

Mulder Veterinary Mobile

EXTRACTIONS PROTOCOL

(MODIFIED FROM LIFELEARN)

TABLE OF CONTENTS

INTRODUCTION	3
TOOTH EVALUATION.....	4
DECIDUOUS TEETH	7
Indications	7
Equipment	7
Pre-op.....	7
Procedure	7
Possible complications	8
MOBILE OR SINGLE-ROOTED TEETH	9
Indications	9
Equipment	Error! Bookmark not defined.
Pre-op.....	Error! Bookmark not defined.
Procedure	9
Possible complications	10
MULTI-ROOTED TEETH	11
Indications	11
Equipment	Error! Bookmark not defined.
Pre-op.....	Error! Bookmark not defined.
Procedure	11
Possible complications	14
CANINE TEETH	15
Indications	15
Equipment	15
Pre-op.....	15
Procedure	15
Possible complications	17
TEETH WITH RESORPTIVE LESIONS.....	18
Indications	18
Equipment	18

Pre-op.....	18
Procedure	18
Possible complications	19

INTRODUCTION

The decision process for extraction can range from simple to complicated and is based on several factors:

- (1) the condition of the tooth
- (2) the condition of the patient
- (3) the cooperation or decision of the owner

Condition of Tooth

A thorough evaluation of the involved tooth or teeth is the first step, to determine the feasibility of salvaging the tooth as compared to the benefits if extracted. While some teeth can undergo extensive therapy to salvage them, sometimes the option to extract is the best choice for a combination of the above reasons.

Condition of Patient

Full evaluation of the patient is necessary as well. In a patient with any systemic compromises (e.g., endocarditis, organ disease, implants), extraction may allow a potential future source of infection to be removed. Those that should have anesthetic events and times minimized might also benefit from extraction. In addition, the age of the pet should be considered. A young pet may be spared a lifetime of troubles if a compromised tooth is removed preventively. Conversely, a compromised but stable tooth in a senior may never move on to cause significant disease.

Cooperation of Owner

Owner consent and commitment is also necessary. In lieu of extraction, extensive periodontal or endodontic therapy may be necessary to preserve a tooth, so the additional costs, anesthetic events, and even the ability to provide home care should be considered.

For whatever reason, and no matter how much it might be indicated, an extraction should never be performed without the owner's knowledge and consent. A signed release form with "permission to extract" may be adequate if minor, simple extractions are anticipated. Any time a more complicated, unexpected extraction is warranted (e.g., a canine or carnassial tooth, multiple teeth) it is best to contact the owner for complete disclosure and permission. When owners admit their pet, they should be informed that unexpected lesions may be found during the dental procedure and it is important that they provide a means of contact.

TOOTH EVALUATION

When determining whether extraction is required, the teeth and surrounding structures must be evaluated:

Strategic vs. Non-strategic Teeth

Is the tooth important? Canine teeth and carnassial teeth are often worth taking extra steps to save. Smaller, less important teeth may be extracted without significant impact – though some owners think all teeth are important.

- Smaller, non-strategic teeth adjacent to strategic teeth may be “sacrificed” in order to be able to more fully treat the larger tooth:
- Lower first incisors adjacent to canines
- Teeth adjacent to lower 1st molars (4th premolar, 2nd molar)

Periodontal Status

Extent or Stage of Periodontal Disease:

Full evaluation with probing, radiographs and physical exam will indicate the extent of disease and potential compromise to the tooth.

Strategic vs. Non-strategic Extraction:

Extraction of adjacent non-strategic teeth will often allow better access to the periodontal structures of the strategic teeth, as well as the ability to provide advanced therapy (root planing, etc).

Crowding:

When teeth are so close together that the gingival tissue is not able to surround a tooth completely, a significant risk for developing periodontal disease exists. Food and bacteria are not prevented from entering the periodontal space and are very difficult to remove by brushing or normal chewing behavior. Common teeth affected by crowding are the 6's with 7's and 8's. This is particularly true for brachiocephalic breeds.

Mobility:

While any level of mobility does not automatically make a tooth a candidate for extraction, extensive mobility that does not respond to therapy may be an indication of insufficient attachment.

Furcation Exposure:

Furcation exposure is not an automatic reason for extraction, either. In fact, with good home care, these teeth can often be salvaged, as long as they are not accompanied by additional attachment loss (deep pockets).

Endodontic Status

ANY time a pulp's vitality is compromised, extraction or endodontic therapy should be performed; persistence of a non-vital pulp will cause bacteria to flow into systemic circulation on a regular basis (at the apical infection site).

