Otitis externa is an inflammation of the vertical and horizontal ear canals and surrounding structures, such as the external auricular meatus and pinna. Symptoms include pain, scratching and rubbing of the ears and a malodorous discharge, among others. Otitis externa can be associated with other dermatologic (e.g., allergies) or systemic diseases. Other possible causes include bacterial infections, fungi, yeasts, parasites (e.g., Demodex canis, ticks), foreign bodies or neoplasia. Contributing factors that make animals more susceptible to otitis externa include excessive moisture in the ear canal and a narrow or convoluted ear canal conformation.

Several surgical approaches exist for the treatment of otitis externa, such as lateral ear canal resection, vertical ear canal ablation and total ear canal ablation with bulla osteotomy, with each route from the auricular region to lateralized larger portions of diseased tissue. It is always important to determine the extent and severity of the disease and select the appropriate type of surgery in order to prevent insufficient treatment (may require repeat surgery) or overtreatment (may create potential for more complications).

**Case Study**

Joey, an 8-year-old male cocker spaniel, had ear infections chronically for many years and was referred to our clinic for possible total ear canal ablation. Joey was in pain on ear palpation and a malodorous discharge was noted. Several bacterial cultures and aerobic and anaerobic cultures always should be tested. Joey was neurotic and hyperkeratotic affecting both the vertical canal and parallel to the tragus. The initial incision begins at the tragus and extends ventrally to the level of the horizontal canal (Figures 1 and 2). The horizontal incision is made parallel to the tragus (Figure 4). This is a full-thickness dissection, including the cartilage. If needed, sharp dissection is done with monoarchive across the base of the ear canal (Figure 6).

Several surgical approaches exist for the treatment of otitis externa such as lateral ear canal resection, vertical ear canal ablation and total ear canal ablation with bulla osteotomy. In an approach from the auricular region to lateralized larger portions of diseased tissue, it is always important to determine the extent and severity of the disease and select the appropriate type of surgery in order to prevent insufficient treatment (may require repeat surgery) or overtreatment (may create potential for more complications).

**Surgical Procedure**

A T-shaped incision is made with the laser. The laser hand piece is held perpendicular to the target tissue. The initial incision begins at the tragus and extends ventrally to the level of the horizontal canal (Figures 1 and 3). The horizontal incision is made parallel to the tragus (Figure 4). The connective tissue is then resected, exposing the vertical ear canal. The horizontal incision is then continued around the external auditory meatus outlining the hyperkeratic area (Figure 5). The goal is to excise the hyperkeratic area, skin and granulation tissue. The area of hyperkeratosis is outlined with the laser (Figure 6). This is a full-thickness dissection, including the cartilage. If needed, sharp dissection is done with monoarchive across the base of the ear canal (Figure 6)

Once the vertical ear canal is exposed and free from all muscle and fascial attachments, it is transected at the horizontal canal (Figure 8). The horizontal incision is made parallel to the tragus (Figure 4) using interrupted cruciate suture pattern. When the vertical canal is closed, the top of the T-shaped incision is sutured in a similar pattern (Figure 4).

**Wound Closure**

A 5-0 mononylon suture is used. The opening of the horizontal canal is sealed to the skin at the skin at the 6 o’clock position in a simple interrupted pattern, making sure to penetrate the cartilage (Figure 4). The incision proceeds vertically using an interrupted cruciate suture pattern. When the vertical incision is closed, the top of the T-shaped incision is sutured in a similar pattern (Figure 10).

**Postoperative Care**

Joey was sent home the evening after surgery. Vetprofes and transtetor were given during the first week. Joey was on Metacam and topical gentamicin for 10 days postoperatively. The horizontal canal was daily with gentamicin otic (Figure 11), and scale was not allowed to form on the incisions. Joey was brought to the clinic every four to five days for thorough cleaning and medication until tissue removal (it often is difficult for owners to keep the incision completely clean themselves). Cold compresses were recommended for the first five days after surgery to minimize the risk of postoperative edema. Joey was an 8-mitral from postoperative recovery 14 two days after surgery removal.

**Follow-up Examinations**

Two weeks postoperatively the sutures were removed (Figure 12). The two-month follow-up examination showed excellent healing with resolution of the horizontal ear canal (Figure 13).

**Conclusion**

The procedure provides improved aeration and drainage of the horizontal ear canal. This allows for a more successful continuation of medical treatment (until the resolution of all, in Joey’s case). The CO2 laser greatly enhances ear canal surgery by minimizing bleeding and providing great visualization of the anatomical structures during the procedure. This helps the surgeon avoid nerves located at the junction of the external and middle ear canal

We also have noticed that in comparison to the standard cold steel procedure, postoperative drainage from the surgical wound has been markedly decreased. Postoperative swelling is reduced following laser treat- ment, resulting in less patient discomfort. In effect, the CO2 laser is our preferred surgical modality for ear canal ablation.

