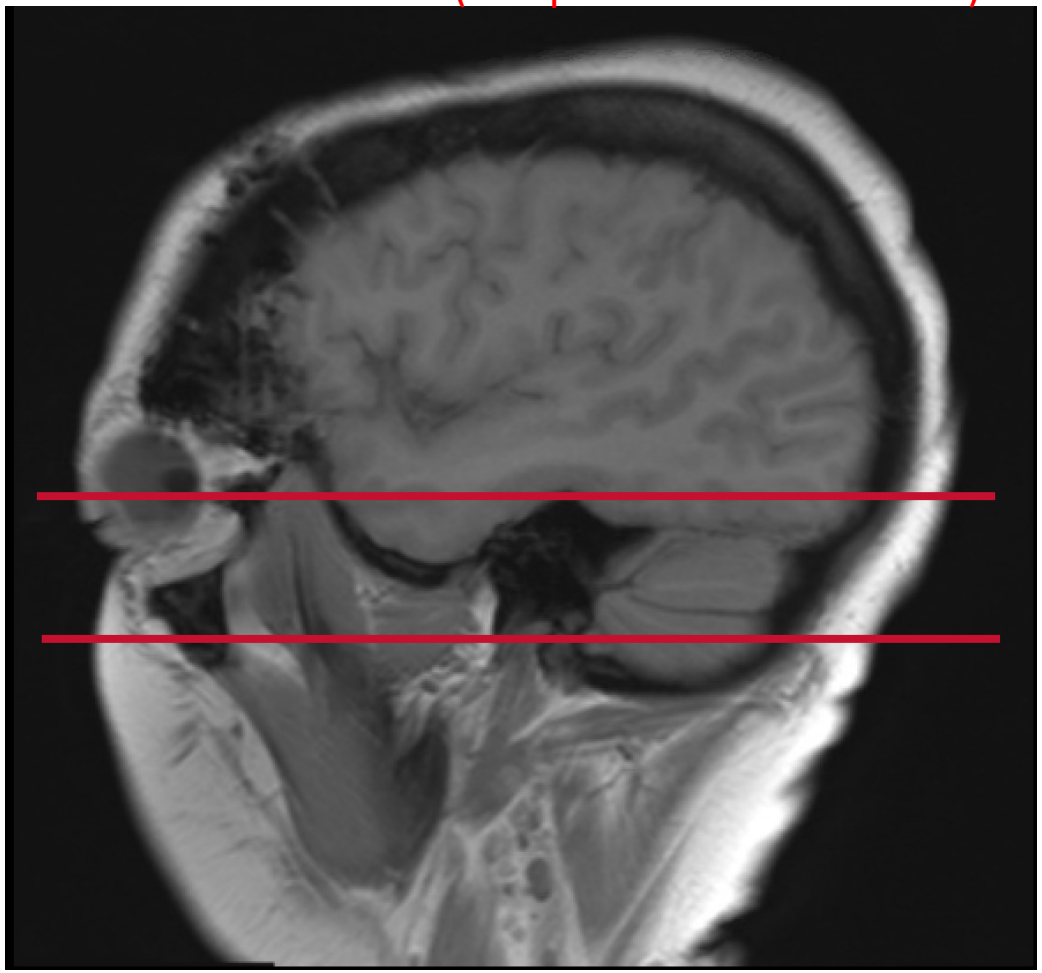
Ax T2 BLADE (whole brain) 4mm skip 0mm high res
Ax DWI (whole brain) 4mm skip 1mm
Ax T1 (IAC/labyrinth) 2mm high res
Contrast
CISS (IAC/labyrinth) 0.5mm isotropic with sag/cor reformats
Ax T1 (IAC/labyrinth) 2mm high res
Ax 3D T1 VIBE (whole brain) 1mm isotropic with sag/cor reformats

Internal Auditory Canal / Temporal Bones – Slice Selection

Axial Slice Selection (Midline Reference)



Axial Slice Selection (Temporal Bone Reference)

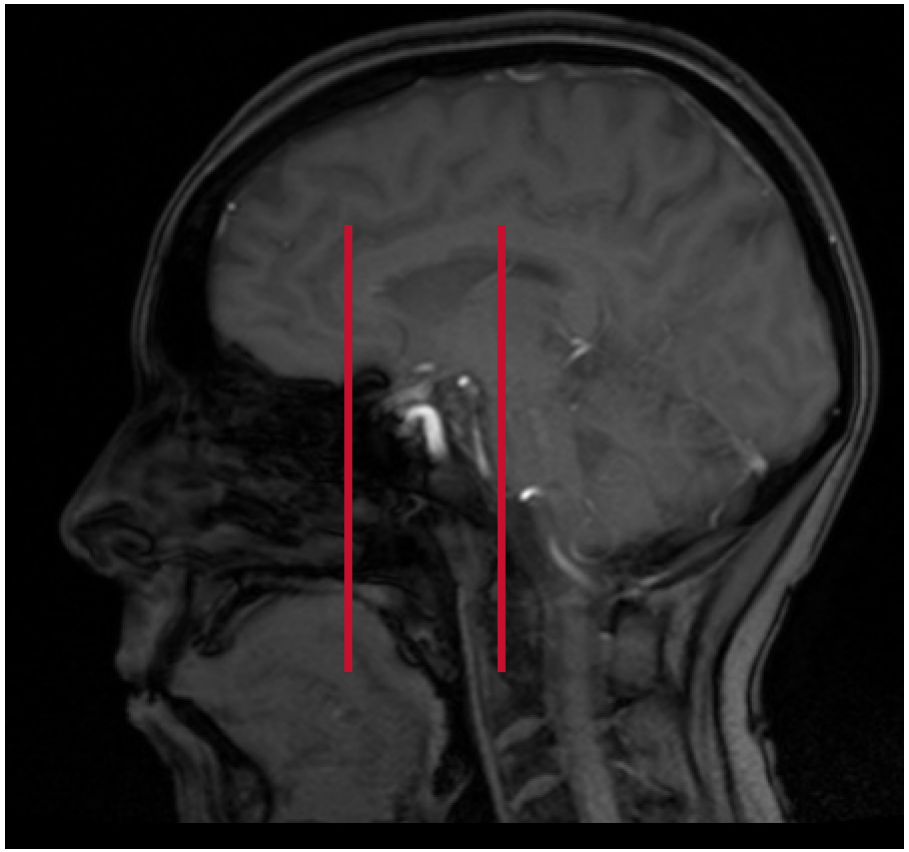


Pituitary – Sequence List

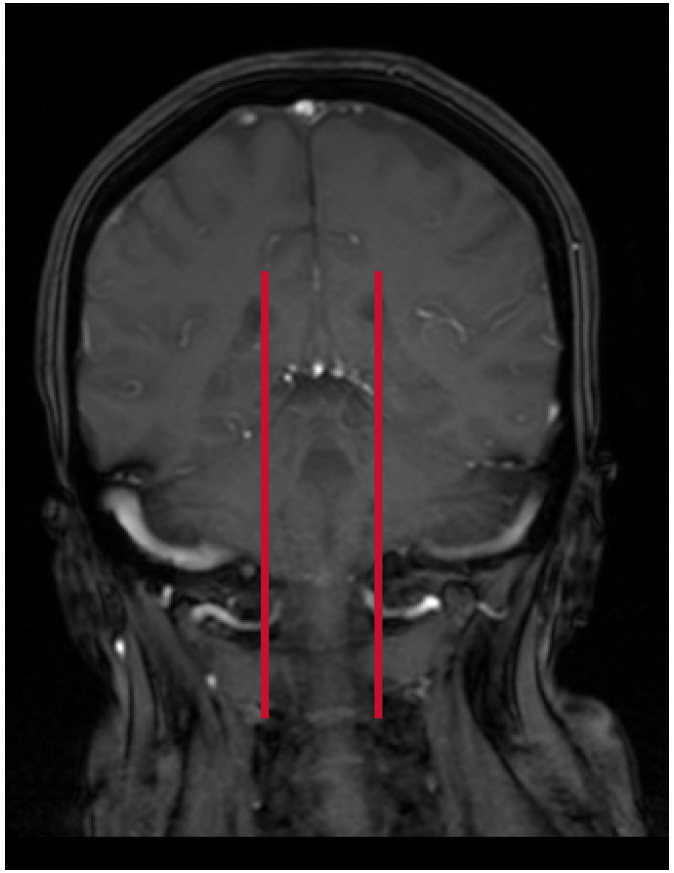
Sag T1 (sella) 3mm
Ax DWI (whole brain) 4mm skip 1mm
Ax T2 (whole brain) 4mm skip 1mm
Ax T2 FLAIR (whole brain) 4mm skip 1mm
Cor T1 (sella) 3mm
Sag 3D T2 (sella) 0.6mm
Contrast
Cor T1 (sella) 3mm
Sag T1(sella) 3mm
Ax 3D T1 (whole brain) 1mm with sag/cor reformats