Vital vs. Non-vital Teeth:

- Open canal? If so, the tooth is compromised
- Pulp not exposed? Bacterial translocation can occur over the long term so even “chipped” teeth are vulnerable to future abscessation.
- Transillumination:
 - Vital tooth will transmit light well – often pink of the pulp is visible
 - Non-vital tooth will appear dark and discolored, sometimes with a “black” pulp appearance
 - Compare with similar teeth if unsure
 - Confirm results with radiology

- Intraoral radiology:
 - Look for any periapical bone loss (not “diagnostic” for abscessation, a histopathologic diagnosis, but highly indicative)
 - Evaluate canal width as compared to similar teeth (non-vital tooth will not produce further dentin, so canal may appear wider)
 - Evaluate condition of roots - presence of resorptive lesion or fracture may lead to extraction



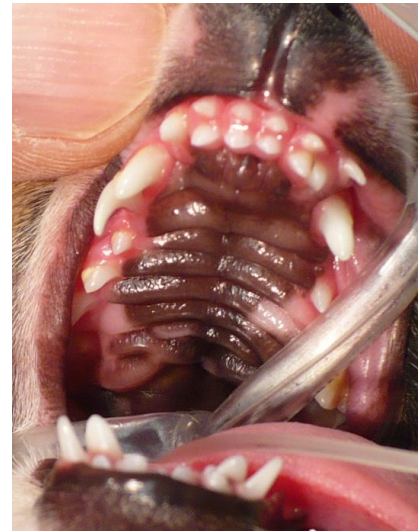
Extraction vs. Endodontic Therapy:

- Is the tooth an appropriate candidate for endodontic therapy?
- Radiograph roots to see if solid
- Fully evaluate canine teeth in cats - often have root resorption after crown fracture
- Additional cost for endodontics - check commitment of owner
- Additional anesthetic time involved - evaluate health of pet
- Repeat occurrence? Most fractured teeth are as a result of behavioural patterns. Will chewing on hard objects continue? Will there be an increased risk of automobile accidents? Jumping? Fighting?

Deciduous Teeth

Retained deciduous tooth with presence of permanent counterpart or it's eruption:

- Any time there are two teeth in the same place at the same time, the deciduous tooth needs to be extracted
- Persistence of the deciduous tooth will cause the permanent tooth to erupt in an abnormal position:
- Most permanent teeth will erupt further lingual or palatal to their normal position - base narrow mandibular canines often require intervention
- Maxillary canine teeth will erupt further forward (rostral or mesial) to their normal position - this can close the natural diastema for the mandibular canine



Fractures of deciduous teeth:

- An open pulp can lead to infection spreading to the apex of the tooth. This can damage the underlying permanent tooth bud

Non-vital deciduous teeth:

- Similar to a fracture, a non-vital tooth can become infected. Infection at the apex can damage the underlying permanent tooth bud

Deciduous malocclusion causing mechanical interference to continued jaw growth:

- Even if a “temporary” situation (i.e., adult jaw will eventually be a normal length), these teeth can disrupt normal jaw growth
- Growth of jaws is disproportionate prior to 12 weeks of age in dogs. Window for interceptive extractions very short to correct malocclusions.

Malocclusions

If there is discomfort or pain from a maloccluded tooth (e.g., base narrow mandibular canine hitting the palate), then extraction (or crown reduction with pulp capping) will provide a more comfortable bite.

Unerrupted Teeth

If a tooth is "missing", it should always be radiographed. With few exceptions, an unerupted tooth should be extracted, because it could form a large dentigerous cyst that can destroy bone.

Supernumerary Teeth

If the extra tooth will cause crowding or contribute to periodontal disease, it should be extracted. Be sure to radiograph to find all supernumerary teeth.

Resorptive Lesions

With resorptive (odontoclastic) lesions, full evaluation of the tooth with radiography is necessary to determine the extent of root involvement. In cats, this is always an indication for extraction due to the pain involved. Canine resorption seems less painful and extraction is limited to those with significant gingival hyperemia or evident discomfort.

DECIDUOUS TEETH

INDICATIONS

- Retained deciduous tooth (still present when permanent tooth starts to erupt):
 - Deciduous tooth retention can cause a permanent tooth to erupt into an abnormal position resulting in malocclusion
 - Fractured, discolored, non-vital tooth
 - Deciduous malocclusion with mechanical interference of teeth that could cause abnormal jaw maturation or soft tissue trauma
-

EQUIPMENT

- Local anesthetic
 - Intraoral radiographs
 - Scalpel blade (#11 or #15)
 - Periosteal elevator
 - Means of sectioning teeth
 - Dental elevators (curved, winged, sharpened!)
 - Suture materials (absorbable monofilament preferred)
-

PRE-OP

- a. Appropriate diagnostics
 - b. I.V. catheter and fluids where indicated
 - c. Antibiotics where indicated (see note below)
 - d. Pre-anesthetic:
 - Sedation
 - Analgesia
 - If surgery anticipated (e.g., extraction, gingival flap)
 - Opioid
 - e. Cuffed endotracheal tube for general anesthesia
 - f. Prepare operatory:
 - Dental instruments sharpened and sterilized
 - Operator eye shield, mask, gloves
-

PROCEDURE

1. **Local anesthetic blocks**
 - Watch total dose on small dogs and cats
 - Regional block
 - Local infiltration block in alveolar mucosa near apex
2. **Take pre-op radiograph**
3. **Extraction:**
 - In most cases, simple elevation with a small dental elevator and steady, gentle pressure is sufficient to release the periodontal ligament:
 - Extreme care should be taken with these teeth because they have long, delicate roots and the permanent tooth bud is just under the tooth surface and can be damaged with excessive force in younger animals.
 - If the permanent tooth is already erupted and in proper occlusion, and the deciduous root is ankylosed, it may not be possible to completely elevate.

