



## **Causes of Deafness in Border Collies**

### **Congenital**

Causes of dogs born deaf can be either inherited or acquired. Inherited congenital deafness may be caused by a variety of genetic defects, most of which are not yet well understood. Congenital sensorineural deafness is caused by vascular degeneration of the blood supply to the cochlea in the inner ear, which leads to loss of the hair cells necessary to transmit sound. One study found there was a somewhat higher risk of congenital deafness in merles, those with predominantly white heads, and those with two blue eyes, than in Border Collies with other color patterns. This is not proof that the genes causing these color patterns also cause deafness, only that these color patterns and deafness were found together more often than would be expected by chance. The great majority of dogs with these color characteristics do not have congenital deafness, and some dogs without these color characteristics do have congenital deafness. More research is needed to understand the mechanism of inheritance of inherited congenital deafness in the Border collie. *Acquired* congenital deafness is usually the result of toxic exposures during pregnancy or very shortly after birth, or by infections in the pregnant bitch.

### **Infection**

Intrauterine infections in the pregnant bitch may produce a host of problems in newborn pups, including deafness. More common infectious causes of unilateral or bilateral deafness in older pups and dogs are infections of the middle or inner ear. Otitis media (middle ear infection) may also produce exudates which can plug the ear canal; once this exudate is removed or absorbed, hearing may return to normal, or may not, if the eardrum was badly damaged. Otitis interna (inner ear infection) produces hearing loss that is usually permanent if not rapidly treated.

### **Toxins**

Many drugs in common use can cause damage to the hair cells in the ear's cochlea which can result in decreased hearing or total deafness. Some of these drugs are antibiotics such as gentamycin, neomycin, and others of the same class, and metronidazole, which is used to treat a variety of canine diarrheal illnesses. Chlorhexidine, no longer available but formerly used as an ear-cleaning solution, could cause deafness.

## **Injury**

Any trauma that damages the eardrum or inner structures (ossicles) of the ear or damage to the 8<sup>th</sup> cranial nerve can produce hearing loss or deafness. Mechanisms include external trauma, noise trauma, and tumors.

*Above Ref: Dr George M. Strain, PhD, Professor of Neuroscience, School of Veterinary Medicine, Louisiana State University: Deafness in Dogs & Cats, [www.lsu.edu/deafness/deaf.htm](http://www.lsu.edu/deafness/deaf.htm)*

## **Early Onset Deafness (EOD)**

Research on Early Onset Deafness has been spearheaded in recent years by Dr. Mark Neff at UC Davis and the Van Andel Institute in Michigan, in collaboration with Dr. Alison Ruhe of ProjectDOG. They are studying dogs who go deaf in early to mid-adulthood with no other outside identified cause of the deafness. EOD is the likely cause of deafness not attributable to other causes in dogs aged 3-6 years. Dogs who go deaf between 6 and 8 years could have EOD, or it could be due to old age. After age 8, old age deafness is most likely. We won't be certain about dogs who go deaf during the 'overlap' period until a genetic test is developed. Two breeds are being studied for EOD; Rhodesian Ridgeback dogs and Border Collies. DNA and pedigree analyses have established an autosomal recessive pattern of inheritance for EOD in the Rhodesian Ridgeback dog. A Genome Wide Association study, supported by the American Border Collie Association and members of the working Border collie community, suggested an autosomal recessive pattern of inheritance for EOD also occurs in Border Collies. More research is needed to locate the genes involved and develop a DNA test for these genes.