



## EXTRACTION COMPLICATIONS MANAGEMENT

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Complications happen, even to specialists. Here are actions to take when they arise. **Give yourself a moment** to breathe and walk away from your patient. Have your technician **take a radiograph**, then look at the radiograph and check in with the anesthetist. When you sit back down to your patient, **make sure you have adequate exposure**. Consider increasing your lighting and eyewear magnification with loupes and/or a headlamp, widening your flap exposure, increasing bony exposure by creating a better moat or removing more buccal bone, and increasing your use of suction to manage water and blood in your site. **Document everything** with radiographs, photographs and client communication notes.

Included in the chart below are common complications that can occur in the course of surgical extractions. Mucogingival flaps can be punctures, root tips break and have the potential to travel deep to their alveolus (into the nose or mandibular canal), and jaw bone can fail and fall apart. How you choose to manage these complications can make a big difference to the patient and their family. Since most of this lecture is picture-intensive, please refer to this table to help you through many common complications that you will inevitably run into as you increase your dentistry caseload. Never hesitate to call your veterinary dentist when you need advice about what your next steps should be.

Complication type	Problem	Methods to try	When to refer
Mucogingival flaps	Hole in flap through parulis (pre-existing hole)	<ol style="list-style-type: none"> <li>1. Remove granulation tissue from the back side of the flap</li> <li>2. Suture hole closed with single interrupted pattern</li> <li>3. Close flap as planned</li> </ol>	
	Hole or tear at the mucogingival line	<ol style="list-style-type: none"> <li>1. Remove the gingiva below the defect at an angle</li> <li>2. Periosteal release and blunt dissection will allow for extra mucosal stretch</li> </ol>	
Root tips	Broken root tip in alveolus (top down approach)	<ol style="list-style-type: none"> <li>1. Take a radiograph to identify the height, width and shape of root tip</li> <li>2. Use a diamond bur to smooth bone, distinguish bone from root (yellow, shiny) and identify PDL (red circle)</li> <li>3. "Top down" moat with 1/4 or 1/2 round carbide bur</li> <li>4. 3mm deep or more than 50% of the height of the root</li> <li>5. Use a small luxator or root tip pick to luxate or lift tip into space that does not have bone</li> <li>6. Smooth bone and remove PDL with diamond bur, then take a radiograph prior to flap closure</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Think weeks or months</li> <li>• sooner if the tooth had pulp exposure prior to extraction</li> </ul> <p>Circumstances:</p> <ul style="list-style-type: none"> <li>• Ran out of time</li> <li>• Widespread infection</li> <li>• Stomatitis cats!</li> </ul> <p><b>EVERY TIP MATTERS</b></p>

	Broken root tip in alveolus (buccal approach)	<ol style="list-style-type: none"> <li>1. Take a radiograph to identify the height, width and shape of root tip</li> <li>2. Use a high speed bur to remove buccal cortical bone, stop after you see the red PDL layer</li> <li>3. Expose &gt;50% of the root height</li> <li>4. Use a 1/4 or 1/2 round bur to create instrument channel for elevation mesial and distal to root</li> <li>5. Use elevator or luxator to luxate and lift root tip</li> <li>6. Smooth bone and remove PDL with diamond bur, then take radiograph prior to flap closure</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Think weeks or months</li> <li>• sooner if the tooth had pulp exposure prior to extraction</li> </ul> <p>Circumstances:</p> <ul style="list-style-type: none"> <li>• Ran out of time</li> <li>• Widespread infection</li> <li>• Stomatitis cats!</li> </ul> <p>EVERY TIP MATTERS</p>
	Broken root tip pushed into nasal cavity	<ol style="list-style-type: none"> <li>1. Radiographs! AP of the left and right nasal cavity at the level of the root tip can be helpful.</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Immediately, if possible</li> <li>• Think days, not weeks</li> </ul>
	Broken root tip into mandibular canal	<ol style="list-style-type: none"> <li>1. Take a deep breath</li> <li>2. Have your technician take a radiograph</li> <li>3. If the root tip is immediately deep to the empty extraction site, use your high speed bur to remove alveolar bone, including interradicular bone, in a "top down" fashion.</li> <li>4. Alternatives include a semilunar incision into the buccal mucosa and a bony fenestration into the buccal cortical bone with a diamond bur (go slow, avoid the vessels)</li> <li>5. Use a small suction tip to remove blood, water and the root tip from the field!</li> <li>6. Smooth bone and radiograph prior to closure</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Immediately, if possible</li> <li>• Think days, not weeks</li> </ul> <p>Circumstances:</p> <ul style="list-style-type: none"> <li>• If hemorrhage cannot be managed or avoided</li> <li>• Operator preference at any point in your intervention</li> </ul>
Maxillary bone	Oronasal fistula formation	<ol style="list-style-type: none"> <li>1. If during the course of extraction a tooth, smooth bone, release periosteum and close flap without tension</li> <li>2. If attempting to close a fistula in the absence of a tooth (the first time), make a wide mucogingival flap, remove granulation and scar tissue around the fistula, release and close flap</li> </ol>	<p>Circumstances:</p> <ul style="list-style-type: none"> <li>• Before the first attempt is ideal!</li> <li>• Definitely before a second closure is attempted</li> </ul> <p>Timeline:</p> <ul style="list-style-type: none"> <li>• Give surgical sites time to heal and fibrosis time to get established (at least 6 weeks post-op)</li> </ul>

