

# Techniques for dental extractions

*Refined techniques allow practitioners to perform successful extractions and enhance a Pet's well-being.*

**T**he extraction of teeth in Pets can be a daunting task and should not be taken lightly. If possible, teeth should be preserved through preventive care, appropriately timed dental cleanings and surgery. Unfortunately, veterinarians often identify periodontal disease problems in their advanced stages when extraction is the most appropriate choice for the Pet's long-term health and well-being.

This article will review how to determine if a tooth must be extracted, prepare for extractions and extract single- and multi-rooted teeth.

## Indications for extractions

There are many indications for extraction:

■ **Retained deciduous teeth.** Deciduous teeth are classified as retained if more than half of the crown length of the permanent tooth has erupted and the deciduous tooth is still firmly attached.<sup>1</sup> Typically, deciduous teeth can safely be classified as retained and extracted if still present at 6 months of age. Retained deciduous teeth should be removed as soon as they are identified to

prevent malocclusions that can occur with inappropriate eruption of the adult tooth when the deciduous tooth is retained longer than normal. Small breed dogs are more prone to retained deciduous teeth than large breed dogs.

■ **Fractured or damaged teeth.** Pets can experience blunt force trauma that may damage the apex of a tooth and disrupt the blood supply while keeping the entire tooth intact. This is seen as a discolored pink to gray tooth (in the more chronic stage). Grey or pink deciduous teeth should be extracted. If a traumatic event results in a fracture that is above the gum line, the Pet is older than 18 months of age and it has occurred recently (*i.e.*, within the last 24 to 48 hours), the tooth may be a viable candidate for a vital pulpotomy. Vital pulpotomy success rates decline rapidly from 88.2 percent to 41.4 percent after 48 hours.<sup>2</sup> Therefore, if the tooth has been fractured with pulp exposure longer than 48 hours or the time of fracture is unknown, then root canal therapy is indicated. Some clients may not want to proceed with restorative techniques, often because of cost; in such cases, extraction may be necessary once other options have



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Figure 1



Classic swelling on the side of a dog's face associated with abscess of the upper fourth premolar.

Figure 2



Feline tooth resorption.

been explored for fractured teeth. If a tooth is discovered on oral exam to be fractured with exposed pulp (acute or chronic) and the exact time of fracture is not known, then root canal therapy may be indicated or, secondarily, tooth extraction may be indicated.

■ **Tooth root abscesses.** When a complicated tooth fracture has exposed the pulp canal for a long period of time, the tooth or teeth will become infected and abscessed. The patient may exhibit no clinical signs of swelling or draining tracts but may exhibit signs of pain as well as radiographic changes surrounding the periapical tissues. As the infection continues, swelling or draining tracts will develop as a result of long-standing infection. Maxillary swelling (with or without a draining tract) is usually indicative of a tooth root abscess involving the upper fourth premolar (*Figure 1*).

■ **Overcrowding of adult teeth.** This often leads to misaligned teeth that may cause trauma to the gingiva or opposing dental arcade. With this increased crowding, the mechanical cleansing will be prevented since the teeth are in such close contact. These teeth may need to be extracted to prevent further damage.

■ **Severe feline gingivostomatitis.** Feline gingivostomatitis that cannot be con-

trolled medically often responds to full mouth extractions. This procedure may seem aggressive at the time it is done, but it eliminates the long-term suffering these cats often experience. Continued postoperative pain control is vital.

■ **Feline tooth resorption** (formerly called feline odontoclastic resorptive lesions). Tooth resorption in cats requires surgical extraction of the subgingival tooth. What determines the type of extraction is what the dental radiographs look like as far as tooth root disease (*Figure 2*).

■ **Severe periodontal disease.** The loss and destruction of the periodontium or supporting structures (*e.g.*, gingiva, cementum, periodontal ligament, alveolar bone) will lead to tooth mobility and is a common indication for dental extractions.<sup>3</sup>

Stage 3 or 4 periodontal disease results in loss of a portion of the periodontium. The alveolar bone loss that accompanies this advancing periodontal disease may result in vertical bone loss with infrabony pockets or horizontal bone loss (*i.e.*, the top of the remaining alveolar bone is level with the bottom of the pocket). The rule of thumb is when there is greater than 50 percent alveolar bone loss around a tooth or tooth root, that tooth needs extraction. Certain bone

augmentation techniques can save affected teeth when infrabony pockets are present.

### Preparation

By taking time to check and set up equipment and receive the proper client authorizations, you help prevent complications. As with any procedure, it is important to ensure all equipment and instruments are available and working before the Pet is anesthetized. It is also a good idea to have backup instruments and equipment available. Organize your instruments so they are easily accessible and review the Pet's radiographs and the nerve block(s) necessary to provide local anesthesia to the affected tooth or teeth (see *Dental nerve block techniques*, page 22).

Before the procedure, talk with clients about what might occur during a dental prophylaxis or other dental procedure. Explain that an extraction may be necessary for the Pet's health if you discover a diseased tooth. It is important to obtain prior authorization from clients to perform an extraction if medically necessary. Many clients may not understand the pain and complications a diseased tooth can cause, but they will notice a missing tooth and may be upset and angry if not prepared.

