The oral cavity is a very common place to encounter neoplastic growths, which may range from benign to malignant. The key to successful therapy of oral masses is early detection and definitive diagnosis. The best therapy for oral masses is complete surgical resection. If surgery is performed early, the procedure is much less invasive. In addition, early detection and treatment decreases the odds for tumor metastasis. The information presented in this article not only helps improve patient care but also improves practice revenue through proper client education (see Educating Clients About Oral Neoplasia, page 56).

**Types of Masses**

**Benign Masses**

The most common oral growths were originally termed epulids (fibromatous and ossifying); now they are identified as peripheral odontogenic fibromas. Another benign oral mass is the acanthomatous ameloblastoma, which was originally termed an epulis.

Peripheral odontogenic fibromas are overgrowths of the periodontal ligament (Figures 1A and 1B), classifying them as hamartomas (benign masses resulting from an overgrowth of mature cells normally present in the affected tissue). These masses can grow very large, but are not aggressive. They do not cause bony reaction (Figure 1C), but the ossifying type produces bony proliferation.

Acanthomatous ameloblastomas are locally aggressive, but do not metastasize. The most common location of these fleshy tumors is in the incisor/canine region of large-breed dogs. They originate within the bone but do not have radiating microtendrils (Figure 2).

**Malignant Masses**

Squamous cell carcinomas (Figure 3) are the most common malignant oral tumors in cats, with fibrosarcomas (Figure 4, page 54) a distant second. Both are typically seen in older cats and locally aggressive but late to metastasize. These soft tissue tumors secondarily invade bone, sending out branches of cells that cannot be seen clinically.

Melanomas (Figure 5, page 54) are the most common malignant oral tumor in dogs (typically seen in older dogs with dark pigmented gingiva). Melanomas are locally aggressive and also metastasize very early in the disease course. At time of diagnosis, 90% of melanomas have already spread. Fibrosarcomas (Figure 6, page 54)
and squamous cell carcinomas (Figure 7, page 54) are also seen in dogs.

**Cysts**

Cysts are a subset of oral masses:

- **Dentigerous cysts** (Figure 8, page 54) are the most common cysts, which arise from the enamel-forming organ of an impacted tooth. They are most commonly found in mandibular first premolars of brachycephalic breeds. Their incidence in veterinary medicine has not been documented, but anecdotally they are found in approximately 50% of embedded teeth.

- **Radicular cysts** (Figure 9, page 54) are another type of cyst that develops from embryonic tissue remains, usually due to an inflammatory stimulus from the tooth. As cysts grow, they cause bone loss by pressure. They can grow quite large in a short period of time, quickly resulting in weakened bone.

**DIAGNOSIS**

During routine physical examinations, an oral examination should be performed. Any oral masses are cause for concern (especially in felines) and should prompt a dental procedure and biopsy or, at minimum, very careful monitoring.

Clinical cues help determine the type of oral growth: In my experience, **malignant growths** tend to invade the tissues; **benign growths** tend to be more proliferative. However, because clinical examination of masses is unreliable, dental radiographs and biopsies should be performed for all oral masses.

**Imaging**

Most **benign neoplastic growths** (Figure 10, page 54) have no boney involvement on dental radiographs.

- If bone involvement does occur, it is expansive—the bone “pulls away” from the advancing tumor, leaving a decalcified, soft—tissue-filled space (Figures 11A and 11B, page 54).

- Bony margins are usually distinct.

- These types of expansive growths typically cause tooth movement (Figures 11B and 11C, page 54).

**Malignant oral neoplasms** typically invade bone early in the course of disease, resulting in irregular, ragged bone...
Figure 4. Sublingual fibrosarcoma in a cat

Figure 5. Large melanosarcoma on the palate/gingiva of a dog

Figure 6. Large fibrosarcoma in the mandibular incisor region of a dog

Figure 7. Large squamous cell carcinoma on the maxillary incisor region of a dog

Figure 8. Intraoral photograph of the mandibular left premolar region in a dog with a dentigerous cyst: the first premolar is “missing” and there is slight smooth swelling on the lingual aspect (see Figure 13B).

