

## OTITIS EXTERNA

-(TECABO vs ZEPP Procedure (Lateral Ear Resection))

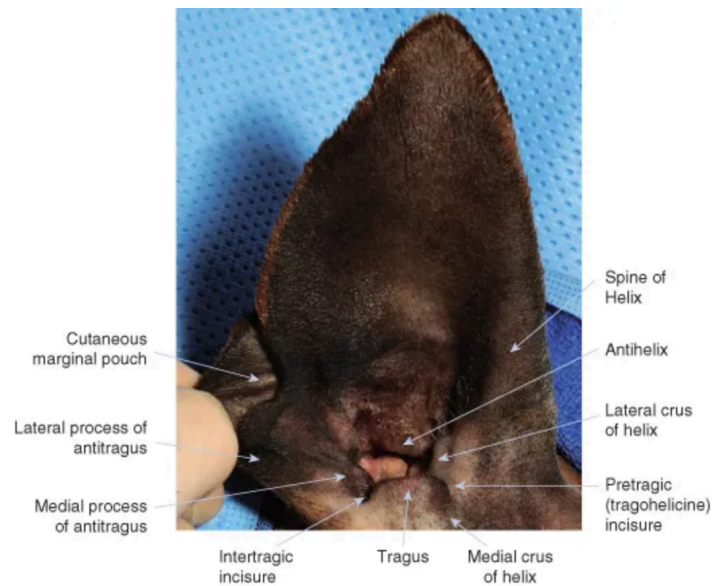
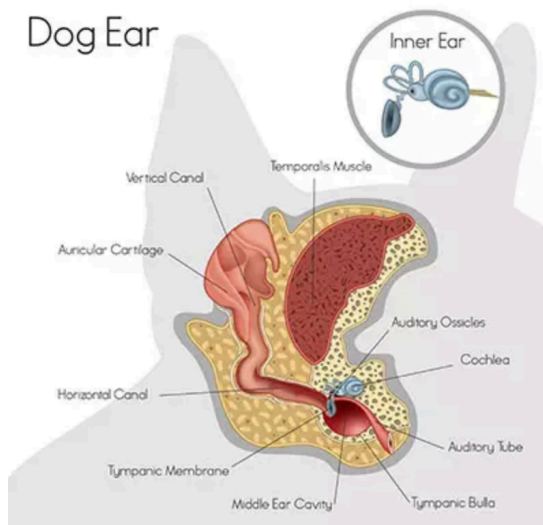
Associated Terms:

Ear Infection, Middle Ear Infection, Inner Ear Infection, TECA, Total Ear Canal Ablation, Swimmer's Ear



Total Ear Canal Ablation and Bulla Osteotomy (TECABO)

## OVERVIEW



Otitis externa is an inflammation of the ear canal. Because dogs' ear canals are L-shaped (Figure 1), fluid does NOT drain easily from canal openings. Additionally, the lining of the ear can become inflamed & thickened, blocking air & fluid flow in & out of the canal. Animals with otitis externa can also develop otitis media (middle ear inflammation).

In puppies & kittens, otitis externa is often caused by ear mites. These tiny parasites cause terrible itching & a thick brown discharge. In adult dogs, the most common underlying cause is allergies- sensitivity to something in the environment or to food. In older animals, tumors can cause blockage of the ear canal & secondary infection. Other predisposing causes may include foreign bodies (such as grass seeds) or small ear canals (often seen in Shar peis) or long floppy ear flaps (for example, Basset hounds) that prevent air flow. Hormonal problems, such as poor thyroid function, or other underlying skin disorders may also be present.

Why does my pet need a TECA surgery?

