

# Deafness

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## BASIC INFORMATION

### Description

Deafness can be divided into several classes based on the specific problem, as follows:

- *Conductive hearing loss* results from failure of sound energy to be translated into mechanical energy in the outer and middle ear structures.
- *Sensorineural hearing loss* is caused by loss of electrical energy transfer from the cochlear sensory receptors or cochlear nerve.
- *Central-mediated hearing loss* is failure to process auditory information at the level of the brain.
- *Presbycusis* is old age–related hearing loss that is not associated with a specific pathologic process but arises from degeneration of the inner ear structures.

### Causes

Conductive hearing loss may be caused by outer ear diseases such as otitis externa, ear wax impaction, foreign bodies, cancerous tumors, benign inflammatory polyps, and trauma. Middle ear diseases such as infectious otitis media, primary secretory otitis media (PSOM), foreign bodies, and tumors are also causes.

Congenital, hereditary sensorineural deafness occurs in some dogs and cats with white coat color and blue eyes. It also affects numerous purebred dogs, such as the Dalmatian, Australian blue heeler, English setter, Argentine dogo, bull terrier, Australian shepherd, Jack Russell terrier, and Cavalier King Charles spaniel.

Acquired sensorineural deafness may develop from certain systemic drugs (aminoglycoside antibiotics) and topical otic medications (ceruminolytic agents), trauma, tumors, or presbycusis.

### Clinical Signs

Conductive hearing loss can occur at any age, depending on the underlying cause. It rarely results in complete hearing loss. Congenital, hereditary deafness is present soon after birth. With acquired deafness, hearing loss may be sudden or slow in onset; in some cases, balance (vestibular) problems may be detected.

### Diagnostic Tests

Physical examination findings are usually normal. Specialized hearing tests are used to confirm deafness, to pinpoint where the hearing loss is occurring in the hearing pathway, and to determine whether the hearing loss is conductive or sensorineural in nature. For the best results, these tests are often performed with the animal sedated or anesthetized, and they are usually available only at veterinary specialty or university hospitals. Examples include the following:

- Impedance audiometry is performed by inserting ear plugs into the ear canal and measuring the change in mobility of the eardrum (tympanic membrane) and the involuntary contraction of the muscles in the middle ear. This test helps to assess the integrity of the middle ear.
- The brainstem evoked auditory response (BAER) test measures specific components of the hearing pathway and can be used to characterize conductive and sensorineural hearing loss.

## TREATMENT AND FOLLOW-UP

### Treatment Options

Conductive hearing loss is usually reversible and requires removal of any obstruction, such as wax from the external ear canal or mucus from the middle ear (especially in dogs with PSOM). Congenital hereditary sensorineural hearing loss and presbycusis are not treatable and are irreversible. Drug-induced hearing loss is usually permanent but may improve once the drug has been discontinued.

### Follow-up Care

Animals with conductive hearing loss from otitis externa and/or media are periodically rechecked to prevent a recurrence of the otitis and hearing loss. Animals with congenital, inherited hearing loss should not be bred.

### Prognosis

Prognosis is good for conductive hearing loss. Prognosis is poor for sensorineural hearing loss; however, behavioral modification techniques (such as hand signals) may be used to train the dog.