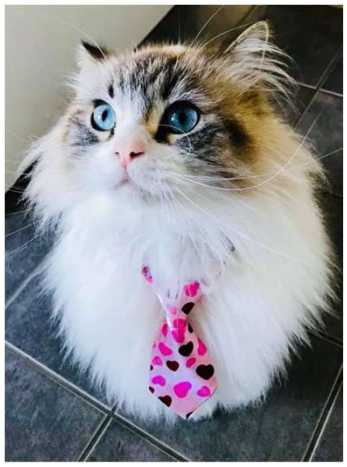
Surgical Extractions

'IMPROVING PATIENTS QUALITY OF LIFE ONE TOOTH AT A TIME'

Overview

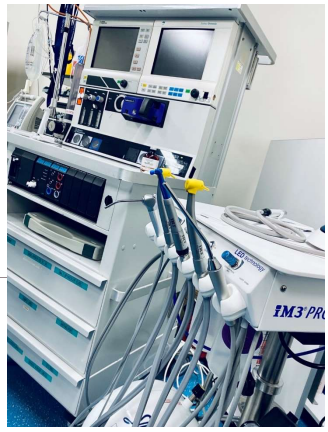
- Equipment
- A step by step guide to surgical extractions
- Trouble shooting
  - Traumatised/dehisced Flaps
  - Oronasal Fistulas
  - Fractures – tooth roots to jaw



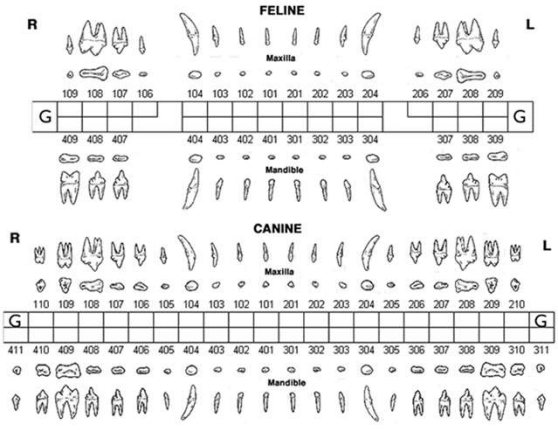
Equipment

'IT IS ESSENTIAL TO HAVE GOOD TOOLS, BUT IT IS ALSO ESSENTIAL THAT THE TOOLS SHOULD BE USED IN THE RIGHT WAY'

WALLACE D. WATTLES

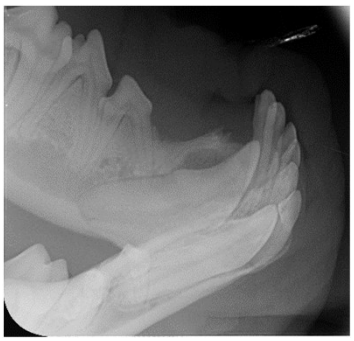


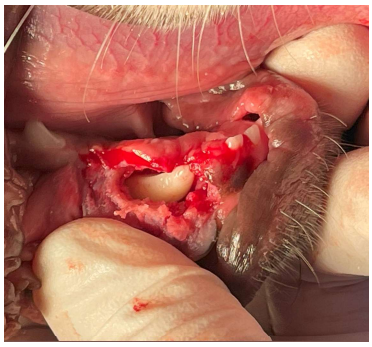
Dental chart + Dental x-rays



Dental x-rays

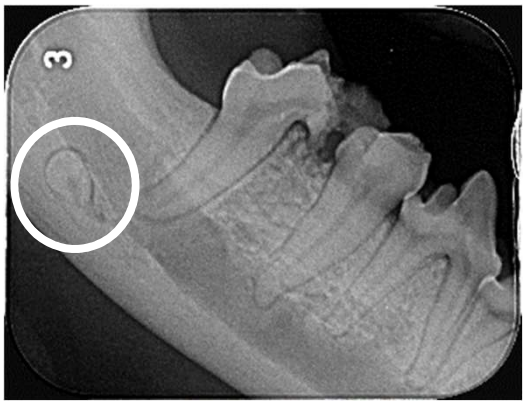
- Clinically important lesions missed without **FULL** mouth x-rays
  - 27.8% in dogs
  - 41.7% in cats





