

Atlantoaxial Subluxation in Dogs

A. Courtenay Freeman, DVM

Marc Kent, DVM, DACVIM (Small Animal and Neurology)

Simon R. Platt, BVM&S, MRCVS, DACVIM (Neurology), DECVN

BASIC INFORMATION

Description

The spine is made up of small bones called *vertebrae*, which surround and protect the spinal cord. The first and second vertebrae in the neck are called the *atlas* and the *axis*, respectively. These vertebrae form the atlantoaxial (AA) joint, which is connected by ligaments. The second vertebra in the neck has a bony, finger-like projection (the dens) that extends into the first vertebra and provides further stabilization of the two vertebrae. AA subluxation is a partial dislocation of the two vertebrae. It occurs when the connection between the first and second vertebrae is unstable, and it usually results in compression of the spinal cord.

Causes

Typically, AA subluxation arises from a developmental problem or birth defect. In affected dogs the dens is absent or deformed, which results in an unstable joint. Additionally, some of the supporting ligaments may not form properly. AA subluxation can also occur as a result of trauma and disruption of the connection between these two vertebrae.

This condition is more common in toy and small-breed dogs, such as the Chihuahua and the Yorkshire terrier. Because it is usually a developmental problem, affected animals are typically young (less than 2 years old); however, older dogs may develop clinical signs later in life, particularly after trauma to the neck.

Clinical Signs

Affected animals may have neck pain, an uncoordinated gait involving all four legs, and weakness. Clinical signs may develop after mild trauma, such as jumping or playing. The severity of clinical signs depends on the degree of spinal cord injury. Mild clinical signs include neck pain or an uncoordinated gait. More severely affected animals may be unable to walk. Severe spinal cord injury can affect the dog's ability to breathe and can even result in death.

Diagnostic Tests

AA subluxation may be suspected in young, toy breed dogs with compatible clinical signs. In many cases, a diagnosis can be made from x-rays of the neck that demonstrate an obvious dislocation of the vertebrae. X-rays must be obtained carefully to avoid further dislocation of the vertebrae. Magnetic resonance imaging (MRI) may be recommended to evaluate the spinal cord for compression and damage and to assess alignment of the vertebrae.

TREATMENT AND FOLLOW-UP

Treatment Options

Medical and surgical treatments exist for dogs with AA subluxation. Although medical therapy can be effective, surgery is the preferred treatment in most animals.

Surgical treatment involves alignment and stabilization (fusion) of this joint:

- Stabilizing the AA joint prevents further spinal cord injury and allows the spinal cord to recover.
- The AA joint is fused by the placement of orthopedic implants (often wires or screws) into the small bones and application of surgical cement.
- Strict cage confinement is necessary after surgical stabilization to allow proper joint fusion and recovery of the spinal cord.

Medical therapy involves placing a splint around the head and neck of the affected animal to immobilize the AA joint:

- The splint usually stays in place for at least 8 weeks and periodically must be replaced.
- The splint immobilizes the AA joint for enough time to allow scar tissue to form and also helps stabilize the joint.
- Because the scar tissue may not be strong enough to stabilize the joint, these animals may re-injure their spinal cord at a later date.
- Strict cage confinement is necessary while the splint is in place and for an additional 4 weeks after its removal.
- Activity is restricted to short, controlled walks (with the dog in a body harness) that allow the animal enough time to urinate and defecate. Many small patients find it difficult to walk with the splint in place.
- The dog cannot be allowed to run, jump, or play during the confinement period.

Follow-up Care

Animals with neck splints are often re-evaluated weekly, and the bandage or splint is changed. Follow-up visits are also needed frequently after surgery, and x-rays are usually done to evaluate healing 6-8 weeks after surgery. During the recovery period, notify your veterinarian immediately if any new neurologic signs develop or if previous ones recur or worsen.

Prognosis

Prognosis depends on the severity of the spinal cord injury and the treatment option pursued. Animals with mild clinical signs have a good prognosis. If clinical signs are severe, prognosis is variable and guarded (uncertain). Recurrence of signs is high with medical therapy, and surgical failure rates range from 10% to 40%.