Chronic ear infections are very difficult to control or eliminate. The anatomy of the ear canal predisposes it to trapping bacteria & the pus & debris that comes with infection. Eventually chronic inflammation associated with the infection thickens the tissues lining the ear canal, growing inward such that it becomes closed. This prevents topical ear medications from contacting the bacteria or yeast deep in the canal and, more importantly, prevents the pus & debris from getting out. The end result is a vicious cycle of worsening infection & severe permanent changes in the ear. Usually the ear drum is no match for this degree of infection & will rupture; middle ear infection results. When the disease within the canal & the middle ear reaches this point, it is generally NOT possible to reverse. Surgery to remove the abnormal tissue & the infection eliminates the problem at the source.

**Otitis externa & media are common conditions in dogs**, particularly in specific breeds such as the Cocker spaniel & German shepherd.

Cocker Spaniels are a unique player when it comes to ear canal disease. They can create canal disease without infection starting or perpetuating it. Something like "the chicken & the egg" scenario, the tissue of the ear canal in Cockers will thicken & change & create the environment for infection to brew. Their ears cannot be reversed with any amount or type of topical medications; all too often, these dogs suffer many years of ear treatments & discomfort with no chance of recovery without surgery. Veterinary medicine has enough history with this breed & condition to predict this outcome.

Cancer within the ear canal is another reason for performing this type of surgery. In some but NOT all cases, surgery can be curative for aggressive cancers of the ear canal if the tumor has NOT invaded through the cartilage or into the middle ear cavity.

## SIGNS & SYMPTOMS

Dogs with otitis externa may start out with mild signs, but can progress with time or failed treatment attempts such as:

- scratching their ears or shaking their heads
- ears may be thick or red on the underside or hairless part
- ears may have a strong, unpleasant smell
- ear canal will eventually be blocked & have a cauliflower-like appearance (Figure 2)
- white thick discharge from the ears of dogs if bacterial infections are present

Because the **condition is painful**, particularly when the middle ear is affected, pets may have personality & behavioral changes. They may shy away from being petted on the head, & may be uncomfortable opening their mouth wide or chewing food. Additionally, **blockage of the ear canal muffles their hearing** & makes them less responsive to their owners.

TABLE.  
**Common Causes & Factors of Otitis**

<b>Predisposing Factors</b>	Abnormal external ear canal and pinna conformation (eg, congenital stenosis) Excessive moisture within ear canal Adverse effects from previous treatments (eg, topical reactions) Obstructive ear disease (eg, neoplasia, polyps) Primary otitis media (eg, primary secretory otitis media)
<b>Primary Causes</b>	Atopic dermatitis Food allergy Epithelialization disorders (eg, seborrhea) Metabolic disorders (eg, hypothyroidism) Foreign bodies Neoplasia
<b>Secondary Causes</b>	Yeast overgrowth (eg, <i>Malassezia</i> , <i>Candida</i> ) Bacterial overgrowth (eg, <i>Staphylococcus</i> , <i>Pseudomonas</i> ) Medication reactions
<b>Perpetuating Factors</b>	Altered, or failure of, epithelial migration Ear canal/pinna fibrosis, proliferation, and stenosis Glandular alteration (eg, hyperplasia) Calcification of tissues

