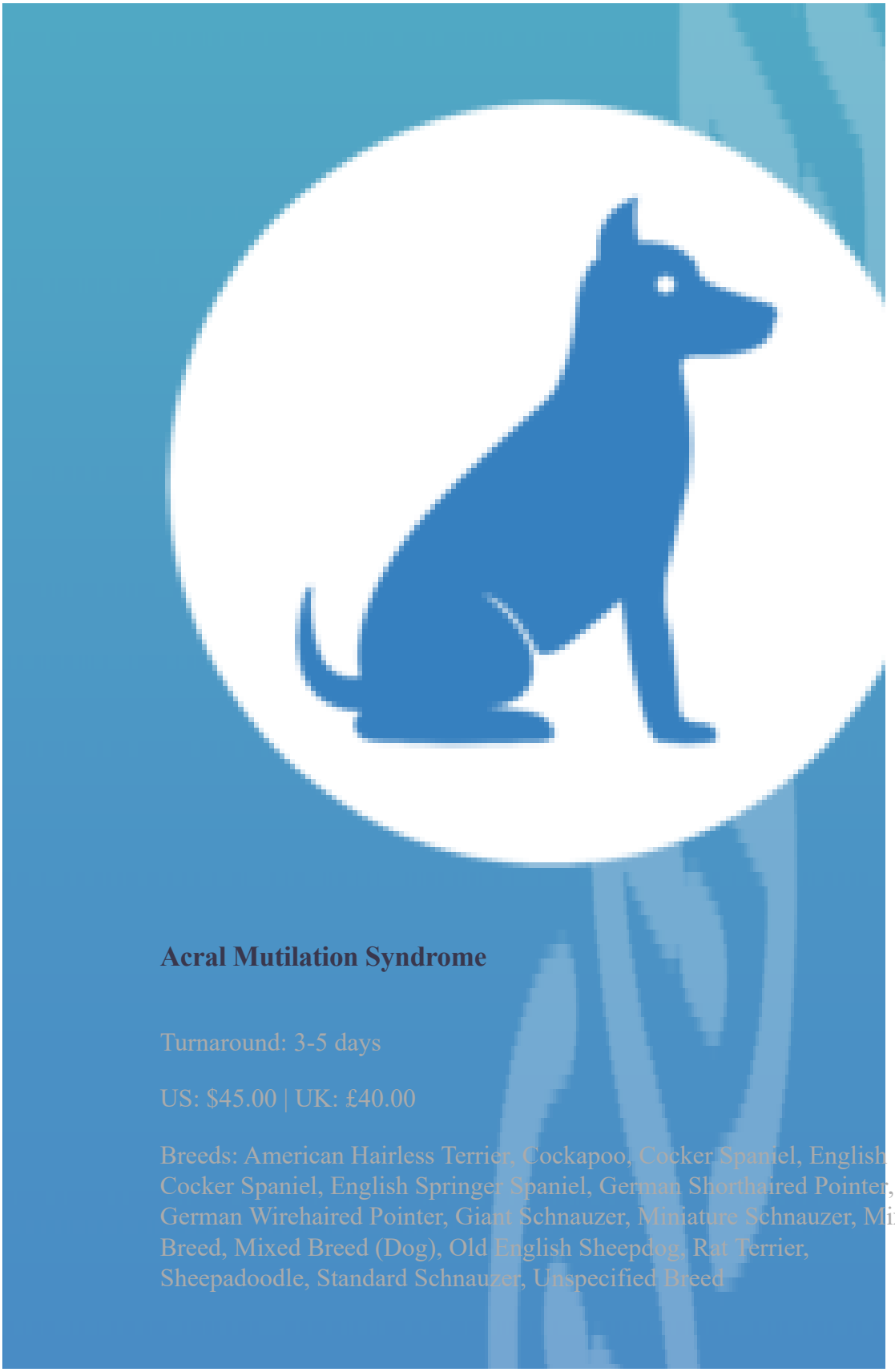
Acral Mutilation Syndrome (AMS)



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Description

Acral Mutilation Syndrome (AMS) is a rare *autosomal recessive genetic disorder* that affects sensation in the extremities of dogs. *Autosomal recessive disorders* are disorders that can be passed from either parent and require two copies of the gene to show symptoms. This disorder results in a progressive mutilation of their pads and paws due to the absence of pain or other sensation. Affected dogs will over-groom, lick, or bite their pads and paws to the point of bleeding and ulceration. Often times, affected puppies will also be smaller than the rest of their littermates.

In severe cases, the dog will sever claws, digits, and footpads. This results in:

- swollen and reddened paws
- paronychia (infection of the tissue adjacent to the nail)
- ulcers on the bottom and top of the paws
- nail loss
- painless fractures.

Single or multiple feet can be affected, though dogs can walk without pain or lameness. Motor skills, coordination, and reflexes all appear to be normal.

A mutation in the regulatory region of GDNF reduces levels of GDNF protein, which affects the axon development in the neurons of the dog. The axons are located in neurons, which are special cells that make up the Central Nervous System (CNS). Axons connect neurons to one another so that messages are able to be transmitted throughout the body. For example, when you touch a hot stove top, a neuron in your hand passes a message to tell the brain that the stove top is hot. When these axons don't develop properly or are damaged, the communication between neurons is broken.This is what decreases pain and temperature sensation in the dog.

Issues associated with AMS include bacterial and fungal infections, as well as ulcers. Elizabethan cones and anti-anxiety medicine are used to cope with the disease. If the disorder proves to be unmanageable, euthanasia is commonplace.

Because AMS is a recessive disorder, a dog must have two copies of the mutation in order for the disease to manifest. This means that a dog can have one copy of the mutation and not experience any signs or symptoms of AMS. This dog would be known as a carrier. The carrier can then pass on either the normal gene or the mutated gene to any offspring. If two carriers are bred, there is a 25% per puppy that they will develop symptoms of AMS.

Possible Results

Genotype	Description
AMS/AMS	At Risk: Dog has two copies of the mutation associated with AMS and is at risk of developing the disorder. The mutation will always be passed on to every offspring.
n/AMS	Carrier: Dog has one copy of the mutation associated with Acral Mutilation Syndrome. The dog is not affected by AMS, but may pass the gene to offspring.

Genotype	Description
n/n	Clear: Dog is negative for the mutation associated with Acral Mutilation Syndrome.

Reference

Acral mutilation syndrome in a miniature pinscher.

Bardagí M, Montoliu P, Ferrer L, Fondevila D, Pumarola M.J Comp Pathol. 2011 Feb-Apr;144(2-3):235-8. doi: 10.1016/j.jcpa.2010.08.014. Epub 2010 Oct 18. PMID: 20961556