Removal of Oral Soft Tissue Tumors

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Introduction
Oral soft tissues not in direct proximity with the jaw bone include the lips, cheeks, tongue, floor of the mouth, soft palate, and palatine tonsils. When oral tumors affect soft tissues such as the gingiva or alveolar mucosa, a portion of the underlying bone usually needs to be included in the resection so that clean (tumor-free) surgical margins can be achieved. This lecture also includes information on postoperative management of the oral tumor patient.

Preoperative Work-Up
Depending on the extent of the planned surgery, preoperative workup may include routine blood tests, blood type determination and cross-matching, coagulation profiles, buccal mucosa bleeding time, regional lymph node aspirates, and diagnostic imaging (thoracic radiographs, abdominal ultrasound, head computed tomography).
The client must be informed about intra- and postoperative complications, follow-up care, long-term function and quality of life, and prognosis. A biopsy should always be taken in a location that can be incorporated in the definitive resection.

Surgical Anatomy of Lips, Cheeks and Tongue
Labial and buccal mucosae face the inside of the lip and cheek, and the former is separated from the skin by the mucocutaneous junction. The lips and cheeks of cats are ‘tighter’ and their oral vestibules less spacious than in dogs, making their labial and buccal mucosae less available for closure of large intraoral wounds. The commissure is where the upper and lower lips meet.
Three important structures run within the soft tissues of the cheek nearly parallel over the masseter muscle in a caudorostral direction. These are the dorsal and ventral buccal branches of the facial nerve and the parotid duct, the latter traversing between the two nerves and opening into the mouth at the parotid papilla in the buccal mucosa near the maxillary fourth premolar.
The body of the tongue constitutes the rostral two-thirds, and the root of the tongue constitutes the caudal one third. The lateral margins of the tongue separate the dorsal and ventral surfaces. The tongue is thinnest at its tip and gradually increases in thickness caudally. The muscular structure of the tongue is complex. Extrinsíc and intrinsic muscles coordinate the movements necessary for thermoregulation, lapping water, food prehension, mastication, and swallowing.
The lingual mucosa covers the dorsal and ventral tongue surfaces; it is thick and heavily cornified dorsally but thin and less cornified ventrally. The cat’s dorsal tongue surface is very rough, having firm papillae that point caudally. The flexible sublingual mucosa covers the floor of the mouth; its submucosa contains the paired sublingual veins. The lingual frenulum connects the body of the tongue to the floor of the mouth. The sublingual caruncles are situated at the frenulum’s rostroventral aspect and contain the orifices of mandibular and sublingual gland ducts which run between the mandible and the root of the tongue. Trauma to these ducts during tongue or mandibular surgery should be avoided. They must be ligated if
transection occurred. This may result in transient glandular swelling, followed by atrophy of the gland.

The arterial supply to the tongue is primarily through the paired lingual arteries. The right and left lingual arteries anastomose in the tip, body, and root of the tongue. Some collateral arterial blood supply is received through the sublingual arteries. Drainage is through the paired lingual and sublingual veins. The maxillary and mandibular branches of the trigeminal nerve are sensory, but the mandibular branch also supplies motor function to the masticatory musculature and other muscles. The motor nerve supply is by the hypoglossal nerve. The lingual nerve is a branch of the mandibular nerve and provides sensory function to the rostral two-thirds of the tongue. The facial nerve is responsible for taste in the rostral-two thirds of the tongue.

Lip and Cheek Resection
Lip and cheek tumors range from benign papillomas to malignant melanomas, fibrosarcomas and other malignancies. Resection of tumors of the lip and check requires special considerations. A functional lip commissure should be maintained so that the mouth can open adequately. The mucosa and skin should be closed in separate layers. Injury to the ducts of the parotid and zygomatic salivary glands is to be avoided. Cosmetic closure of any resulting facial defect is accomplished by advancing or rotating tissue from the lower lip, and the side of the face, head or neck.

Tongue Resection
Calciosis circumscripta can present as well-defined mineralization in the rostral portion of the tongue typically in young, large-breed dogs. The cause of lingual calcnosis is unknown, although the rostral location and the young age of the patient suggest that mechanical trauma or chemical agents may be etiologic factors. Treatment is resection of affected tissue and apposition of the incised edges with absorbable suture material. Hemostasis can effectively be provided intraoperatively by having an assistant compress the tongue digitally some distance caudal to the surgical site, while wedge excision is performed. Proliferative and ulcerated lesions should always be examined by biopsy before resection (or before euthanasia if the lesion appears to be too extensive for surgery or radiation therapy). Lingual eosinophilic granuloma, which is treated medically with good results, appears similar to an invading neoplasm in some cats and dogs. Benign lingual neoplasms include papilloma, plasma cell tumor, and granular cell tumor. Squamous cell carcinoma is a common malignant neoplasia of the tongue in both species. The sublingual area is often involved in the cat, with the tumor often invading the root of the tongue and causing it to be tied down to the floor of the mouth. Other lingual malignancies include malignant melanoma, hemangiosarcoma, fibrosarcoma and rhabdomyosarcoma. Mass lesions are resected with good to excellent results if the resection is confined to the free rostral or – due to the more ventral location of supplying arteries – the dorsocaudal portions of the tongue. Partial surgical resection is likely to result in significant hemorrhage. Intraoperative hemostasis is achieved by clamping the tongue caudal to the excision site with one or two non-crushing intestinal forceps. A window may be created (stab incision and blunt dissection) through the lingual frenulum and sublingual tissues to allow engagement of the blades of the forceps around the tongue. Once the affected piece of tongue is removed, the connective tissue and mucosa can be apposed with synthetic absorbable sutures. Malignant lesions located deep in the root of the tongue or causing the tongue to be tied down to the intermandibular tissues are likely not amenable to complete resection without loss of function of remaining tongue tissue.
Loss of up to one third of the body of the tongue may not necessarily be associated with clinical signs. Animals may compensate for greater amounts of tongue loss by sucking in liquid food or tossing bolused food to the oropharynx. Esophagostomy or gastrostomy feeding tubes should be considered during the immediate postoperative period after major tongue surgery. Partial loss of the tongue is more likely to be troublesome in cats; even though they can eat and drink, they may be unable to groom effectively. One possible solution to this problem is to acquire an additional cat, which may socialize by grooming the disabled cat.

**Postoperative Care**

Pain control is achieved with a combination of intraoperatively given longer-acting local anesthetics, centrally acting opioids, and NSAIDs. Patients undergoing radical resective surgery invariably benefit from placement of a transdermal fentanyl patch plus injectable opioid supplementation until the patch achieves adequate blood levels. Chlorhexidine digluconate solution or gel (0.1-0.2%) is administered into the mouth for 2 weeks. Antibiotic treatment is not required after oral and maxillofacial surgeries in the otherwise healthy patient. Water is offered once the animal has recovered from anesthesia. Soft food is offered 6-8 hours after surgery and maintained for about 2 weeks. Dogs usually eat the same or following day; cats may benefit from placement of an esophagostomy tube to ensure proper nutrition and medication during the immediate postoperative period. Elizabethan collars, tape and nylon muzzles, or other restraining devices may be used in some animals to prevent disruption of the surgical sites. Reexaminations are scheduled at 2 weeks (removal of skin sutures) and at 2, 6, 12, 18, and 24 months postoperatively. Collaboration with an oncologist is helpful after histopathological results return to discuss the need for further treatment (surgery, radiation therapy and/or chemotherapy). Palpation of non-resected lymph nodes (with cytological or histopathological examination of enlarged nodes) and thoracic radiographs should be performed to monitor for regional and distant metastasis.