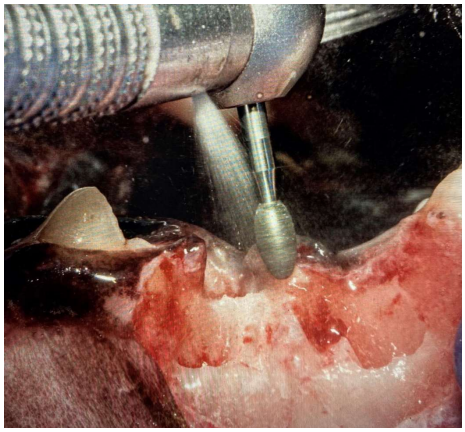
Dental x-rays

- Clinically important lesions missed without FULL mouth x-rays
  - 27.8% in dogs
  - 41.7% in cats
- X-rays added essential information to the visible clinical lesions noted on oral exam



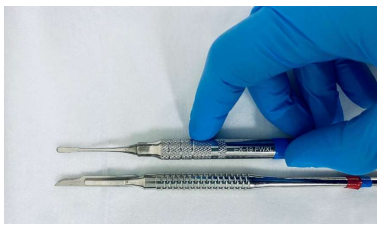
Water-cooled high-speed drill

- Alveolectomy – removal of buccal alveolar bone
  - Round ½, 1, 2, 4 size burs
- Sectioning multi-rooted teeth
  - Taper fissure crosscut 699, 699L, 701,701L burs
- Smooth and re-contour
  - Medium grit diamond football bur
- Fibre-optics



Creating Mucoperiosteal Flaps

- 15 or 15C scalpel blade
- Periosteal Elevator
  - Sharp narrow end to begin the process of lifting the mucoperiosteum
  - Slightly wider, more rounded end to raise the tissue for alveolar bone exposure



DENTAL LUXATOR'S	DENTAL ELEVATOR'S
Thin working end to incise PDL	Thicker working end
Technique sensitive	Fatigue and tear PDL
Tip bent left or right – better access to molars and premolars	Wedge into the PDL space

Extraction forceps

- It is easy to fracture the crown:
  - Using excessive force with the forceps
  - Attempting to extract an insufficiently levered tooth

Surgical site closure

- Small needle holders (4.5-5inch Olsen Hegar)
- Thumb forceps
- Iris scissors
- Miller bone curette
- 4/0 (Dogs) 5/0 (Cats) Poliglecaprone with a reverse cutting needle

Life saving instruments

ROOT TIP PICK

ROOT TIP FORCEPS

Life saving instruments

LIGHT

MAGNIFICATION

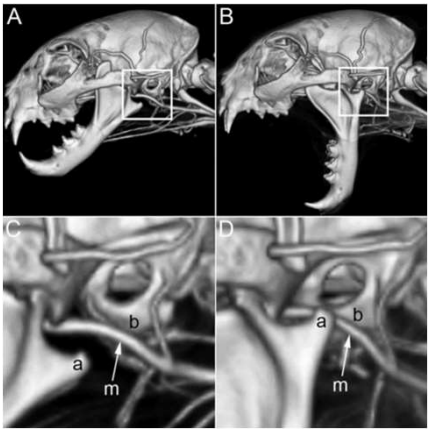
Periotome

- Sever and remove resistance of the PDL

Spring-loaded gags

Not recommended due to:

- Iatrogenic damage to teeth
- TMJ damage
- Decreased maxillary blood flow to the brain and retina in cats
  - Neurological dysfunction
  - Blindness

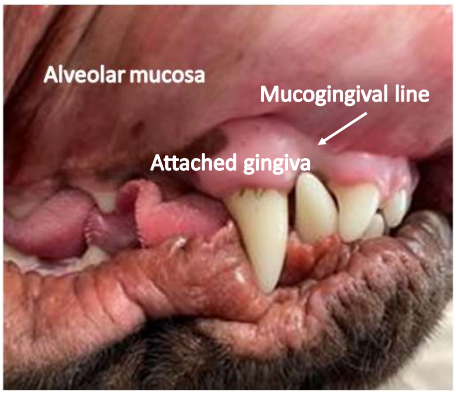


Surgical Extractions

A step by step guide

1. Pre-extraction x-ray + Nerve block
2. Gingival incision

- Palpate buccal bone and plan incision over sound bone
- Full thickness mesial incision
- Adequate blood supply



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SMALL PIECES MAKE THE BIG PICTURE

The Smiling Pet

Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision

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Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision
3. Mucoperiosteal flap creation

