ORAL MASSES: A FAMILY PRACTIONER'S GUIDE

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First things first, a reminder: When you find something growing on the gingiva, you can call it an epulis. An "epulis" is an oral exam finding, but rarely an accurate histopathologic diagnosis. So if a pathologist's report says "epulis" in the diagnosis, get a second opinion.

Exuberant gingival growth is limited to the gingiva and can be in a single area, a single quadrant, multifocal or generalized. Unless you submit a biopsy sample for histopathologic diagnosis, this clinical finding should be termed "gingival enlargement." Focal fibrous hyperplasia is a histopathologic change in the stroma and clinical consistency of the gingiva, and does not typically require surgical intervention. Gingival hyperplasia, on the other hand, is a histopathologic change that can cause gingival overhangs called "pseudopockets." This means that the gingiva still attaches to the tooth at the appropriate place, but a deep recess created by tall or overhanging gingiva can trap plaque and debris. Gingival hyperplasia is typically plaque responsive, but can also be brought on by certain prescription drugs, genetics (breed predisposition) and other factors.

Odontogenic tumors arise from cell lineages associated with the teeth and periodontal ligament. They can grow slowly or quickly, be pigmented or inflammatory, cystic or mineralized. They do not metastasize and typically are great candidates for curative-intent surgery. **Peripheral odontogenic fibroma (POF)** used to be classified as "fibromatous or ossifying epulis," but not since 2014. They arise from periodontal ligament tissue, which means they have a single tooth origin. They can mineralize over time, which can be appreciated radiographically as "bone-like" proliferation, even though it's not really bone. Depending on how slowly they grow, they can maintain pigmentation. **Odontoma**, further categorized as "complex" or "compound," is a superficial tumor that contains enamel, dentin and pulp tissues in either disorganized or organized structures, called "denticles. Odontomas are largely space-occupying within the gingiva and alveolar bone and can result in eruption errors in young dogs. **Ameloblastic fibroma or fibro-odontoma** is another tumor type that affects young dogs, and it is not well-described in the current veterinary literature. These tumors can grow rapidly and can have cystic components. They look scary clinically, in part because they cause rapid bone remodeling and, secondarily, tooth displacement. **Canine acanthomatous ameloblastoma (CAA)** occur commonly in middle-aged dogs and have a predilection for the rostral mandible (~40%). They can grow rapidly, especially after "surgical activation" such as biopsy sampling or extraction of an involved tooth. Because of their rapid growth, they are clinically friable and/or ulcerative and they infiltrate extensively into the local bone. Fortunately, they are remarkably responsive to surgery, even with positive margins, so please always give your dentist the chance to resect, even if it looks ugly.

Odontogenic cysts also arise from epithelial lineages related to the tooth or periodontium. Remember, ALL tooth-related cysts are "odontogenic cysts" *unless you have histopathology.* **Dentigerous cysts** arise from the enamel protecting cells that never get the chance to erupt form epithelial cyst lining and therefore any unerupted enamel could form a cyst lining at any age. **Radicular cysts** can form on seemingly normal, erupted tooth roots and cause bone remodeling that may not visible clinically. **Lateral cysts** can form as an inflammatory response on a diseased tooth. Sometimes these definitions overlap. All odontogenic cysts expand, cause the surrounding bone to thin out, and can lead to secondary changes in neighboring teeth, like root resorption.

Here are some rules of thumb for odontogenic tumors and cysts: Remember to sample all tumor/cyst tissue for histopathology. Take photos and rads whenever possible and include these images with your histopathology submission. Be skeptical if the histopathology results do not match the clinical picture of the mass: growing faster? slower? bony expansion/lysis/proliferation? Is there ulceration or depigmentation? Ask for advice from your friendly neighborhood vet dentist.

Non-odontogenic masses just happen to arise in the oral cavity or jaws. **Canine viral papillomatosis** occurs mostly in young and/or immunocompromised patients. Although they are typically self-limiting due to poor vascular supply, severe multifocal disease can mechanically obstruct the oropharynx, impairing swallowing and panting. **Granulomas** are inflammatory lesions that can occupy space and cause pain. As proliferative masses, they are invariably caused by trauma. In dogs, self trauma from chewing can lead to sublingual and buccal mucosal granuloma formation that fibrose/scarrify into firm tissue that rest in the patient's occlusion, like chewing gum. In cats, self trauma from abnormal tooth to mucosa contact is actually iatrogenic, following extraction of the mandibular molar with closure under tension. Maxillary carnassial teeth traumatize the buccal

mandibular mucosa, creating a "**pyogenic granuloma**." These lesions are mean looking, and often confused for malignant tumors! Finally, **ranulas (sublingual sialocele)** occur secondary to traumatic or other pathologic rupture of the sublingual salivary duct. Remember, this is not a cyst or a dilated duct, it's just loose saliva outside constantly flowing into the sublingual tissues.

