

Atlantoaxial Subluxation in Chihuahuas

by Stacey Amirov

Atlantoaxial Subluxation, sometimes referred to as hypoplasia of the dens, is a condition that chihuahuas and other toy breeds are at risk for. Because it is not a well-known disorder, and its neurological symptoms may mimic those of other conditions such as hydrocephalus, there is a risk of delayed or incorrect diagnosis.

Atlantoaxial Subluxation may prove fatal if it is not diagnosed and treated in a timely manner; therefore it is imperative that we learn to recognize the signs and symptoms of this condition.

What is Atlantoaxial Subluxation? Atlantoaxial Subluxation is a condition in which the first two cervical (neck) vertebrae are not firmly attached. This may be the result of trauma or a congenital abnormality.

Atlantoaxial Subluxation leads to spinal cord injury with resulting pain or paralysis and possible sudden death⁴. Progression can be slow or rapid.

The following anatomical terms should prove helpful in understanding Atlantoaxial Subluxation and its causative factors:

The atlas is the 1st cervical vertebrae and is directly under the head.

The axis is the 2nd cervical vertebrae and has the odontoid process which the axis rotates on.³

The dens is the area where the axis and atlas unite.

Together the atlas and axis form a pivot joint which allows the head to turn from side to side.

This joint is known as the atlaxoid or Atlantoaxial joint³. Ligaments surrounding this joint serve to support and strengthen it.

Causes of Atlantoaxial Subluxation: Anatomic abnormalities responsible for Atlantoaxial Subluxation include: congenital absence or incomplete development (hypoplasia) of the dens, unattached dens, angulated dens, or lack of ligamentous support between the atlas and axis.¹ Trauma can also cause the condition.

Incomplete development of the axis' odontoid process can cause an unattached dens and can be associated with mucopolysaccharide (MPS) storage diseases such as MPS3B in Schipperkes^{7,9} or Morquio syndrome^{7,8}. MPS diseases are genetic inherited diseases caused by the body's inability to produce certain enzymes. More research would need to be done to determine whether or not an MPS disorder is a causative factor in Atlantoaxial Subluxation in the chihuahua.

Atlantoaxial Subluxation most often occurs in dogs less than a year of age², although injury or weak ligamentation can bring on symptoms later in life.

Symptoms of Atlantoaxial Subluxation include: Neck pain, reluctance to raise or lower head, gait dysfunction (e.g. walking sideways, in circles, or staggering as if drunk), sudden crying out for seemingly no reason, incoordination of muscle movements, weakness or paralysis of limbs and abnormal increase in sensitivity to stimuli.^{1, 4, 5, 6}

Neurological symptoms such as circling, weakness and incoordination may be confused with hydrocephalus, a more common issue in our breed. Other possible misdiagnoses include: Vestibular disease, Tick related disease, stroke, reaction to topical flea medication, distemper,

encephalitis, and poisoning⁷. The longer Atlantoaxial Subluxation remains undiagnosed, the greater the risk of severe injury and possible death.

Diagnosis is generally made by X-ray¹.

Treatment: Conservative therapy, including external splinting or casting, is generally ineffective on a long-term basis¹. Surgery to fuse the joint or stabilize it with pins, wire, or sutures is the preferred method of treatment⁴.

How much of a concern is Atlantoaxial Subluxation in chihuahuas? Chihuahuas are specifically mentioned as one of the breeds most likely to be affected by this condition by Padgett², Hoskins¹, and Reese⁴. When the topic of Atlantoaxial Subluxation was mentioned recently on a chihuahua email list⁷, 4 out of 205 (not all active) members had direct experience with this condition. Three had bred or owned chihuahuas with the condition and one had been contacted by a pet owner with the condition.

According to Natasha Olby, a veterinary neurologist at North Carolina State University College of Veterinary Medicine, Atlantoaxial Subluxation is one of the top 3 neurological conditions diagnosed in our breed, along with encephalitis and hydrocephalus. Perhaps it is not as uncommon as we think, but often misdiagnosed or unreported.

¹ Hoskins, Johnny D. Veterinary Pediatrics: Dogs and Cats from Birth to 6 months 3rd ed. 2001: 417, 435

² Padgett, George A. Control of Canine genetic Diseases 1998: 245

³ Medterms.com: definition of atlas and axis joint

⁴ Reese, Dr. Cathy Atlantoaxial Instability (luxation) Petplace.com

⁵ Bertani, Leanne Atlantoaxial Subluxation (hypoplasia of the dens) Japanesechinonline.org

⁶ Merckvetmanual.com- Spinal Cord Disorders in Small Animals

⁷ pets.groups.yahoo.com/group/ShowChis/

⁸ Lipson, S.J. Dysplasia of the odontoid process in Morquio's syndrome causing quadriparesis. The Journal of Bone and Joint Surgery, Vol 59, Issue 3 340-344, 1977 by Journal of Bone and Joint Surgery, Inc www.ejbs.org

⁹ www.bonchien.com/MPSIIIB.html