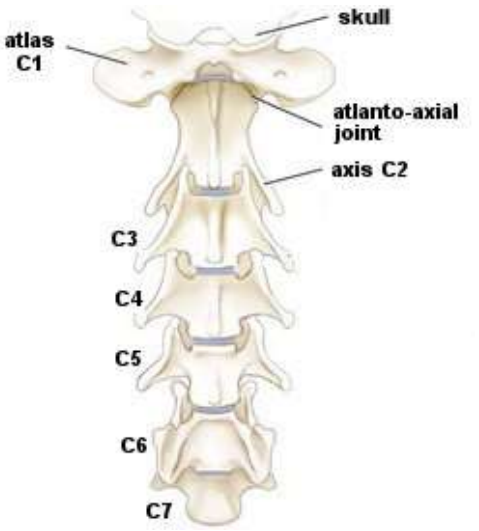
Atlantoaxial (AA) instability

Atlantoaxial (AA) instability can result in looseness of the attachment between the first backbone in the neck (C1 – the atlas) and the second backbone in the neck (C2 – the axis). As a result, the spinal cord is compressed, especially when the head and neck are lowered (called flexion). AA subluxation most commonly affects young, small/toy breeds of dogs but occasionally large breeds and cats can be affected.

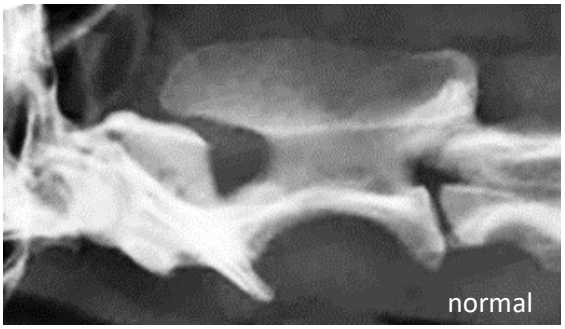


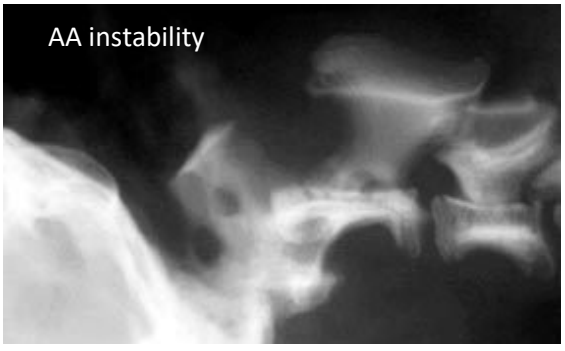
AA instability may result from the following:

1) Trauma and damage to the upper neck, affecting the previously normal and healthy bones, joint, and/or supporting ligaments. Fracture of the atlas is the most common example.
2) Congenital or developmental abnormalities. Normally, there is a a a a projection from the front of the axis called dens, which is attached to the atlas and the skull by several ligaments. When a pet is affected by AA Instability, the dens is poorly formed, and not well attached to the atlas and skull, resulting in instability at the top of the neck.
3) A combination of mild trauma to poorly developed ligaments and/or dens.

Symptoms

Symptoms associated with AA instability often have an acute onset but signs can be slowly progressive or even intermittent. Although signs related to congenital malformations usually occur within the first year of life, occasionally problems develop in an older animal. Symptoms may be more obvious immediately after minor trauma (e.g. falls, excessive playing). They can vary from mild upper neck pain to uncoordinated walking or even paralysis of all 4 legs. Your vet may notice when doing a neurologic exam that reflexes in all limbs are exaggerated – often rear legs are worse. Occasionally, AA instability results in trauma to the brain stem, which results in problems with the nerve supplies to the head, such as difficulty swallowing, drooping of the face or even vertigo. The Yorkshire terrier, Chihuahua, poodles of all sizes, Pomeranian, and Pekingese are the most frequently affected breeds. Large breed dogs, such as the Doberman pinscher and Rottweiler, are sometimes affected.





Diagnosis

Diagnosis is based on the breed and age fitting, history of trauma or recent activity, suggestive clinical symptoms, and x-ray findings.