Pituitary – Slice Selection

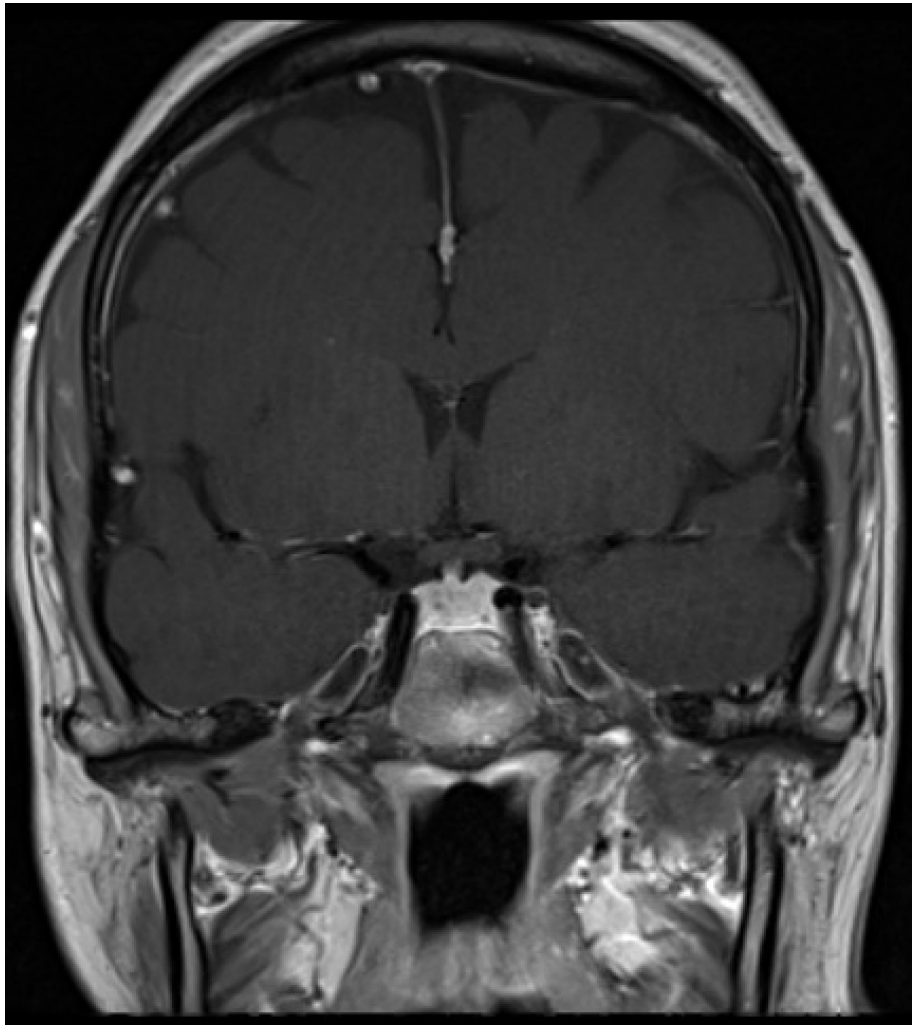
Coronal Slice Selection



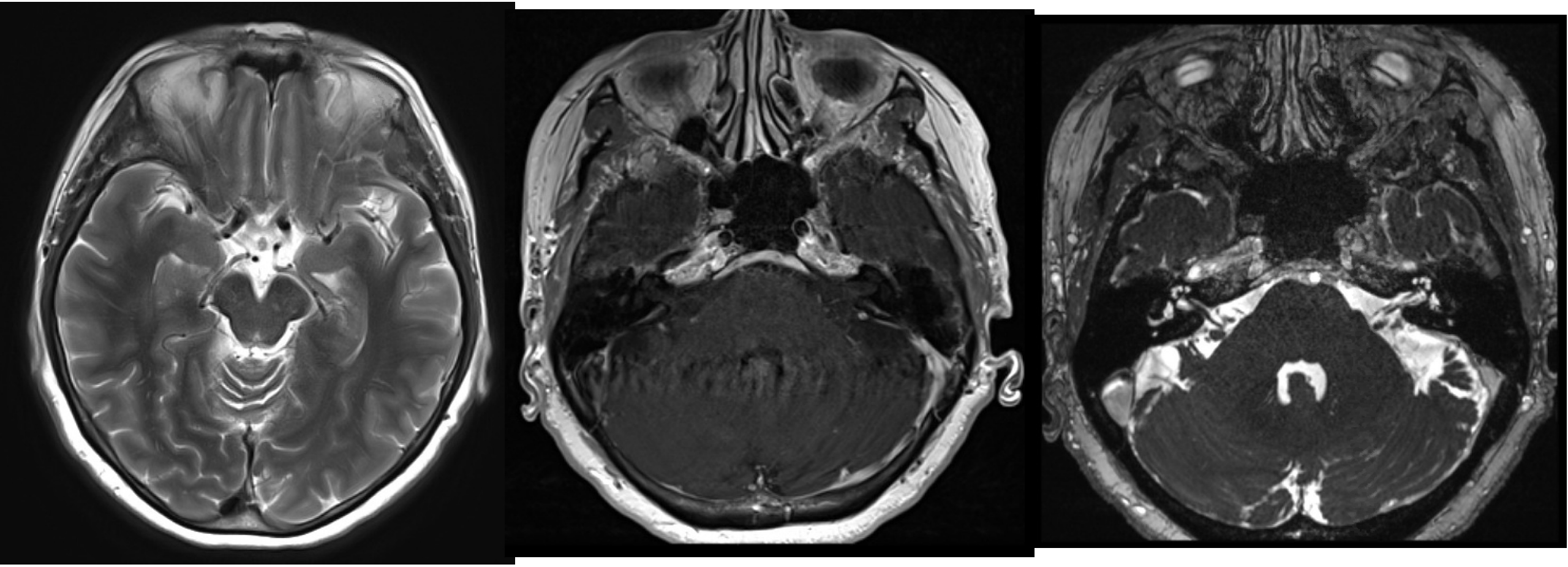
Sagittal Slice Selection



Pituitary – Example Images



Internal Auditory Canal / Temporal Bones – Example Images

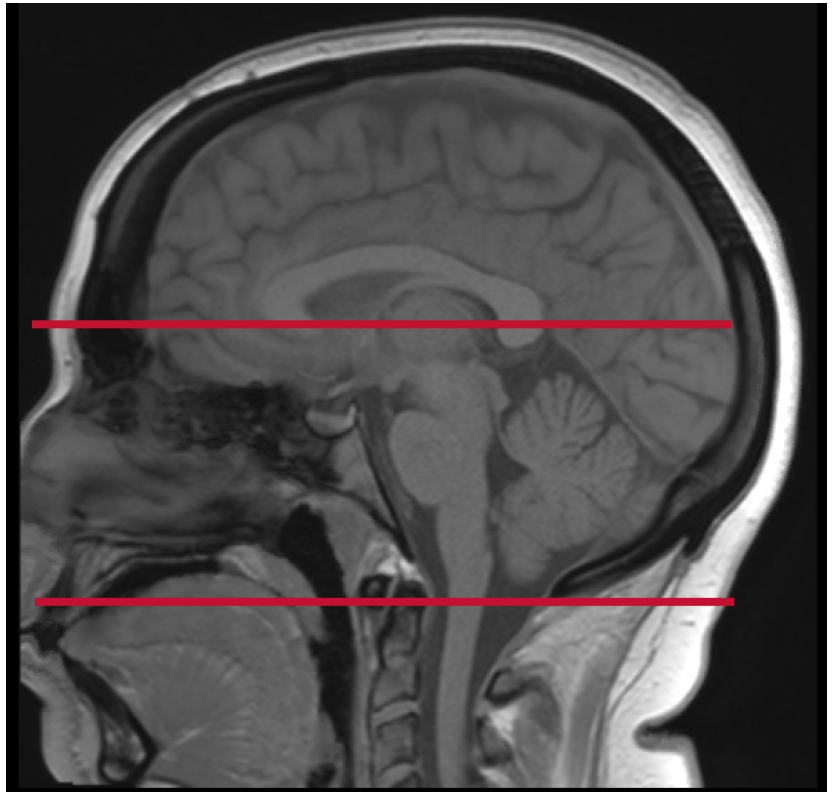


Skull Base – Sequence List

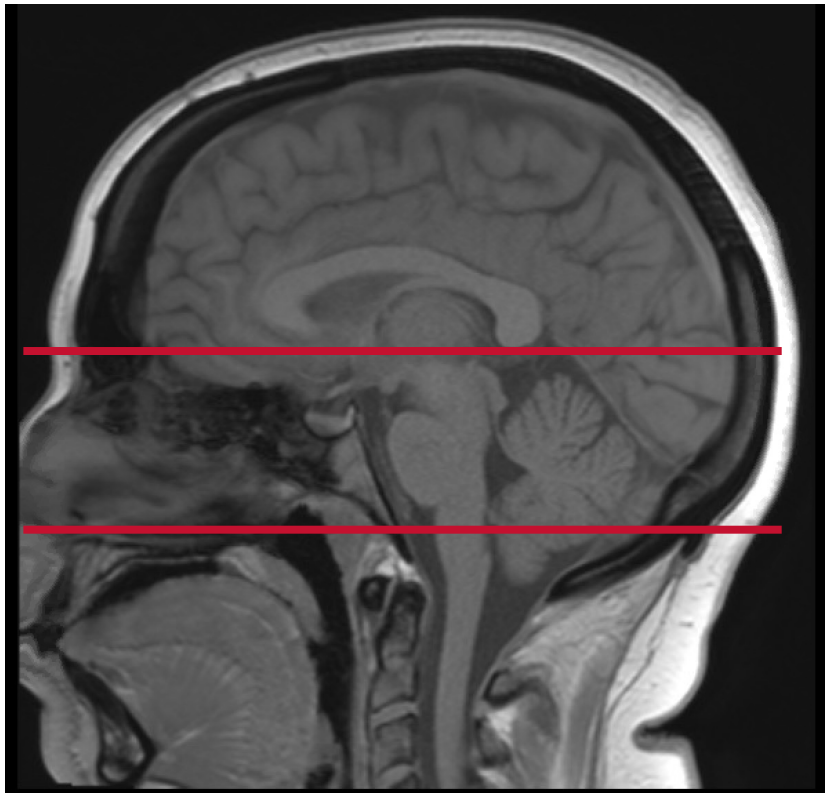
Ax T2 BLADE (whole brain) 4mm skip 0mm high res
Ax DWI (whole brain) 4mm skip 1mm
Ax T1 (skull base cover tumor) 3mm high res
Contrast
CISS (skull base cranial nerves) 0.8mm isotropic
Ax T1 (skull base cover tumor) 3mm high res
Cor T1 (skull base cover tumor) 3mm high res
Ax 3D T1 VIBE Fat Suppressed (whole brain) 1mm isotropic with sag/cor reformats