- If the permanent tooth is erupting in an abnormal pattern, the entire deciduous root should be elevated; a single incision over the root can gently expose it for careful elevation. Suture close the incision only; not the gingival margins.
- If any difficulty in achieving appropriate mobility to allow for extraction, do not hesitate to make a gingival flap. Burring of alveolar bone over deciduous canine teeth is often required to enable complete extraction.
- In the event of a fracture of the root, a flap is always indicated to assess and provide access to remove the fragment left behind.

4. Take post-operative radiograph (see note below)

5. Recovery and discharge:

- Recover patient – watch for signs of discomfort or bleeding
- Discharge with appropriate antibiotic and pain management
- Continue to monitor patient for any further malocclusion



A fractured deciduous canine with open canal is a candidate for extraction. Periapical infection of this tooth can cause damage to the underlying permanent tooth buds.



Radiograph of the fractured deciduous tooth reveals how close the permanent tooth buds are to the root structure. Extraction should be VERY gentle, as excessive force can damage the tooth buds.



The extracted deciduous canine reveals a long root structure that is very delicate.

POSSIBLE COMPLICATIONS

- Damage to underlying permanent tooth bud from extraction forces:
 - Handle tissues gently, avoiding elevation at position of permanent tooth bud
- Retention of root with displaced permanent tooth:
 - All of the deciduous root must be removed if the permanent tooth is erupting abnormally

MOBILE OR SINGLE-ROOTED TEETH

INDICATIONS

- Extensive periodontal disease
- Non-vital pulp – fractured with open canal, discolored pulp

EQUIPMENT

- Local anesthetic
- Intraoral radiographs
- Scalpel blade (#11 or #15)
- Periosteal elevator
- Means of sectioning teeth
- Dental elevators (curved, winged, sharpened!)
- Suture materials (absorbable monofilament preferred)

PRE-OP

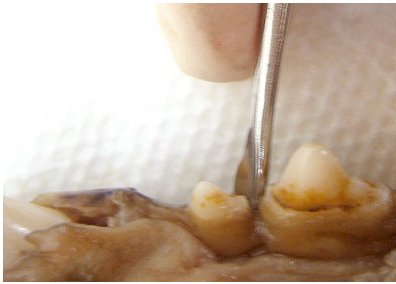
- g. Appropriate diagnostics
- h. I.V. catheter and fluids where indicated
- i. Antibiotics where indicated (see note below)
- j. Pre-anesthetic:
 - Sedation
 - Analgesia
 - If surgery anticipated (e.g., extraction, gingival flap)
 - Opioid
- k. Cuffed endotracheal tube for general anesthesia
- l. Prepare operatory:
 - Dental instruments sharpened and sterilized
 - Operator eye shield, mask, gloves

PROCEDURE

1. **Local anesthetic blocks (see note below):**
 - a) Regional block
 - b) Local infiltration block in alveolar mucosa near apex
2. **Take pre-op radiograph (see note below)**
3. **Elevation:**
 - a) Simple elevation with dental elevator may be sufficient to extract tooth:
 - Gently curettage alveolus
 - Make decision to pack and/or suture
 - b) Envelope flap or releasing flap if tooth is more solidly attached
 - c) Removing alveolar bone with a bur may be indicated.
4. **Take post-op radiograph (see note below)**
5. **Prepare and close site:**
 - a) Alveoloplasty – smooth roughened areas of bone
 - b) Curette alveolus – remove infected granulation tissue
 - c) Close extraction site with continuous pattern if possible to minimize the amount of suture in the mouth. Use absorbable sutures

6. Recovery and discharge:

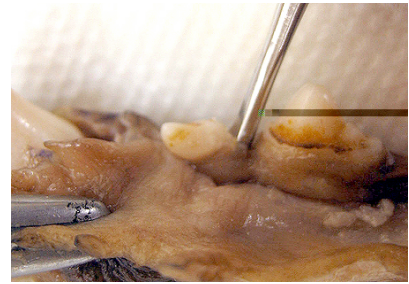
- Recover patient – watch for signs of discomfort or bleeding
- Discharge with appropriate antibiotic and pain management



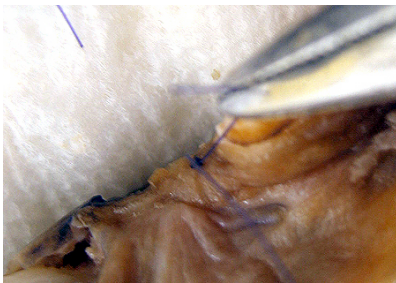
Simple elevation of a small tooth can be performed with a dental elevator, used here at the distal aspect of the mandibular 1st premolar.



