Respiratory system (upper tract)

ANATOMY

Nose

The nasal cavity begins at the nostril, ends at the choanae, and is divided longitudinally by the nasal septum into two nasal fossae.

The nasal openings are referred to as *nares* or *nostrils* and open into the nasal vestibule
The external nose is supported by a paired, symmetric, cartilaginous frame The cartilaginous septum separates the right and left nasal fossae in the rostral plane.

Nasopharynx

The nasopharynx is the portion of the pharynx dorsal to the hard and soft palates. The choanae are the rostral nasopharyngeal meatus they are considered the caudal border of the nasal cavity. At this location, the ventral, dorsal, and lateral walls of the nasopharynx are formed by the hard palate, vomer bone, and palatine bone.

Each auditory tube opens into the lateral nasopharynx through a slit-like opening directly caudal to the caudal border of the pterygoid bone.

DISEASES OF THE NOSE AND SINUSES

Foreign Bodies

Foreign bodies found in the noses of dogs and cats commonly include plant matter; however, a wide variety of items may be found. radiopaque foreign body itself may be visualized.

DISEASES OF THE NASOPHARYNX

Nasopharyngeal Polyps

Inflammatory polyps are benign lesions arising from the mucosa of the auditory tube, middle ear, or nasopharynx. Inflammatory polyps may also commonly occur in the external ear canal or in both locations. The cause is unknown; congenital and infectious causes, including calicivirus and herpesvirus.

Nasopharyngeal polyps are frequently associated with clinical or histopathologic evidence of inflammation, but it is unclear if the inflammation is a cause or result of the polyp.

Treatment of Nasopharyngeal Polyps

Nasopharyngeal inflammatory polyps may be treated with traction–avulsion with or without a ventral bulla osteotomy.

To perform removal by traction, the animal is placed under general anesthesia and intubated. The polyp can be palpated
dorsal to the soft palate. The palate can be retracted rostrally or the polyp digitally manipulated caudally. The polyp is grasped gently but frmly with Allis tissue forceps or hemostats without transecting its base. Gentle ventral pressure is exerted with the instrument. If possible, a second instrument is used to grasp the polyp as dorsally on its base as possible, and gentle, steady traction is continued until the polyp is released.

Most or all of the stalk associated with the polyp will also be removed as long as the polyp is retracted with gentle steady pressure and gripped close to its base. In some patients, blood will be evident beneath the tympanic membrane on otoscopic examination after polyp retraction.

Retraction may result in Horner syndrome or vestibular signs. Rarely, an approach to the nasopharynx via a midline incision in the soft palate is required to facilitate polyp exposure and removal.

Nasopharyngeal Stenosis

Nasopharyngeal stenosis is most often an acquired condition resulting from nasopharyngeal inflammation and has been reported in dogs and cats. ongenital stenotic nasopharyngeal dysgenesis has also been reported. Animals with acquired stenosis often have a history of nasopharyngeal surgery, an upper airway infection, or some other inciting cause of nasopharyngeal inflammation

Clinical signs

chronic nasal discharge, open-mouth breathing, lack of nasal airflow, gagging, and sneezing.

Treatment

First, open surgical resection of the stenotic membrane has been reported. however, restenosis after surgical correction has been documented. Accurate mucosal apposition after resection may prevent web formation and restenosis postoperatively.

Secondly, endoscopic-guided balloon dilatation of the stenotic membrane has been successful in a number of cases. Animals may need more than one dilatation if clinical signs recur.

Use of steroids and antibiotics after surgery has been described.

The palate

The palate separates the nasal passages, choanae, and nasopharynx from the oral cavity and oropharynx. Failure of the palate to fuse or trauma to the hard or soft palate results in an abnormal communication between the mouth and nose or the oropharynx and nasopharynx.
The hard palate is composed of the palatine, maxillary, and incisive bones and the palatal mucoperiosteum

The soft palate is continuous with the hard palate and extends just caudal to the last maxillary molar teeth. It is composed of a stratifed squamous oral epithelium rich in palatine glands, the palatine muscles, and a nasal epithelial surface.

PHYSIOLOGY

The soft palate has two functions during swallowing:

(1) stimulation of sensory nerves in the palate is part of the mechanism that triggers swallowing.
(2) closure of the intrapharyngeal opening during swallowing and vomiting prevents swallowed food, liquid, and vomitus from entering the nasopharynx and being subsequently aspirated.

PALATE DEFECTS

Palate defects are either present at birth (congenital) or are acquired after birth.

Congenital lip and palate defects in cats and dogs can be inherited or are a sequela of intrauterine trauma or stress.

Hard palate clefts are almost always in the midline and are usually associated with a midline soft palate cleft.

Soft palate clefts without hard palate clefts may occur in the midline or are unilateral. An association between congenital unilateral defects or hypoplasia of the soft palate and middle ear pathology.