Skull Base – Slice Selection

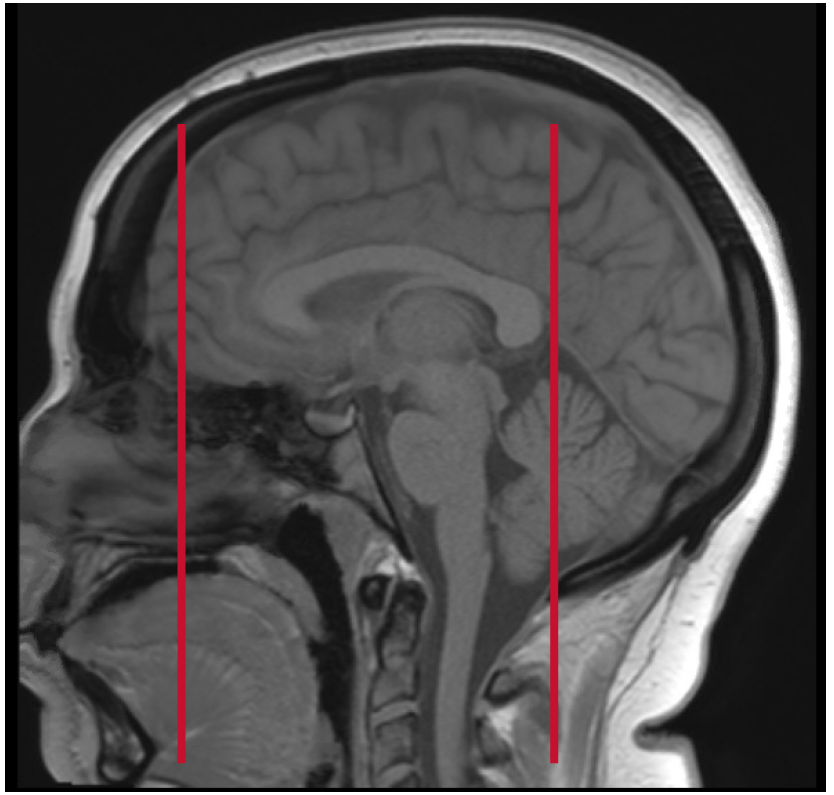
Axial T1 Slice Selection
(Adjust to Cover Tumor)



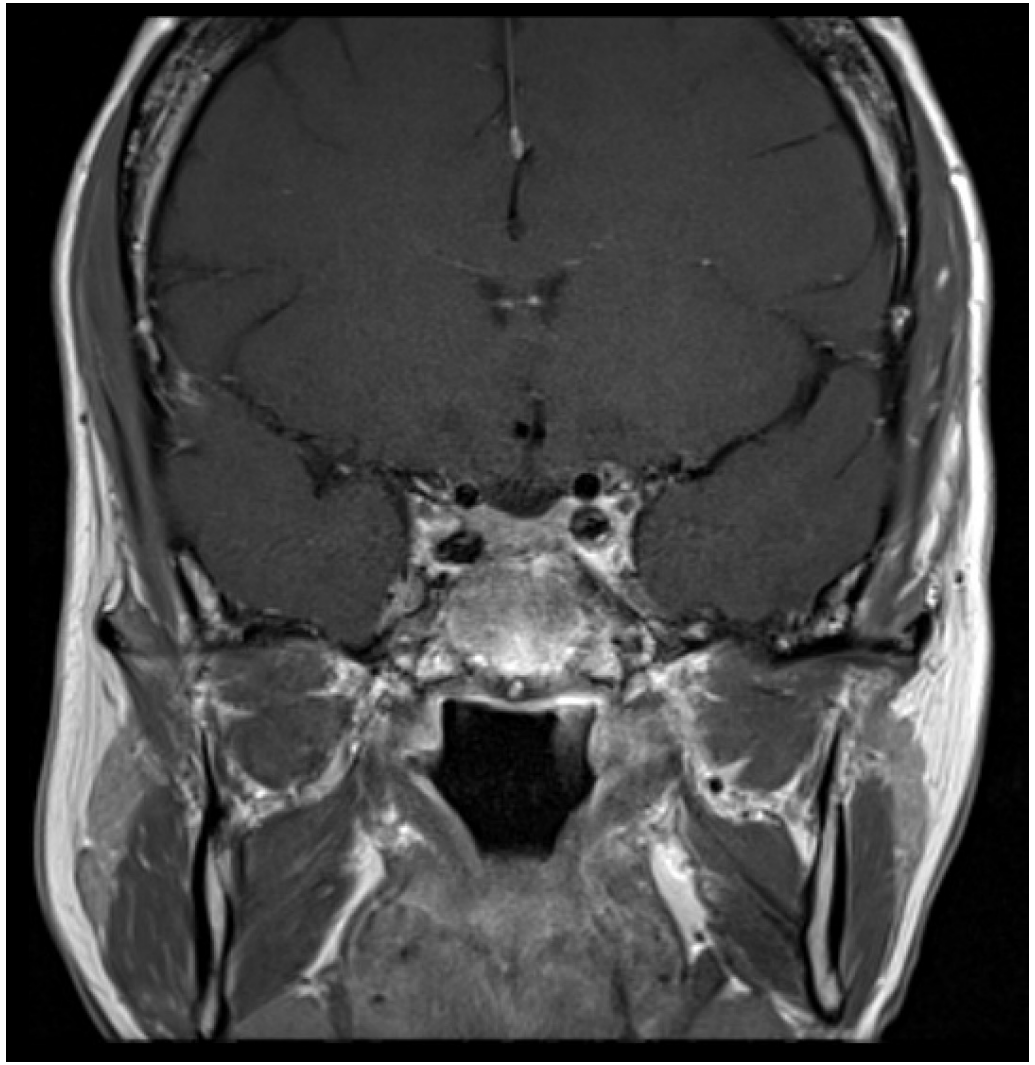
CISS Slice Selection
(DO NOT ADJUST)

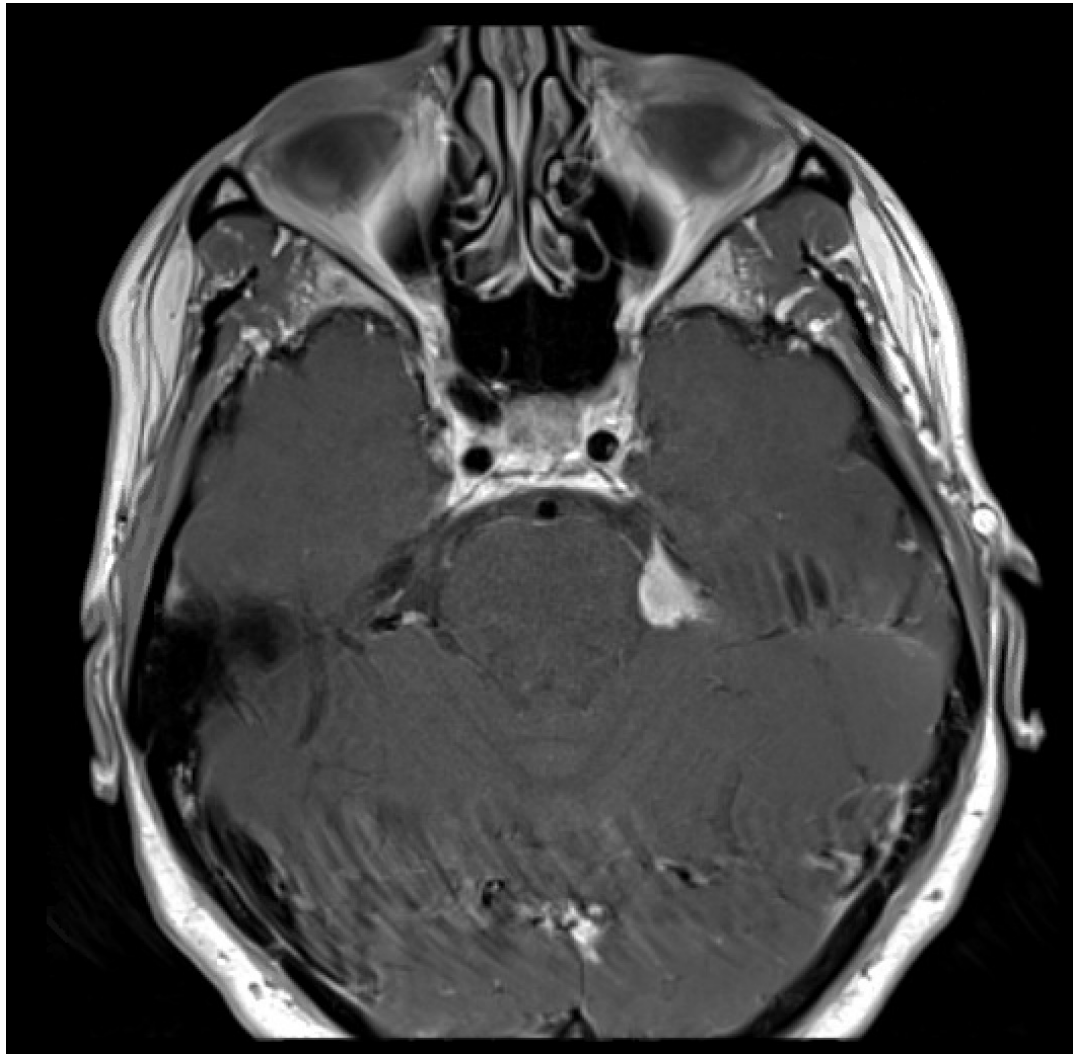


Coronal Slice Selection
(Adjust to Cover Tumor)