## DIAGNOSTICS

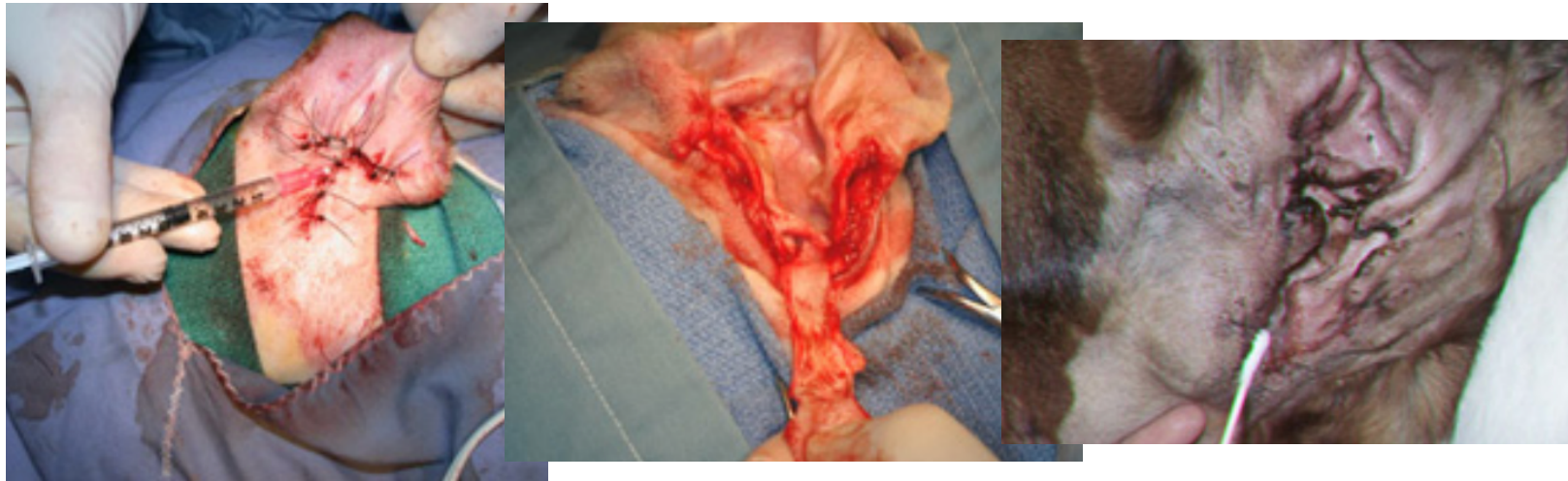
Unless a tumor, foreign body, or ear canal narrowing or blockage is present, otitis externa is usually treated medically. First, however, your primary care veterinarian must determine the underlying cause of the ear disease. They may perform:

- **Otoscopic Exam** to look down into the ear canal with a lighted scope, to see if there is anything unusual in the canal & will take samples from the ear to determine whether your dog has problems with yeast, bacteria, or mites.
- **Culture & Sensitivity of the Discharge** in the ears to determine which bacteria might be present & what antibiotics to which they might be sensitive
- **X-RAYS &/or a CT scan** to evaluate the ear canal & determine if the middle ear is involved (Figure 3). If the ear canal cartilage is no longer bendable & has become calcified, surgery will probably be required.



- **Blood Test:** thyroid gland function & blood chemistries to see if there is any signs of systemic illness
- **Allergy testing or skin scrapes** to assess allergies

## TREATMENT



Medical management is preferred in pets that have inflammation & discharge of the ear canals, but no blockage. The ear canals are cleaned & flushed, & your veterinarian may even need to drain the middle ear to relieve the fluid buildup. Pets are treated with a medication that kills mites, bacteria, or yeast, depending on what type of organism is found in the canal. Because pets with ear infections are uncomfortable, pain medications may be prescribed. Animals with allergies may require shots or a diet change.

Pets that have a tumor, traumatic separation, calcification or other blockage of the canal may require removal of the ear canal.

TABLE 1.  
**Surgical Techniques for Chronic Otitis**

SURGERY	INDICATIONS	DIAGNOSTIC APPROACH
<b>Lateral ear canal resection</b>	<ul style="list-style-type: none"> <li>• Stenotic vertical ear canals</li> <li>• Ear canals in which LECR can improve medical management</li> <li>• Patients in which primary disease is limited to vertical canal</li> </ul>	<ul style="list-style-type: none"> <li>• Complete otoscopic examination to determine whether disease is limited to the vertical canal</li> <li>• Videotoscopy</li> <li>• Computed tomography (CT) imaging</li> </ul>
<b>Vertical ear canal ablation</b>	<ul style="list-style-type: none"> <li>• Same indications as for LECR</li> <li>• Patients in which primary disease has proliferated to the medial wall, or entire circumference, of the vertical canal</li> </ul>	<ul style="list-style-type: none"> <li>• Same diagnostics as for LECR</li> </ul>
<b>Total ear canal ablation + lateral bulla osteotomy</b>	<ul style="list-style-type: none"> <li>• Visible masses that cannot be removed by alternative methods</li> <li>• Neoplasia of ear canal/bullae</li> <li>• Severe end-stage otitis externa/media that has not responded to medical therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Complete otoscopic examination to determine whether disease is affecting the entire ear canal</li> <li>• Videotoscopy</li> <li>• CT and magnetic resonance imaging (MRI) imaging</li> </ul>

### **Is the TECA surgery the right choice for my pet at this time?**

Making the decision to go to surgery with your pet is never easy. Listed below are "pros" & "cons" of information to help work thru this decision.

