

## Rupture of the Anterior Cruciate Ligament

By Pauline Lock on behalf of the Chow Breed Council August 2007

A study based on 42 Danish Chow Chows assessed claims that the high incidence of rupture of the anterior cruciate ligament in the chow chow is a result of their typically straight hind legs and shuffling gait.

Such ruptures usually occur after strenuous exercise or vigorous play most commonly found in the larger breeds. However, damage may also occur through chronic degeneration of the ligament and is associated with older small to intermediate sized dogs. In some 20% of the cases presenting with injury to the anterior cruciate ligament both degeneration and traumatic injury are implicated.

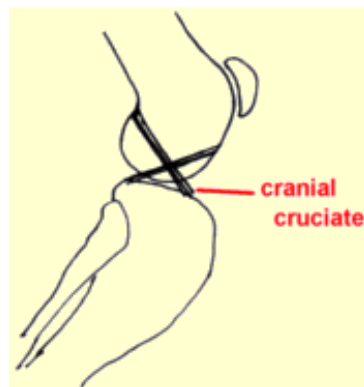


Fig 2 nearly normal joint

fig 3 damaged joint

Fig 1 anterior/cranial cruciate ligament  
([www.marvistavet.com](http://www.marvistavet.com))

The wear on the bones in the knee can be seen in fig 2 and fig 3. Once the cruciate ligament is torn the knee becomes unstable and the joint begins to develop degenerative change. Bone spurs called 'osteophytes' develop and chronic pain and loss of motion in the joint follows  
([www.Marvistavet.com](http://www.Marvistavet.com))

Of the dogs presenting with cruciate ligament injury 8 – 37%(fig1) have injuries to both legs. However, in the case of traumatic injury it does not imply a predisposition for injury to the other leg, this is only the case when there is a chronic degeneration process to the anterior cruciate ligament in both legs.

The study found that the incidence of anterior cruciate ligament rupture whether degenerative or traumatic is considerably higher in the chow chow (4 – 16%) compared to other breeds (1.6 – 1.8%).

- **Age** appears to be the main cause of degeneration of the cruciate ligament, occurring more often and earlier in dogs weighing over 15kg. However this does not explain why some dogs are affected as early as 1 – 2 yrs of age, a more likely explanation would be a combination of trauma and degeneration.
- **Neutered** dogs/bitches are more predisposed towards rupture of the ligament particularly neutered bitches, this may be due to weight gain and hormonal changes associated with neutering.

- The characteristic **straight back leg** of the chow chow may lead to hypertension in the knee or hock joint and increase the tension on the ligament where the anterior cruciate ligament is in its end position and taught. There is a significant difference in angulation of the chow chow in relation to that of other breeds (see table 1). This reflects the minimal angulation giving the characteristic stilted gait called for in the breed standard and affects the movement of the hind legs in relation to the hip and the pressure placed on the paw, energy is transferred to the body in an almost straight line.

Average angulation	Chow chow	Other breeds
<b>Knee joint</b>	150°	125 - 140°
<b>Hock joint</b>	167°	135°

*Table 1 average angulation of chow compared to other breeds*

The stilted gait is as a result of missing the 'yielding' phase between the foot landing and taking the weight and preparation for setting off again. The yielding phase relieves the pressure on landing and protects the knee joint, it is argued where this phase is missing the risk of exaggerated stress to the ligament increases.

However, there is no evidence to support claims that cruciate ligament injury and degenerative changes are more likely to occur in dogs with straight hind legs. It is assumed that adaptation should have occurred that generates a compensatory instability to avoid associated stresses of the ligaments. In reality the highest frequency of lameness and joint degeneration is found in dogs with the most angulated legs.

The quality and dimensions of the ligaments may be a more important factor. The weight of the chow places it in the high-risk group for natural degeneration of the ligament at an early age. Moderate exercise may reduce such risk by reducing the degree of tension and increase the strength of the ligament.

Other factors for degenerative changes to the ligament cited by [www.animalhealthchannel.com/ccl/](http://www.animalhealthchannel.com/ccl/) particularly in bitches are:

- Obesity
- Neutering
- Poorly conditioned dogs
- Size – more prevalent in large and giant breeds (The chow is listed as one of those most likely to present with a cruciate ligament injury).

Dogs under 4yrs are particularly susceptible to **traumatic injury** with larger breeds more at risk than small breeds. Degenerative changes lead to chronic rupture, where the ligament weakens and partially ruptures making the joint unstable and eventually tears completely (see fig 2 & 3).

Additional risk factors to above for degenerative changes: -

- Age
- Arthritis
- Poor musculature near the joint
- Structural abnormalities (bow-legged, luxated patella)

***In summary*** the only way to work towards improving the status of the breed is to stop breeding from dogs/bitches with cruciate ligament damage or those with signs of degenerative changes to the ligament.

Additional considerations that may reduce the risk are to ensure the dog is exercised appropriately to improve the overall condition of muscles and ligaments and avoid the dog becoming overweight.

Neutering was cited as a factor however the decision to neuter will depend on other individual factors that are equally important to the general wellbeing of the dog and the needs of the owner. The associated hormonal changes associated with neutering may increase the risk of degenerative changes occurring, however the tendency for neutered animals to put on weight may exacerbate the situation.

References: -

[www.animalhealthchannel.com/ccl/](http://www.animalhealthchannel.com/ccl/)

[www.marvistavet.com/html/body\\_ruptured\\_anterior\\_cruciate](http://www.marvistavet.com/html/body_ruptured_anterior_cruciate)

Torngren, M. B and Arnbjerg, J. (2003) *Ligament problem in Chow Chow – One step forward, one back.*