How to Succeed with Oral Flaps

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Learner Objectives

- Understand the basic instruments and steps for creating oral surgical flaps.
- Compare envelope flaps and mucogingival flaps and know when to use each.
- Recognize common causes of oronasal fistulas and how to prevent them during surgery.
- Learn different techniques for closing palatal defects and challenging fistulas.
- Apply good surgical planning and tissue handling to improve flap survival and healing.

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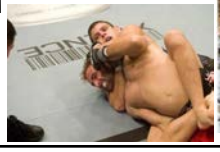
Instrumentation



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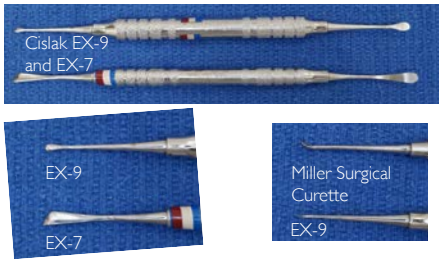
Periosteal Elevators



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Periosteal Elevators

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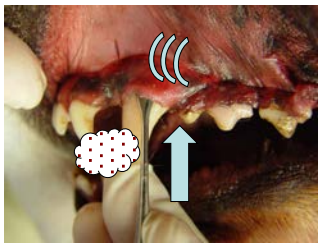
Mucogingival Flap Elevation

- Chewing forces: coronal to apical
- Periosteal fibers resist this directional force



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Mucogingival Flap Elevation

- When apical elevation of gingiva is difficult – elevate in a mesio-distal or coronal direction

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Mucogingival Flaps

- Envelope flaps – simple extractions/crown amputations
  - Least invasive/exposure
  - Appropriate for severely diseased teeth / resorbed roots
- Mucogingival flaps – surgical extractions
  - Utilize vertical releasing incisions to provide broad exposure
  - Facilitates adequate, controlled bone removal

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Envelope Flaps

- Envelope Flaps
  - Good for: crown amputations, simple extractions
  - Provide exposure to crown and neck
  - Tension free closure= elevate to mucogingival line

Courtesy of : Verstraete F, Lommer M. *Oral and Maxillofacial Surgery in Dogs and Cats* Saunders 2012

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The Envelope Flap

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Periosteal Release for Envelope Flaps

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Envelope Flap Preparation

- Elevate attached gingiva beyond mucogingival line
- Remove sulcular epithelium with blade or diamond bur

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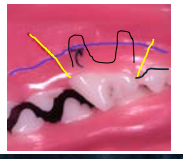
Mucogingival Flap Preparation

- Vertical releasing incision
- Placed over supporting bone
- Gingiva = collagen
- Mucosa = elastin
- Preplan closure
- Respect:
  - Salivary ducts
  - Neurovasculature



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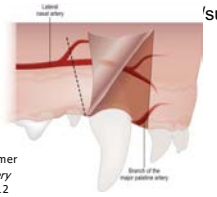
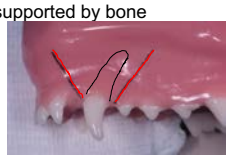
Mucogingival Flap

- Double vertical release
- Divergence to accommodate stretch
- Wide base to supported by bone





Courtesy of : Verstraete F, Lommer M. *Oral and Maxillofacial Surgery in Dogs and Cats* Saunders 2012

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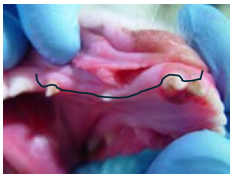
Planning for Multiple Extractions

- Preplan flaps to accommodate multiple neighboring teeth
  - Improves:
    - Visualization
    - Flap viability



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Release periosteum prior to closure

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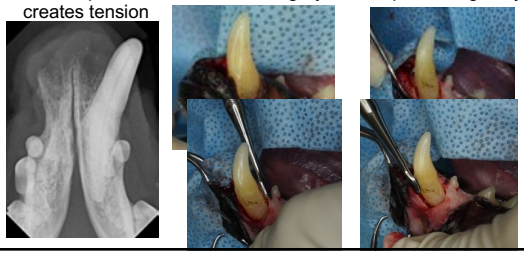
Clinical Tips: Bone Tunnels

- Clinical problem: mandibular surgery sites exposed to gravity- creates tension



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Clinical Tips: Bone Tunnels

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Acquired Oronasal Fistulas

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Acquired Oronasal Fistulas

- Causes:
  - Trauma
  - Iatrogenic
    - Biopsy
    - Extraction
  - Pathologic (tumor-related)
  - Residual from cleft palate repair

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Oronasal Fistula- 2º to Extraction? Periodontal Disease?

- Maxillary canine teeth- caution with palatal elevation- thin bone!

