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Veterinary Education

Case 1 – Canine Oral Melanoma: Staging and Initial Management

A 10-year-old male neutered Golden Retriever presents with a 3.5 cm pigmented, ulcerated mass arising from the gingiva adjacent to the left maxillary carnassial tooth. The owner reports halitosis and intermittent oral bleeding for 6 weeks. Submandibular lymph nodes are symmetrical and not palpably enlarged. Fine-needle aspirates of the mass suggest a malignant neoplasm, but pigmentation is variable and diagnosis is uncertain.

Thoracic radiographs are unremarkable. No advanced imaging has yet been performed.

Question

Describe and justify your **diagnostic, staging, and initial treatment plan** for this patient. Your answer should include:

- Appropriate biopsy technique and rationale
- Clinical staging steps and limitations of lymph node assessment
- How tumour size and location influence prognosis and treatment intent

Feedback

This presentation is highly suspicious for **canine oral malignant melanoma**, a common oral malignancy where **visual appearance and pigmentation are unreliable indicators of malignancy**.

1) Confirm diagnosis (biopsy choice + rationale)

- I would prioritise a **large, deep incisional biopsy** (e.g., deep wedge or large punch/core) taken from **viable tissue** and avoiding ulcerated/necrotic surface, because superficial/necrotic samples risk non-diagnostic histology.

- Biopsy must be obtained **through the oral mucosa (not skin)** to minimise iatrogenic tumour seeding that could compromise future curative surgery.
- If histology is equivocal (especially if poorly pigmented/amelanotic areas), I would request **immunohistochemistry** to confirm melanocytic origin.

2) Stage the patient (TNM focus, limitations, and best practice)
Staging is fundamental for prognosis and treatment intent.

- **T**: record tumour **site and size** before any further intervention; size is prognostically important and underpins the oral melanoma stage scheme.
  - At 3.5 cm, this fits **T2 (2–4 cm)** in WHO scheme.
- **N**: lymph node palpation is insufficient because **node size is an unreliable predictor** of metastasis.
  - I would sample at least ipsilateral mandibular ± parotid and retropharyngeal nodes; where status is uncertain, sentinel lymph node mapping is useful, but **excisional biopsy for histopathology is the gold standard** (IHC may be needed to distinguish melanocytes from melanophages).
  - Recognise bilateral/contralateral spread can occur; bilateral node assessment is advocated by some groups.
- **M**: thoracic imaging—radiographs are acceptable, but **CT is more sensitive** for small pulmonary metastases.
- Consider abdominal imaging (ultrasonography and/or CT with contrast) for thorough staging (metastasis is rare but described).

3) Initial treatment plan (intent + justification)

- **Local control** is the cornerstone: **wide surgical resection** is mainstay across sites.
- For determination of extent of local disease (suspected jaw invasion), I would recommend **contrast CT for surgical planning** (gold standard), guiding extent of mandibulectomy/maxillectomy.
- Discuss that adjuvant/definitive **radiotherapy is integral in canine oral melanoma** (neoadjuvant, primary or adjuvant), particularly if complete margins cannot be achieved.
- Prognosis: oral/mucosal location generally carries poorer prognosis than haired skin; clinical stage and metastasis worsen outcome.

Case 2 – Amelanotic Oral Mass: Diagnostic Challenges

An 11-year-old mixed-breed dog presents with a rapidly enlarging, non-pigmented mass on the ventral tongue. Cytology reveals pleomorphic spindle cells with marked anisokaryosis but no visible melanin granules. The mass surface is ulcerated. An incisional Tru-cut biopsy yields a diagnosis of "high-grade sarcoma." The clinician suspects melanoma despite the histology report.

Question

Discuss how you would **confirm or refute a diagnosis of melanoma** in this case. Include:

- Limitations of cytology and small biopsies
- The role of immunohistochemistry and relevant markers
- How diagnostic uncertainty might alter treatment planning and client communication.

Feedback

This case illustrates a classic pitfall: **amelanotic melanoma can be cytologically and histologically misleading** and may be labelled as sarcoma if pigment is absent or biopsy is small.