Figure 9. Intraoral photograph of the maxillary right molar region in a dog with a radicular cyst (arrow): there is significant smooth swelling on the buccal aspect (see Figure 13A).

Figure 10. Intraoral radiograph of the patient in Figure 1B: note there is no bony reaction, which is typical of a benign lesion. There is also no bony proliferation, even though the growth was diagnosed as ossifying.

Figure 11. (A) Intraoral radiograph of the mandibular left fourth premolar (308) of a dog with an acanthomatous ameloblastoma; note the smooth bony margins and soft tissue “deficit.” (B) Intraoral radiograph of the maxillary incisors of a dog with an acanthomatous ameloblastoma; note the expansiveness of the growth and movement of the incisors, which is indicative of this type of tumor. (C) Intraoral radiograph of the mandibular incisors of a dog with an acanthomatous ameloblastoma; note the smooth bony margins, soft tissue “deficit,” and movement of the incisors.
Practical Dentistry | Introduction to Oral Neoplasia in the Dog & Cat

Destruction (Figures 12A and 12B). Initially, the bone will display a mottled “moth eaten” appearance, but radiographs late in the disease course reveal a complete loss of bone (the teeth appear to “float” in space) (Figures 12C and 12D). If the cortex is involved, an irregular periosteal reaction is often seen (Figure 12E).

Cystic structures appear as radiolucent areas with smooth bony edges (Figure 13A). Similar to other benign growths, they grow by expansion and displace other structures (e.g., teeth). Dentigerous cysts are typically seen as a radiolucent structure centered on the crown of an unerupted tooth (Figure 13B).

Aspiration & Biopsy
Fine-needle aspiration is useful to differentiate inflammation from neoplasia, and can potentially determine tumor type.

Histopathologic testing is always necessary for accurate diagnosis of oral masses and prior to definitive therapy since, as mentioned earlier, benign and malignant tumors can appear clinically and radiographically similar (compare Figure 11B to Figure 12C).

Additional Diagnostics
Additional diagnostic tests for questionable cases include:

- Complete blood panel
A MASS IS NOT ALWAYS WHAT IT SEEMS

In my experience, approximately 1% of “very benign” oral growths in the dog turn out to be malignant (Figures A and B). Furthermore, it is not uncommon to see very destructive benign growths, such as eosinophilic granulomas (Figure C). Finally, osteomyelitis (Figure D) may demonstrate the same radiographic findings as malignant tumors, and aggressive tumors may show no bone involvement early in the course of disease.

It is crucial to interpret histopathology results in light of radiographic findings. The prudent practitioner will note the type and extent of bony involvement (if any) on the histopathology request form (and may include copies of the radiographs and pictures) to aid the pathologist.

A diagnosis of a malignancy without bony involvement should be questioned prior to initiating definitive therapy, such as aggressive surgery, radiation therapy, or chemotherapy. Conversely, a benign tumor diagnosis with significant bony reaction should be further investigated prior to assuming the tumor is not malignant.

Figure A. Intraoral picture of the left buccal mucosa of a dog with a small, soft mass. Histopathology revealed high-grade melanomasarcoma, which was successfully treated (5-year survival) with only local resection. This case highlights the importance of early detection.

Figure B. Intraoral picture of the left buccal mucosa of a dog with a small, soft mass. Histopathology revealed low-grade fibrosarcoma, which was successfully treated (5-year survival) with a maxillectomy.

Figure C. Intraoral picture of the palate of a cat with significant soft tissue and bony destruction/infection. Histopathologic evaluation revealed eosinophilic granuloma, which was successfully treated with a combination of medical and surgical interventions.

Figure D. Intraoral picture of the left maxilla of a dog with significant soft tissue and bony destruction/infection. Histopathologic evaluation revealed osteomyelitis, which was successfully treated with a maxillectomy.

• Urinalysis
• Bacterial and/or fungal culture
• Fungal serology
• Computed tomography/magnetic resonance imaging to determine surgical margins.

