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## **EXTERNAL OTITIS IN CHILDREN AND ITS TREATMENT**

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### **Annotation**

Otitis externa is an infection that causes inflammation (redness and swelling) of the ear canal, which is the tube between the outer ear and the eardrum. Otitis externa is often called 'swimmer's ear' because regularly getting water in your ear can make inflammation more likely. External otitis is an acute infection of the ear canal skin typically caused by bacteria; *Pseudomonas* is most common. Symptoms include pain, discharge, and hearing loss if the ear canal has swollen shut; manipulation of the auricle causes pain. Diagnosis is based on history and inspection. Treatment is with careful debridement of dead skin and wax, topical medications (including antibiotics, corticosteroids, and acetic acid or a combination), and dry ear precautions.

**Keywords:** otitis externa, inflammation, antibiotic, steroid, bacteria.

The ear possesses two primary defense mechanisms to protect it from the development of otitis externa. The most important mechanism is the slightly acidic and hydrophobic cerumen barrier. The acidity of the cerumen, as well as a mild lysozyme contained therein, presents an inhospitable environment for fungal and bacterial pathogens. Furthermore, the hydrophobic barrier imparted by cerumen protects the very thin squamous epithelium of the ear canal. The second, albeit less potent, mechanism is the migratory pattern of this epithelium. There is a constant lateral migration of the epithelial layer away from the tympanic membrane towards the canal meatus. Desquamated elements are thus amalgamated into the cerumen and expunged from the ear canal. Infectious otitis externa arises when the above-



mentioned defense mechanisms are compromised. Breakdown of the cerumen barrier, for example through physical disruption or extended exposure to water, grants the pathogen access to the epithelium. Such actions that break down the barrier are also likely to cause maceration of the skin, providing a portal of entry for the microbial pathogens and initiating inflammatory processes. Bacterial infection is the most common cause of otitis externa. The most common pathogens are *Pseudomonas aeruginosa* and *Staphylococcus* species. Other species such as *Coryneform* and *Bacteroides* are found in a significant minority of patients (10–20 %). Fungal infections, usually with *Candida* or *Aspergillus* species, tend to be rare in published series. Fungal otitis externa tends not to be a primary infection, but rather a secondary infection that arises if the environment of the external auditory canal is disrupted with topical antibiotics or steroids. Hearing aid users can often demonstrate a benign-appearing, asymptomatic, superficial colonization of the external auditory canal with *Candida*.

**Clinical Presentation.** Otitis externa secondary to either bacterial or fungal pathogens typically results in itching or pain localized to the external auditory canal. Patients will often complain of otorrhea or residue left on the pillow after a night's sleep. Often debris composed of squamous elements, bacterial or fungal cells, and purulence will accumulate in the external auditory canal, resulting in decreased hearing and a sense of blockage in the affected ear. On exam, the ear may be tender to manipulation of the auricle or tragus. The ear canal may be edematous, erythematous, or both and edema may obscure the view of the tympanic membrane. Such cases require a good deal of care on the part of the clinician as increased edema often correlates with exquisite tenderness. The fluid or debris in the ear canal itself is variable and its character gives the clinician a clue as to the nature of the offending pathogen. Thin, slightly cloudy fluid is often present in early bacterial otitis externa, while a thicker, creamy, pale yellow accumulation of debris is present in more established cases.

**Treatment.** The primary treatment for infectious otitis externa is the application of topical antiseptic or antibiotic agents; however, adjuvant therapies are both important and often overlooked. Careful debridement of the ear canal is important in order to provide access of topical agents to the bacteria or fungi that would



otherwise be protected within or behind debris. Furthermore, some topical agents are ototoxic or highly irritating to the middle ear, and thus an assessment of whether the tympanic membrane is perforated or not helps guide the practitioner in the choice of agents. In addition to debridement, maintenance of dry ear precautions promotes resolution of the infection. Affected individuals should be encouraged to use a swimmer's ear plug or a cotton ball saturated with petroleum jelly to occlude the ear canal when there is any chance of water entering the ear, such as with swimming, bathing, showering, or washing hair. Other measures to avoid the accumulation of moisture within the ear canal should also be taken such as avoiding the use of headphones, hearing aids, occlusive ear buds, or ear plugs other than for brief periods as described above. Treatment of otitis externa rarely requires systemic antibiotics. Topical treatments fall into three categories: (1) drying and acidifying agents, (2) antimicrobial agents, and (3) steroids.

**Drying and acidifying agents .** A number of acidifying preparations containing acetic acid (combined with isopropyl alcohol, aluminum acetate, or propylene glycol) are available, and can be used for both bacterial and fungal otitis externa. These agents have the potential to be highly irritating to an inflamed or macerated canal epithelium. Furthermore, these agents cannot be used in the presence of a tympanic membrane perforation due to the sensitive nature of the middle ear mucosa. Because of these two reasons, these agents are rarely used to treat acute infection; however they can be used as part of a maintenance routine in individuals with an intact tympanic membrane and a propensity towards otitis externa. The application of such agents (after showering or swimming, for example) can prevent or reduce the frequency of otitis externa.

**Antimicrobial agents .** Antibiotic drops are the most commonly used therapeutic option for otitis externa. Prior to the introduction of fluoroquinolone topical antibiotics, the mainstay of treatment was a mixture of neomycin, polymyxin, and hydrocortisone (Cortisporin). This preparation had the advantage of being inexpensive as well as helping to reduce inflammation with the presence of steroids. Concerns over the potential ototoxic effects of neomycin (an aminoglycoside) and polymyxin limit the use of these antibiotics to cases without a tympanic membrane perforation. Because general practitioners often initiate therapy in the absence of a



clear view of the eardrum, this preparation is seldom first-line therapy. In cases of fungal otitis externa antifungal agents are required. Miconazole, nystatin, tolnaftate, and ciclopirox olamine are all available in solution form and thus have the advantage of being able to be prescribed by the general practitioner and administered by the patient; however, debridement is an essential aspect of otomycosis therapy. 1 Management of the Child with Otorrhea 6 Steroids . Hydrocortisone and dexamethasone are often included in antibiotic preparations, or may be delivered separately if combination agents are not available. The benefit in symptom resolution provided by the addition of steroids is 0.8 days.

All in all, external otitis often can be prevented by applying a few drops of a 1:1 mixture of rubbing alcohol and white vinegar or acetic acid drops (as long as the eardrum is intact) immediately after swimming. The alcohol helps remove (evaporate) water, and the vinegar alters the pH of the canal. Use of cotton swabs or other implements in the canal should be strongly discouraged.

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