Continued elevation of the premolar at its mesial aspect.



The premolar is elevated out of its alveolus.



A simple interrupted or cruciate suture with absorbable material will often be sufficient for closure.



Extraction site (of two mandibular central incisors) is sutured with a simple interrupted or cruciate pattern

POSSIBLE COMPLICATIONS

- Fractured tooth with retained roots:
 - Must elevate if any indication of infection
 - May retain only if complete resorption/ankylosis present
- Fractured jaw:
 - Stabilize
- Damage to deeper structures:
 - Caused by sharp instruments used with minimal control
 - Reported cases of ocular and brain abscesses
- Resorptive lesions:
 - Refer to the *Resorptive Lesions Protocol*

MULTI-ROOTED TEETH

INDICATIONS

- Extensive periodontal disease
- Non-vital pulp – fractured with open canal, discolored pulp
- Small breed dogs – abnormally formed mandibular 1st molar

EQUIPMENT

- Local anesthetic
- Intraoral radiographs
- Scalpel blade (#11 or #15)
- Periosteal elevator
- Means of sectioning teeth
- Dental elevators (curved, winged, sharpened!)
- Suture materials (absorbable monofilament preferred)

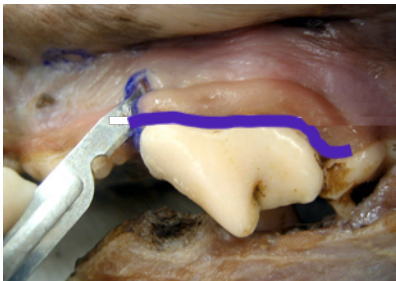
PRE-OP

- m. Appropriate diagnostics
- n. I.V. catheter and fluids where indicated
- o. Antibiotics where indicated (see note below)
- p. Pre-anesthetic:
 - Sedation
 - Analgesia
 - If surgery anticipated (e.g., extraction, gingival flap)
 - Opioid
- q. Cuffed endotracheal tube for general anesthesia
- r. Prepare operatory:
 - Dental instruments sharpened and sterilized
 - Operator eye shield, mask, gloves

PROCEDURE

1. **Local anesthetic blocks (see note below):**
 - a) Regional block (infraorbital, maxillary, mental, mandibular) as indicated
 - b) Local infiltration block in alveolar mucosa near apex
 - c) Ligamental block into periodontal ligament space (big dog)
2. **Take pre-op radiograph (see note below)**
3. **Sever epithelial attachment with a #11 or 15C blade in sulcus/pocket depth**
4. **Debride edge of gingiva, especially if inflamed, to get fresh edge (buccal and palatal edges)**
5. **Gingival flap:**
 - a) Envelope flap – gently stretch gingival margin to expose furcation using periosteal elevator
 - b) Releasing incisions:
 - Rostral (mesial) to tooth, extending up in attached gingiva into alveolar mucosa, past mucogingival line
 - Slightly divergent; broad based
 - c) Raise flap using periosteal elevator (Molt #2 or #4), work full thickness flap of gingival and periosteum off the underlying bone, past the level of the mucogingival line
 - d) Release flap:
 - Hold up with thumb forceps

- Excise periosteal fibers attaching flap to underlying bone until thoroughly freed of tension (avoid going through flap)
- 6. Section tooth:**
 - a) Cross-cut fissure bur on high-speed or low-speed handpiece with water coolant
 - b) Section tooth starting at furcation (exposed by flap and alveolar bone), moving up through the crown (shortest distance)
 - Upper 4th premolar – section between two mesial (rostral) roots – be sure to get through entire depth of furcation before elevation
 - 7. Alveolar prep:**
 - a) With round bur, make “groove” at distal and rostral aspect of larger roots, for elevator to fit
 - Upper 4th premolar – remove area of distal crown if crowded against first molar to allow space for elevator
 - 8. Elevation:**
 - a) Insert elevator blade into groove made between tooth and alveolar bone, and in between tooth segments and adjacent teeth (if solid). Avoid elevating between tooth segments until after loosened between tooth and bone.
 - b) Rotate elevator steadily until pressure felt against tooth
 - c) Hold with constant pressure (not excessive) for 30-60 seconds.
 - d) Continue elevation efforts until tooth loosens; if not effective, consider removing additional amounts of alveolar bone
 - Remove inter-radicular cancellous bone (in between roots) if possible, preserving as much lateral cortical bone as possible
 - e) Use extraction forceps (without force) to remove tooth from socket
 - 9. Take post-operative radiograph (see note below)**
 - 10. Prepare and close site:**
 - a) Alveoloplasty – smooth roughened areas of bone
 - b) Curette alveolus – remove infected granulation tissue
 - c) Close extraction site with continuous pattern if possible to minimize the amount of suture in the mouth. Use absorbable sutures
 - d) Mesial “corner” of maxillary 4th premolar sutured to palatal root region
 - 11. Recovery and discharge:**
 - a) Recover patient – watch for signs of discomfort or bleeding
 - b) Discharge with appropriate antibiotic and pain management