**Choice of Technique**

Sharp dissection is an acceptable technique. However, the lack of hemostasis with a scalpel makes surgical repair quite difficult. The use of laser surgery is associated with postoperative tissue edema and extension of chronic necrosis, thus compromising healing.

The surgical CO2 laser produces sufficient hemosta- sis without the significant tissue damage associated with electrocautery. Studies have shown that with the proper combination of laser settings and the surgeon’s laser hand speed, the thermal tissue change with the CO2 laser can be as small as 10 microns.

**Surgical Procedure**

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Once the vertical ear canal is exposed and free from all muscle and fascial attachments, it is transected at the horizontal canal (Figure 8). The horizontal incision is made parallel to the tragus (Figure 4) using interrupted cruciate suture pattern. When the vertical canal is closed, the top of the T-shaped incision is sutured in a similar pattern (Figure 10).
How to ablate canine vertical ear canal with CO2 laser

By William E. Sacht, DVM
For The Education Center

Otitis externa is an inflammation of the vertical and horizontal ear canals and surrounding structures, such as the external auditory meatus and pinna.1 Symptoms include pain, itching, redness and swelling of the ears and a malodorous discharge, among others. Otitis externa can be associated with other dermatologic (e.g., allergies) or systemic diseases. Other possible causes include bacterial infections, fungi, yeasts, parasites (e.g., Demodex canis, ticks), foreign bodies or neoplasia. Contributing factors that make animals more susceptible to otitis externa include excessive moisture in the ear canal and a narrow or convoluted ear canal configuration.

Although dogs of any breed can develop ear infections, some breeds are more predisposed than others. Among such high-risk populations are breeds with pendulous ears (e.g., spaniels, basenji hounds) and those with abundant hair in the inner ear (e.g., poodles, schnauzers, Old English sheepdogs).1

When the underlying cause of otitis externa is not properly identified, the disease tends to recur and can become chronic. Secondary to infection, hyperkeratosis and hyperplasia of the skin may occur. Calcification of the ear canal can develop. The presence of hyperplasia, hyperkeratosis and calcification can impede the delivery of medication into the ear canal, thus leaving the dog with chronic infection and pain.

Several surgical approaches exist for the treatment of otitis externa, such as lateral ear canal resection, vertical ear canal ablation and total ear canal ablation with bulla osteotomy, with each requiring surgery of the auricular cartilage, tympanum and external ear canal.

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For The Education Center

**Surgical Procedure**

A T-shaped incision is made with the laser. The laser hand piece is held perpendicular to the target tissue. The initial incision begins at the tragus and extends ventrally to the level of the horizontal canal (Figure 2 and 3). The horizontal incision is made parallel to the tragus (Figure 4). The connective tissue is then reflected, exposing the vertical ear canal. The horizontal incision is then continued around the external auditory meatus outlining the hyperkeratic area (Figure 5). When the vertical ear canal is exposed and free from all muscle and fascial attachments, it is transected at the hyperkeratic region of the ear flap.

**Conclusion**

The procedure provides improved aeration and drainage of the horizontal ear canal. This allows for a more successful continuation of medical treatment (until the resolution of the issue, in Joey’s case). The CO2 laser greatly enhances ear canal surgery by minimizing bleeding and providing good visualization of the anatomical structures during the procedure. This helps the surgeon avoid nerves located at the junction of the external and middle ear structures. We also have noticed that in comparison to the standard cold steel procedure, postoperative drainage from the surgical wound has been markedly decreased. Postoperative swelling is reduced following laser treatment, resulting in less patient discomfort. In effect, the CO2 laser is our preferred surgical modality for ear canal ablation.

Dr. Schulte graduated from Michigan State University in 1973, went into private practice and opened his companion animal practice in 1974. He has been a board member on the Syntacta Reproductive Advisory Panel, the Society for Theriogenology and the Theriogenology Foundation. He has spoken at several veterinary conferences and before veterinary associations and national specialties because of a special interest in canine reproduction. He has lectured and published articles on transvenous and surgical in-seminations using frozen and chilled frozen semen. Dr. Schulte is interested in soft tissue and orthopedic surgery. He has more than 20 years of experience with laser surgery, and he used a 40-watt flexible holmium YAG laser with constant wave and SuperPulse modes.

**REFERENCES**


