

# Ear wicks in veterinary medicine: Part 1

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Ear wicks are surgical packs that have been used in human medicine for about 50 years to treat a variety of aural conditions. They are used to treat otitis externa, particularly in children, where topical application of drops is difficult, the wicks can be used to concentrate antibiotics in the ear canal (Taylor, 1974). Papers have also been published in medical texts describing the use of wicks in the therapy of ear canal stenosis (Miller, 1978) as well as a post-operative dressing after minor surgical procedures including myringoplasty (McRae, 1992 and Cannon, 1985).

Ear wicks are made of polyvinyl alcohol (PVA), which forms a hard, compact structure. When they are dry prior to insertion in the canal they can be cut and shaped. When the wick is soaked in any aqueous solution the sponge will expand in a controlled manner, which allows it to be positioned within the ear. Expansion produces a soft internal 'bandage' that adapts to fill the contours of the ear canal. In the author's experience they are well tolerated providing they are positioned correctly. In small dogs and cats overlong wicks can be felt when the animals articulate their temporomandibular joint, which can lead to some discomfort on opening their jaws. Designed for human use they can be used successfully in all but the giant dogs. In normal ears of such breeds the canals are too wide so that even when the wick is expanded they do not fill the whole canal. They can however be used to treat stenotic ear canals in these breeds. The sponge has a porous interconnected structure, which gives it great tensile strength, so that it will not disintegrate or tear whilst *in situ* or when it is grasped to be removed. The fine pores facilitate minimal tissue adhesion providing it remains soaked.

Although the majority of ear wicks are used in severely infected otic environments they are prepared to the same high degree of surgical asepsis as any other operative pack. The design of the PVA wick is such that it will not sustain microbial growth providing it is not contaminated with organic debris such as blood, pus, wax etc. Effective cleaning of the canal is thus critical to a successful outcome when wicks are used. If the canal is not adequately flushed then the wick will act as a cork to 'bottle up' infection and can predispose to the development of otitis media. The principal uses of ear wicks in veterinary medicine are:

- treatment of bacterial/yeast otitis externa
- post-operative packing after non-ablative surgery
- reduction of hyperplasia/stenosis of the external ear canal

This article will deal with therapy of infectious otitis externa using ear wicks, the next article in this series will discuss use of ear wicks in the therapy of hyperplasia and stenosis of the canal and also post-operatively as a surgical pack.

## THErapy OF OTITIS EXTERNA

Otitis externa lends itself particularly well to therapy with ear wicks. The author would recommend the following steps in selecting and treating cases (these can only really be achieved in an anaesthetised animal):

- Assessment of the ear canal and tympanic membrane
- Assessment of the otic discharge with cytology +/- culture
- Thorough cleaning of the canal
- Selection of soak solution and placement of wick
- Post flushing glucocorticoid administration

Therapy of otitis media will be discussed later in the article and requires a slightly different approach.

### a) Assessment of the ear canal and tympanic membrane

Although it is possible to undertake otoscopic examination in a conscious animal it can be achieved much more easily and thoroughly if the patient is anaesthetised. The use of a video-otoscope vastly improves the clinician's ability to examine the canal. Otherwise a hand-held scope with a good light source can be used. If the ear canal is full of a waxy or purulent exudate cleaning of the canal may be needed to assess the deeper regions of the horizontal canal and the eardrum before a decision can be made regarding appropriate therapy. Before this is started it is important to take adequate samples for cytology and the author would generally also take one for culture at the same time if needed. These can be examined whilst the ear is flushed. Initial flush should be with warm water. In uncomplicated cases where the canal has no evidence of polyp formation or ceruminous gland hyperplasia and the eardrum is intact and of a normal appearance an ear wick can be used.

## b) Assessment of the otic discharge with cytology +/- culture

Cytology should be taken in every case of otitis externa and media. It is a quick and easy procedure enabling selection of initial therapy. Samples taken with a cotton swab can be rolled onto a glass slide, dried and stained with a suitable product such as Diff Quik or Rapi Diff. Where cocci or yeast are present the author would not generally undertake culture unless the bacterial infection has already failed to respond to conventional therapy or MRSA is suspected. Soak solutions can be used as detailed below (Table 1). When rods are identified, culture should be performed. Initial selection may be the same as those for cocci but other drugs can be used according to sensitivity patterns.