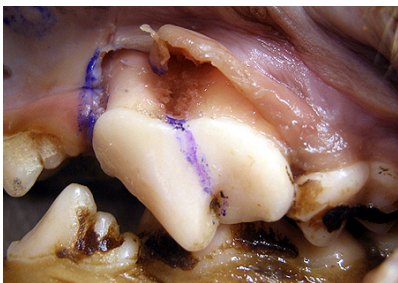
The mesial incision is made through all soft tissue thicknesses down to bone.



Periosteal elevation is continued until the entire flap extends past the mucogingival line into the alveolar mucosa.



Periosteal fibers are excised with sharp scissors.



With removal of crestal alveolar bone, the furcation is exposed and the buccal root sectioning marked.



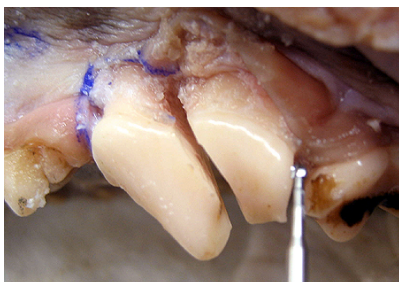
The mark for palatal root sectioning should extend from the mesial furcation to the furcation at the midpoint of the tooth.



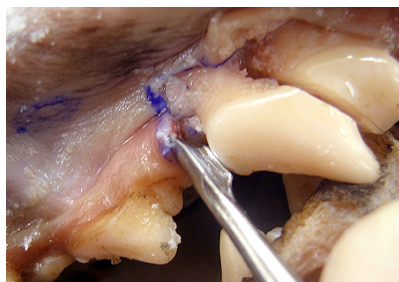
Using a crosscut fissure bur, sectioning should proceed from the furcation down the crown.



The palatal root sectioning should extend the entire depth of the crown to fully reach the furcation. The distal root may be extracted and the crown portion of remaining tooth removed to facilitate complete sectioning of palatal and mesial roots.



If the upper 4th premolar and 1st molar are close, a small section of the distal root can be removed to provide sufficient space for the dental elevator.



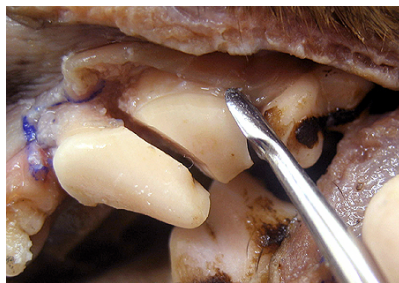
The dental elevator is positioned between the mesial root and alveolar bone, rotated to engage the tooth with steady pressure, and held in that position to fatigue the periodontal ligament.



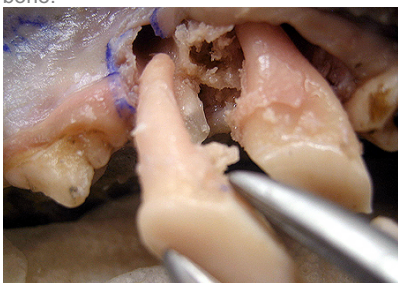
Gentle wedging between tooth segments can help fatigue the periodontal ligament, but avoid excessive force as the crowns can break off. Only do this AFTER elevating between the tooth and alveolar bone.



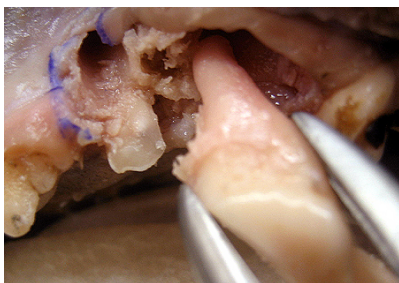
Careful pressure is exerted between the two mesial roots (buccal and palatal) to ensure that they are fully separated. If the sectioning is incomplete, any elevation of either root could lead to root fracture.



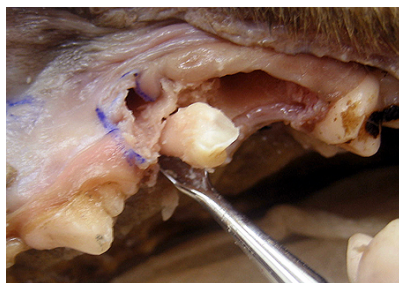
The elevator is placed in the space created behind the distal root to elevate that segment.