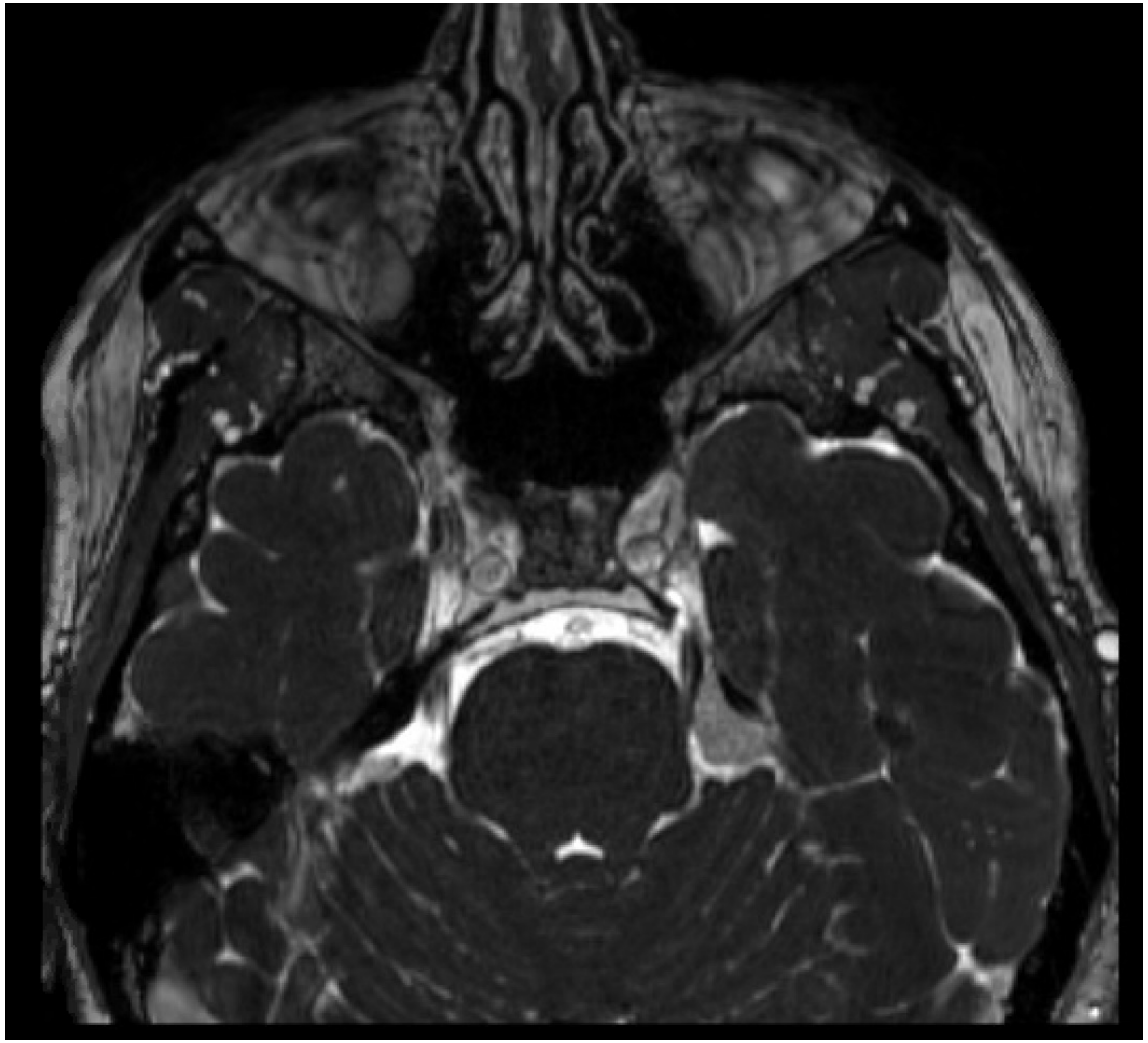


Skull Base – Example Images





Skull Base – Example Images



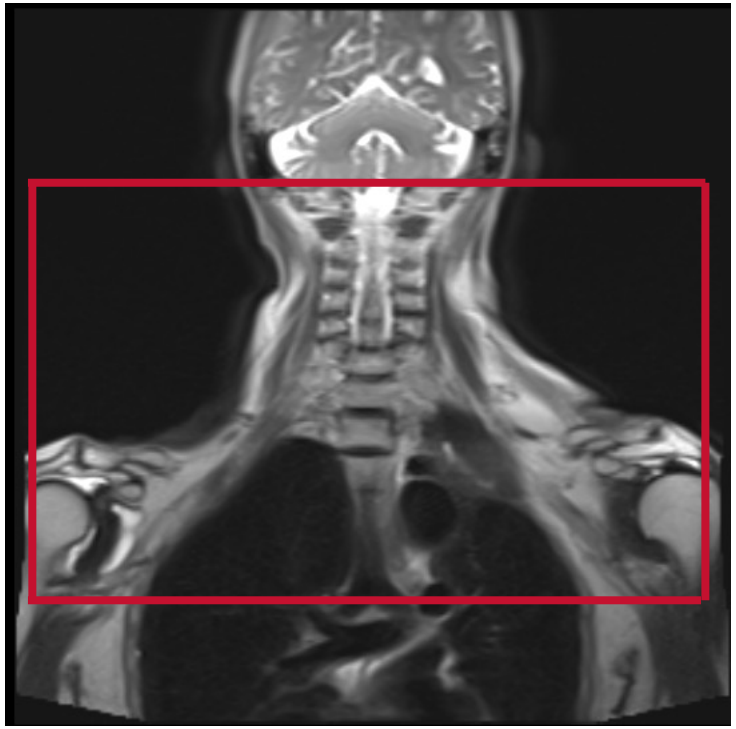
Other

Brachial Plexus – Sequence List

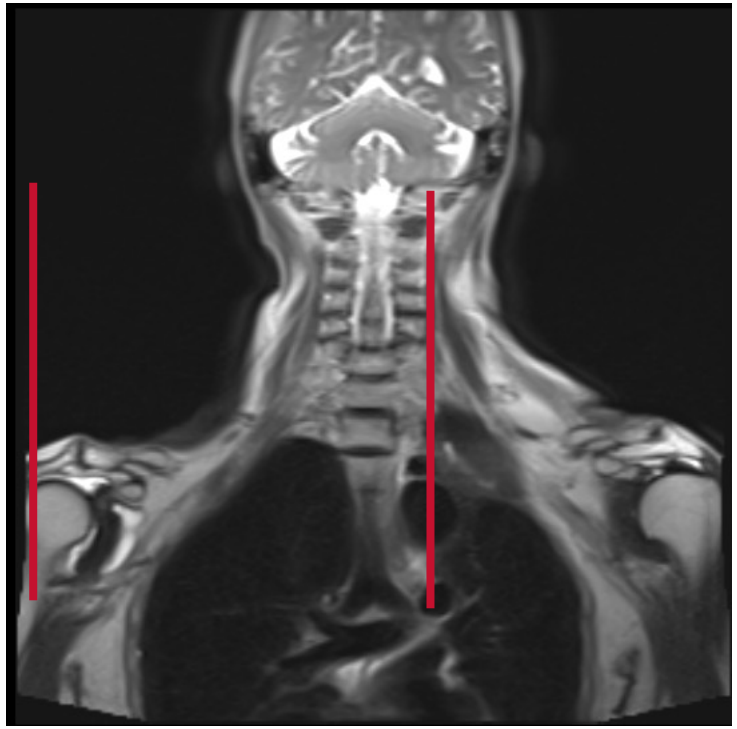
Cor STIR SPACE (angled to C5-C7) 1.3mm bilateral
Sag T1 4mm side of interest only
Cor T2 (angled to C5-C7) 4mm bilateral
Ax T1 4mm bilateral
Ax T2 4mm bilateral
Cor T1 VIBE (angled to C5-C7) 1.3mm bilateral
Contrast
Cor T1 VIBE (angled to C5-C7) 1.3mm bilateral
Ax T1 4mm bilateral

Brachial Plexus – Slice Selection

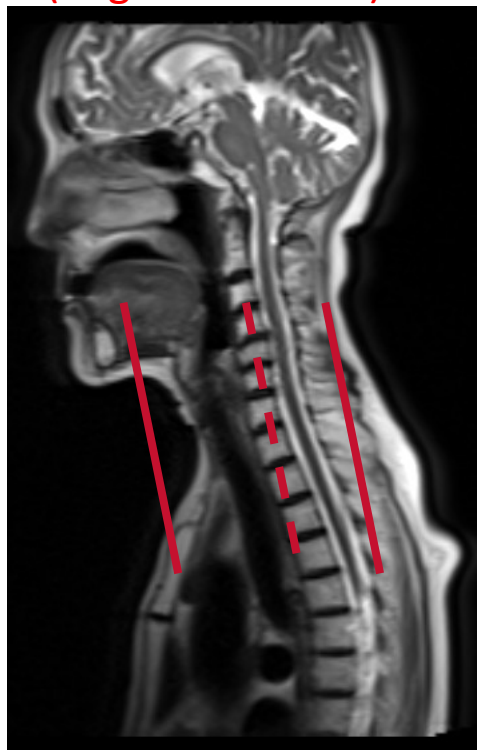
Coronal FOV
Axial Slice Selection



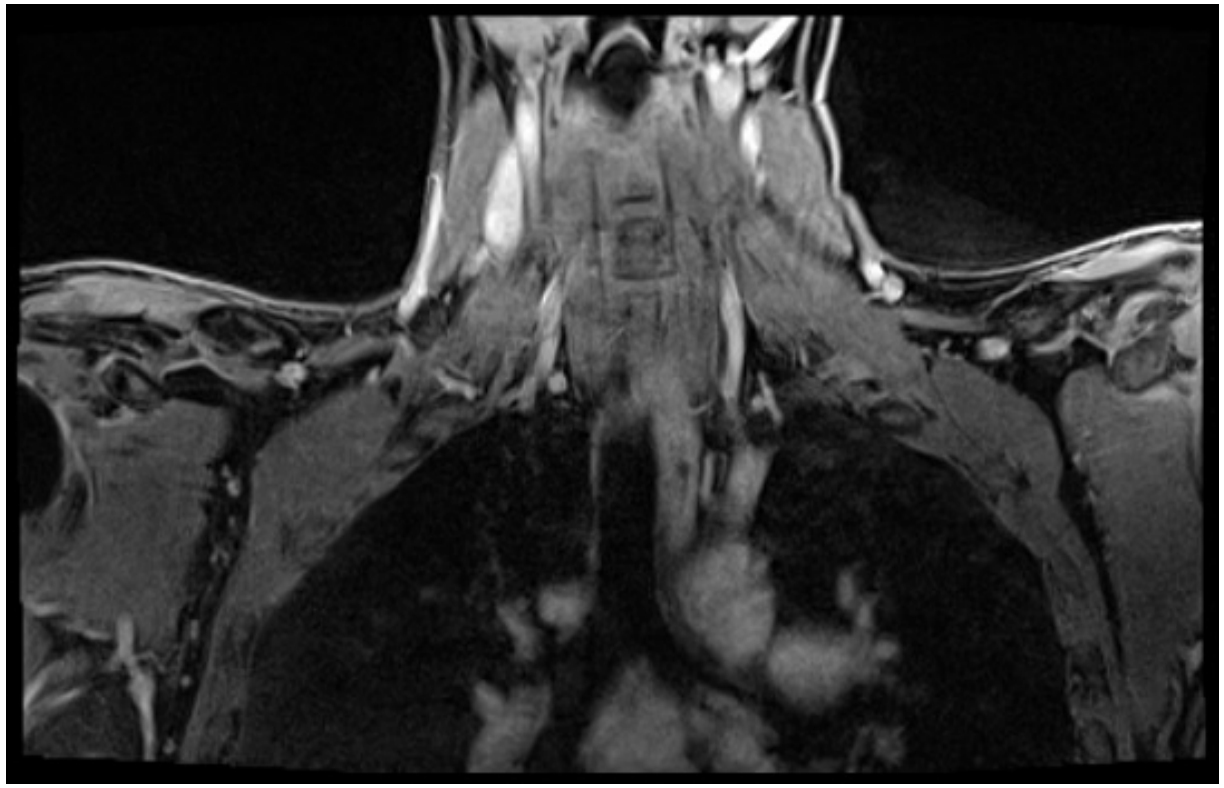
Sagittal Slice Selection



Coronal Slice Selection
(angled to C5-C7)



