

Chiari-Like Malformation Fact Sheet

The Essential Role of MRI

We understand that receiving a diagnosis of Chiari-like malformation (CLM) can be overwhelming, and our aim is to empower you with the knowledge and resources to navigate your healthcare journey. This information sheet provides an overview of how CLM is diagnosed in dogs using MRI and what to expect when your pet undergoes this procedure.

What are Chiari-Like Malformation and Syringomyelia?

Chiari-like malformation is a developmental abnormality of the skull and upper spine. Simply put, the skull is too small for the brain, particularly at the back of the head. This overcrowding can block the normal flow of cerebrospinal fluid (CSF)—the clear fluid that cushions the brain and spinal cord. Over time, increased pressure and altered fluid dynamics can cause fluid-filled cavities called syrinxes (singular: syrinx) to form within the spinal cord. This secondary condition is known as syringomyelia (SM).

CM involves widespread changes throughout the skull, including:

- Shortening of the skull base (basicranium)
- Flattening of the forebrain and downward rotation of the olfactory bulbs
- Reduced size of the frontal sinuses
- Changes in the craniocervical junction (where the skull meets the spine)

These changes can cause pain even in the absence of a syrinx, a condition now called CM-associated pain (CM-P).

Why Is Imaging Necessary?

Clinical signs alone cannot confirm CM/SM. Symptoms such as phantom scratching (air scratching without contact with the body) can mimic allergies or ear infections. A thorough neurological exam may raise suspicion, but imaging is essential to:

1. Confirm or rule out CM and SM definitively.
2. Assess severity and predict prognosis.

- 3. Rule out other diseases with similar signs (e.g., intervertebral disc disease, brain tumors, meningitis).
- 4. Guide breeding decisions (official health schemes require MRI).
- 5. Plan medical or surgical treatment.

Overview of Imaging Modalities: What Works and What Doesn't!

Imaging Type	Utility for CM/SM	Key Limitation
Radiography (X-rays)	Very limited. May show a flattened supraoccipital bone or narrowed atlanto-occipital space but cannot visualize the brain or syringes.	Cannot see soft tissues like brain or spinal cord.
Computed Tomography (CT)	Useful for evaluating bony changes (e.g., atlantooccipital overlapping, skull base shortening) and for surgical planning. Poor soft tissue contrast. Cannot reliably detect syringomyelia	Poor brain tissue detail. Cannot reliably detect syringomyelia.
Magnetic Resonance Imaging (MRI)	Gold standard. Excellent soft tissue contrast; directly visualizes cerebellar herniation, syringes, and CSF flow.	Expensive; requires general anesthesia; not available at all clinics.

Why is MRI the Gold Standard?

MRI is the only imaging modality that can reliably diagnose both CM and SM. According to the British Veterinary Association/Kennel Club (BVA/KC) CM/SM Scheme, an MRI must include T1-weighted and T2-weighted sequences in sagittal and transverse planes, covering the brain and at least the cervical spinal cord.

Key advantages of MRI:

- 1. Direct visualization of brain and spinal cord: MRI shows the cerebellum, brainstem, and spinal cord in exquisite detail.

2. Detection of syringomyelia: MRI can identify syringes as small as 1–2 mm in diameter. The maximum transverse width of the syrinx is the single best predictor of pain and neurological deficits. A syrinx wider than 4 mm is strongly associated with clinical signs like weakness and phantom scratching.
3. Identification of “active” vs. “quiescent” syringes: An active, expanding syrinx often shows a fluid signal-void sign (dark areas within the bright syrinx on T2-weighted images), indicating turbulent or pulsatile fluid flow. This helps predict disease progression.
4. Assessment of the whole brain: MRI can reveal signs of raised intracranial pressure, such as loss of sulci definition, ventriculomegaly (enlarged fluid-filled spaces within the brain), and reduction of the cisterna magna.
5. Grading for breeding schemes: The BVA/KC Scheme uses standardized MRI grading for CM (Grades 0–2) and SM (Grades 0–2, with age modifiers a, b, c). This allows breeders to make informed choices.

What to Expect During an MRI

Anesthesia is essential: Your dog must remain perfectly still for 30–60 minutes. Modern anesthetic protocols are very safe, especially with pre-anesthetic blood work.

Procedure: The dog is placed on a table that slides into the MRI machine. The scan is painless, but the machine produces loud knocking sounds (ear protection is provided).

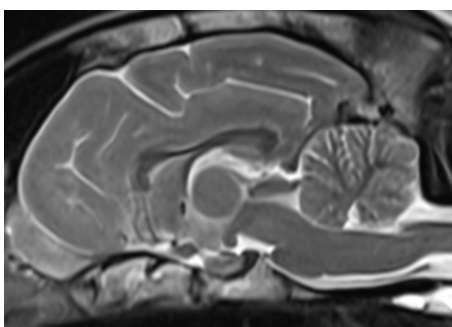
Time: Plan for 2–4 hours at the hospital, including preparation, scanning, and recovery.