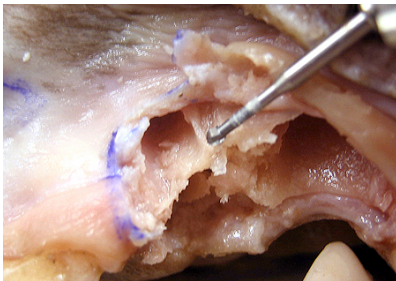
Elevation is continued until the tooth segments are released enough to gently grasp with the extraction forceps.



If the distal segment cannot be easily removed, additional inter-radicular, cancellous bone may be removed to facilitate further elevation as in this image,



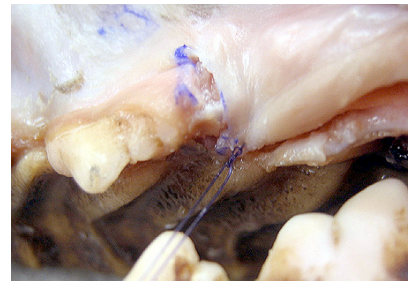
The palatal root is elevated from its alveolus.



Any rough edges of the alveolus should be smoothed before closure either with round bur or bone rasp.



Although absorbable sutures in a simple interrupted pattern will provide adequate closure, a continuous pattern reduces the number of knots. Ensure minimal tension.



The mesial corner of the gingival flap can be sutured to the palatal mucosa at the site of the palatal root alveolus.

POSSIBLE COMPLICATIONS

- Fractured tooth with retained roots:
 - Must elevate if any indication of infection
 - May retain only if complete resorption/ankylosis present (refer to the *Resorptive Lesions Protocol*)
- Fractured jaw:
 - Extraction forces, even careful ones, can lead to mandibular fracture if the bone is compromised
 - Stabilize fracture with interosseous wire
 - Enhance osseous healing and strength by placement of osseopromotive substance
- Damage to deeper structures:
 - Caused by sharp instruments used with minimal control
 - Reported cases of ocular and brain abscesses

CANINE TEETH

INDICATIONS

- Extensive periodontal disease
- Non-vital pulp – fractured with open canal, discolored pulp

EQUIPMENT

- Local anesthetic
- Intraoral radiographs
- Scalpel blade (#11 or #15c)
- Periosteal elevator
- Means of alveoplasty
- Dental elevators (winged – and sharpened!)
- Suture materials (absorbable monofilament preferred)

PRE-OP

- a. Appropriate diagnostics
- b. I.V. catheter and fluids where indicated
- c. Antibiotics where indicated (see note below):
 - Systemic considerations
 - Extensive oral/dental disease
- d. Pre-anesthetic:
 - Sedation
 - Analgesia (see note below):
 - Anticipated surgery: extraction, gingival flap
 - Opioid
- e. Cuffed endotracheal tube for general anesthesia
- f. Prepare operatory:
 - Dental instruments sharpened and sterilized
 - Operator eye shield, mask, gloves

PROCEDURE

1. **Local anesthetic blocks (see note below):**
 - a) Regional block (infraorbital, maxillary, mental, mandibular) as indicated
 - b) Local infiltration block in alveolar mucosa near apex
 - c) Ligamental block into periodontal ligament space (big dog)
2. **Take pre-op radiograph (see note below)**
3. **Sever epithelial attachment with a #11 or #15C blade in sulcus/pocket depth**
4. **Debride edge of gingiva, especially if inflamed, to get fresh edge (buccal and palatal edges)**
5. **Releasing incisions:**
 - a) Maxillary or Mandibular canine: Start with a rostral releasing incision 1 to 2 mm rostral (mesial) to tooth, extending up through attached gingiva into alveolar mucosa past mucogingival line; Then a second incision starting at the distal aspect of tooth, extend distally to allow for enough flap to expose enough root.
6. **Raise and release flap:**
 - a) Using periosteal elevator (Molt #2 or #4), work full thickness flap of gingival and periosteum off the underlying bone past the level of the mucogingival line

- b) Hold flap up with thumb forceps and excise periosteal fibers attaching flap to underlying bone until thoroughly freed of tension (avoid going through flap)

7. Alveolar prep:

- a) Maxillary canine: With a round bur, make a "groove" at the distal and rostral aspect of the root for elevator to fit; remove 2 - 3 mm of buccal bone to release root at its widest aspect
- b) Mandibular canine: With a round bur, remove 2 - 3 mm of alveolar bone at the distal aspect of the canine to expose the widest part of the root; can make a "groove" at the rostral (mesial) aspect for elevator to fit

8. Elevation:

- a) Supporting jaw with second hand, insert elevator blade into groove made between tooth and alveolar bone (rostral)
- b) Rotate elevator steadily until pressure felt against tooth
- c) Hold with constant pressure (not excessive) for 30-60 seconds.
- d) Elevate distal aspect and release any soft tissue connection at palatal aspect with periosteal elevator; do not elevate crown buccally – root would be pushed nasally
- e) Continue elevation efforts until tooth loosens; if not effective, consider removing additional amounts of alveolar bone
- f) Use extraction forceps (without force) to remove tooth from socket