Brachial Plexus – Example Images

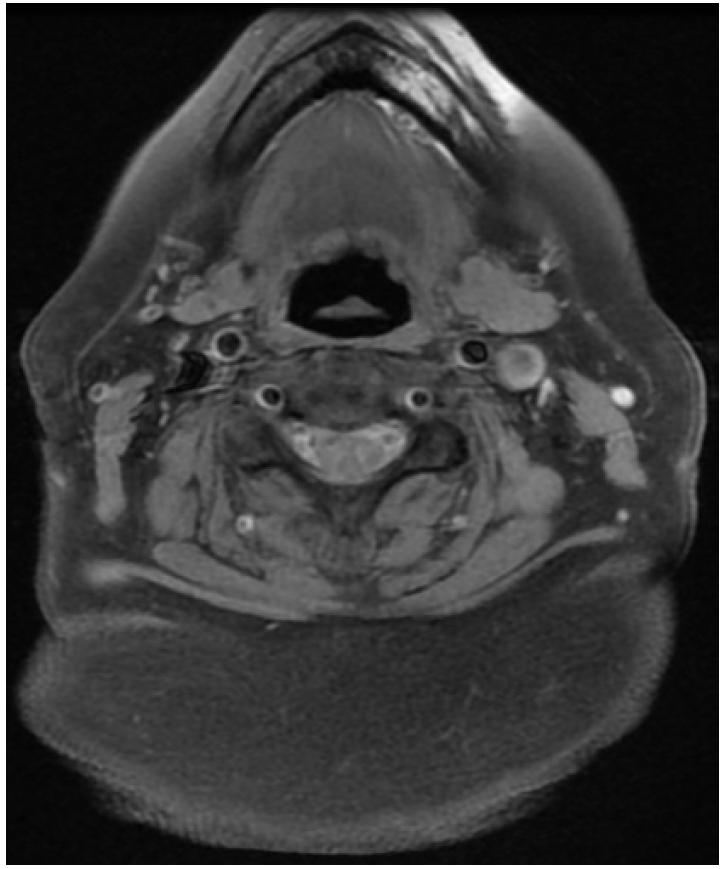


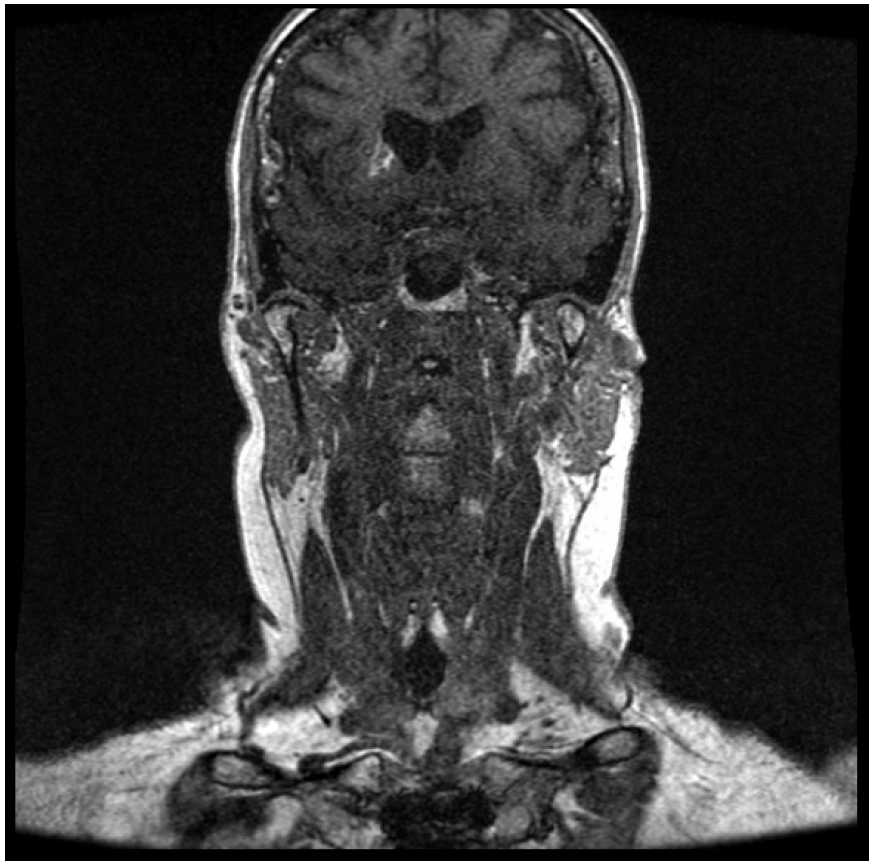
Cervical MRA C+ - Sequence List

Cor T1 GRE mask
Ax T1 Fat Suppression (if requested for dissection)
Contrast
Cor T1 GRE

- Spin MIP reformat bilateral
- Spin MIP reformat right
- Spin MIP reformat left

Cervical MRA C+ - Example Images





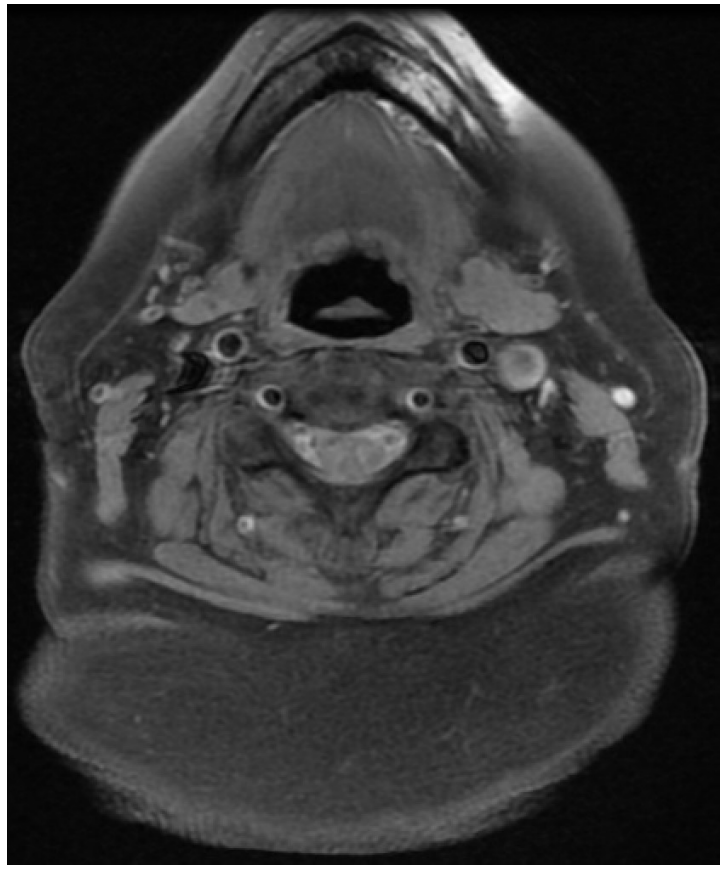
Cervical MRA C- - Sequence List

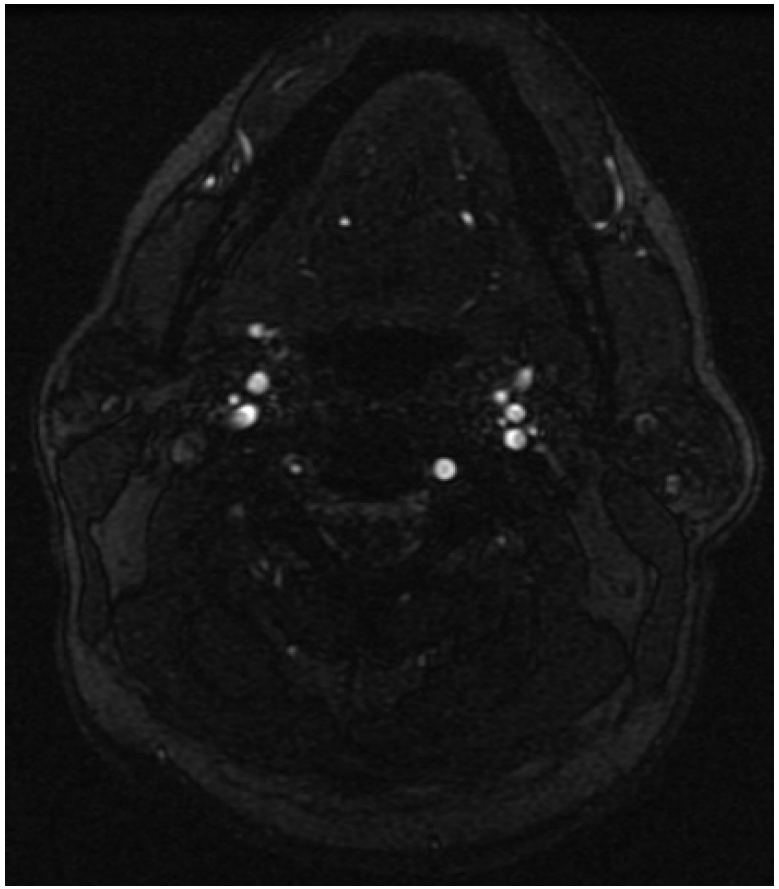
2D TOF cervical arteries
- Spin MIP reformat bilateral

3D TOF carotid bifurcations
- Spin MIP reformat bilateral
- Spin MIP reformat right
- Spin MIP reformat left

Ax T1 Fat Suppression (if requested for dissection)

