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## Oral Neoplasia

Thanks mostly to the emergence of dentistry as an economic pillar of small animal practice, biopsies submitted to investigate chronic inflammation or suspected neoplasms within the oral cavity have become a substantial part of any surgical biopsy caseload. If we exclude the very common gingival proliferative lesions of gingival hypertrophy and fibromatous epulis, 75-90% of oral tumors in **dogs** are malignancies: melanomas, squamous cell carcinomas, osteosarcomas or fibrosarcomas. In **cats**, at least 75% of the genuine neoplasms are squamous cell carcinomas and most of the rest are fibrosarcomas. While there is some difference in behavior and therapeutic response depending on the specific tumor and its location, oral tumors in both species are locally invasive and osteolytic, have a very high frequency of local recurrence, and an almost equally high prevalence of eventual metastasis to local lymph node and to lung (unless we intervene with euthanasia). This dismal prognosis can be improved considerably, particularly in terms of the rapidity of local recurrence, by radical surgical excision, and/or by the use of radiation therapy.

It is by no means a foregone conclusion that a “mass” in the mouth of a dog or cat is going to be a neoplasm. In **dogs**, for example, the most common oral masses are not neoplasms, but proliferative lesions known as gingival hypertrophy and fibromatous epulis. The criteria used to distinguish these two closely-related lesions are controversial and somewhat subjective, and fortunately there is no significant prognostic difference between the two. In gingival hypertrophy there is a nodular proliferation of gingival lamina propria accompanied by epithelial hyperplasia and, often, by osseous metaplasia. In fibromatous epulis the proliferation is not by gingival lamina propria, but by more primitive mesenchymal tissue resembling periodontal ligament. Accompanying the mesenchymal proliferation is a proliferation of odontogenic epithelium and some islands of primitive dental matrix material. Surgical excision is curative, although some dogs are prone to subsequently developing similar lesions at multiple locations.

The other non-neoplastic proliferative lesion that you will see with some frequency is calcinosis circumscripta within the tongue of young large dogs. This is seen as a coalescence of semisolid white mineralized granulomas with content macroscopically resembling toothpaste. Similar lesions will occur in the periarticular skin and in the footpad, although it is very rare for a dog to have more than one focus of this disease. Its pathogenesis is completely unknown, and there has never been a satisfactory explanation for why this disease occurs in only one location, in such unusual locations, and only once in the life of the dog. Any hypothesis must also explain why it occurs preferentially in large dogs less than two years of age.

The non-neoplastic causes of tumor-like proliferative lesions in the mouth of **cats** are eosinophilic collagenolytic granuloma and nodules of exuberant granulation tissue at sites of previous ulceration. Eosinophilic granuloma is not usually mistaken for neoplasia, but nodules of **exuberant granulation tissue** are indistinguishable from some examples of squamous cell carcinoma and require histologic assessment. These are relatively more common within the mouth of cats than of dogs, despite the fact that we assume dogs are more prone to ulcers (caused by dietary misadventure?) than are cats.

Prognostic data for the various genuine neoplasms in both species are presented on the next page. A word of warning: these data are highly biased by the timing of diagnosis in the course of the disease. Most come from referral institutions and thus reflect the post-surgical survival times for relatively advanced disease, and often reflect the behavior of lesions that have already recurred following initial excision by the primary care veterinarian. With the growing popularity of dental examination, I suspect that we will be detecting these

tumors much earlier. This may not reduce the eventual case fatality rate, but it should result in a much longer interval between surgery and euthanasia. Whether it will improve the cure rate or not is harder to predict.

**What about adjunct therapies?**
Based on available data, these are palliative rather than curative. About 80% of canine oral melanomas respond to high dose radiation fractionated over three doses (days 0, 7, 21). In about half the cases, the oral tumor completely disappears for a few months but the prevalence of fatal distant metastasis is not affected. Another study of 140 dogs treated with external beam radiation had similar results, with a median survival of only seven months (95% C.I. 6-9 months). Even though eventual case fatality rates remain the same, the quality of life is greatly improved and the need for premature euthanasia because of locally destructive growth is greatly reduced. Irradiation of feline oral squamous cell carcinomas increases median survival time from 3-6 months to 12-14 months but does not result in cure.

**Are there any "good" oral tumors?**

In addition to gingival hypertrophy, fibromatous epulis, calcinosis circumscripta, and exuberant granulation tissue mentioned above as examples of non-neoplastic proliferative lesions, there are also a few genuine neoplasms within the mouth that are behaviourally relatively benign.

**Granular cell tumors** are smooth nodular growths that bulge from the surface of the canine tongue. Their cell of origin remains controversial but at least some originate from Schwann cells of peripheral nerve. They are cured by excision and have no metastatic potential.

**Plasmacytomas** occur in mouth as yet another of their unusual site predilections that include ear canal, larynx, toe, prepuce and rectum! Although a few will recur because of initially incomplete excision in this difficult operative environment, they have no metastatic potential.