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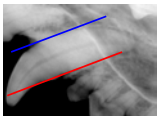
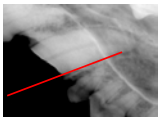
Avoiding Oronasal Fistula Development During Extraction

- Canine tooth curvature limits elevator placement



- Crown amputation permits straight-line access



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Trauma Induced Oronasal Fistulas

- Palliative care as the wound heals- allow tissues to re-vascularize and declare itself
- Remaining tissue may complicate the reconstruction

Courtesy: Sylvia Nagy DVM

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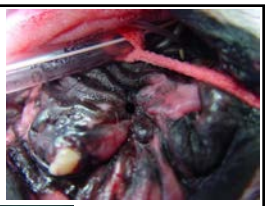
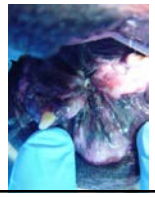
Oronasal Fistula

- Iatrogenic
  - Extraction site of a maxillary tooth
  - Typically the canine or 3rd incisor





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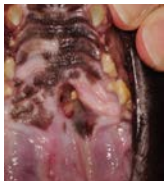
Oronasal Fistulas

Pathologic
- Neoplastic
  - Primary tumor
  - Secondary to radiation therapy



Courtesy: Wade Gingerich, DVM, DAVDC

- Pathologic
  - Other
    - Autoimmune (Eosinophillic granuloma complex?)

Spontaneous ONF development in a 12-year-old cat?

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Residual from Previous Surgery

- Previous cleft palate repair

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Residual from Previous Surgery

- Previous maxillectomy
  - >70% ONFs caudal to canine teeth
  - Acute nasal signs following surgery
  - Clean margins?

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Oronasal Fistula Treatment

- Repair:
  Centered on creating an air-tight seal to permit epithelialization
  - Advancement flaps
  - Pedicle / Axial pattern flaps
  - Grafting
    - Cartilage
    - Muscle / tissue grafts

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ORONASAL FISTULA REPAIR: Step-by-Step

Courtesy: John Lewis, VMD, DAVDC

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Courtesy: John Lewis, VMD, DAVDC

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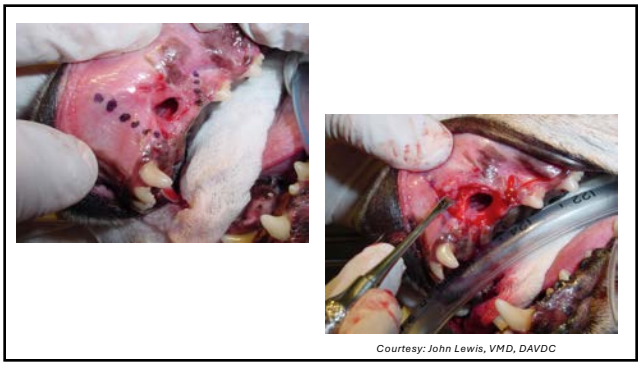

Courtesy: John Lewis, VMD, DAVDC

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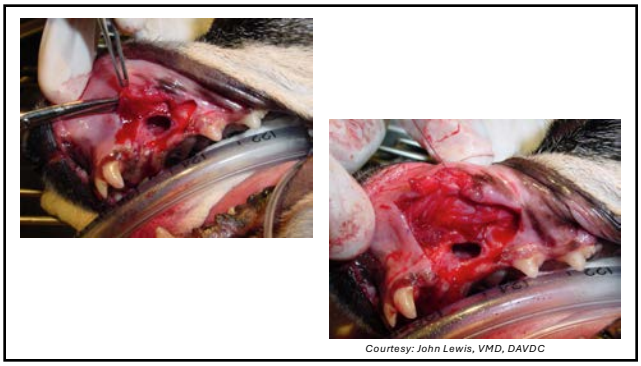

Courtesy: John Lewis, VMD, DAVDC

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Courtesy: John Lewis, VMD, DAVDC

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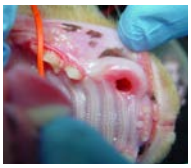
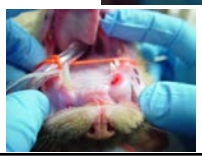
Buccal Advancement Flap

- Most common "first attempt" technique
- Planned the same as a surgical extraction





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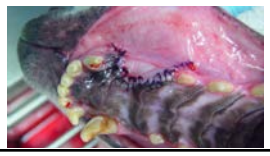
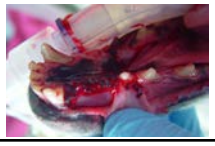
Buccal Advancement Flap

- With malocclusions- must treat the ONF and address the cause
  - Extraction vs. crown reduction





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Oronasal Fistulas

- 2º to periodontal disease, trauma (physical, chemical, electrical), neoplasia or iatrogenic causes
- Understand underlying cause
- Focus: airtight closure

From: Zacher A, Manfra SM- *Vet Clin North Am Small Anim Pract* 2013

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From: Zacher A, Manfra SM- *Vet Clin North Am Small Anim Pract* 2013