TECA surgery will do the following:

- Eliminate ongoing ear pain & odor;
- Stop the need for & cost of ear medications & veterinary visits to treat long-term & frequent ear infections;
- Cure most ear canal tumors/cancers;
- Improve your relationship with your pet (no odor, no pain, no difficult ear treatments);
- Improve your pet's attitude, activity & general well being with the removal of chronic pain & inflammation.

TECA surgery is not right for your pet at this time if:

- Your pet has other medical issues that make general anesthesia too dangerous;
- An ear tumor/cancer has already spread to other areas of the body.
- Another ear canal surgery is sufficient to manage the ear disease your pet has;
- You do not wish to accept the surgical risks.

The majority owners with pets having very chronic ear troubles report a dramatic change in their pets' attitude after surgery. "A new dog!" "She is like a puppy again!"

### **Now that I have decided that surgery is right for me & my pet, what needs to happen before surgery?**

Commonly, your veterinarian will suggest performing a panel of screening blood tests to evaluate major organ function before anesthesia; this is routine & helpful in choosing anesthetic drugs & postoperative medications.

In some cases, x-rays of the skull are helpful in determining the extent of the disease; this is most common in the case of ear tumors or when there is evidence of more advanced neurologic problems (head tilt, abnormal eye movements, facial palsy). In a smaller number of cases, an MRI or CT scan might be helpful to fully understand the nature of the disease.

When there is a tumor in the ear canal, we often suggest routine chest x-rays to evaluate the lungs for any spread of the tumor. This is quite rare, but the screening tests are simple & prevent an unnecessary surgery in the case of advanced disease.

And as part of your pet's normal physical exam, your veterinarian will evaluate the cranial nerves & their function. Commonly, the facial nerve is negatively affected by ear infection & tumor; this can be identified prior to surgery.

## **SURGERY: Pre-Operation (Ear Surgery):**

### **What exactly does a TECA surgery involve?**

After your pet is under anesthesia, his/her ears flaps and surrounding skin are shaved, and the ear canal is cleaned. The area is prepared for sterile surgery. An incision is made around the cartilage of the external/outer ear canal, and the canal is removed down to the level of the middle ear. The middle ear (also called the "bullae") is a boney, eggshell-like structure on the side of the skull. The eardrum usually is stretched across the opening between the external/outer ear and the middle ear. In the majority of dogs requiring a TECA, the ear drum has long been ruptured. The middle ear is cleaned of infected material and tissue, and then flushed with sterile saline. A culture sample is taken at this time to help identify any remaining bacteria.

The surgery is completed by sewing the tissues closed in several layers, ending with sutures in the skin completely closing what used to be an open ear canal. Occasionally, a temporary drain will be left in place for 3-5 days if infection was severe.

## **SURGICAL OPTIONS**

- **TECABO (*T*otal *E*ar *C*anal *A*blation & *B*ulla *O*steotomy)**  
When the ear canal is completely calcified or blocked by thickened lining or a tumor, the **entire ear canal may need to be removed** (Figures 4). The ear flap is left in place, but may droop a little in dogs with upright ears, such as shepherds. The veterinary surgeon will also need to open the middle ear, or bulla, to remove the lining & provide drainage. Because dogs with otitis externa & media have very thickened & inflamed ear canals, the **surgery may be long & complex** & the animal will require pain medication for several days after recovery.