Cervical MRA C- - Example Images





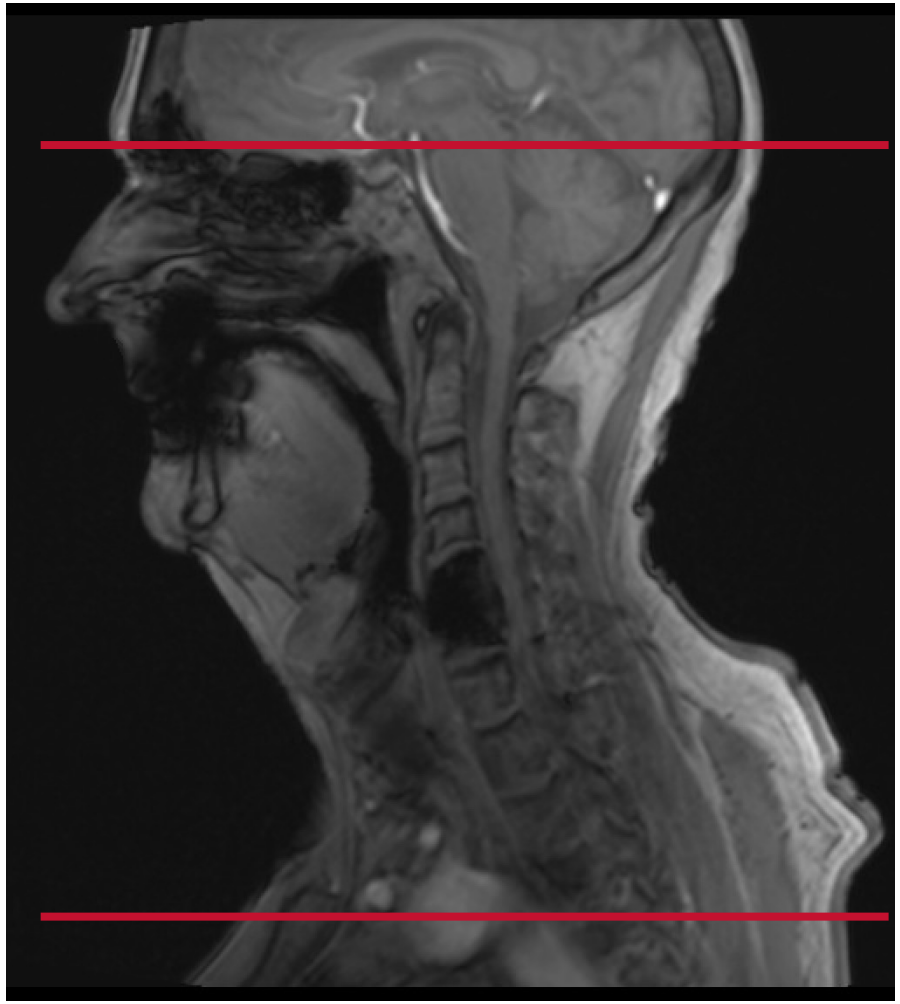
Protocols with 3D Sequences

General / Trans-spatial – Sequence List

Cor STIR (mid orbits to manubrium) 4mm
Ax STIR (mid orbits to manubrium) 4mm
Sag 3D T1 TSE (mid orbits to manubrium) 1mm isotropic with Ax/Cor 1mm reformats
Contrast
Sag 3D T1 Dixon (mid orbits to manubrium) 1mm isotropic with Ax/Cor 1mm reformats

General / Trans-spatial – Slice Selection

Axial Slice Selection



Coronal Slice Selection

General / Trans-spatial – Example Images

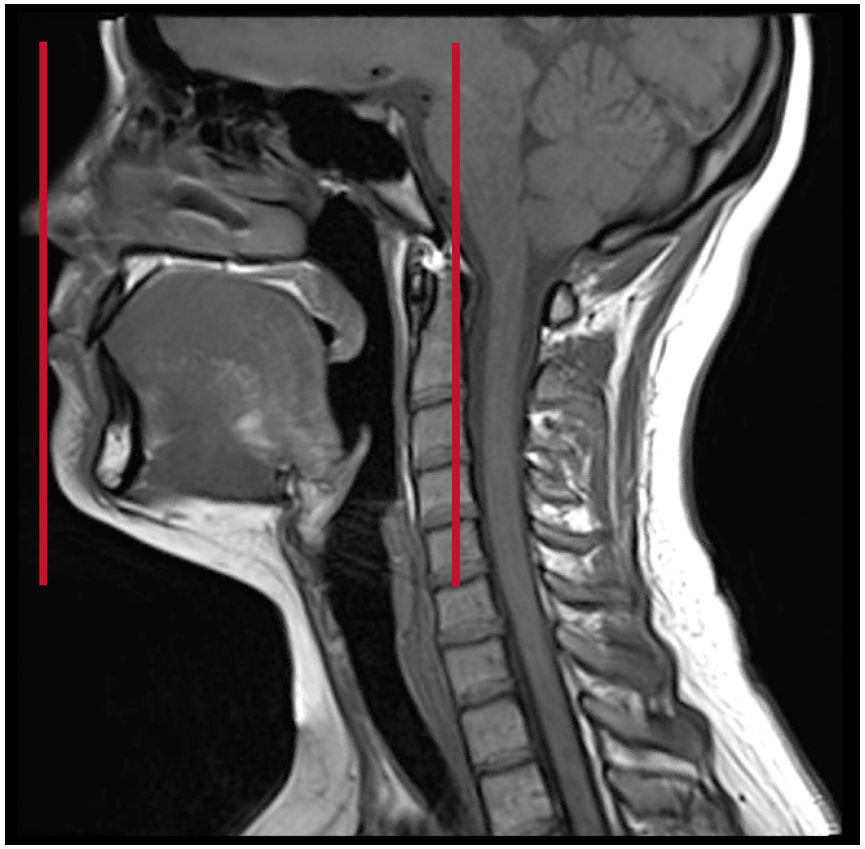
Nasopharynx & Nasal Cavity – Sequence List

Ax 3D T1 TSE (mid orbits to mid tongue) 0.8x0.9x0.9mm with Sag/Cor 0.9mm reformats
Ax STIR (mid orbits to manubrium) 4mm
Contrast
Ax 3D T1 Dixon (mid orbits to mid tongue) 0.9x0.9x0.9mm with Sag/Cor 0.9mm reformats

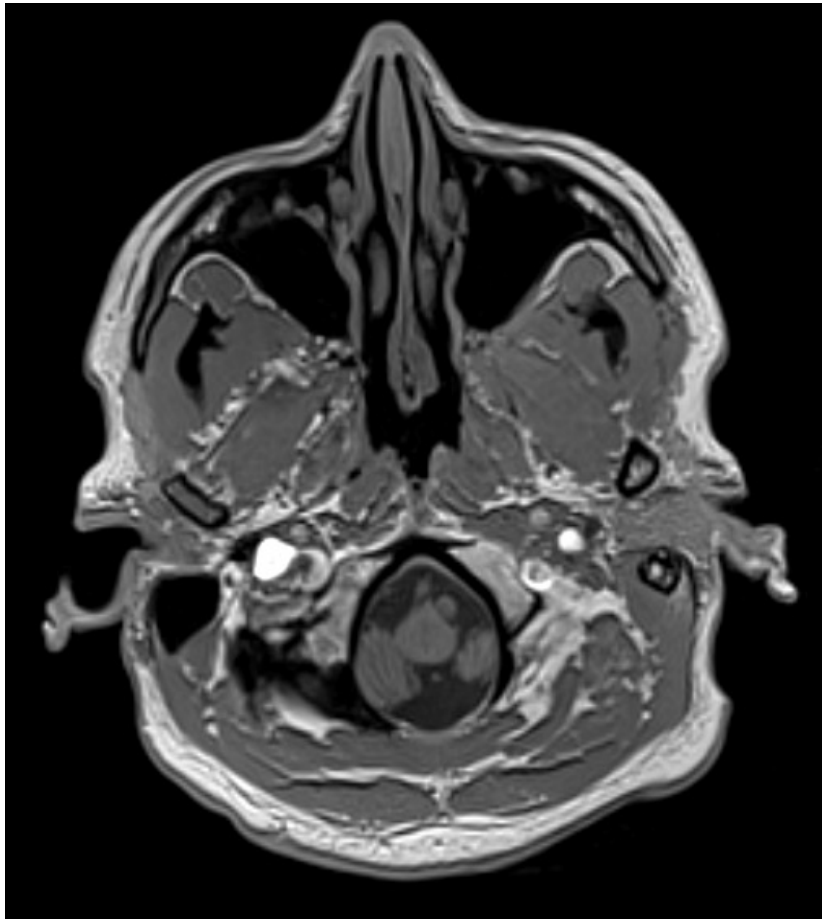
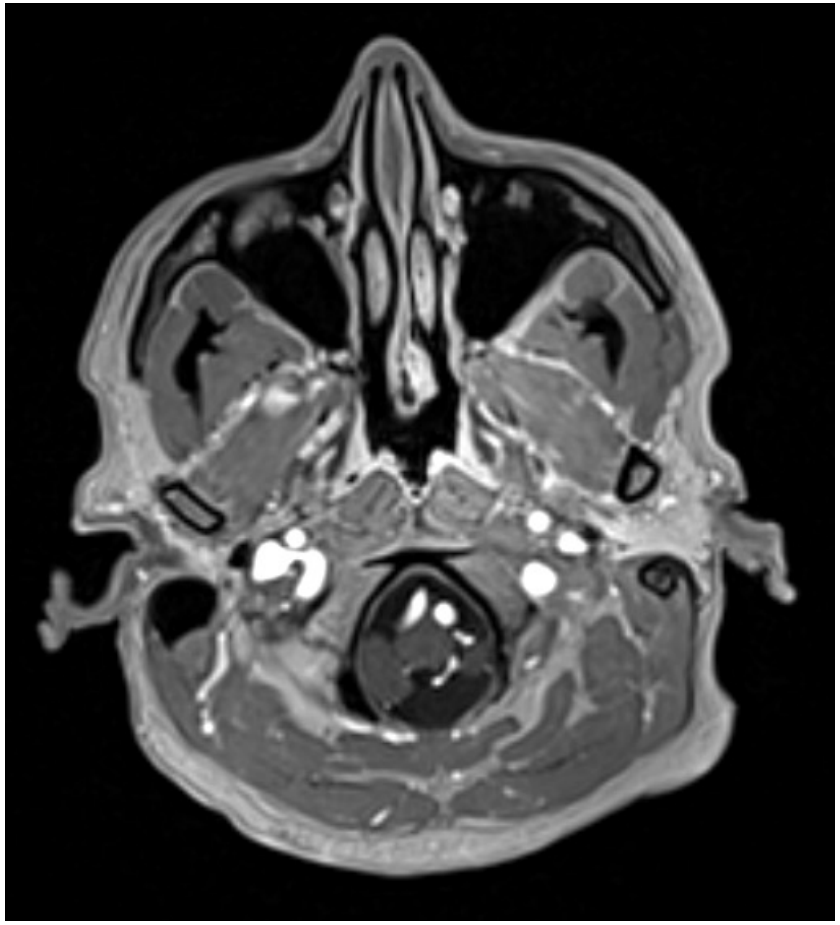
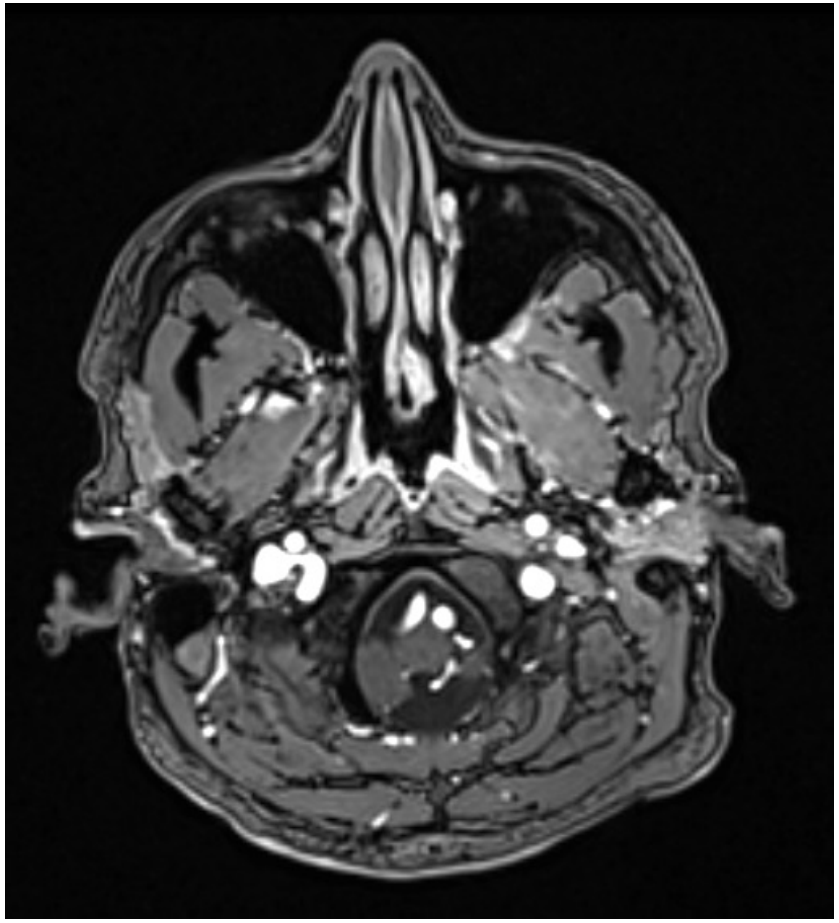
Nasopharynx & Nasal Cavity – Slice Selection

