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COSMETIC AND ADVANCED SURGERY OF THE NASAL PLANUM AND NASAL SINUSES IN DOGS

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Introduction

The nasal plane is the first and hairless part of the nose of dogs and cats, and is covered with thick keratinized epidermis. It includes the nostrils or nares, which are separated from each other by a groove or philtrum [1,2]. The nasal cavity itself is divided by a cartilaginous septum rostrally and a bony septum caudally into two non-communicating symmetric sides. During inhalation, air enters the nasal vestibule and is then directed into three longitudinally oriented chambers, the ventral, middle and dorsal nasal meatuses [1,2]. The vertically oriented common meatus just lateral to the septum connects the other three meatuses. The conchae consist of the rostrally located ventral (maxilloturbinates) conchae, the smaller dorsal (dorsal nasoturbinates) conchae, and the caudally located ethmoidal conchae (ethmoturbinates)[1,2].

Clinical signs & clinical examination of the nose

Symptoms of nasal plane disease like depigmentation, crustformation, dehydration, hyperkeratosis and inflammation are usually noted by the owner[2]. Unilateral or bilateral nasal discharge, sneezing and reverse sneezing are indicative of intranasal disease. Nasal plane depigmentation is often seen in patients with fungal disease [2]. Air passage is usually diminished in patients with tumors or large foreign bodies [2,3]. Pain on palpation of the nose is highly indicative of fungal disease [2]. Additional examination of the nose and nasal cavities primarily consists of diagnostic imaging (radiography, CT-scan, MRI) and endoscopy. After diagnostic imaging, endoscopy is necessary in most patients. Not only for diagnosing a specific condition, but also because material can be obtained for bacterial and fungal culture or cytology and biopsies can be taken for histopathologic evaluation. All procedures require a deep general anesthesia. For a complete rhinoscopy, a variety of rigid and flexible instruments can be used, but a rigid scope is preferable and provides adequate and superior visualisation of the nasal sinuses [2].

Surgical diseases of the nasal plane & nasal sinuses

Congenital malformation of the nasal plane in the form of stenotic nares is part of the brachycephalic
obstructive syndrome (BOS) and is a common finding in brachycephalic dogs, but also occurs in Persian cats. Other congenital malformations that require surgery are clefts of the primary or secondary palate [2,4]. In dogs squamous cell carcinoma is the most common tumour type of the nasal plane [2,3]. SCC’s are usually seen in adult or aged animals and are locally invasive but late to metastasise. They are however erosive and deeply infiltrative. For complete resection, complete nasal plane amputation is usually necessary [2-4]. In Labrador Retrievers, intranasal SCC’s usually originate from the cranial nasal septum. In these dogs, the tumor tends to behave rather benign and complete surgical excision is usually possible (see modified lateral rhinotomy). Diseases of the nasal plane in cats are uncommon with the exception of tumours. The most common tumor is squamous cell carcinoma (SCC) like in dogs [2-4]. This tumor manifests itself as a progressive ulcerative and erosive inflammation of the nasal plane. The recommended treatment for most tumors of the nasal plane in dogs and cats is nasal plane amputation [2-4], but depending on tumor type and invasion, in most patients a cosmetic result can be achieved.

Correction of stenotic nares

Stenotic nares are the result of underdevelopment and lack of normal rigidity of the cartilages of the rostral nose. Stenotic nares are frequently diagnosed in younger brachycephalic dogs (less than 2 years) with an overlong soft palate and have a favourable prognosis after surgical treatment [2,4]. The therapy consists of surgical resection of a part of the nostril. Several techniques have been described, the author uses a slightly modified version of the horizontal wedge technique [4]: With this method, a wedge of the nostril is removed in a medial to lateral direction. The incision is started near the medial edge of the wing and continued along the ventral edge to the lateral border. A second incision is made horizontally across the rostral surface of the wing of the nostril, creating a large dorsal and smaller ventral part. The resulting flap is sutured dorsally to close the defect with four or five sutures of a 4-0 or 5-0 absorbable material.