1) Recognise limitations of the current samples

- Cytology may be non-diagnostic because some melanomas are **devoid of pigment**, making cytological diagnosis "challenging or impossible."
- Tru-cut samples are often **too small**, can miss junctional activity/epithelium, and may limit reporting to "sarcoma/malignant tumour." Multiple areas should be sampled if Tru-cut is used.
- Ulcerated/necrotic surfaces reduce diagnostic yield → reinforces need for deeper viable sampling.

2) Confirm melanocytic origin (IHC and stains)

- I would request immunohistochemistry using a panel such as **Melan-A, PNL-2, TRP-1, TRP-2**; a "cocktail" approach is highlighted as highly useful in oral amelanotic melanoma.
- Where pigment confusion exists, histochemical stains (e.g., Fontana-Masson; bleaching) can support assessment, but IHC is key for amelanotic disease.

3) If IHC still fails (advanced discrimination)

- For amelanotic spindle cell tumours lacking epithelium, even IHC may fail; the paper notes **RNA expression profiling (TYR, CALD1, CD34)** can discriminate between spindloid oral melanoma and soft tissue sarcoma.

4) Clinical implications and communication

- Until confirmed, I would treat as a potentially aggressive oral malignancy and proceed with full staging and referral-level planning (CT for extent; node assessment; thoracic imaging).
- I would explain uncertainty transparently: diagnosis may change with further testing, which can alter surgery/radiotherapy intent and prognosis.

Case 3 – Adjuvant Therapy in Oral Melanoma

A 12-year-old Cocker Spaniel undergoes partial mandibulectomy for a 2 cm oral melanoma (Stage II, T2N0M0). Histopathology confirms complete margins, moderate pigmentation, low nuclear atypia, and a Ki-67 index below the published prognostic threshold.

The owners are motivated and ask about further treatment to reduce the risk of metastasis.

Question

Discuss the **role of adjuvant therapies** in this case. Include:

- Indications and evidence for immunotherapy
- Why chemotherapy is or is not recommended
- How prognostic indicators influence shared decision-making

Feedback

This dog has Stage II oral melanoma with apparently favourable histologic features and complete margins. However, oral location still carries metastatic risk; local control alone does not necessarily prevent death from distant disease.

1) Clarify goals: local control vs metastatic prevention

- Surgery with complete margins provides local control; nonetheless, metastatic progression is a major driver of outcome.
- Request comprehensive surgical margin assessment to confirm complete margins.
- Radiotherapy is integral where margins are incomplete or surgery not feasible; in this case it may not be required if margins are truly complete but should be discussed if margin assessment is uncertain.
- Repeat contrast CT may be assistive pre-radiotherapy to assess for the presence of residual viable neoplastic tissue at surgical margins and/or regional lymph nodes and is especially useful for adjuvant radiotherapy planning.

2) Immunotherapy (evidence and indication)

- The consensus cites prospective trial data for **xenogeneic human tyrosinase DNA vaccine (ONCEPT®)** in dogs with **stage 2–3 oral melanoma** when local control (surgery ± node management ± RT if needed) is achieved, showing a statistically significant survival improvement versus historical controls.
- It also notes retrospective studies failing to show benefit where **local control was not optimal**, reinforcing label guidance that it should be used with adequate local control.
- Therefore, I would present ONCEPT® as a reasonable adjuvant option in this Stage II patient given owners are motivated, explaining evidence strength and limitations.

3) Chemotherapy (why not routine)

- The paper states there is **no evidence** that adding cytotoxic drugs (e.g., carboplatin/cisplatin/melphalan) to surgery/RT leads to significant survival increase in oral/digital/cutaneous melanoma.
- I would not recommend routine adjuvant chemotherapy, but I'd discuss exceptions (e.g., radiosensitisation protocols in incompletely excised cases) which is not the scenario here.

4) Use prognostic indicators to individualise recommendations

- Ki-67 has prognostic value; lower index supports a more favourable outlook but does not eliminate metastatic risk.
- I would propose a shared decision approach: vaccinate vs monitor, with explicit discussion of uncertainty, cost/availability, and follow-up staging intervals.