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Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision
3. Mucoperiosteal flap creation
4. Removal of alveolar bone – round bur

- Care not to damage flap
  - Suction from high speed bur
- Create a small trough for elevator/luxator placement

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Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision
3. Mucoperiosteal flap creation
4. Removal of alveolar bone – round bur
5. Sectioning of multi-rooted teeth – cross-cut taper fissure bur

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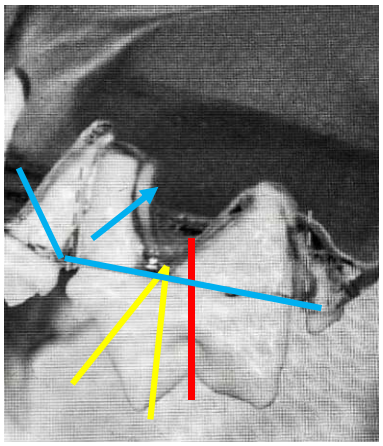
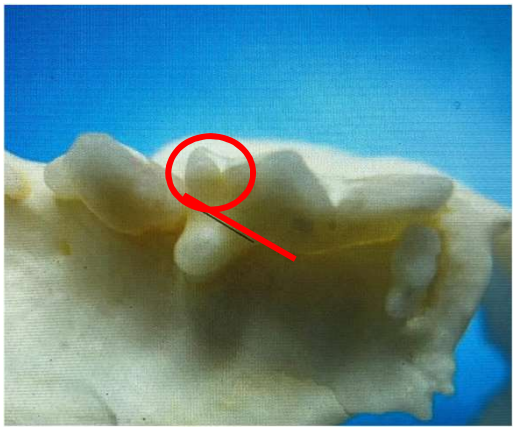
Maxillary carnassial – 108,208

- Raise the flap to identify the furcation
- After sectioning all three roots remove the distal root first

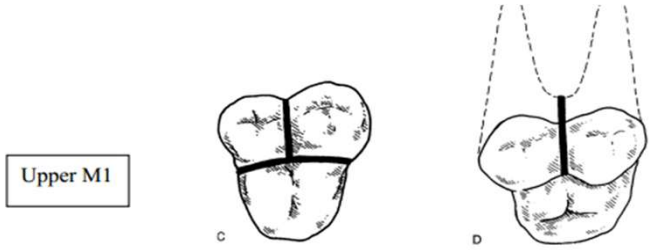


Maxillary carnassial – mesial roots

- Extract the mesial buccal root first
- Remove interseptal bone between the mesial roots to allow luxation of the palatal root by moving it towards the empty alveoli



Maxillary Molar 109,209



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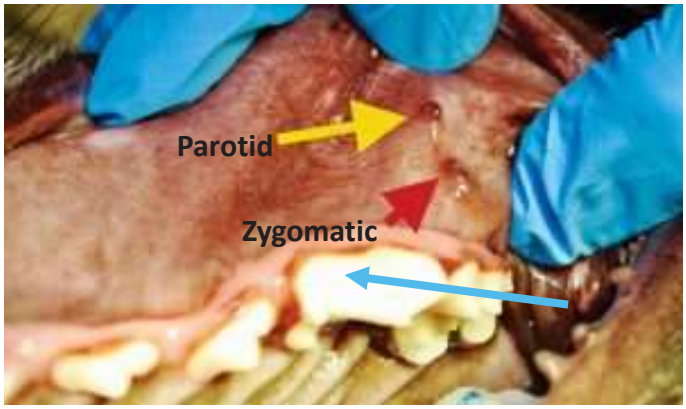
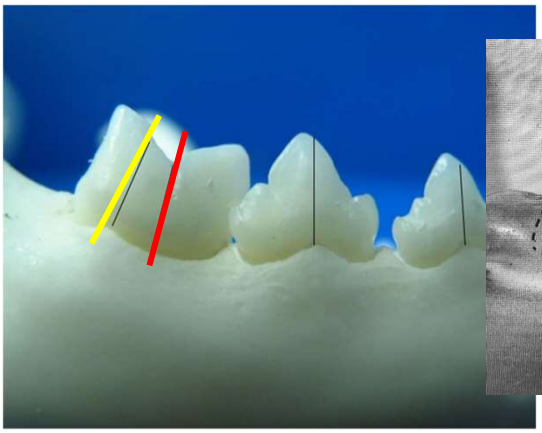
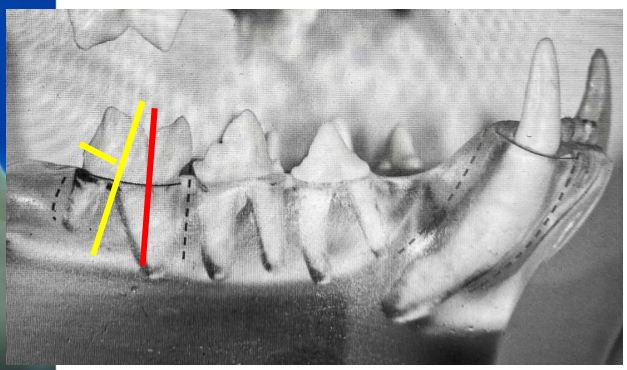
Parotid and Zygomatic salivary papillae