Plain Radiographs (x-rays): X-rays are most often taken under sedation for best results, but during that time, care is taken to support the neck and to avoid bending it too far downward. In cases of AA instability, the axis is too far toward the top of the neck relative to the atlas, and increased distance between the roof of the atlas and the normal projection that comes out of the top of the axis (the spinous process). The dens may be normal, small, absent, broken or angled upward. Sometimes special views such as open mouthed x-rays are needed to fully evaluate the problem, and these can be realistically done only under sedation. Occasionally, the problem cannot be diagnosed with x-rays alone, and advanced imaging such as moving x-ray, CT scan or MRI is required.

Fluoroscopy (moving x-ray): By positioning the neck in mild flexion during fluoroscopy, AA instability may be observed or become more obvious. This is generally only done by a veterinary specialist.

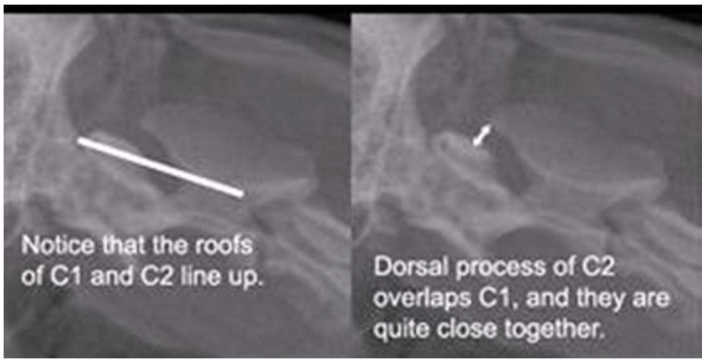
Computed Tomography (CT Scan) and Magnetic Resonance Imaging (MRI): CT Scan provides detailed resolution of bony abnormalities that might not be seen on still or moving x-rays. Concurrent soft tissue malformations of the spinal cord may be visible on magnetic resonance imaging (MRI). MRI can also tell better than any other test if there is disruption of spinal cord tissue, which indicates a poor prognosis

Treatment

Cast/Splint. Conservative management is often successful in mild cases, but the potential for relapse is of concern. Nonsurgical management involves strict cage rest and application of a rigid neck cast or brace for a minimum of 6 weeks. Immobilization of the neck allows the formation of fibrous tissue that may stabilize the joint.

- A cast or splint holding the neck up (extended) can properly align the neck for healing.
- The cast or splint should extend from over the head to the chest in order to immobilize the AA junction.
- If a cast is used rather than a splint, it can be cut horizontally to allow periodic removal and changes to the cast padding. Quick removal is also possible if compression of the neck or chest prevents normal breathing.

Neck Surgery. **D**ogs with substantial neurologic weakness, unmanageable neck pain, paralysis and those that do not respond to conservative therapy will require surgery in order to recover. The two main types of surgical intervention used are dorsal stabilization and ventral fusion techniques, and both are done only by specialist veterinary neurosurgeons, or other veterinary surgeons with advanced training. Dorsal stabilization with wire or suture has a failure rate of about 37%, from breakage of the wire or suture or fracture of the dorsal spinous process of C2 or the arch of C1. Failure of dorsal fixation may require a second surgery.[1]



Supportive Therapies. Bending the neck downward (ventroflexion) should be avoided in all animals with AA Instability. Pain medications and anti-inflammatories are given as needed. Confinement and rest during the healing period is crucial to a successful outcome, and re-injury can be disastrous. After healing is complete, your veterinarian will likely recommend a physical therapy program to maximize recovery.

Prognosis and Recovery

Follow-up visits including neurologic exams are the best methods of evaluating response to treatment and identifying potential complications. Complications associated with a cast or brace include ear infections from decreased air flow to the ear canals, skin infections from prolonged presence of the cast/splint and worsening neurological symptoms. Possible complications associated with surgery include implant failure, upper respiratory problems, respiratory arrest and death. Prognosis is highly variable with both conservative and surgical management. Surgical success rates vary from 61-90%.

References:

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