Improve Veterinary Education

Oral Tumours in Small Animals: Biological Behaviour, Diagnosis, Surgical Management and Prognosis

Introduction and Learning Objectives

This lecture addresses oral tumours in small animal patients, with a focus on their biological behaviour, grading, surgical and adjunctive management, prognosis, and appropriate follow-up, including effective communication with clients. Oral tumours are common in both dogs and cats, although important species differences exist that influence diagnosis, treatment options, and expected outcomes.

Epidemiology and General Considerations

Oral tumours occur frequently in dogs and cats. In cats, the majority of oral tumours are malignant, whereas dogs more commonly present with benign oral masses, with notable exceptions that carry a guarded to poor prognosis. Malignant melanoma represents a key example of an aggressive oral tumour in dogs, for which surgical excision remains the mainstay of therapy. In cats, surgical options are highly dependent on tumour location. In some cases, complete excision is achievable, but tumours located sublingually or in caudal oral regions are often unresectable. Tumour location therefore plays a critical role in determining treatment feasibility and outcome.

Clinical Presentation and Oral Examination

Clinical signs associated with oral tumours are often insidious. In dogs, one of the most frequently reported signs is severe halitosis, typically indicating that a mass has been present for a prolonged period. Many dogs compensate well until tumours become necrotic, at which point malodour becomes evident and eating may be affected. Another hallmark clinical sign is blood-tinged saliva or overt oral bleeding, particularly when the animal bites into a sublingual or gingival mass. Depending on tumour size and extent, facial swelling or exophthalmos may also be observed. In some cases, hypersalivation without visible bleeding is the primary sign.

Masses may be intermittently visible to owners, but a thorough oral examination under appropriate restraint or anaesthesia is often required to fully assess disease extent. Oral tumours are not always grossly apparent, but secondary findings such as loose or severely displaced teeth, particularly in the rostral mandible, may raise suspicion. Signalment and clinical examination findings can provide clues regarding

tumour type. For example, expansion of the incisors in the rostral mandible is commonly associated with squamous cell carcinoma. Ulceration of the tumour surface is almost invariably seen with squamous cell carcinomas, particularly in the maxilla. Fibrosarcomas are more commonly encountered in the maxilla, while malignant melanoma should be suspected in heavily pigmented oral cavities when tumours are melanotic.

Breed Predispositions

Several breed predispositions are recognised. Malignant melanoma is more common in dogs with pigmented oral mucosa, with Chow Chows being overrepresented. Fibrosarcomas are more frequently seen in dolichocephalic breeds such as Labradors and Golden Retrievers. Dentigerous cysts are most often encountered in brachycephalic breeds, particularly Boxers. Ameloblastomas, including acanthomatous ameloblastomas, are seen more commonly in Shetland Sheepdogs and Old English Sheepdogs.

Clinical Diagnosis and Initial Staging

A thorough physical examination forms the basis of diagnosis and staging. Rectal examination may be indicated in selected cases, as some oral tumours are associated with paraneoplastic hypercalcaemia. This is particularly relevant in conditions such as lymphosarcoma and multiple myeloma, which can cause elevated serum calcium concentrations. Haematology and serum biochemistry are often unremarkable unless disease is chronic. Mild anaemia may be present in some patients, and increased alkaline phosphatase activity may be observed when bony destruction is present.

Fine needle aspiration cytology is one of the most useful initial diagnostic tools, particularly for round cell tumours and assessment of lymph node involvement. Many oral tumours are highly exfoliative, including malignant melanoma and squamous cell carcinoma, allowing for cytological diagnosis. However, cytology may be limited in distinguishing benign from malignant lesions in poorly differentiated tumours or when inflammation induces cellular atypia. In such cases, incisional or punch biopsy is required for definitive diagnosis and grading.

When performing biopsies, areas of necrosis should be avoided, particularly in rapidly growing tumours. Samples should be obtained from viable tissue near the periphery of the mass, ideally including a bony component when bone invasion is suspected. In cases of active haemorrhage, partial debulking with cauterisation may be performed as a palliative measure to improve patient comfort while awaiting

histopathological results. This approach should not be considered curative but can provide meaningful short-term benefit.

Imaging for Tumour Assessment and Staging

Advanced imaging plays a central role in assessing tumour extent. Conventional radiography may reveal subtle bony changes, such as a moth-eaten appearance, but often underestimates disease severity. Computed tomography is superior for evaluating skull involvement, allowing clear visualisation of bony destruction, tumour expansion, invasion into the nasal cavity, and dental displacement. This is particularly valuable for tumours such as osteosarcoma and squamous cell carcinoma involving the maxilla or mandible.

Thoracic imaging is essential for metastatic staging, although radiographs may be limited by positioning and lung inflation. Computed tomography provides improved detection of pulmonary nodules and assessment of intrathoracic lymph nodes. Ultrasound is especially useful for evaluation of submandibular and retropharyngeal lymph nodes, which are difficult or impossible to palpate unless markedly enlarged. Ultrasound-guided aspiration of these nodes is strongly recommended.

Histopathology and Tumour Types

Histopathology remains the gold standard for distinguishing benign from malignant oral tumours, particularly when gross appearance is misleading. Ameloblastomas can resemble malignant tumours macroscopically, reinforcing the need for tissue diagnosis. Malignant melanoma, although often pigmented, may be amelanotic in approximately thirty-three percent of cases, meaning lack of pigmentation does not exclude this diagnosis. These tumours are highly aggressive, with metastatic rates approaching eighty percent, underscoring the importance of thorough staging.

Squamous cell carcinoma is the second most common oral tumour in dogs and the most common in cats. In cats, these tumours are frequently sublingual, tonsillar, or pharyngeal, are extremely debilitating, and are often unresectable due to their location. Although metastatic rates in cats are approximately twenty percent, local disease is aggressive and profoundly impacts quality of life. More rostral tumours tend to metastasise less frequently.