	Pathologic fracture	<ol style="list-style-type: none"> <li>1. The bone is extra thin, typically toothless and fractures transversely/obliquely</li> <li>2. Extract any PD2+ teeth and close soft tissues</li> <li>3. Check occlusion</li> <li>4. Soft food for 5-6 weeks</li> </ol>	<p>Circumstances:</p> <ul style="list-style-type: none"> <li>• Teeth in the fracture line</li> <li>• The soft tissues cannot be closed primarily</li> <li>• Displaced, contaminated fracture</li> <li>• The occlusion is incorrect following your interventions</li> </ul> <p>Timeline:</p> <ul style="list-style-type: none"> <li>• Immediately, if possible</li> <li>• Longer if there are no teeth or occlusal issues</li> </ul>
Mandibular bone	Symphyseal separation	<ol style="list-style-type: none"> <li>1. Was it pre-existing? Are the soft tissues intact?</li> <li>2. Close any soft tissues</li> <li>3. Symphyseal cerclage?</li> </ol>	<p>Circumstances:</p> <ul style="list-style-type: none"> <li>• Traumatic rupture of soft tissues</li> <li>• Operator preference</li> </ul>
	Paramedian symphyseal fracture	<ol style="list-style-type: none"> <li>1. Occur traumatically in the rostral mandible at the level of the incisors (X01-X03)</li> <li>2. Extract any teeth in the fracture line</li> <li>3. Close soft tissues</li> <li>4. Check occlusion!!</li> <li>5. Consider symphyseal cerclage</li> </ol>	<p>Circumstances:</p> <ul style="list-style-type: none"> <li>• If the patient requires stabilization (cerclage) and you do not feel comfortable</li> <li>• Contaminated, displaced fracture (sequestrum)</li> <li>• Occlusion is incorrect following your interventions</li> </ul>
	Iatrogenic fracture	<ol style="list-style-type: none"> <li>1. Commonly between X03 and X04 or at X09 during extraction</li> <li>2. Will the bone heal? Extract PD4 teeth and close soft tissue. Cerclage is often inappropriate</li> <li>3. Muzzle and refer</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Immediately or as soon as possible</li> <li>• Patient should be muzzled in the interim</li> </ul>
	Pathologic fracture	<ol style="list-style-type: none"> <li>1. Identify and document fracture</li> <li>2. Extract PD4 teeth in the ipsilateral mandible</li> <li>3. Close soft tissues</li> <li>4. Place muzzle, adjusting occlusion for patient comfort</li> <li>5. Refer</li> </ol>	<p>Timeline:</p> <ul style="list-style-type: none"> <li>• Immediately or as soon as possible</li> <li>• Patient should be muzzled in the interim</li> </ul>