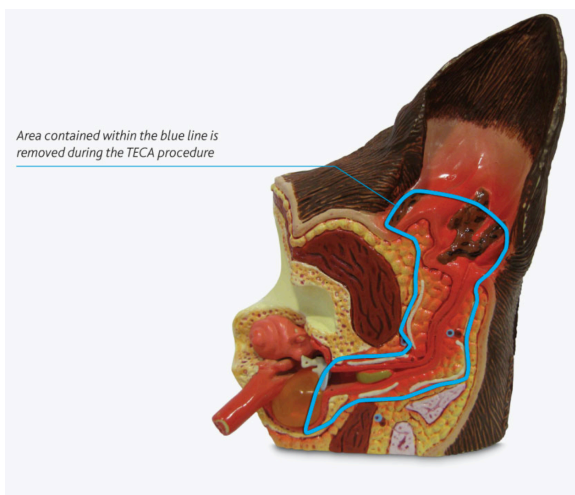


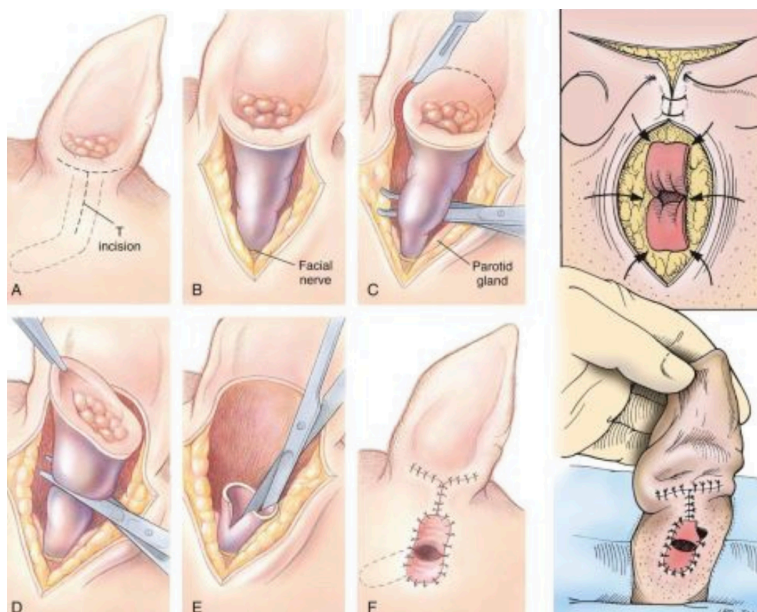
Figure 3 The blue area outlines the damaged tissue that will be removed

# TECABO



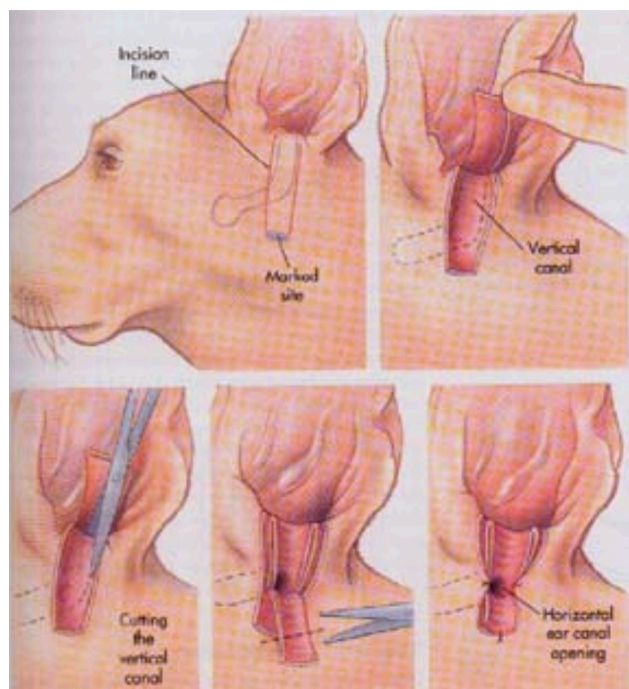
- **VECA (*Vertical Ear Canal Ablation*)**

Occasionally, the horizontal portion of the ear canal is normal & only the upright, or vertical portion, needs to be removed. This **procedure is less complicated** than total ear canal removal & does NOT require opening & cleaning out the middle ear. Although the veterinary surgeon may plan to perform a vertical ear canal ablation, they may find during the surgery that the entire ear canal must be removed because of the extent of the ear canal disease.