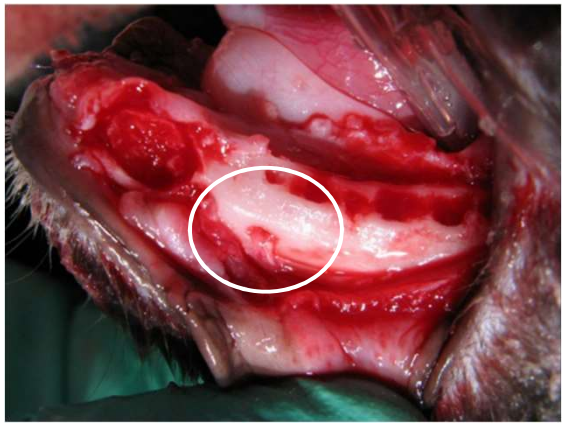


Feline Mandibular molar 309, 409

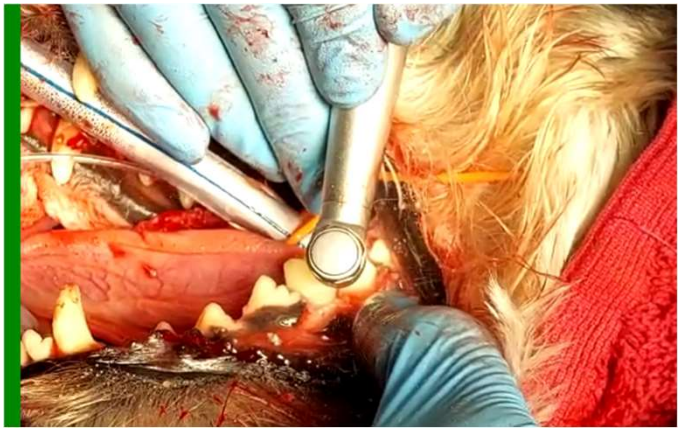




Feline Mandible



Canine Mandibular 1st molar 309,409



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Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision
3. Mucoperiosteal flap creation
4. Removal of alveolar bone – round bur
5. Sectioning of multi-rooted teeth – cross-cut taper fissure bur
6. Luxation/elevation
   - Short finger stop

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Surgical extraction

1. Pre-extraction x-ray + Nerve block
2. Gingival incision
3. mucoperiostealflap creation
4. Removal of alveolar bone
5. Sectioning of multi-rooted teeth
6. Luxation/elevation
7. Removal of root

- Avoid excessive force
- Ensure tooth adequately elevated

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Surgical extraction

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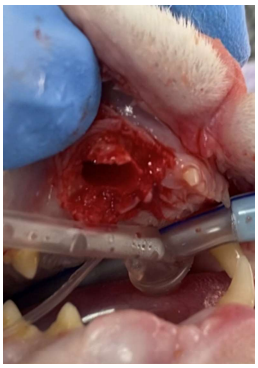
7. Removal of root
8. Management of alveolus



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Surgical extraction

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4. Removal of alveolar bone
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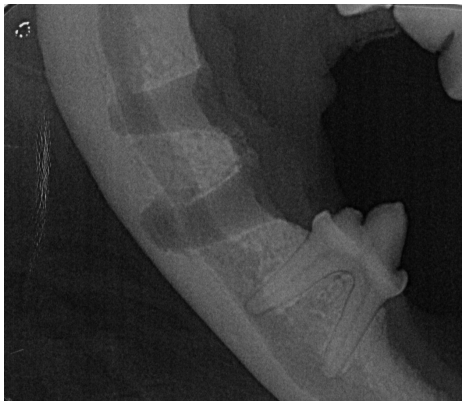
6. Luxation/elevation
7. Removal of root
8. Management of alveolus
9. Post-extraction x-ray
10. Mucoperiosteal flap closure