into the horizontal canal where possible. This may then be soaked in an appropriate solution. When the eardrum is intact a wide range of topical therapy can be used. The author prefers not to use some of the more potent topical aminoglycosides, such as tobramycin or penicillins e.g. ticarcillin, to soak wicks unless dictated by culture and sensitivity. First line drugs where cocci are identified on cytology would include gentamicin, marbofloxacin and enrofloxacin. Suitable dilutions are indicated in Table 1. Where rods are identified on cytology culture is indicated. Choice of initial soak solutions can still be the same but amikacin, tobramycin and ticarcillin may be appropriate. Where yeast is identified on cytology enilconazole diluted 1:5 may be used to infuse the wicks. It is important that the wick is well soaked. The author would normally gently dribble approximately 2 ml of the antibiotic solution into the clean ear until the wick is completely soaked. The wick should then be left for a few minutes

**TABLE 1: Suitable ear wick soak solutions**

Drug name	Trade name	Concentration to be applied to wick
Enrofloxacin	Baytril 2.5% solution for injection (Bayer)	To be diluted 50:50 with sterile water and applied to the wick
Gentamicin	Gentacin injection 80 mg/2 ml (available as 2 ml vials) Roche	To be diluted 50:50 with sterile water and applied to the wick
Marbofloxacin	Marbocyl SA 200 mg	To reconstitute as per data sheet and then to be diluted 50:50 with sterile water and applied to the wick)

## c) Thorough cleaning of the canal

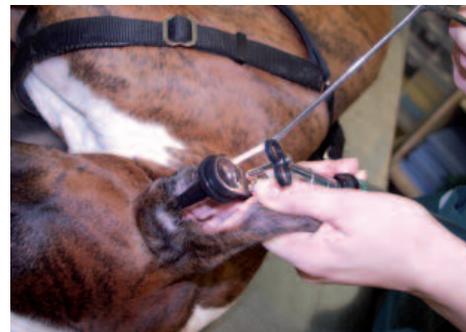
There is no substitute for thorough cleaning. This is a more important process than the instillation of the soak solution. Careful selection of cleaning solution is essential. Acid based cleaners have potent antibacterial and anti-yeast activity and are useful prior to wick placement. Cleaners that contain such components as acetic acid, benzoic acid, lactic acid and salicylic acid have antibacterial properties and where the pH is under 4 they will also kill yeast. The more irritant cleaners tend to have a low pH and can have dioctyl sodium succinate as a ceruminolytic. Although such cleaners are excellent they can be irritating in an inflamed or ulcerated ear and are best avoided. Where the canal is inflamed a less harsh cleaner is appropriate - gentler products tend to be neutral - or slightly basic cleaners containing propylene glycol, menthol, xylene, squalene or triz EDTA/chlorhexidine. With the exception of the latter this second group of cleaners has limited antibacterial action. Where yeast is identified on cytology boric acid, which has good anti-yeast activity, or low pH solutions are best used to flush the ear.

## d) Selection of soak solution and placement of wick

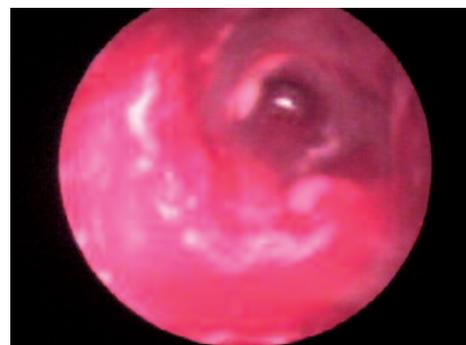
After the ear has been cleaned an unsoaked wick should be placed deep in the vertical canal extending



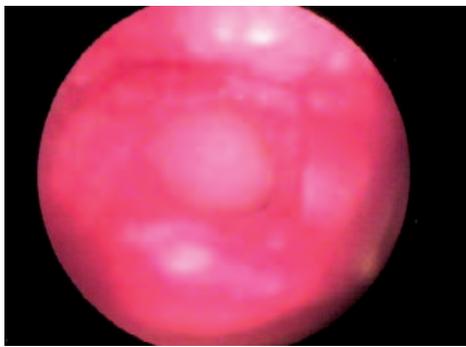
**Fig. 1:** Ear wicks prior to insertion and soaking (left), wick after soaking and removal (right).



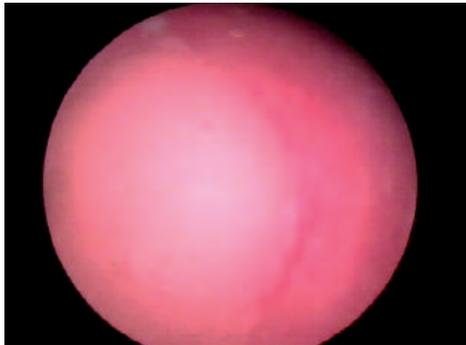
**Fig. 2:** Placement of ear wick within the ear canal can be achieved using a hand held otoscope in an anaesthetised animal.



