Brachial Plexus MRI

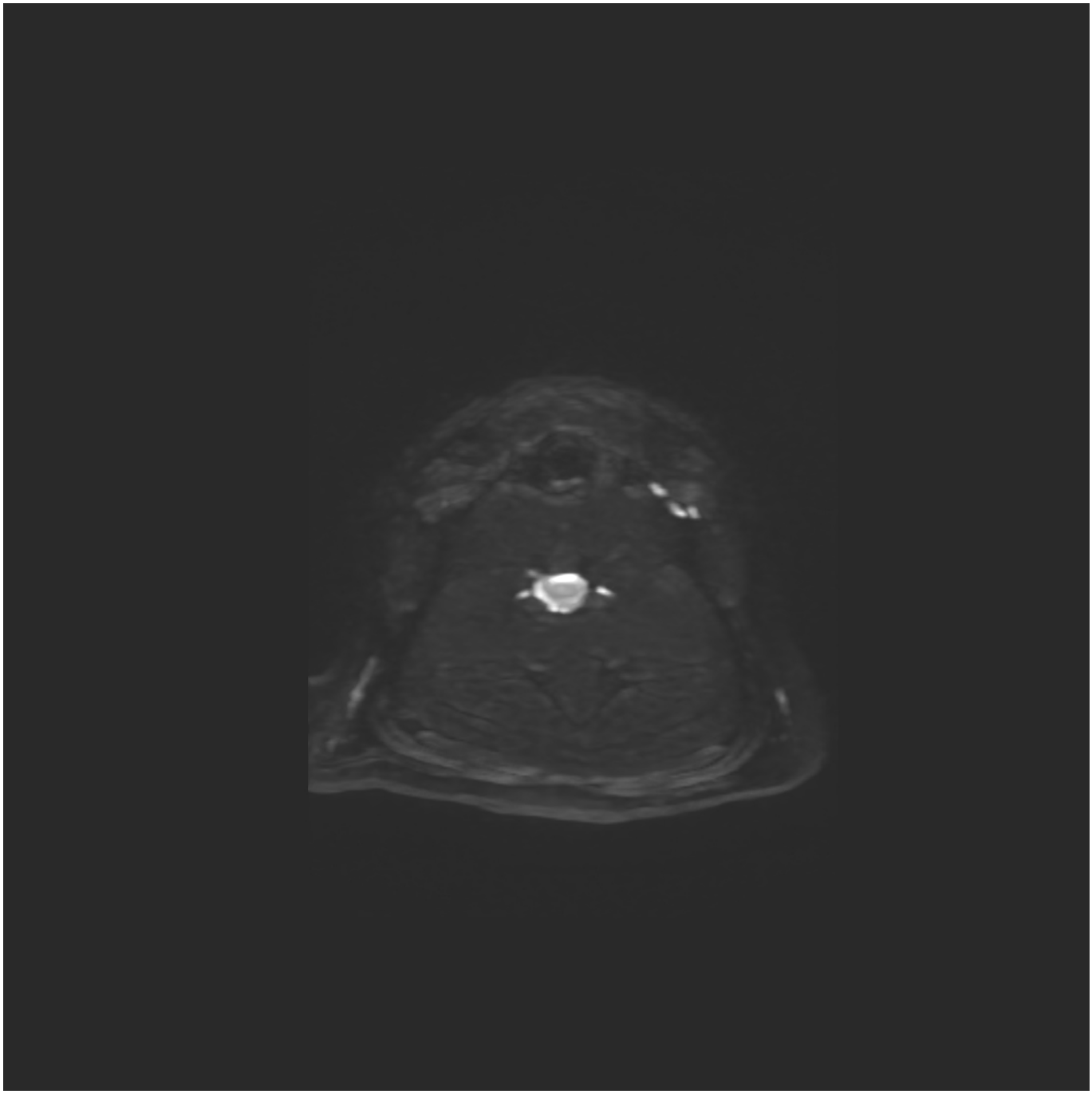
Positioning

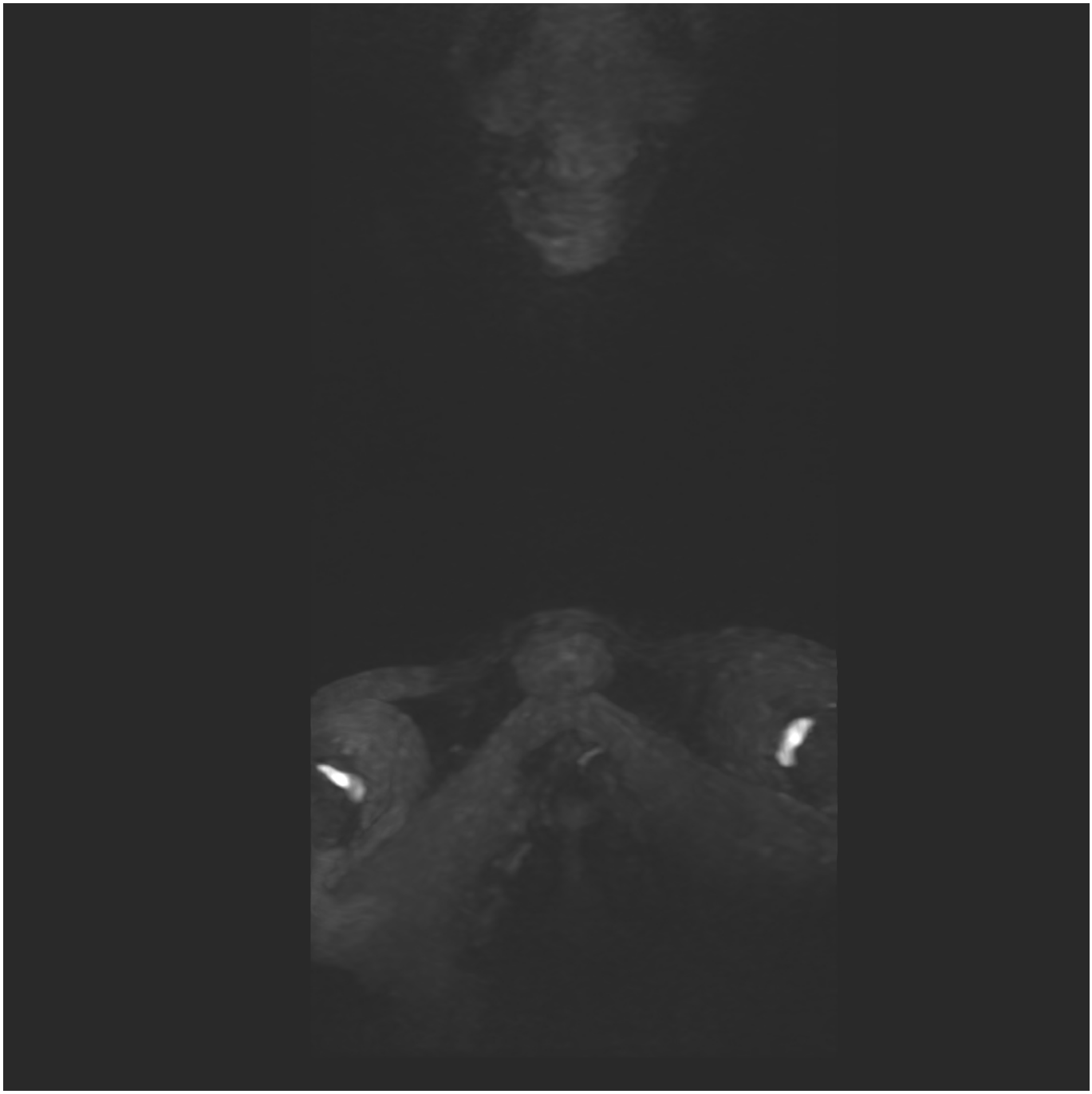
Positioning for the brachial plexus exam is especially important. To ensure the nerves and forelimbs can be well assessed, both limbs should be positioned as symmetrical as possible, and pulled rostrally and well secured. Proper limb positioning will ensure that the peripheral brachial plexus nerves can be imaged closest to isocenter, compared slice-to-slice, and without excessive slice coverage. Typically dorsal recumbency is preferred, and any compatible coils that can be positioned over the elbows or sternum will help with SNR.

Anatomy

The brachial plexus exam can be more difficult than a standard brain or spine exam, as there is more complex anatomy, different positioning requirements, and different scanning challenges. A good sense of the anatomy is crucial to proper coverage and slice orientation.