- **“ZEPP” Procedure (*Lateral Ear Canal Resection*)**

Opening up the side of the ear canal will let more air in, improve drainage, & make it easier for owners to clean & medicate the canals (Figures 5 & 6). Unfortunately **most dogs do NOT show much improvement after this procedure**, so it is usually reserved for dogs that are born with narrow ear canals.





## AFTERCARE & OUTCOME

### **What is going to happen after the TECA surgery?**

Your pet may come home the same day as surgery, or stay in the hospital for 24hrs, depending on the anesthetic recovery. An antibiotic will be prescribed for up to 2-4wks. Pain medications will be prescribed for the first two weeks postoperatively, and your pet may have a pain patch that will continuously release pain medication thru the skin for the first 3-5 days.

Patients are often more comfortable if their head and ears are bandaged snugly to prevent ear flapping or bumping the incision. Since head bandages are sometimes difficult to maintain in place, your pet may have a stockinette "tube" that he/she can wear over the head and ears like a turtleneck shirt that "isn't pulled all the way on". This will serve the same function of keeping the ear(s) snug against the head.

Sutures will need to be removed 10-14 days after surgery

### **Restrictions Following Surgery are usually:**

- Antibiotics may be prescribed if severe infection is present based on culture & sensitivity.
- E-collar to prevent scratching the ear incision.
- Eye drops for two weeks if the blink response is NOT normal.
- Oral pain medications.
- Sutures will be removed 10–14 days after surgery (if present).
- Medical management of underlying diseases, such as allergies or poor thyroid function, will need to be continued for life to prevent clinical signs from recurring.

### **Post-Operative Complications can include:**

- Facial nerve damage; resulting in an abnormal or absent blink in the eye on the side of the surgery. This occurs in 25–50% of dogs, & in 10–15% the damage is permanent.
- Head tilt (Figure 7), because of the loss of balance.
- Drainage from the surgical site months to years after surgery may occur if some infection or secretory tissues remain after the original surgery.

### **What are the possible complications associated with a TECA?**

Complications fall into 4 categories:

1) Anesthetic Complications-- In general, most anesthetic problems can be foreseen and prevented with advanced planning using the physical examination and the preoperative bloodwork. There are no anesthesia complications unique to TECA surgery, although each patient is unique with his/her own limitations and concerns to be managed.

2) Nerve Damage-- As mentioned above, the facial nerve (one of the twelve cranial nerves) lies next to the ear canal. When longstanding ear disease has caused the infection or tumor to extend thru the wall of the ear canal, the facial nerve is often trapped in this abnormal tissue. During the removal of the ear canal, the facial nerve can be temporarily or permanently damaged. This results in the loss of the "blink" function of the eyelids and a slight facial droop on the side of the ear surgery. Initially after surgery, we recommend eye ointment to keep the eye moist in the absence of the eyelids blinking. Rarely does this palsy last longer than 2-3wks, but it can be permanent and then will require eye ointment lifelong. The more extensive the ear disease at the time of surgery, the more at-risk is the facial nerve. Fewer than 10% of patients experience permanent facial nerve palsy due to surgery.

3) Vestibular Problems-- The middle and inner ear are responsible for maintaining our balance and sense of orientation. "Vertigo" is the sense of dizziness we, and our pets, feel when these structures are disturbed. For pets with early ear disease, a normal middle ear and a normal eardrum, surgery that disrupts the eardrum and middle ear can be a sudden enough change to cause vertigo. For pets with longstanding ear disease, the changes have been gradual enough to the middle ear that surgery does not create any sudden change; they usually do not experience vertigo. Rarely does this feeling last more than a day after surgery. Some pets with signs of vertigo before surgery (due to their ear disease) will find relief from these signs after surgery, but some signs may remain. The most common is a head tilt to one side.