High Res Axial Slice Selection

High Res Coronal Slice Selection



Nasopharynx & Nasal Cavity – Example Images

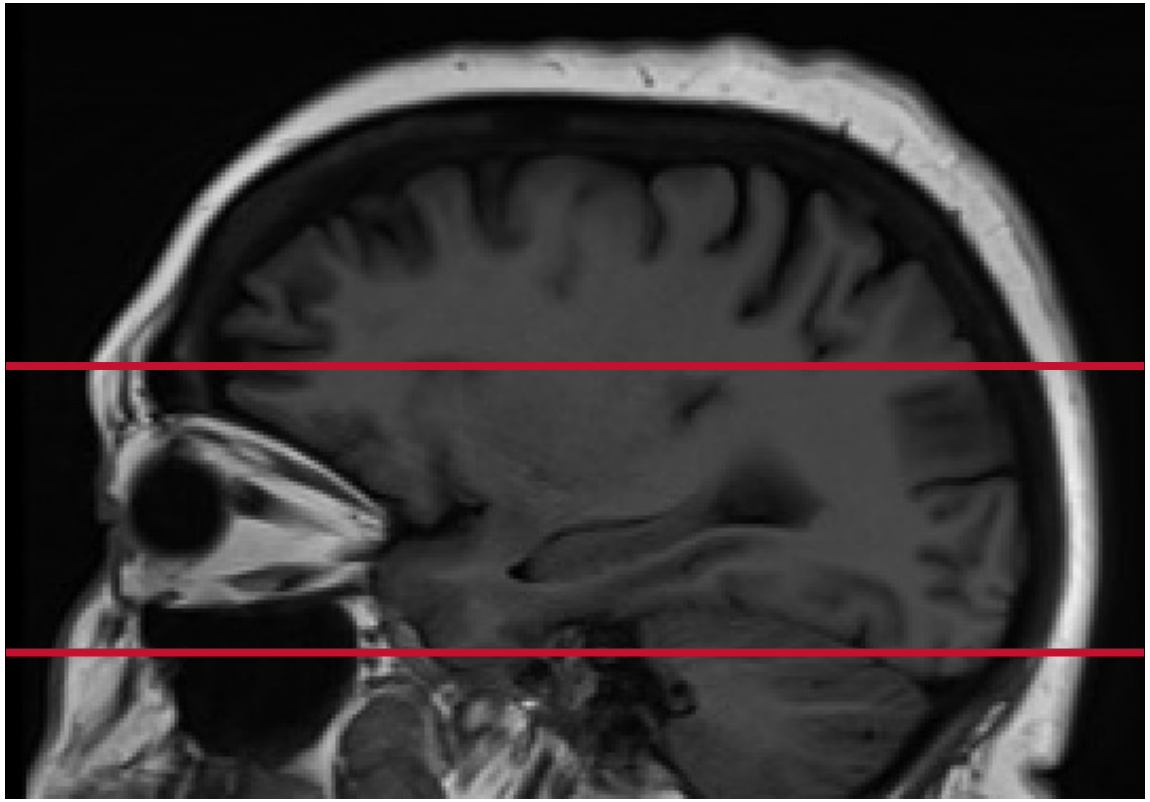




Orbits – Sequence List

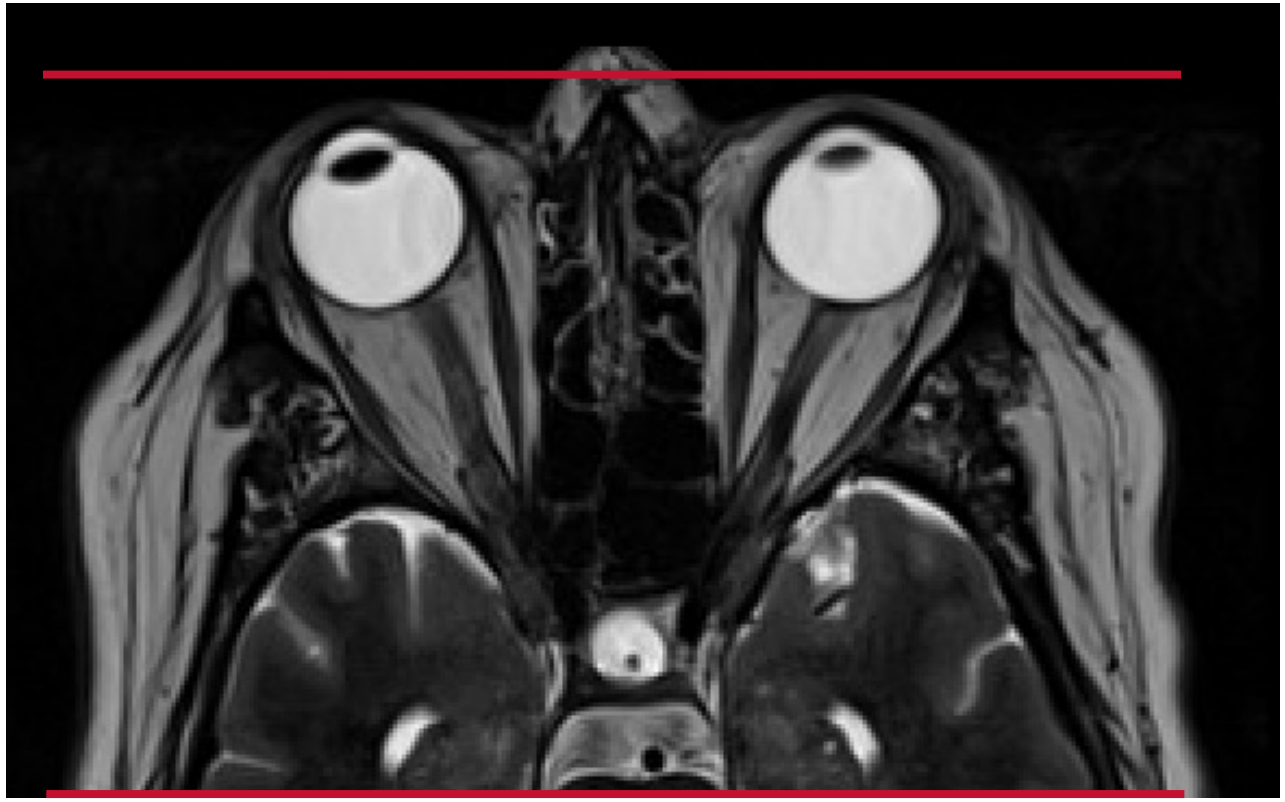
Cor T1 3mm high res (eyelid through orbit)
Cor STIR 3mm high res (eyelid through sella)
Ax T1 3mm high res
Axial T2 3mm high res
Contrast
Cor T1 3mm high res (eyelid through orbit)
Ax T1 3mm high res
Cor T1 FS 4mm (eyelid through brain stem)