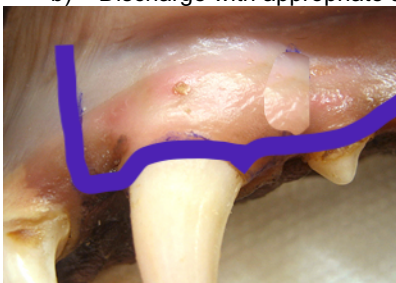
9. Take post-operative radiograph (see note below)

10. Prepare and close site:

- a) Alveoloplasty - smooth roughened areas of bone
- b) Curette alveolus - remove infected granulation tissue
- c) Close extraction site with simple interrupted absorbable sutures

11. Recovery and discharge:

- a) Recover patient – watch for signs of discomfort or bleeding
- b) Discharge with appropriate antibiotic and pain management



Placement of incisions.



Debriding of the gingival margin.



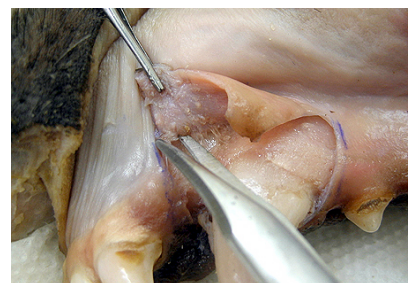
The mesial incision is made.



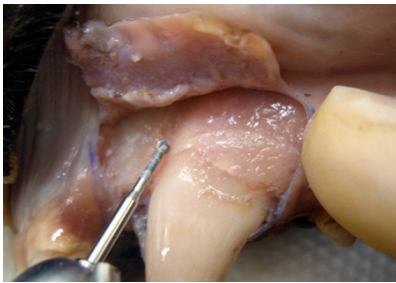
Periosteal elevation completed. (note pictures depict two vertical releasing incisions, not advised due to vascular compromise)



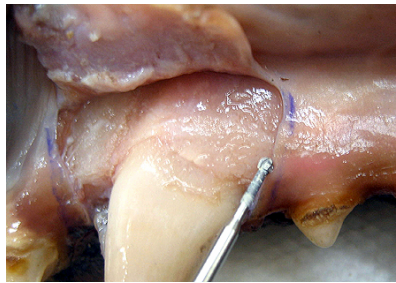
Flap is lifted with forceps.



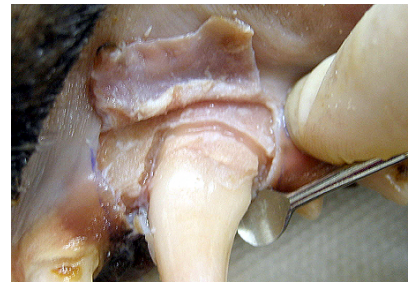
Sharp scissors separate the gingival flap from underlying bone.



A groove is created at the mesial aspect of the tooth.



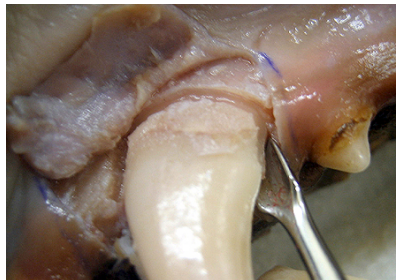
A groove is created at the distal aspect of the tooth as well.



2-3 mm of the buccal alveolar bone has been removed using round bur



The winged elevator is positioned in the mesial (rostral groove) for continued elevation.



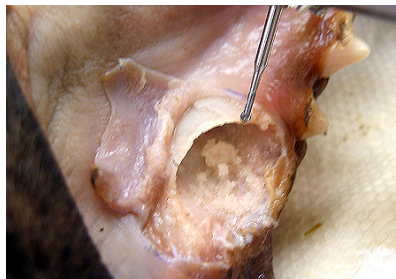
The winged elevator is positioned in the distal groove, gently rotated to engage the tooth until slight, firm pressure is felt, and held in that position for several seconds to help fatigue the periodontal ligament and loosen the tooth.



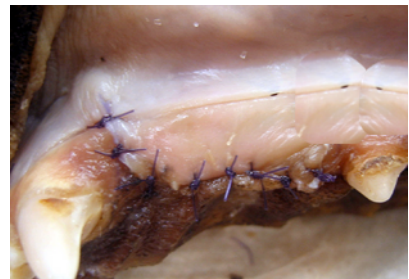
Continued elevation results in the loosening of the tooth from the alveolar socket.



The loosened tooth is grasped with the extraction forceps and gently removed from the alveolus.



Any rough edges of the alveolus should be smoothed before closure either with round bur or bone rasp.