4) Infection-- The normal ear canal and middle ear are essentially an extension of the skin on the surface of the body. They are lined by tissue (called epithelium) that sheds cells, just like our skin sheds cells. The TECA surgery totally removes the ear canal and closes this opening to the outside. The middle ear (bullae) is also lined by a very thin layer of epithelium; during surgery, this bullae cavity is cleaned of all recognizable tissues, but if any microscopic cells remain, they can grow and expand and begin to shed cells again. This debris can accumulate in the bullae, sometimes becomes infected, and ultimately will need to find a way out. This often presents as a swelling on the side of the head months to years later. Treatment is aimed at encouraging this pocket of debris to "head up" and drain like an abscess; thereafter, patients may develop a tiny draining tract where the ear canal used to be that drains small amounts of waxy debris occasionally. If there are signs of infection (fever, pain), antibiotics may be used for treatment too. ~5% of patients will experience this complication.

Since most pets with severe otitis externa have poor hearing before surgeries, owners often do NOT notice much difference in their dog's hearing ability after surgery.

**Owners of certain breeds of dogs**, such as Cocker spaniels, **should be prepared for ear problems.** These dogs should have their ears checked once or twice a year, & any ear infections should be treated promptly to prevent inflammation & thickening of the canal. Any dogs prone to skin or food allergies should also be checked annually.

Prognosis for surgical treatment of otitis externa & media depends on the underlying cause of the disease. Total ear canal ablation with bulla osteotomy is successful in resolving the drainage & discomfort from the ear in 90–95% of dogs, but problems can recur if underlying allergies or disease are NOT controlled. Long term success rates are much poorer when lateral ear canal resections are performed on animals that have severely diseased ear canals.

### **Will my pet lose the ability to hear after surgery?**

This is the most common question asked regarding this surgery. And the answer is "it depends". It depends on the disease status before surgery, and it depends on what one considers "hearing".

The majority of pets with chronic ear disease (like those in Cocker Spaniels) have lost their ear drums, their middle ears are filled with abnormal fluid or tissue and their ear canals are so thick they are no longer open. What we generally think of as "hearing" requires air vibrations to pass thru the ear canal, cause the eardrum to vibrate, which causes delicate, little bones in the middle ear to move against inner ear structures that send signals to our brain registering that we heard something. None of these normal ear hearing things are happening in patients with chronic ear disease. Surgery will not change the status of these patients' hearing.

So, what about those patients with very severe, chronic ear disease who appear to still respond to sound? Are they not hearing? Well, they probably are, and the type of "hearing" they are experiencing is likely what patients experience after the TECA surgery. The closest example that we, as humans, can understand is probably hearing under water. The experience is very garbled and indistinct, but with time, we probably could learn to understand things somewhat. Most owners report that their pets appear to experience something like hearing, responding to their food dish and their name and sudden, loud noises such as a car door slamming or the doorbell ringing.

## **SUMMARY**

The total ear canal ablation surgery is a major experience for your pet and you. It is also one of the most rewarding surgery we can perform. Time and again, we see patients rejuvenated with this procedure, simple because we are eliminating a longstanding and underappreciated source of pain and suffering. Families, too, experience the dramatic difference with the removal of often profound odor and the improvement of their pet's temperament.

For pets with ear canal tumors with no history of chronic ear disease, it may seem like a dramatic procedure for treatment. But these patients often have an easier time with surgery and fewer complications because they do not have the associated challenge of major, chronic infection. They are also usually cured of their disease.

The TECA surgery should be considered early in the course of ear disease, when complications will be fewest and when benefits can be appreciated the longest.

If you have any questions, please feel free to ask your primary veterinarian &/or veterinary surgeon.

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