Ventral Bulla Osteotomy

Key Points
- The most common condition requiring bulla osteotomy is inflammatory polyps in cats
- Clinical signs vary, but usually include discharge from the ear and scratching at the ear
- Bulla osteotomy involves opening the middle ear to remove the offending polyp
- Prognosis usually is good following surgery

Definition of Bulla
- Bulla = tympanic bulla = middle ear cavity

Anatomy of the ear
- Ear flap (F)
- Ear canal (C)
- Ear drum (D) or tympanic membrane - which separates the ear canal from the bulla
- Middle ear - bulla (B)
- Auditory tube (A) - is a tube that connects the bulla to the back of the throat
- Inner ear (I) - contains the hearing apparatus (trochlea) and the balance organ (vestibular canals)

- The illustration below left is a cross section through the head showing the components of the ear;
- The illustration below right is of a magnified view of the bulla, with the thatched area representing the portion of bone that is removed during a ventral bulla osteotomy surgery

Signs of a diseased middle ear cavity (bulla) and inner ear
- Scratching or rubbing the ear
• Discharge coming out of the ear

• Vestibular signs
  - Tilting of the head toward the affected ear
  - walking in circles toward the affected ear
  - nystagnus - eyes shift back and forth
  - incoordination or inability to walk

• Horner's syndrome
  - third eyelid covers eye
  - pupil becomes smaller than the opposite normal eye
  - slight drooping of the upper eyelid

• Facial nerve paralysis is uncommon with middle ear problems, but occasionally is seen in dogs
  - sagging of lips and face on side affected
  - drooling from affected side due to lack of control of lips
  - inability to blink eye on affected side

• Malaise

• Loss of appetite

• Pain upon opening the mouth - due to inflammation of the joint of the jaw (TMJ)

• Breathing difficulty or snorting due to
  - discharge draining into the back of the throat via the auditory tube
  - extension of a polyp from the the middle ear into the back of the throat

Potential disease conditions in the bulla

• Inflammatory polyps - most common in cats

• Cancer

• Infection

• Foreign body
Inflammatory polyps in cats

- Cause is unknown, but may be associated with chronic recurrent upper respiratory infections.
- Feline leukemia virus or Feline Immunodeficiency virus may suppress the immune system, resulting in chronic infection that leads to polyp formation.
- Ear polyps are commonly found in the younger cats, malignant tumors are more common in older cats.
- A polyp is rooted in the middle ear cavity and grows until it ruptures the ear drum, then it continues to grow out of the ear canal.
- Some inflammatory polyps will grow through the Eustachian tube (auditory tube) and appear as a mass in the back of the throat.
- Removal of the polyp by plucking it out of the ear canal is about 50% successful when medications (oral - Baytril and Dexamethasone, and ear drops - Baytril and Synotic) are also administered.
- Ventral bulla osteotomy is a more successful procedure, as the entire polyp can be removed more completely.
- Below is a view down the ear canal of a cat that has a polyp (pink mass) that is penetrating through the ear drum.

Diagnostic tests

- Blood work - Complete Blood Cell Count and Chemistry Profile.
- Cats only - Feline Leukemia and Feline Immunodeficiency Virus tests.
- Culture of fluid from the ear or bulla.
- Biopsy of tumor if present.
- Radiographs (x-rays) of the bulla.
• CT scan of the bulla is the most diagnostic test to see the internal structure of the bulla and extent of tumor invasion

**Surgery**

• An incision is made on the under side of the neck, just behind the jaw bone

• The bulla is exposed and is opened

• If only infection is present, the lining of the bulla is removed and the area is flushed with saline solution

• If present, the tumor or polyp is moved

• In the photo below, a white inflammatory polyp is being removed from the middle ear of a cat

![Photo of a white inflammatory polyp being removed](image1)

• Below is a photo of a large polyp that was removed from the middle ear cavity in a cat

![Large polyp](image2)
Potential complications after surgery

- Cats
  - Recurrence of inflammatory polyp - 80% cure rate with surgery
  - Vestibular signs - uncommon and usually resolves with time
  - Facial nerve paralysis - uncommon
  - Persistent infection
  - About 80% of cats develop Horner's syndrome after the surgery
    - this can occur following removal of a nasal pharyngeal polyp, removal of a polyp from the ear canal, or removal of a polyp via ventral bulla osteotomy
  - In the photo below, this cat has signs of Horner's syndrome immediately following surgery; take note of the prolapsed third eyelid (white membrane covering the cat's right eye); this problem usually resolves in about 30 days
  - The photo below was taken 24 hours after surgery demonstrating that the Horner's syndrome has almost completely resolved (minor prolapse of the third eyelid and slightly smaller pupil in the right eye)
• Dogs
  
  o Same potential complications as cats, but Horner's syndrome is uncommon

Dogs that already have vestibular signs, such as a head tilt may have permanent damage to the balance organ, and surgery may not correct this problem; the goal of this surgery is to relieve the infection so that the equilibrium (sense of balance) does not get so bad that the dog is unable to walk