Absorbable sutures in a simple interrupted pattern will provide adequate closure, preferably with no tension

POSSIBLE COMPLICATIONS

- Oronasal fistulation:
 - Maxillary canine
 - Must debride necrotic tissue and ensure a vital flap, no tension on sutures, no sharp bone below
- Fractured tooth with retained roots:
 - Must elevate if any indication of infection
 - May retain only if complete resorption/ankylosis present (refer to the *Resorptive Lesions Protocol*)
- Fractured jaw:
 - Stabilize jaw while elevating
 - Don't elevate excessively
 - For cats, do not attempt to extract mandibular canine tooth roots that have been resorbed as symphyseal fracture will occur
- Damage to deeper structures:
 - Caused by sharp instruments used with minimal control
 - Reported cases of ocular and brain abscesses

TEETH WITH RESORPTIVE LESIONS

INDICATIONS

- Odontoclastic resorptive lesion of tooth:
 - Defect noticed grossly in crown, often at the neck of the tooth
 - Hyperplastic gingiva or calculus covering defect
 - Concurrent resorption of roots predate the crown lesion, ALWAYS RADIOGRAPH CATS
- Non-odontoclastic resorptive lesion (inflammatory):
 - Resorption on root surface exposed by periodontal attachment loss
 - Root structure normal on radiographs

EQUIPMENT

- Local anesthetic
- Intraoral radiographs
- Scalpel blade (#11 or #15c)
- Periosteal elevator
- Means of sectioning teeth
- Dental elevators (winged – and sharpened!)
- Suture materials (absorbable monofilament preferred)

PRE-OP

- a. Appropriate diagnostics
- b. I.V. catheter and fluids where indicated
- c. Antibiotics where indicated (see note below):
 - Systemic considerations
 - Extensive oral/dental disease
- d. Pre-anesthetic:
 - Sedation
 - Analgesia
 - Anticipated surgery: extraction, gingival flap
 - Opioid
- e. Cuffed endotracheal tube for general anesthesia
- f. Prepare operatory:
 - Dental instruments sharpened and sterilized
 - Operator eye shield, mask, gloves

PROCEDURE

1. **Local anesthetic blocks (see note below):**
 - a) Regional block (infraorbital, maxillary, mental, mandibular) as indicated
 - b) Local infiltration block in alveolar mucosa near apex
 - c) Watch total dose on cats and small dogs
2. **Take pre-operative radiograph (see note below)**
3. **Sever epithelial attachment with #11 or #15C blade in sulcus/pocket depth**
4. **Debride edge of gingiva, especially if inflamed, to get fresh edge (buccal and palatal edges)**
5. **Envelope flap – gently stretch gingival margin to expose furcation using periosteal elevator (use mesial releasing incision if necessary)**

6. Section tooth with crosscut fissure bur if multi-rooted

7. Gently elevate tooth, prepare alveolous and suture gingiva:

- a) Odontoclastic lesion with root resorption:
 - Crown will often break off because roots are ankylosed, often like a greenstick fracture vs “snap”
 - Confirm radiographically
 - Note bleeding from “root” tissue, normal roots will not ooze blood but resorbed root will act like bone.
 - Remove remaining crown, smooth osseous edges, and suture site
 - Record evidence of resorbing roots and “modified” extraction technique
 - Communicate patient’s condition and selected therapy to owner
 - Monitor site for any persistent inflammation; if inflammation persists, site may need further debridement
 - All tooth structures must be removed in patients with stomatitis
- b) No root resorption – intact roots:
 - Fully elevate roots
 - Prepare alveolous and suture gingiva

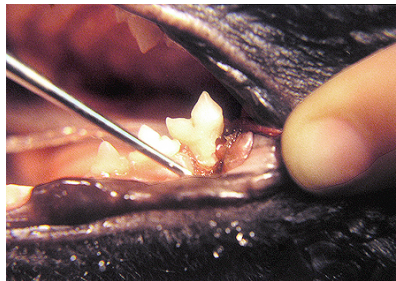
8. Take post-operative radiograph (see note below)

9. Recovery and discharge:

- a) Recover patient – watch for signs of discomfort or bleeding
- b) Discharge with appropriate antibiotic and pain management



This radiograph shows extensive crown and root resorption of multiple teeth.



If the roots appear intact radiographically, use extreme care with elevation because the roots will be fragile.



Even though there is extensive resorption of these roots, they can be carefully elevated because the embedded portion of the roots and their periodontal ligaments are still intact.

POSSIBLE COMPLICATIONS

- Retention of resorbing roots, leading to persistent inflammation:
 - Go back in and get them out
- Retention of non-resorbing roots:
 - Don’t leave in
- Fractured jaw:
 - Don’t elevate excessively
 - For cats, do not attempt to extract mandibular canine tooth roots that have been resorbed as symphyseal fracture will occur
- Retention of roots in feline lymphocytic/plasmacytic stomatitis:
 - Often require caudal or full mouth extractions
 - All root structures **MUST** be fully removed or inflammation may persist