The brachial plexuses are bundles of nerves that originate from about C4/5 to T2/3 and extends into the forelimbs on both sides. When there is an injury or lesion in the brachial plexus, a patient may present with muscle atrophy or forelimb lameness without an orthopedic cause. Below are MIPs of the brachial plexus nerves in 3 planes. Keep in mind that the nerves extend deeper into the forelimb than visualized on these sequences, so the required coverage will be larger.

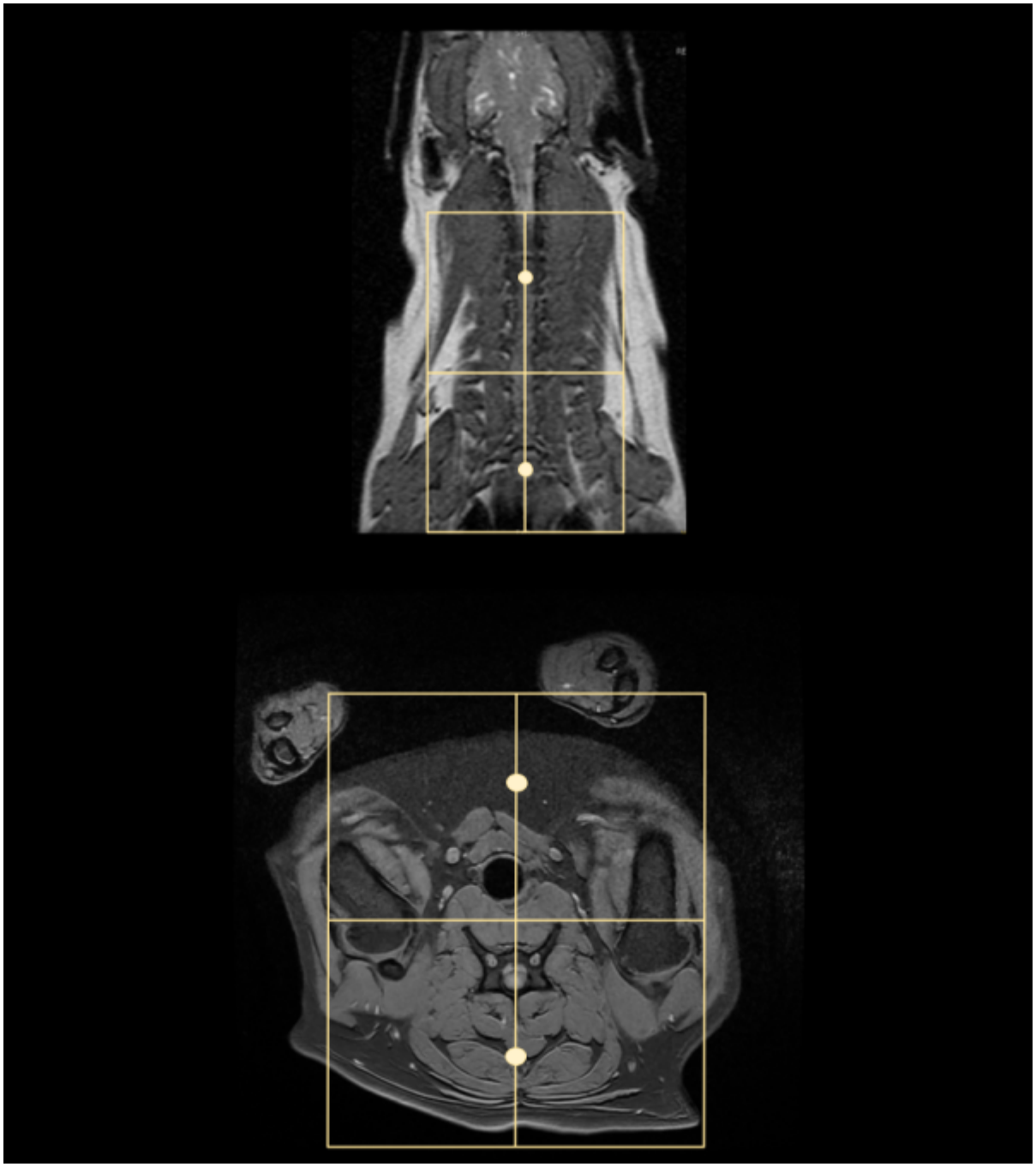




Scan Coverage and Planning

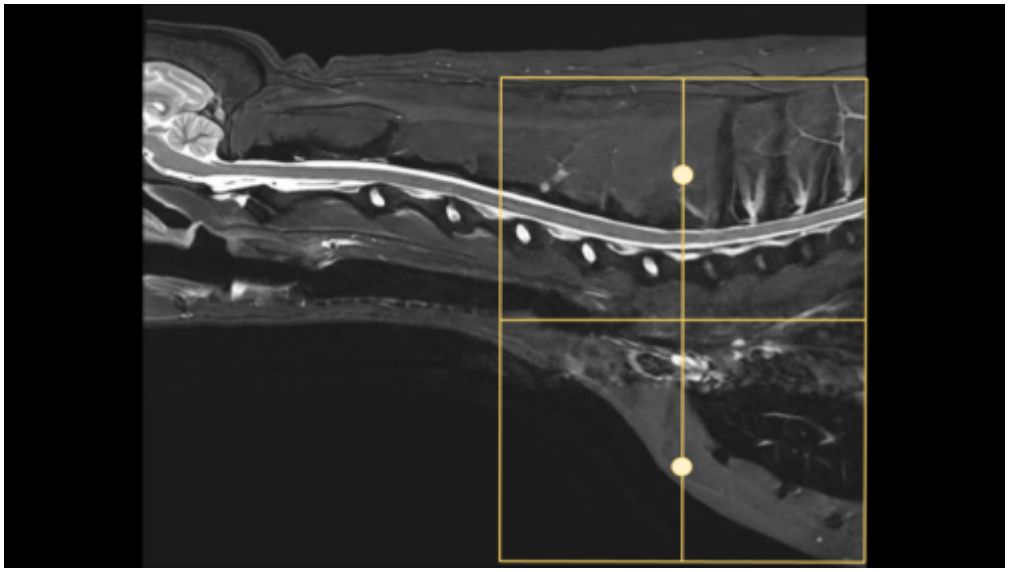
Sagittal Plane

For brachial plexus scout images, add more slices on all planes to cover sternum to spine dorsally, shoulder to shoulder sagittal, and C3 to T3 axially. On the axial and dorsal scout imaging, plan the slices parallel to the center of the spinal cord. On the sagittal scout image, center the FOV on C6/7. For each patient, the FOV should be re-sized to include at least C4/5 to include the T3/4. On the dorsal scout image, add enough slices to cover out to the humeral head on both sides unless specifically doing a unilateral study. **Be sure to use an ODD number of slices. This will ensure that the center slice is in true midline through the spinal cord.**



