Radiology of the Cervical Spine

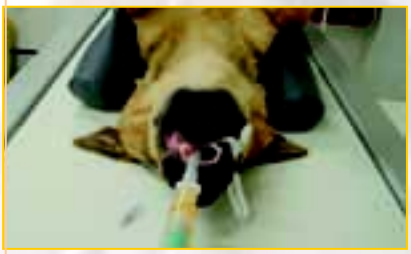
- by Chris Warman

Many veterinary patients present with a clinical history suggestive of possible involvement of the cervical spine. Plain radiology is an appropriate screening imaging modality when a patient presents with clinical signs suggestive of cervical spine pathology. Unfortunately many of the radiographs presented for a specialist opinion are of inadequate diagnostic quality, largely, but not solely due to inappropriate positioning. To optimize the value of any radiographic examination it is important to adhere to a stringent positioning and beam localizing protocol. The failure to adhere to a strict protocol will result in images that can be extremely difficult to interpret with an increased likelihood that erroneous diagnosis being made, probably more so in spinal radiology than in any other examination.

Survey spinal radiology requires general anesthetic. Adequate patient relaxation is generally not achieved with sedation alone. General anesthetic produces the necessary degree of muscle relaxation to produce diagnostic radiographs and allows the technician or veterinarian to easily make subtle adjustments to positioning.

In the lateral view it is very important that the spine is parallel to the cassette. Place the patient in lateral recumbency and caudally distract the hindlimbs so that the shoulders do not to summate with the caudal cervical spine in the resultant images. The head should be in a neutral position, neither extended nor flexed. The nose needs to be supported so that the head reveals no rotation and the mandibular rami are superimposed. If positioning is correct, it should be possible to see when standing behind the patient that the occipital crest is positioned in exactly the same plane as the dorsal processes of the thoracic spine. A radiolucent packing device is then placed under the neck in the region of C3-C5. A mound of cotton wool, which is adjusted depending upon patient size, is excellent packing.

Two radiographs are required to evaluate the cervical spine on the lateral position. One radiograph should be taken with the beam focused at C2-C3 and the other focused at C5-C6. An adjustment in exposure factors is necessary between the two radiographs due to the discrepancy in patient thickness between the two regions.



In the resultant image the wings of the atlas and the transverse processes of the lower cervical vertebra should overlay one another.
The intervertebral spaces should not reveal the effects of tangential obliquity, in that the end plates of the respective vertebra are parallel to the beam.

In the ventral-dorsal view the hindlimbs need to be retracted caudally. The thoracic region needs to be supported either by sandbags or in a trough. The head is gently extended and fixed in position generally with a sandbag. The correct alignment of the spine can be assessed by standing at the head of the patient looking towards the thorax. Once again two radiographs at appropriate exposure for both the cranial and caudal cervical spine need to be performed. If possible, rotation of the tube-head, approximately 10° to the head will limit the influence of tangential obliquity through the intervertebral disc spaces. Use can also be made of the "heel effect" to assist in obtaining a more uniform image density despite the varying tissue thickness. When performing a ventral-dorsal radiograph it is important that the radiograph be photographically labeled so that left can be distinguished from right. The resultant image should reveal a straight spine from the head to the thorax. By drawing the line from the occipital crest to the thoracic dorsal processes, the left side of the spinal image should be a mirror image of the right.

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