Craniomandibular Osteopathy (CMO)

Affected breeds: West Highland White Terrier, Scottish Terrier, Cairn Terrier

Craniomandibular Osteopathy (CMO) is an inherited defect which affects the formation of bones in young dogs, particularly the jaw. Affected dogs typically have swelling of the jaw, fever, loss of appetite and difficulty in opening the mouth and swallowing. This is a painful condition which usually develops from 4-8 months of age, but subsides with age as the dog matures.

CMO is highly associated with a genetic mutation which has now been characterised and can be tested for. In the research study 81% of clinically affected dogs had two copies of the mutation (CMO-2), 17% had a single copy of the mutation (CMO-1), and 2% of CMO diagnosed dogs did not carry the mutation (CMO-0).

This test is particularly useful for breeders:
The breeding of CMO-2 dogs should be discouraged. CMO-1 dogs can be still used in breeding, if they are mated with CMO-0 (clear) dogs. A strict exclusion of all CMO carriers should be avoided as this would greatly narrow the gene pool within the breed and may lead to other inherited diseases.

This test will be reported as:
CMO-0 (clear):
These dogs have two normal copies of DNA and are likely to be clear of CMO.
CMO-1 (low risk):
These dogs have one copy of the CMO mutation and one normal copy of DNA. These dogs are at low risk of developing CMO.
CMO-2 (high risk):
These dogs have two copies of the CMO mutation and have a high chance of developing CMO, however the CMO-2 genotype is not conclusive of disease.

The genetic status of dogs can be used to predict breeding outcomes when different combinations are mated:

CMO-0 X CMO-0	= 100% CMO-0
CMO-1 X CMO-0	= 50% CMO-1, 50% CMO-0
CMO-2 X CMO-0	= 100% CMO-1
CMO-1 X CMO-1	= 25% CMO-2, 50% CMO-1, 25% CMO-0
CMO-2 X CMO-1	= 50% CMO-2, 50% CMO-1
CMO-2 X CMO-2	= 100% CMO-2

References
Marjo K. Hytönen, Meharji Arumilli, Anu K. Lappalainen, Marta Owczarek-Lipska, Vidhya Jagannathan, Sruthi Hundi, Elina Salmela, Patrick Venta, Eva Sarkiala, Tarja Jokinen, Daniela Gorgas, Juha Kere, Pekka Nieminen, Cord Drögemüller, Hannes Lohi (2016) Molecular Characterization of Three Canine Models of Human Rare Bone Diseases: Caffey, van den Ende-Gupta, and Raine Syndromes. PLOS Genetics May 17;12(5)