

Clinical Findings and Diagnosis

There is no recognized sex distribution for otitis externa. Young animals may be more commonly affected. There are clear breed predispositions for otitis, which directly reflect the breed predispositions for skin disease (eg, allergies in retrievers and terriers). The most common historical findings are headshaking and aural pruritus.

The first step in physical examination is determination of the severity of pain. This can be done by gentle palpation or petting of the animal. If the ear is painful or the degree of discomfort is high, the animal should be sedated before performing any further diagnostic testing. The second step is gentle palpation and manipulation of the ear canal and pinna to determine the presence of swelling, pruritus, fibrosis, or calcification. The presence or absence of these findings will help determine whether advanced diagnostics are needed, specifically imaging of the ear canal. Next, the outside of the ear should be examined, noting erythema, edema, crusts, scale, ulcers, lichenification, hyperpigmentation, or exudate. The pinnae and periauricular regions should be examined for evidence of self-trauma, erythema, and primary and secondary skin lesions. Pinnal deformities, hyperplastic tissue in the canal, and headshaking suggest chronic otic discomfort. If the otitis is unilateral, the unaffected ear should be examined first to prevent iatrogenic contamination of the unaffected ear with organisms (eg, *Pseudomonas aeruginosa* or *Proteus mirabilis*) that may be present in the diseased ear. The unaffected ear may, in fact, be diseased, meaning that the differential diagnosis list should also include causes of bilateral otitis.

Otoscopic examination is often not possible because the ear is painful, swollen, or filled with exudate; sedation is usually required. Swelling of the ear canal often makes it impossible to see the tympanic membrane. A handheld otoscope must have enough light and magnification to clearly visualize the external canal to the level of the tympanic membrane. Disposable otoscopic ear cones are recommended, because studies have demonstrated contamination of cones. Handheld otoscopes are available with a variety of heads, including magnification options and surgical operating heads, that allow for visualization of the ear canal while inserting another instrument. The surgical head is used when biopsies, foreign body removal, or deep flush of the canal is anticipated.

A video otoscope provides magnification of the ear canal and tympanic membrane. Most have a working channel through which biopsy instruments, catheters for flushing debris from the canal, and laser tips can be passed. Video otoscopes allow visualization through water and saline to determine the integrity of the tympanic membrane and to facilitate sampling and culture of the middle ear.

During an otoscopic examination, the ear canal should be inspected for changes in diameter, pathologic changes in the skin, quantity and type of exudate, parasites, foreign bodies, neoplasms, and changes in the tympanic membrane. The tympanic membrane should be examined for evidence of disease or rupture. However, in many cases of otitis, the character of the ear canal and tympanic membrane cannot be visualized at all until the exudate is gently flushed from the canal. Samples for cytologic evaluation and

culture should be obtained before the ear is flushed. Examination is attempted again after the ear is dried. In chronic cases, the canal may be too stenotic, either from hyperplasia or edema, to be examined. Systemic glucocorticoids given daily for 1 wk may reduce swelling enough to allow examination.

If sedation is not needed, samples for ear diagnostic tests should be collected: skin cytology from the external and inner pinnae, cytology of any exudates present, hair trichograms and skin scrapings for *Demodex*, and ear swab cytology with mineral oil in young and adult animals (especially cats, because feline demodicosis can present as pruritic otitis). Wood's lamp examinations need to be done with care, keeping in mind that the key color is apple-green fluorescence and that sebum can glow yellow. Dermatitis affects the hair of the pinnae and hairs in the concave surface of the ear canal.

Cytologic evaluation of exudate or cerumen taken from the horizontal ear canal may provide immediate diagnostic information. The external ear canals of most dogs and cats harbor small numbers of commensal gram-positive cocci. These organisms may become pathogenic if the microenvironment is changed and encourages their overgrowth. Exudate obtained with a cotton-tipped applicator can be rolled onto a glass slide, stained with a 3-step quick stain or modified Wright's stain, and examined under a microscope. (A recent study has shown that heat fixing is not necessary for ear swab cytology.) Smears should be examined microscopically under 4X, 10X, and oil immersion to look for numbers and morphology of keratinocytes, bacteria, yeasts, and WBCs; evidence of phagocytosis of microorganisms; fungal hyphae; and acantholytic or neoplastic cells.

A stained smear can quickly determine whether microbial overgrowth is present. Coccal organisms are usually staphylococci or streptococci. Rod-shaped organisms are usually *Pseudomonas aeruginosa*, *Escherichia coli*, or *Proteus mirabilis*; their appearance in large numbers indicates that a bacterial culture with antibiotic sensitivity should be performed because of their known resistance to many antimicrobial agents. The presence of many neutrophils phagocytizing bacteria confirms the pathogenic nature of the organisms.

The yeast *Malassezia pachydermatis* is found in low numbers in the ear canals of many healthy dogs and cats. Because yeasts colonize the surface of the ear canal, they are most easily found adhered to clumps of exfoliated squamous epithelial cells. *M. pachydermatis* is identified readily on microscopic examination and its numbers easily assessed. There is no specific number that indicates yeast overgrowth. The key determining factor is whether the ears are pruritic. In addition, if previous treatment did not include antifungal therapy and if otitis externa is recurrent, antifungal therapy is warranted.

A dark exudate in the canal usually signals the presence of either *Malassezia* spp or a parasite but may also be seen with a bacterial or mixed infection. In addition to stained cytology, otic exudate should be examined for eggs, larvae, or adults of the ear mite *Otodectes cynotis* and for *Demodex* mites in dogs and cats, and *Psoroptes cuniculi* in rabbits and goats. Smears are made by combining cerumen and otic

discharge with a small quantity of mineral oil on a glass slide. A coverglass should be used, with the smear examined under low-power magnification. Rarely, refractory ceruminous otitis externa may be associated with localized proliferation of *Demodex* sp in the external ear canals of dogs and cats and may be the only area on the body affected.

Microbial cultures are taken before otoscopy is completed and before any cleaning is done. Samples for culture should be taken with a sterile culturette from the horizontal canal (the region where most infections arise) or from the middle ear in cases of tympanic rupture. A bacterial culture and antibiotic sensitivity and an antibiotic mean inhibitory concentration should be done.

Histopathologic changes associated with chronic otitis externa are often nonspecific. Histopathologic evidence of a hypersensitivity response may support a recommendation for intradermal allergy testing or for a hypoallergenic diet trial. In addition, biopsies from animals with chronic, obstructive, unilateral otitis externa may reveal whether neoplastic changes are present.

Radiography of the osseous bullae is indicated when proliferative tissues prevent adequate visualization of the tympanic membrane, when otitis media is suspected as a cause of relapsing bacterial otitis externa, and when neurologic signs accompany otitis externa. Fluid densities and proliferative or lytic osseous changes provide evidence of middle ear involvement. Unfortunately, radiographs are normal in many otitis media cases. CT or MRI, if available, should be performed for cases of severe, chronic otitis.

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