Now, let's talk about **non-odontogenic tumors in DOGS**. For some reason, **malignant melanoma** was widely reported in the 1970s and 1980s as the most common oral tumor in dogs. This baffles today's veterinary dentists, but maybe they are less likely to be referred because they are so easily recognizable? As with melanomas elsewhere in the body, there are melanotic vs. amelanotic (which may act more agg ressive in the oral cavity). Melanomas metastasize to the regional lymph nodes, even though they may not clinically enlarge. Generally speaking, surgery and chemo is the best chance for extended survival, including the popular use of the melanoma vaccine. There is a wide range of reported median survival time (MST) based on tumor size, location and spread, and newer research suggests that even debunking can provide proportionate survival benefit. **Squamous cell carcinoma (SCC)** is arguably the most common oral malignancy seen in referral dental practices. SCC has a wide range of clinical presentations and is classically seen in older dogs (8-9y median age). SCC surgery (with 2cm margins) is an excellent option, when possible, for tumors in the jaws, but not in the tonsils. SCC has a reported MST of 1+ years, but is dependent on tumor location and age of the patient. Chemo/radiation following surgery has a better reported response in dogs than cats. A subtype of SCC, called papillary SCC, acts like a completely different tumor, does not metastasize and affects young dogs. Papillary SCC also is a great candidate for curative-intent surgery. **Fibrosarcoma (FSA)** is also a highly reported oral tumor in dogs. It's really important to be thinking about "biologically high-grade, histologically low-grade" FSA, common in Golden Retrievers. Early recognition of an ambiguous "fibromatous" histopath report, early diagnosis and aggressive local control is *essential (even if it looks like you can just peel it off the bone).* FSA have a relatively high recurrence rate following surgery alone (1 yr survival rate is ~50%), and radiation studies are mixed. Discuss adjunctive therapy with your local dentistry and oncology team on a case-by-case basis. **Osteosarcoma (OSA)** also has a wide range of clinical presentations, including squishy cystic masses. OSA have relatively high metastatic rate, which is why we CT these guys a lot to try to catch thoracic metastases when scanning the maxillofacial areas for surgically planning.

Non-odontogenic tumors in CATS is a shorter, sadder story, because **squamous cell carcinoma (SCC)** makes up 70-75% of all oral tumors in cats. Commonly thought to be caused by environmental factors via grooming: tobacco smoke, flea collars, canned food/tuna, etc., SCC tumors are rarely diagnosed in cats when they are small enough to surgically resect successfully. The median survival time (MST) is reported as 30 days to 6 months REGARDLESS OF TREATMENT. Getting the diagnosis is terrible, too, since the initial biopsy procedure seems to "accelerate" or "activate" tumor growth. Surgery, chemo, accelerated radiation success is extremely case-specific and a dedicated owner and perfect candidate patient might have good results. On a personal note: *I am not performing curative intent surgery on these cases. By the time they see me, it's unilaterally too late for surgery.* NSAIDs are frequently prescribed palliatively for pain, perineoplastic inflammation, anti-tumor COX-2 activity which can slow neoplastic growth. **Fibrosarcoma** is the second most common oral tumor in cats (10-20% of oral tumors in cats), and requires aggressive local control, which is sometimes incompatible with an acceptable quality of life for the patient. After all, 2cm margins is a lot of cat! CT-guided surgical planning will help determine if a tumor is operable with good post-op functionality. There are at least a dozen tumor types, odontogenic or non-odontogenic, that make up a minority of diagnoses specific to cat mouths. If you ever biopsy something, and it comes back as something that is no SCC or FSA, refer to a dentist as soon as possible to determine if curative-intent surgery is an option.

Here are my **rules of thumb for non-odontogenic tumors**: oral tumors are QUALITY OF LIFE THREATENING before they are life threatening. Owners should be educated to expect bleeding, pain, malocclusion and drooling, which will result in humane euthanasia at some point. These patients do not go quietly into the night. Submit deep BONY samples for histopathology. Take photos and radiographs, and include these images with your biopsy submission. Consider staging early, with thoracic radiographs and lymph node FNA cytology. These early results may dictate whether owner pursue referral, surgery, palliative care or euthanasia.

Benefits of local control (curative intent surgery) include an opportunity to cure odontogenic tumors and growths, reducing the odds of metastasis in early stage malignant tumors, increasing efficacy of adjunctive oncologic therapy, reducing pain, infection, bleeding and pathologic fractures in all patients, and increasing time that the family and the patient have together.