Clinical Signs and Diagnosis

(externally visible, cleft lips) Clinical signs and history associated with congenital secondary palate defects include

1- failure to create negative pressure for nursing,
2- nasal discharge (drainage of milk from the nares during or after nursing),
3- coughing, gagging, sneezing, nasal reflux,
4- tonsillitis, laryngotracheitis, aspiration pneumonia,
5- poor weight gain

Treatment

Surgical goals include closure of well-vascularized and tension-free tissues separating the oral and nasal passages.
The choice of technique used depends on the age and systemic health of the patient, the viability and integrity of local tissues, the location and size of the defect, the amount of tissue available for flap procedures, and the oral surgeon's preference.

Repair of Rostral Defects

In the case of congenital defects of the primary palate, close the lip and most

rostral hard palate defects by simple sliding procedures are rarely successful because there is no connective tissue bed to support the flaps.

The floor of the nasal vestibule and most rostral hard palates the treatment by creating flaps of oral and nasal soft tissue or flaps that are harvested from oral soft tissue only. This is often complicated by the presence of teeth in the incisive bone and maxilla; removal of one or more incisors and the canine tooth on the affected side before lip and palate surgery will facilitate flap management.
Rostral hard palate defects resulting from trauma, osteomyelitis, osteonecrosis, or partial maxillectomy

Overlapping Flap Technique for Hard Palate Repair

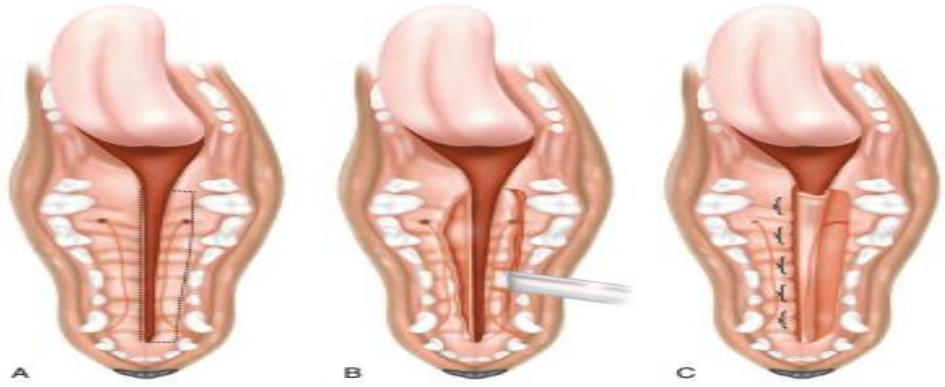
The overlapping flap technique is preferred for midline clefts of the hard palate There is less tension on the suture line, the suture line is not located directly over the defect, and the area of opposing connective tissue is larger, which results in a stronger scar.
1- Incisions are made in the mucoperiosteum to the bone along the dental arch about 1 to 2 mm away from the teeth and to the rostral and caudal margins of the defect on one side,

2- forming an overlapped flap, and at the medial margin of the defect on the other side, forming an envelope flap.

3- Both flaps are carefully undermined with a periosteal elevator.

4- The envelope flap is also undermined with a periosteal elevator on its medial margin to create a pocket of space for the overlapped flap.

5- The overlapped flap is inverted at its base so that its periosteal surface is exposed and secured under the envelope flap with horizontal mattress sutures so that large connective tissue surfaces are in contact. Granulation and epithelialization of exposed bone generally are completed in 3 to 4 weeks



Medially Positioned Flap Technique for Soft Palate Repair

The medially positioned flap technique is often used for repair of midline clefts of the soft palate

1- Incisions are made along the medial margins of the defect to the level of the caudal end of the tonsils.
2- Palatal tissues are separated with blunt-ended scissors to form a dorsal (nasopharyngeal) and ventral (oropharyngeal) flap on each side.
3- The two dorsal and the two ventral flaps are sutured separately in a simple interrupted pattern to the midpoint or caudal end of the palatine tonsils.

A **bilateral overlapping flap technique for a midline soft palate cleft has also been described**.

Repair of a unilateral soft palate defect is performed with or without removal of the ipsilateral tonsil. The tonsillectomy incisions can be extended rostrally to meet at the most rostral location of the soft palate defect and continued along the medial edge of the soft palate.

The pharyngeal and palatal tissues are separated, and two dorsal and two ventral flaps are sutured separately in a simple interrupted pattern to the midpoint or caudal end of the contralateral tonsil.

Medially Positioned Flap Technique for Hard Palate Repair

Traumatic clefts of the hard palate associated with high-rise syndrome in cats can often be managed with the medially positioned flap technique.

1- The torn palatal tissues are debrided to provide fresh tissue edges. If the defect is older and the tissue edges have epithelialized,
2- incisions are made at the medial aspects of the hard palate defect.
3- Simple undermining of inelastic palatal mucoperiosteum with a periosteal elevator
4- incisions about 1 to 2 mm away from the maxillary cheek teeth on one or both sides are often necessary so the flaps can be moved medially into apposition with each other.
5- The exposed bone next to the teeth is left to granulate and epithelialize.
6- Torn palatal soft tissues are then sutured in a simple interrupted or mattress pattern.