Orbits – Slice Selection

Axial Slice Selection



Coronal Slice Selection / Axial FOV

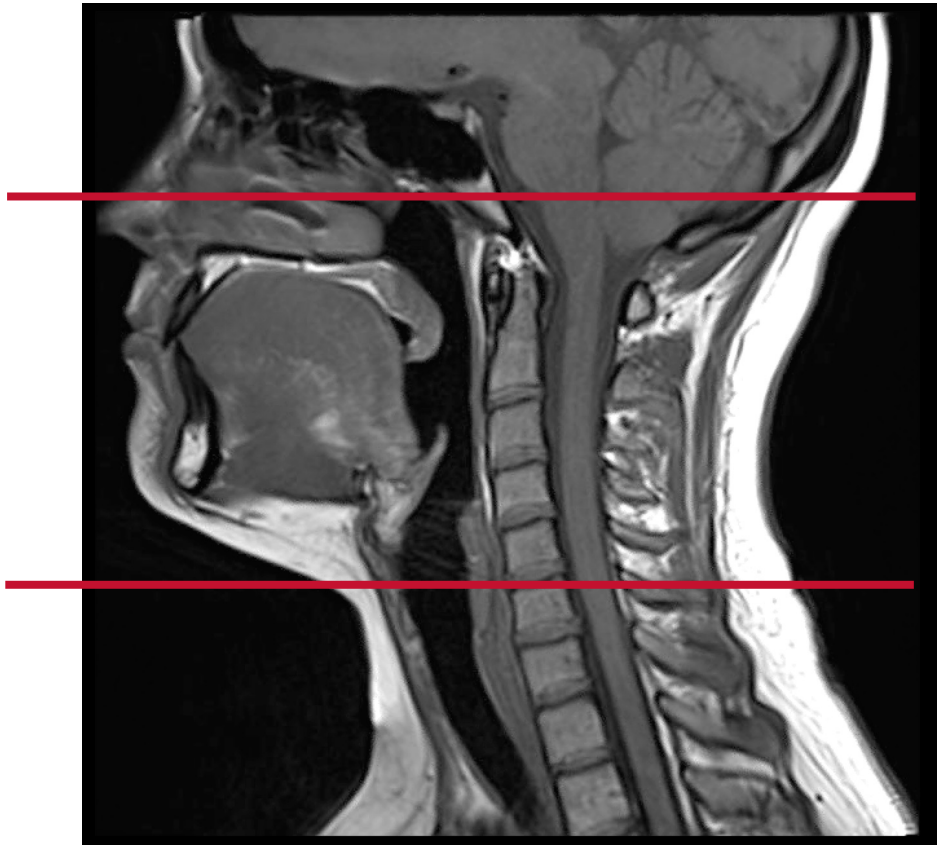


Oropharynx & Oral Cavity – Sequence List

Ax 3D T1 TSE (mid nose to larynx) 0.8x0.9x0.9mm with Sag/Cor 0.9mm reformats
Ax STIR (mid orbits to manubrium) 4mm
Cor STIR (lips to vertebral bodies, face only FOV) 3mm high res
Contrast
Ax 3D T1 Dixon (mid nose to larynx) 0.9x0.9x0.9mm with Sag/Cor 0.9mm reformats

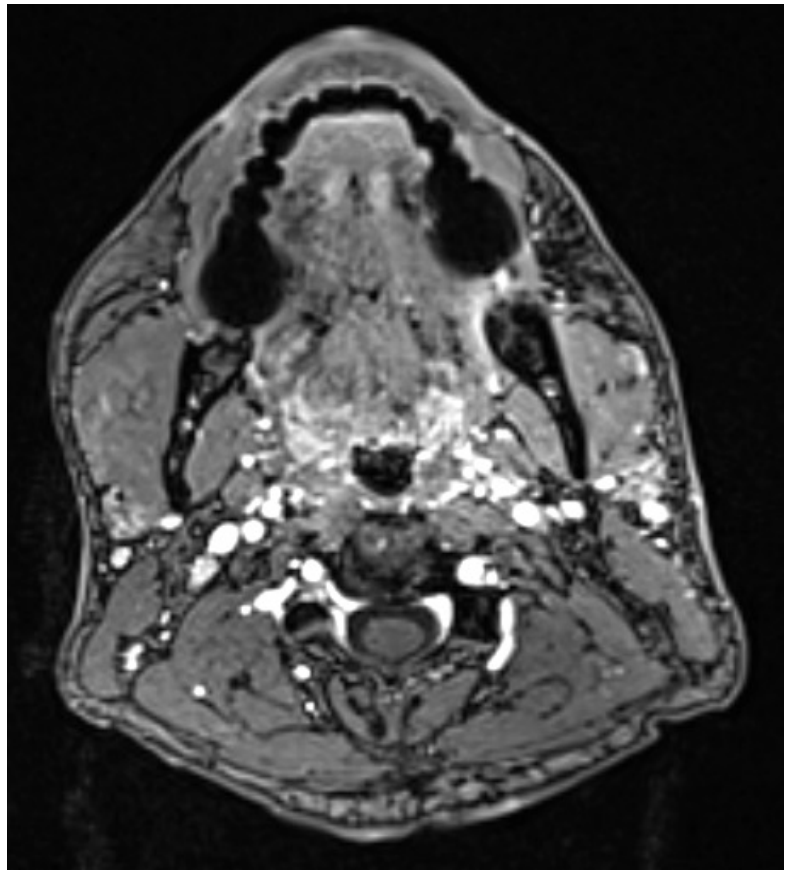
Oropharynx & Oral Cavity – Slice Selection

High Res Axial Slice Selection



High Res Coronal Slice Selection

Oropharynx & Oral Cavity – Example Images



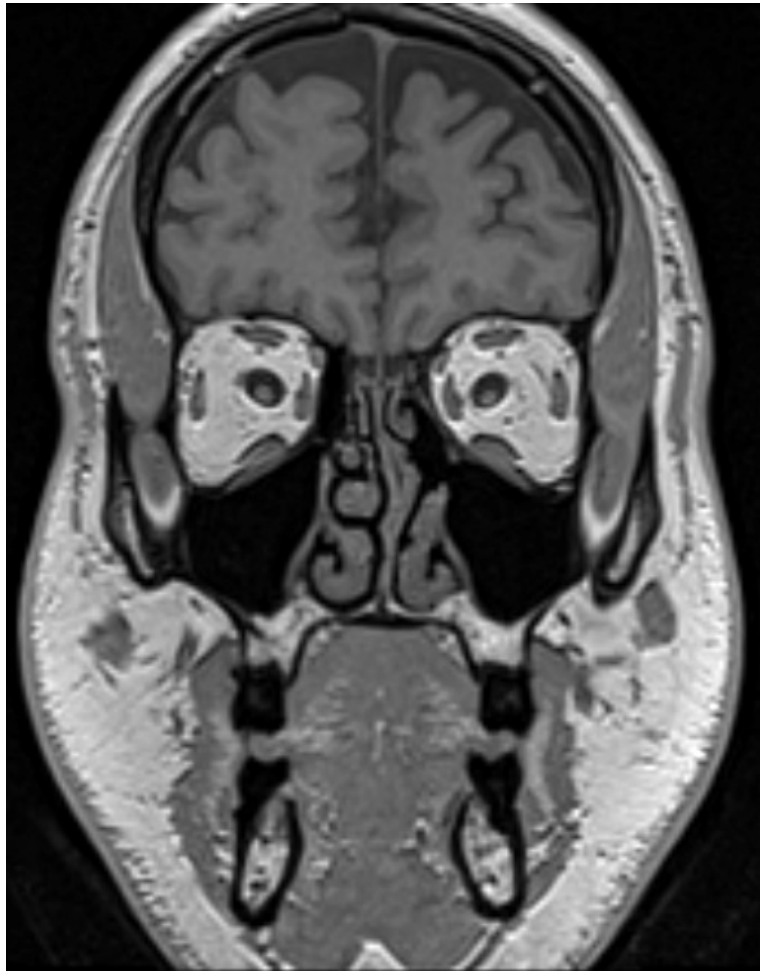
Sinus – Sequence List

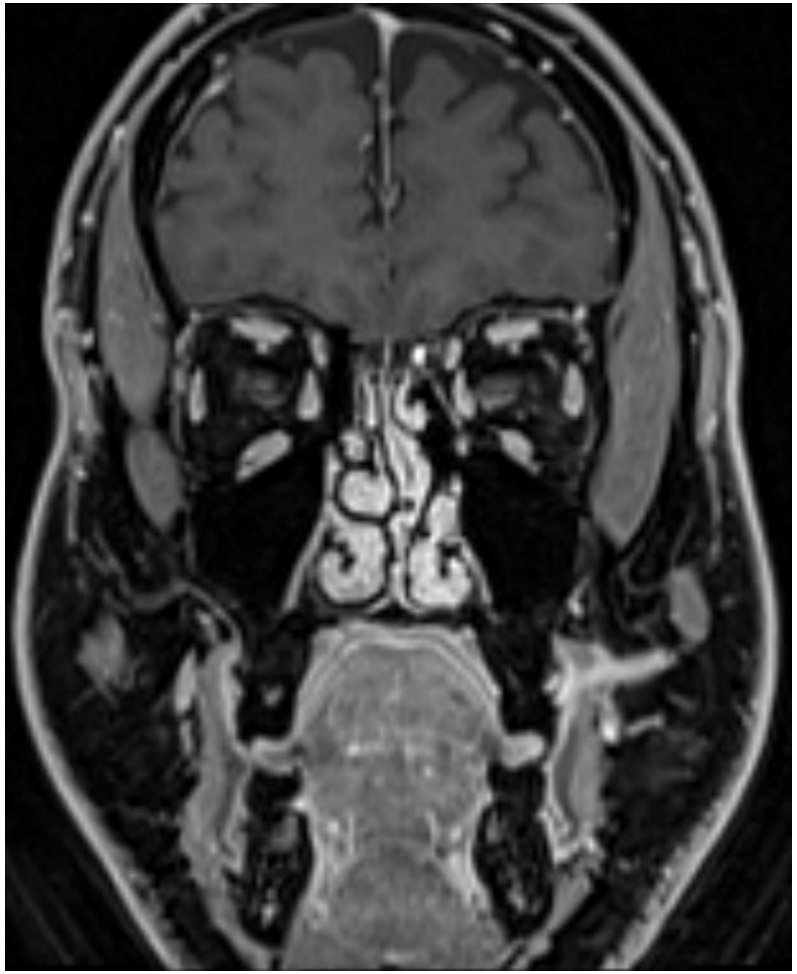
Cor 3D T1 GRE (nose to brain stem) 1mm isotropic with Ax/Sag 1mm reformats
Cor 3D T2 TSE (nose to brain stem) 1mm isotropic with Ax/Sag 1mm reformats
Contrast
Cor 3D T1 Dixon (nose to brain stem) 1mm isotropic with Ax/Sag 1mm reformats

Sinus – Slice Selection

Coronal Slab Selection

Sinus – Example Images





Mass General Brigham