Fibrosarcomas typically affect large-breed dogs and are firm, infiltrative masses that exfoliate poorly, making biopsy essential. Particular caution is required with so-called high-low fibrosarcomas, which are histologically low grade but biologically aggressive, with extensive local invasion of the maxilla and mandible.

Osteosarcomas of the oral cavity most commonly affect medium to large breed dogs. Rostral mandibular osteosarcomas carry a more favourable prognosis than appendicular osteosarcomas due to improved resectability and lower metastatic rates. However, tumours located caudally, particularly in the maxilla near the soft palate, remain challenging despite potential reconstructive options.

Acanthomatous ameloblastomas, previously referred to as epulides, are benign but locally invasive tumours that invade bone and recur if adequate margins are not obtained. Surgical margins typically include the affected tooth and at least one adjacent tooth root beyond the visible lesion. These tumours do not metastasise.

In cats, oral tumours are overwhelmingly squamous cell carcinomas, commonly affecting the tongue, pharynx, and tonsils. Risk factors include flea collars and diets high in tinned tuna. These tumours are slow growing but highly aggressive locally, leading to significant morbidity. Feeding difficulties often prompt earlier veterinary consultation, but prognosis remains poor due to limited surgical options and perioperative nutritional challenges.

Lymph Node Staging and Sentinel Node Mapping

Comprehensive regional lymph node staging is essential. Both mandibular lymph nodes should be sampled bilaterally, regardless of size, as lymphatic spread may be contralateral. Retropharyngeal lymph nodes should also be assessed using ultrasound guidance. Palpation alone is unreliable, as a significant proportion of enlarged nodes are reactive, while up to fifty percent of normal-sized nodes may contain metastases.

Sentinel lymph node mapping is an emerging technique in veterinary oncology, adapted from human medicine. Techniques involving methylene blue or lipiodol injection around the tumour show promise in identifying true sentinel nodes. Although currently limited by cost and availability, this approach may improve staging accuracy and guide surgical extirpation of metastatic nodes.

Surgical Planning and Perioperative Considerations

Surgical margins are based on tumour type rather than definitive evidence-based guidelines. Current recommendations suggest margins of approximately two centimetres for fibrosarcoma, malignant melanoma, and osteosarcoma, and one centimetre or one tooth root for rostral squamous cell carcinoma. Regional lymph nodes should be removed for definitive staging.

Effective perioperative analgesia includes the use of local anaesthetic blocks such as infraorbital, maxillary, and mandibular nerve blocks. Oral tumour surgeries are

associated with significant haemorrhage, and blood products should be available. Patients should be blood typed and cross-matched preoperatively, and owners informed of the potential need for transfusion. Temporary or permanent ligation of major vessels, including the carotid arteries in dogs, may be required.

Closure planning should begin before tumour excision. Surgeons must balance the need for definitive margins with preservation of critical structures. In mandibular surgery, jaw drift is a common complication, particularly following hemimandibulectomy or rostral mandibulectomy. Pre-emptive stabilisation using custom or contourable implants, including three-dimensional printed devices or specialised plates, may help maintain occlusion and postoperative function.

Surgical Technique: Mandibulectomy and Maxillectomy

Mandibulectomy requires appropriate instrumentation, particularly a sagittal or oscillating saw. Osteotomes alone are not recommended due to the risk of bone fragmentation. Sternal recumbency with the head suspended provides optimal exposure and facilitates gravity-assisted retraction of soft tissues. Identification and control of the mental artery are critical for haemorrhage management.

Multilayer closure is essential to minimise dehiscence, with bone tunnels often drilled to anchor labial tissues securely to the remaining alveolar bone. Tension-free mucosal closure is the primary goal. Canine teeth that risk trauma to closure sites should be removed.

For maxillectomy, early identification and ligation of the palatine and maxillary arteries is recommended prior to osteotomy whenever possible. Completion of caudal osteotomies may require sharp osteotomes due to limited access.

Complications and Client Communication

Common complications include haemorrhage, dehiscence, oronasal fistula formation, and local recurrence due to incomplete margins. Cosmetic changes, such as nasal dipping following partial maxillectomy or facial asymmetry after mandibulectomy, should be discussed with owners preoperatively using photographic examples. Despite altered appearance, most dogs adapt well functionally and experience improved comfort, appetite, and quality of life following tumour removal.

Adjunctive Therapies and Prognosis

Adjunctive therapies, including radiation and chemotherapy, may be indicated depending on tumour type and margins. Radiation therapy can be beneficial,

particularly for fibrosarcoma, but late complications such as osteonecrosis may occur. The DNA melanoma vaccine has shown promise in dogs with oral malignant melanoma.

Median survival times vary by tumour type. Multiple myeloma carries a median survival of approximately two hundred days. Squamous cell carcinoma survival may extend to three to four years in selected cases. Fibrosarcoma survival ranges from two hundred to six hundred days. Oral osteosarcoma generally carries a better prognosis than appendicular disease, with outcomes dependent on location and completeness of excision.

Summary and Clinical Implications

Oral tumours range from benign to highly malignant and differ markedly between dogs and cats. Early detection, definitive diagnosis, and complete surgical excision remain the most effective treatments. Client education regarding routine oral examination is critical, as early intervention reduces tumour size, improves resectability, and lowers metastatic risk. All excised tissues, including lymph nodes, should be submitted for histopathological assessment to determine tumour type, grade, and margin status. Early surgery is less invasive, preserves function, and improves outcomes, particularly when combined with thoughtful surgical planning to maintain occlusion and minimise complications.