**Squamous cell carcinomas** in dogs (but not in cats) are probably more manageable than the other oral malignancies, especially if detected early. Early tumors may not look proliferative: my records are full of mildly osteolytic lesions of tooth sockets or subgingival bone, or of non-healing sublingual ulcers in cats, that are identified on biopsy as squamous cell carcinomas. Many are well differentiated tumors that seem to progress only slowly, so early surgical intervention may offer a good chance for complete cure. The prospects for cure look better for dogs than for cats.

A tumor requiring special mention is a distinctive **histologically low grade but behaviorally aggressive fibrosarcoma** in the mouth of relatively young, large dogs. Most occur on the hard palate and are initially mistaken for reactive fibrosis or exuberant granulation tissue following inflammatory disease. It is often not until the second or third biopsy, and after the tumor has undergone extensive local invasion, that we finally recognize this as a genuine neoplasm rather than just hyperplastic scarring. As with other oral fibrosarcomas, these tumors will eventually metastasize but in fact our ability to successfully control the local disease is more important than the threat of eventual metastasis.

As usual, the **feline** squamous cell tumors seem inherently more aggressive despite a histologic appearance that is virtually identical to that of dogs. Part of the dismal prognosis relates to anatomy (you can't amputate much from a cat's tongue!), but there also seems to be a fundamental species difference. Those from the maxilla are particularly nasty, and a one-year survival with even the most determined therapy is the best you can offer. We may discover some new magic bullet, but realistic pessimism seems to be the watchword for now. A lot of the feline data are getting quite old, and we may see some new and more promising statistics emerging over the next few years as we revisit this traditionally dismal disease with earlier diagnoses, better imaging techniques, better drugs, and better surgery!

The tables below are summaries of available data; in some tables, the results from similar studies have been combined for ease of presentation. Please note the very small numbers under some headings, which make definitive prognosis virtually impossible.

## PREVALENCE OF ORAL MALIGANCIES IN DOGS AND CATS IN ONTARIO*

| Species | Squamous cell carcinoma (%) | Melanoma (%) | Fibrosarcoma (%) |
|---|---|---|---|
| Dog | 28 | 22 | 4 |
| Cat | 84 | 0 | 10 |

* Histovet data, 820 cases.

## POSTOPERATIVE BEHAVIOR OF GINGIVAL SQUAMOUS CELL CARCINOMAS IN DOGS

| Procedure | No. | Recurrence | | Survival | |
|---|---|---|---|---|---|
| | | Local (%) | Distant (%) | 1 yr. (%) | Median (mos.) |
| Local excision[1] | 8 | ? | ? | 40 | 9 |
| Partial mandibulectomy[2,3] | 43 | 7 | 11 | 88 | 26 |
| Partial maxillectomy[4] | 7 | 29 | 0 | 57 | 19 |

## POSTOPERATIVE BEHAVIOR OF TONSILLAR SQUAMOUS CELL CARCINOMAS IN DOGS

| Procedure | No. | Recurrence | Survival | |
|---|---|---|---|---|
| | | (%) | 1 yr. (%) | Median (mos.) |
| Tonsillectomy[1,5] | 24 | 100 | 0 | 2 |

## POSTOPERATIVE BEHAVIOR OF ORAL MELANOMAS IN DOGS

| Procedure | No. | Recurrence | | Survival | |
|---|---|---|---|---|---|
| | | Local (%) | Distant (%) | 1 yr. (%) | Median (mos.) |
| Partial mandibulectomy[2,3,6] | 50 | 17 | >80 | 19 | 9 |
| Partial maxillectomy[4,7] | 37 | 35 | >80 | 36 | 8 |
| External beam radiation[8] | 140 | 39 | 57 | 20 | 7 |

## POSTOPERATIVE BEHAVIOR OF ORAL FIBROSARCOMAS IN DOGS

| Procedure | No. | Recurrence | | Survival | |
|---|---|---|---|---|---|
| | | Local (%) | Distant (%) | 1 yr. (%) | Median (mos.) |
| Local excision[1] | 6 | ? | 35 | 33 | 1 |
| Partial mandibulectomy[2,4,6] | 47 | 52 | 16 | 29 | 10 |
| Partial maxillectomy[3,4,7,9] | 36 | 50 | 15 | 50 | 10 |

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**POSTOPERATIVE BEHAVIOR OF GINGIVAL SQUAMOUS CELL CARCINOMAS IN CATS***

| Procedure | No. | Recurrence | | Survival | |
|---|---|---|---|---|---|
| | | Local (%) | Distant (%) | 1 yr. (%) | Median (mos.) |
| Partial mandibulectomy or maxillectomy[10,11] | 10 | 90 | 8 | 10 | 6 |

* prognosis for sublingual SCC appears to be even worse.

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