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Mucoperiosteal flap TENSION FREE closure:

- Alveoloplasty
- Releasing incisions with care through the periosteum
- Flap should remain in place without being held by forceps
- May need to extend flap – careful of local anatomy and keeping the base of the flap wide

Trouble shooting

FLAPS, FISTULAS AND FRACTURES

How to fix the traumatised flap

Damage to the flap is small
- Suturing the tear – adequate but delayed healing

Large areas of damage
- Need to excise and redesign the flap – ensure tension-free closure

Flap dehiscence

POTENTIAL RISKS

- Poor flap design
- Sutures not supported by bone
- Closed under tension
- Occlusal interference
- Patient factors – chewing/pawing

How to fix the dehiscing flap

Alveolus intact and no necrotic bone

- Second intention healing
  - Unsuitable if an Oronasal fistula is present
- Flushing site after eating
- Heals within two weeks

No evidence of healing

- GA examination and treatment

Oronasal Fistulas

POTENTIAL RISKS

Small breed dolichocephalic dogs secondary to periodontal disease

ONF created during extraction by removal of bone on palatal aspect of tooth root

Previous canine extraction and site not closed

Oronasal Fistulas

Design a good mucoperiosteal flap

- 1.5-2 x the width of the defect to provide good blood supply
- Incision over bone to avoid excess tension and motion ('trampoline' effect)

Oronasal Fistulas

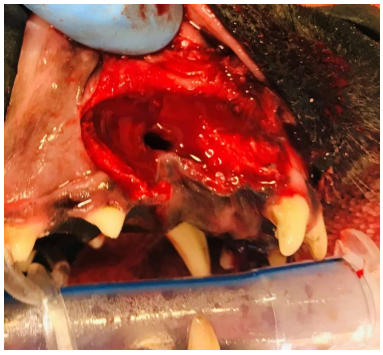
Need to debride the edges

Epithelial cells line the edges of the defect

Failing to debride the epithelial-lined tissue especially the palatal aspect will lead to failure

Scalpel blade and/or fine diamond tapered bur

ONF may get significantly larger and will require a bigger flap



Oronasal Fistulas

Closing without tension

- Fenestrate the periosteum
- Testing for tension - resulting flap should stay in place without sutures or forceps
- Simple interrupted sutures placed 2-3mm apart with 2-3mm full thickness bites

With each repeated repair attempt the difficulty and risk of failure increases significantly

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Oronasal Fistulas

Protecting the surgical site

- Elizabethan collar
- Chunks of soft food
- Avoid chews and toys
- Avoid pulling on lips
- Exercise restriction?
- Epistaxis 48-72 hours post-op

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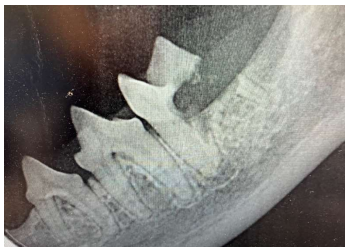
Fractures

THE CASES OF THE DREADED 'CRACK' FROM TOOTH ROOT TO JAW

Factors that increase the likelihood of tooth root fractures

- Overzealous extraction techniques
  - Excessive force
  - Using extraction forceps before the tooth is adequately elevated
- Dental elevators used in a levering rather than twisting force
- Pre-existing damage to the root structure
  - Resorption



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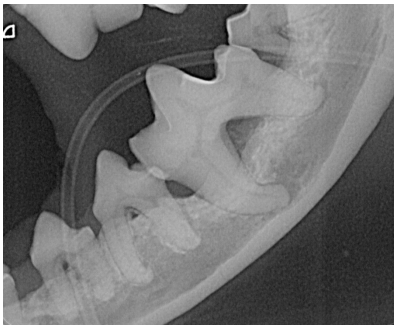
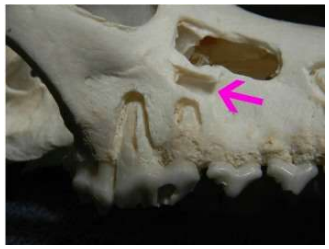
Factors that increase the likelihood of tooth root fractures