Oronasal Fistula Closure

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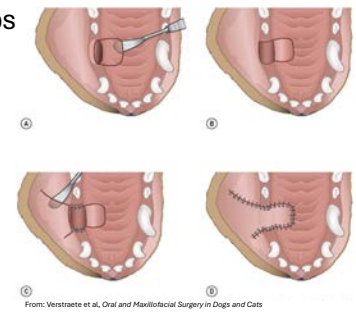
Double Hinge Flaps

- Two-layer closure
  - Reconstructs nasal mucosal surface



From: Verstraete et al, *Oral and Maxillofacial Surgery in Dogs and Cats*

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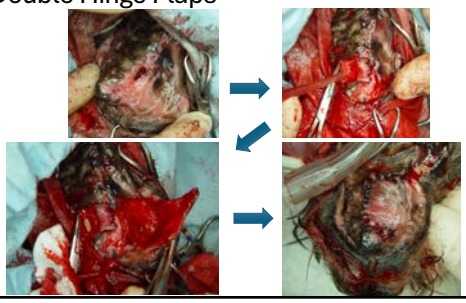
Double Hinge Flaps



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Auricular Cartilage Graft

- Autogenous auricular cartilage "tucked" between palatal mucosa and hard palate
- Affords support, airtight membrane
- 2 sites of potential morbidity (vs. allograft)
- Maintains anatomy and vascularity for future revisions

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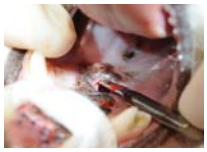
Auricular Cartilage Graft

Soukup JW, Snyder CJ, Gengler WR. Free auricular cartilage autograft for repair of an oronasal fistula in a dog. J Vet Dent 2009;26(2):84-95.



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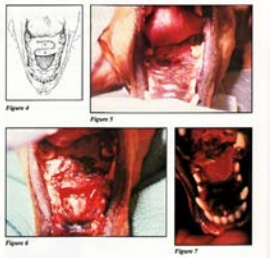
Split Palatal-U Flap

- Use two pedicle flaps preserving blood supply

From: Verstraete et al, *Oral and Maxillofacial Surgery in Dogs and Cats*



Manfra SM. Split palatal U-flap. J Vet Dent 1991;8(1):5-8

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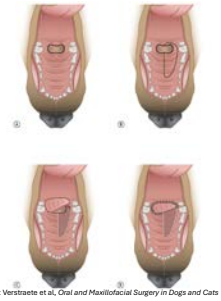
Island Pedicle Graft

- Full thickness "island" of palatal mucosa anchored by greater palatine artery
- Exposed palate – 2° intention



From: Verstraete et al, *Oral and Maxillofacial Surgery in Dogs and Cats*

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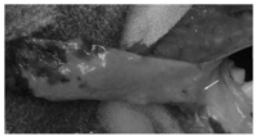
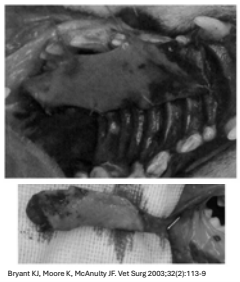
Angularis Oris Artery Axial Flap

- Relies on angularis oris artery
  - Transillumination of cheek





Bryant KJ, Moore K, McAnulty JF. Vet Surg 2003;32(2):113-9

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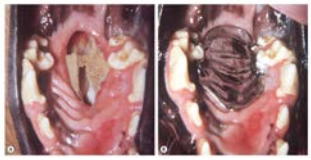
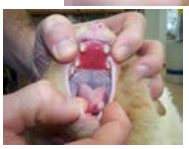
Palatal Obturators

- Fabricated chair side (PVS) or through prosthodontics lab
- Fixed vs. removable
- Homecare/upkeep?





From: AVDC list serve

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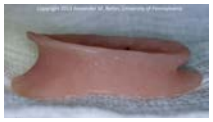
Palatal Obturators

- Option if surgical closure fails
- Retention based on support by hard tissue
- Necessary q6 month rechecks



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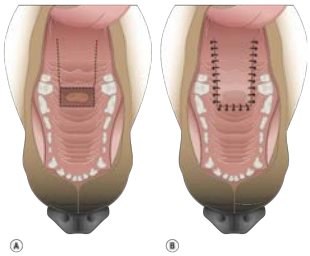
Caudal ONF Flaps

- Limitations of bony support impacts treatment options
- Even pinpoint communications can be symptomatic
- Soft palate defects can be approximated and closed with double layer closure



From: Verstraete et al, *Oral and Maxillofacial Surgery in Dogs and Cats*

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Conclusions

- The right instruments and techniques make flap creation easier and safer.
- Choose the simplest flap design that provides adequate exposure.
- Careful surgical planning helps prevent oronasal fistulas.
- Multiple flap and graft options exist for closing difficult palatal defects.
- Gentle tissue handling and tension-free closure are the keys to long-term success.

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