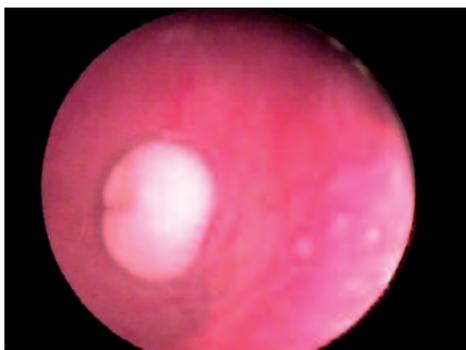
**Fig. 3:** Dogs with severely ulcerated ears are intolerant of most topical therapy but are suitable for therapy with a wick.



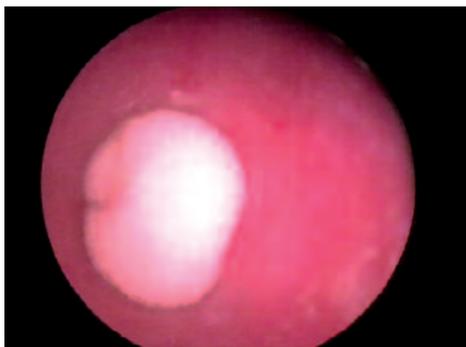
**Fig. 4:** Ear wick soaked in antibiotic within severely ulcerated canal with a Gram negative infection.



**Fig. 5:** Pooling of fluid on the top of the wick is an indication that it is fully hydrated.



**Fig. 6:** Ear wick partially expanded within the ear canal.



**Fig. 7:** Ear wick completely expanded within the ear canal.

before being rechecked, when a further small amount of fluid (0.5 ml) can be applied if necessary. The wick can be considered adequately soaked when a small amount of fluid is seen to be pooled on the top of the wick.

#### e) Post flushing glucocorticoid administration

Even when flushing is undertaken carefully with

warm water the infected dog's ear can be irritated by the flushing solution. If the dog wakes up post-operatively shaking its head the wick may be catapulted across its kennel to be discovered by the discharge nurse. The author will therefore, unless contra-indicated for some other reason, administer an intravenous bolus of dexamethasone at an anti-inflammatory dose at the time of wick instillation.

When the dog is discharged the author will usually prescribe a small quantity of prednisolone over the next 10 days to provide some anti-inflammatory benefits. This would be at a dose of 0.25 – 0.5 mg/kg daily or alternate day depending on the degree of erythema in the dog's ear at the time of examination. Ideally the wick should be kept hydrated and clients are usually sent home with 2 ml of solution, which can be added to the ear after about five days. If this is not possible the patient should revisit the surgery for a nurse to administer the additional soak solution.

Reassessment should be undertaken at 7–10 days. The dog will need to be anaesthetised again at this stage. The wick can be easily removed if it is well soaked. The author would recommend adding approximately 2 ml of sterile water into the ear to ensure adequate hydration of the wick before attempting removal. It may then be grasped with a pair of forceps and gently removed. Cytology can now be repeated, the ear reflushed and, if necessary, a further wick applied. Often at this juncture the ear is more comfortable and the owner can then administer drops. Cytology may reveal that the infection has cleared.

#### OTHER THERAPY OF OTITIS MEDIA USING EAR WICKS

Otitis media is always a much more chronic disease than otitis externa. Assessment of the ear canal and tympanic bulla are crucial to decide if the ear can be treated medically. Where the canal is fibrotic or stenotic, medical therapy will often be unsuccessful and where the tympanic bulla contains excessive granulation tissue, surgical intervention is more appropriate. In order to use a wick the tympanic bulla must be completely flushed. **This can probably only be achieved adequately using a video-otoscope** and the author would recommend referral of such cases to a clinician with the appropriate equipment and expertise. If the tympanic bulla is not cleaned adequately wick placement in the external canal can lead to worsening of the otitis media and an extension of the infection into the nasopharynx. Where the tympanic bulla is flushed adequately it can be packed with an appropriate antibiotic solution (the same as that used in the wick) and a small amount of aqueous glucocorticoid. The wick can be placed in the external ear canal and therapy can be undertaken as for otitis externa.

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