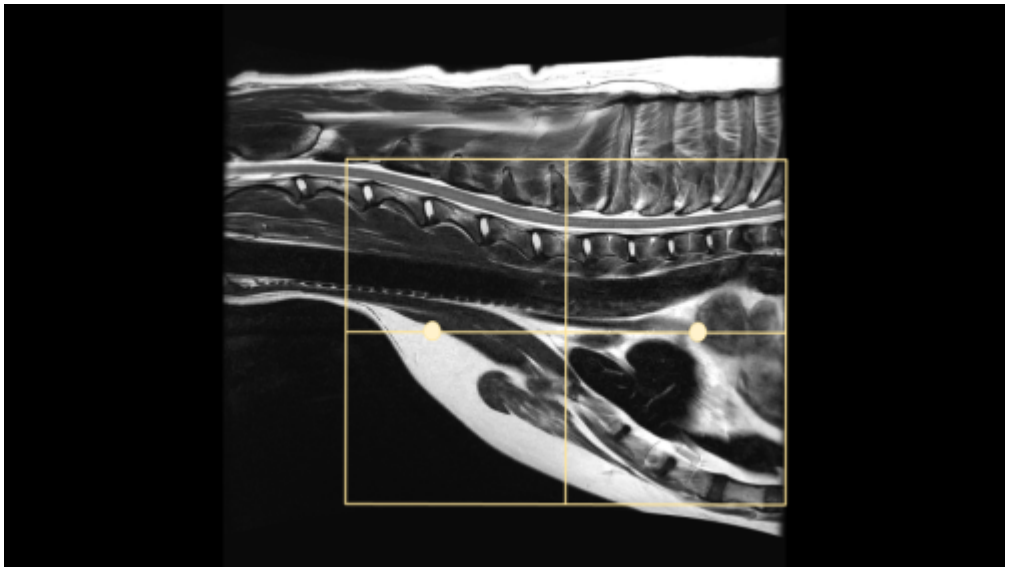
Axial Plane

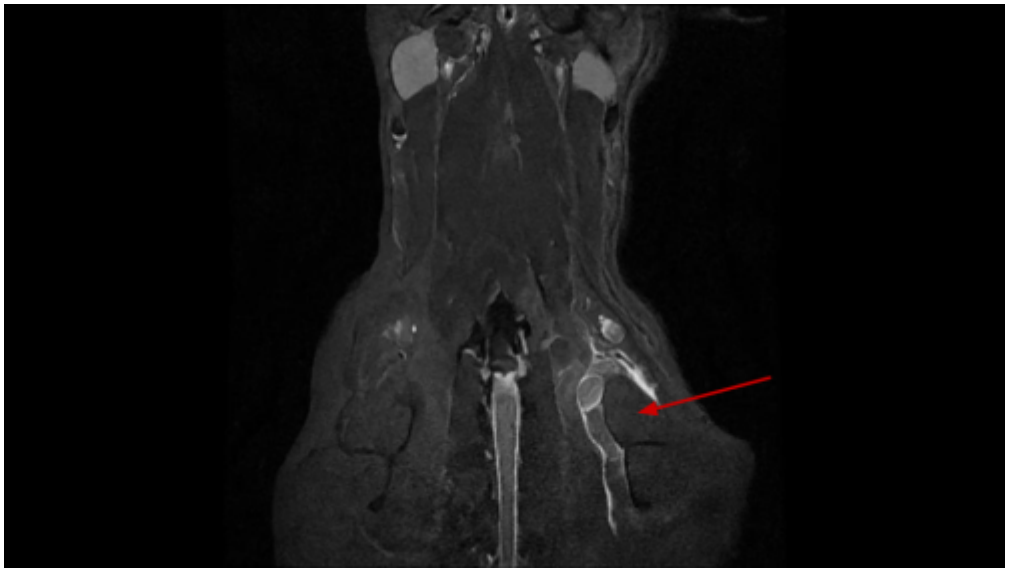
Axial coverage for the brachial plexus should cover from typically C4/5 to T3/4 to ensure that the entire plexus is covered. Angling parallel to the intervertebral disc will generally display the nerves exiting the foramen more clearly. The FOV should relatively large and be centered at the inferior aspect at the vertebrae and large enough to include the sternum and mid shaft of the humerus on both sides.



Dorsal Plane

The dorsal plane is particularly useful when scanning for brachial plexus pathology, as it provides a good overview of both forelimbs symmetrically. As a first screening sequence, the dorsal should cover from the sternum to just past the vertebral bodies, with the FOV large enough to demonstrate both forelimbs. The Brachial Plexus nerves exit ventrocaudally from C4/5 to T1/2 and extend into the forelimbs and dorsal to the humeral head. Incidental findings are also frequently located on the dorsal plane (Right image, red arrow)





Tips and Tricks

Selecting Phase Direction

In the cervical spine, either A/P or S/I may be selected, but require slightly different acquisition strategies. If choosing the phase direction S/I, motion artifact from respiration and flow the vessels in the cranial thorax will propagate S/I. Unlike awake human patients, there should be no motion artifact from swallowing. In the S/I direction there will be anatomy that extends beyond the FOV, and will require significant oversampling to prevent wrap artifact. This can add quite a bit of time, but will afford some extra SNR, so it may be possible to reduce time by reducing NEX/Averages. Note the flow artifact from the vessels (red arrow). If selecting the phase direction as A/P, it is possible to not only remove all the oversampling, but even to reduce the phase FOV to further reduce time. It is necessary with this method to prescribe a sat band over the cranial thorax to prevent flow artifact from propagating through the caudal cervical spine. It is important to note, this is not an appropriate method when brachial plexus pathology is suspected, as the sat band will obscure the nerve bundles.

From:
https://wiki.virtual-scan.com/ - **Knowledge Portal**

Permanent link:
https://wiki.virtual-scan.com/doku.php?id=brachial_plexus&rev=1777306827

Last update: **2026/04/27 16:20**