- Variation in normal anatomy
  - Curved, hooked or bulbous near the apex



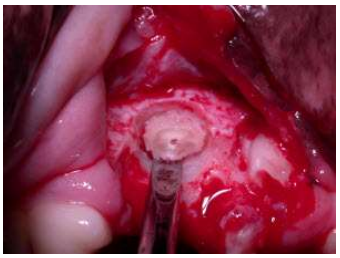
Take a deep breath and follow these steps

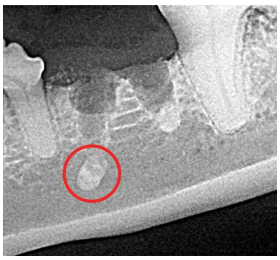
- Take a dental x-ray
  - Confirm the anatomy of the root
  - Adjacent structures and pathology of the surrounding bone
    - Mandibular canal/infraorbital canal
    - Orbit
    - Neurovascular bundles
    - Nasal cavity



- Expose the root tip
  - Never dig blindly
  - Adequate lighting and magnification
- Removal of alveolar bone
  - Round bur (1/2, 1, 2 bur) to remove buccal bone and create a groove in the PDL space
  - Circumferential 'moat' around the root – root tip pick
  - Root tip located near the apex, the diameter of the alveolus will need to be enlarged 30% wider than the diameter of the root fragment

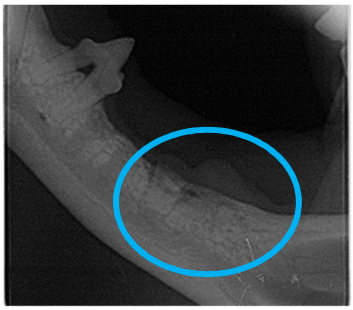
- Mobilise and remove the root
  - Luxate or elevate on the mesial and distal sides
  - Do not use apical pressure (mandibular canal, nasal cavity or maxillary sinus)
  - Mobile root can then be removed through the buccal bone window or with fine root tip extraction forceps





To avoid further complications with fractured roots, DO NOT:

- Leave a root tip in place if clinical or radiographic signs of periodontal or endodontic disease are associated with the tooth
- Leave a root tip in patients with stomatitis



Drilling or 'pulverising' roots

- Drilling or 'pulverising' the roots with a bur is strongly discouraged – dire iatrogenic consequences can result
  - Incomplete removal of dental tissue (leading to infection)
  - Damage to local structures (vessels, nerves, salivary ducts)
  - Forcing root fragments into surrounding tissues (mandibular canal, maxillary sinuses, nasal cavity)
  - Air embolism (from air-driven equipment)
- If it is too risky to retrieve the root tip (unstable GA, risk of trauma to surrounding tissues), then document this (including x-rays) and inform the owner. Consider referral

Iatrogenic Jaw Fractures

Potential risks

- Mandibular canine
  - Dogs and cats
  - Substantial percentage of the cross-sectional diameter of the mandible

Iatrogenic Jaw Fractures

POTENTIAL RISKS

- Mandibular first molar
  - Mainly small-breed dogs
  - Decreased mandibular bone height relative to the mandibular first molar height
  - Minimal amount of bone apical to the tooth root
  - Pre-existing periodontal +/- endodontic disease

Communication is the key

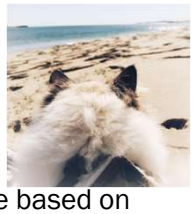
- Dental x-rays allow you to assess the risk of jaw fracture
- Referral can be offered or at the very least pre-warn the client about the potential complication
- Client compliance and consent for fracture repair is improved if they perceive it as a complication and not a 'mistake'

Fracture repair

Repair involves restoration of normal occlusion and avoidance of iatrogenic damage to the roots of the teeth (if any left) and the neurovascular bundle – intraoral splint with wires and acrylic

Take home message

- Extractions are surgical procedures
  - Treat them with the same level of respect as any surgery to avoid complications
- Dental x-rays provide critical information for treatment planning and successful, less stressful extractions.
- To minimise extraction complications:
  - Have a plan
  - Have patience for your patients - extractions take time
  - Use atraumatic techniques
  - Do not use excessive force!
- Referral is best if you are not comfortable with a particular procedure based on your equipment, knowledge, skill and/or pathology present
- Put on a good playlist, take a deep breath and be confident that you are going to make a difference



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Questions?

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