Closure oronasal fistulae and palatal defects

Congenital oronasal fistulas are abnormal communications between the oral and nasal cavities involving the soft palate, hard palate, premaxilla and/or lip [4]. The cleft is present at birth, although it is not always recognized immediately. Clinical signs are difficulty nursing, nasal regurgitation of milk, nasal discharge, coughing (aspiration pneumonia), gagging and failure to thrive. The diagnosis is based on clinical signs and visual examination of the lip, hard and soft palate. Thoracic radiographs are useful in evaluating aspiration pneumonia. Surgical treatment generally is delayed until the patient is at least 8 weeks of age [4]. At that time they are better anesthetic candidates and tissues are less friable and hold sutures better. The primary goal of repairing cleft palate is to reconstruct the nasal floor. Several procedures may be necessary before the entire cleft is permanently reconstructed. Multiple techniques have been described, but it is essential to try to close the hard palate in two and the soft palate in three layers [4].

Nasal plane resection

For complete resection of the nasal plane in the cat, the animal is positioned in sternal recumbency, the surgical area is carefully palpated to estimate tumour extension into adjacent tissue. The nasal planum is completely removed with a 360 degrees skin incision made with a scalpel [4]. The incision is made so it transects the underlying turbinates. The cartilage of the nasal plane and the turbinates should be cut with an incision angled at about 45 degrees to the hard palate. Hemorrhage can be controlled by direct pressure. A
pursestring suture of 2-0 or 3-0 absorbable or nonabsorbable suture material is placed through the skin around the incision to cover the exposed nasal conchae partly with skin. The new nasal orifice is closed to approximately 1 cm in diameter. Postoperative care consists of an Elizabethan collar, broad-spectrum antibiotics for 1 week and analgesia for 3 days. In early lesions or in absence of tumor invasion of the nostrils, cosmetic reconstruction can be achieved using local tissue.

**Crescentic Nasojugal Flap**

The bridge of the nose in dogs and cats can be very difficult to reconstruct due to the limited availability of free local tissues. Recently, a crescentic nasojugal flap (CNJF) for nasal tip reconstruction after tumor removal in human patients was described [5]. The donor skin is harvested from the lateral side of the nose and the cheek or the perialar region. A crescentic perialar skin excision is made to enable advancement of the skin of the cheek. A second, triangular excision is made on the contralateral side of the defect to prevent a dog-ear upon closure of the defect. Upon closure, the sutures are placed in the alar and alar-labial groove, yielding the excellent cosmetic appearance of the flap in people [5]. The feasibility of the CNJF in dogs was studied by performing the technique unilaterally and bilaterally on canine cadavers [6]. The applicability of the CNJF for reconstruction of the rostral nasal area in a dog with a large rostral nasal defect as a result of granulomatous inflammation involving the nasal plane and the nasal dorsum was subsequently demonstrated [6].

**Modified lateral rhinotomy for SCC of the nasal septum**

As described by Pavletic, it is possible to elevate the central planum as a dorsally based flap, thereby preserving this tissue while gaining access to the cranial nasal septum [7]. To get full access to tumors of the rostral cranial septum, usually squamous cell carcinoma, this approach can be combined with a lateral rhinotomy, as described by Hedlund in analogy with the technique used in humans for surgical removal of nasal septum squamous cell carcinoma [4]. The surgeon directs the incision dorso-caudally from the angle of the rhinarium toward the nasomaxillary notch between the dorsal and ventral parietal cartilage, transecting accessory cartilage. The tumor can now be removed full-thickness. The lateral rhinotomy incision is closed in three layers (nasal mucosa, cartilage or subcutaneous tissue, and skin). The nasal septum flap is then resutured into position using a simple interrupted suture pattern, using preplaced sutures.

**References**