Cost: MRI is expensive. Many pet insurance policies cover MRI when recommended by a specialist. Check with your provider.

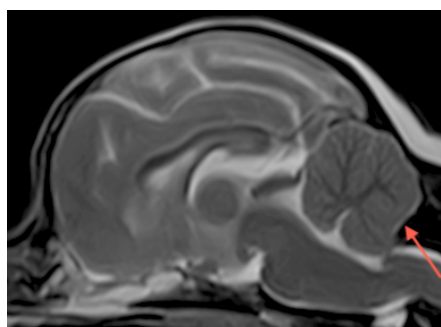
How Are MRI Results Interpreted?

A veterinary neurologist or radiologist will evaluate:

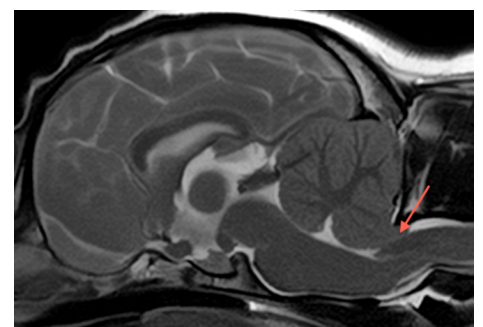
CM grade: Is the cerebellum rounded (Grade 0), indented (Grade 1), or herniated through the foramen magnum (Grade 2)



Grade 0

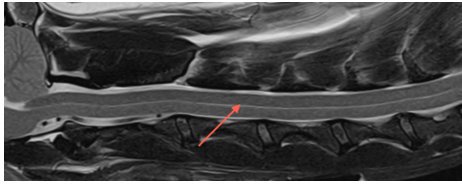


Grade 1

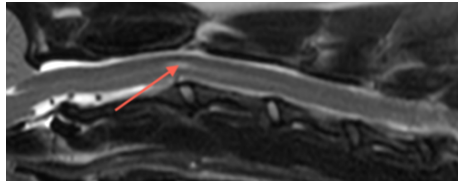


Grade 2

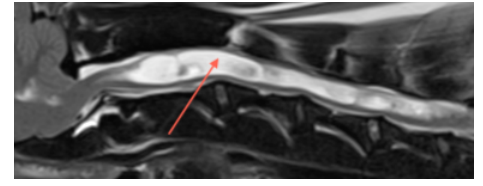
SM grade: Is there a normal central canal (Grade 0), dilation <2 mm (Grade 1), or a syrinx $\geq$ 2 mm (Grade 2)?



Grade 0

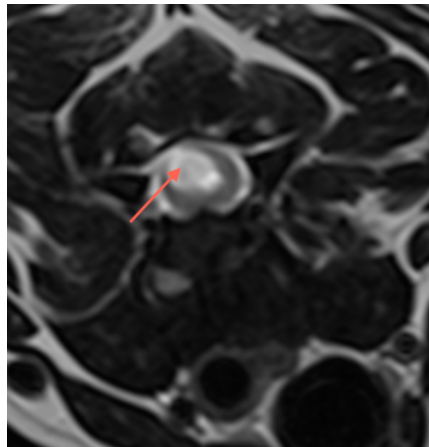


Grade 1



Grade 2

Syrinx location and extent: A syrinx extending into the top left or right portion of the cervical spinal cord (see picture below with asymmetrical fluid accumulation arrowed) is specifically associated with phantom scratching.



Additional features: Presence of atlantooccipital overlapping, medullary kinking, reduced cisterna magna, or ventriculomegaly may occur in the breeds affected by CM. These may be incidental findings which are not causing any signs but in some cases, they can complicate the presentation of CM by causing additional signs or more severe signs.

Important note: Nearly all Cavalier King Charles Spaniels have some degree of CM on MRI. The diagnosis of clinically significant disease depends on correlating imaging findings with your dog's symptoms. An incidental finding of a small central syrinx without cord expansion may never cause problems.

What are MRI-Based Breeding Recommendations?

The BVA/KC Scheme provides clear breeding guidelines based on MRI results. For example:

- Dogs with SM Grade 2 (syrinx $\geq$ 2 mm) at any age should not be bred.
- Dogs with SM Grade 1c (central canal dilation, age 1–3 years) should only be bred to dogs with SM Grade 0a, 0b, or 1a (older, normal or mild).
- Dogs with clinical signs of CM/SM should not be bred.

Responsible breeders use MRI screening to reduce the prevalence of this painful condition over generations. The scheme is open to all dogs, including crossbreeds.

Final Thoughts For Owners

If your dog shows signs of neck pain, phantom scratching, or unusual behavior, do not dismiss it. See a veterinary neurologist. An MRI provides a clear, definitive answer that can guide effective treatment—whether medical management (e.g., gabapentin, pregabalin) or, in select cases, surgery (foramen magnum decompression). Imaging turns guesswork into science, giving your dog the best chance at a comfortable, pain-free life.

This information sheet is intended for educational purposes only and does not replace professional veterinary medical advice, diagnosis, or treatment. Always consult a qualified veterinarian regarding your pet's health.