TREATMENT

Benign Masses

Peripheral Odontogenic Fibromas

A surgical cure can be achieved by:
• Removal of the mass with narrow margins
• Extraction of the tooth (or teeth) from which the mass has arisen
• Debridement of the periodontal ligament.

However, since benign masses are typically slow growing and noninvasive, I tend to take a more conservative approach, especially when large teeth are involved. Conservative treatment involves:
• Excision of the mass to physiologic margins
• Monitoring the area.

If the mass regrows quickly, treat as discussed earlier. If regrowth takes a year or two, then reexcise at annual (or semi-annual) dental cleanings.

Acanthomatous Ameloblastomas

After quality dental imaging, these tumors can be removed.

EDUCATING CLIENTS ABOUT ORAL NEOPLASIA

Client education about oral neoplasia encourages them to embrace the importance of proper dental care. Carefully explain that:

• Prevention: Every dental cleaning (prophylaxis) includes a complete oral examination, which also screens for oral neoplasia
• Detection: Early detection and treatment decreases the odds for tumor metastasis
• Therapy: Prompt surgery to address an oral mass decreases the risks of the procedure since it is much less invasive as well as less painful for the pet.
• Monitoring: Encourage clients to perform dental homecare, including an oral examination for growths or masses. If they suspect anything is out of the ordinary, instruct them to contact the clinic immediately.
• Feline Fundamentals: Benign tumors are extremely rare in cats; therefore, counsel cat owners that any oral masses should be immediately evaluated and biopsied at the clinic.
• Education: Use photos and radiographs (see Furthering Your Knowledge: Oral Neoplasia, page 57) to illustrate the different types of oral masses, which helps clients identify masses early and portrays how these masses can proliferate and metastasize.
by local excision with small margins. Depending on the text, recommendations vary from 0.5 to 1 cm. These tumors have a 90% control rate with radiation therapy and some reports cite that local chemotherapy may also be effective.6,10

Malignant Masses

**Squamous Cell Carcinoma & Fibrosarcoma**

In cats, aggressive surgery (en bloc, with 1- to 2-cm surgical margins) is required for definitive treatment.1,5 Radiation therapy may help with pain, but has not been shown to increase survival times significantly.

In dogs, recommended therapy is similar to therapy for cats; however, in the dog these tumors respond better to radiation therapy (up to one year survival rates for squamous cell carcinoma).11

**Melanoma**

In dogs, optimum treatment incorporates a combination of aggressive surgery with 2-cm margins, radiation therapy, and chemotherapy. Despite combining all of these treatment methods, survival is generally less than a year. However, a vaccine has been recently released that shows promise as an adjunct therapy for this tumor.12,13,14

**Cysts**

Cyst treatment requires surgery due to the potential for pathologic fracture. In addition, cysts can become infected, creating significant swelling, pain, and/or malignancy.15 If cyst formation has occurred, en bloc removal or extraction of the tooth and meticulous curettage of the lining can prove curative.

**WHEN TO REFER**

Simple excision of benign masses can be performed by the general practitioner. However, aggressive masses should be referred to a veterinarian dentist, surgeon, or oncologist for definitive therapy. Three-view chest radiographs and a complete blood panel should be obtained prior to referral.

---

Furthering Your Knowledge: Oral Neoplasia

For additional information on oral neoplasia, specifically staging, treatment, and prognosis, refer to the following resources:

**Suggested Reading**


**Client Education Resources:**

- avdc.org/oraltumors.html
- dogbeachtumors.html (videos, posters, books)

**References**


---

Brook A. Niemiec, DVM, FAVD, Diplomate AVDC, is chief of staff of Southern California Veterinary Dental Specialties, with offices in San Diego and Murrieta, California, and Las Vegas, Nevada.

He has authored many articles and chapters, including the recently published Small Animal Dental, Oral and Maxillofacial Disease: A Colour Handbook (Manson Publishing). Dr. Niemiec founded the veterinary dental teledentistry website vetdentalrad.com, which also offers instructional videos and educational posters. He lectures extensively at national and international conferences and is the coordinator and instructor of the San Diego Veterinary Dental Training Center (vetdentaltraining.com). Dr. Niemiec received his DVM from University of California–Davis.