The Pet should be evaluated with a complete physical examination and pre-anesthetic bloodwork. Any bloodwork abnormalities should be addressed before starting anesthesia. Contraindications include bleeding abnormalities; poor health; and concurrent radiation, chemotherapy, anticoagulant and aspirin therapy.<sup>3</sup>

### General extraction principles

The oral cavity has an abundant blood supply and an epithelial surface constantly bathed by saliva, a fluid rich in antimicrobial properties. Oral tissue heals more rapidly

than the skin. Sterile surgical preparation of the oral cavity is not necessary; however, using clean instruments, rinsing the area with chlorhexidine and adequately preparing the surgical area is recommended. Good accessibility and exposure to the surgical site is important, and buccal gingival flaps will expose the tooth root and alveolar bone adequately (see *Creating effective dental flaps*, page 34).

Gentle tissue handling will minimize tissue trauma and promote faster healing. Appropriate instruments that are clean, sharp, well taken care of and stored properly will maintain their effectiveness and longevity. Practitioners' preference for suture material varies. Typically, 3-0 to 5-0 absorbable sutures are used. Monocryl, Vicryl and chromic gut are all commonly used. The suturing technique may vary according to procedure, but practitioners often use a simple interrupted pattern. When exposing alveolar bone and roots, gingival flaps should be elevated to the degree of absolutely no tension, so in most cases of surgical extractions, tension sutures should not be indicated. To promote optimal healing, avoid unnecessary gaps and suture lines over defects and sharp edges of alveolar bony crests with spicules contacting the tissue being sutured. Most importantly, never place a suture line under tension.

Areas with severe infections or unhealthy epithelial tissues will need to be debrided to healthy tissue before you replace the flap. When extracting upper canine teeth that have unhealthy surrounding tissue, oronasal fistulas may occur. If it does, leave the oronasal fistula open to drain, heal and allow time for healthy epithelial tissue to develop. The fistula will often shrink in size and sometimes even close. If the oronasal fistula has not closed

on its own, the patient should return in four to six weeks for surgery to repair the fistula when healthy tissue exists. This increases the success rate tremendously because it's easier to repair the oronasal fistula when the tissue is healthy.

You should take radiographs before any extraction procedure to ascertain the condition of the periodontium and determine if tooth or tooth root disease exists so you can take appropriate measures before the extractions begin. You should also take post-extraction radiographs to ensure no tooth roots or pieces of alveolar bone have been left behind as well as to properly document the procedure's success.<sup>4</sup>

### **Extractions**

When extracting the canines, upper and lower molars, upper fourth premolars and any difficult extraction, create full thickness gingival flaps to provide better visualization and exposure to the tooth roots. Create two diverging, vertical releasing incisions on each side of the tooth, elevate the gingival tissue with a periosteal elevator and remove the buccal alveolar bone plate with a round bur or crosscut fissure bur. Remove small amounts of alveolar bone for better tooth root exposure—this allows easier elevation and extraction of the tooth in question.

### **Single-rooted teeth or sectioned multi-rooted teeth**

The goal of extracting teeth is to stretch, break, tear or cut the periodontal ligament fibers enough to successfully remove the tooth in its entirety. When holding the elevator during this process, keep a finger on the shank near the blade so a stop exists to prevent the elevator from slipping, penetrating tissues and causing injury to other structures of the head, such as the eye and

nasal cavity. Place the blade of a concave elevator with the concave surface toward the tooth, in between the tooth and alveolar socket. Depending on the location, mobility of the tooth and degree of bone loss, the angle of the elevator may be perpendicular or along the long axis of the tooth. Press it into the periodontal space with a rotational pressure or twist and hold the elevator in place, under tension, for five to 10 seconds.

Repeat this process circumferentially around the tooth until the tooth loosens. Adjacent teeth may be used as fulcrums, being careful not to put too much pressure that might cause damage to healthy teeth. This puts a lifting or elevating force on the tooth and stretches and tears the ligaments until the tooth is loose in the socket. Additional rocking or rotational movement may be helpful in further breaking down the periodontal ligament attachments as well as intruding or pushing the tooth into the socket to stretch and tear the ligaments in another direction. Using extraction forceps alone, prematurely trying to extract the tooth, applying excessive torque or failing to hold the tension for a period of time may result in tooth fracture.

Once the tooth is mobile enough to remove, place the extraction forceps onto the tooth as far apical as possible. If you place the forceps more coronally, the chance of the tooth or tooth root breaking increases. Grasp the tooth with the forceps and apply additional rotational and twisting forces for five to 10 seconds. Doing this several times will loosen up the tooth more. While applying pressure, a slippage or short movement of the tooth in the direction of the force will occur, indicating the remaining periodontal ligaments are breaking. Once this occurs, lift the tooth out of the

alveolar socket in a twisting, pulling motion, keeping the tooth parallel to the tooth's original long axis. If the tooth is rotated back and forth or laterally, the tooth root may fracture.

Once you remove the tooth, rub your finger over the alveolar crest to feel for any sharp edges or spicules. If you identify sharp edges or spicules, use a rongeur to remove large pieces of bone or football-shaped diamond burs to smooth the alveolar ridges. This will expedite the healing process and improve the chances of tissue apposition when the gingiva is closed with sutures. When using a bur, it is important to use light pressure and continual motion to avoid damaging the alveolar bone via overheating. Using a bone curette, remove any soft or hard tissue that may be left in the socket and flush the alveolar socket with chlorhexidine solution or saline to flush out any remaining debris within the socket. When you use gingival flaps, close them without tension with absorbable suture material in a simple interrupted pattern.

### Multi-rooted teeth

All multi-rooted teeth need to be sectioned into single roots. Even in the most damaged or infected teeth, sectioning multi-rooted teeth is essential to prevent inadvertent fracturing of the teeth or roots. It is important for you to know which teeth have multiple roots. After the gingival flap has been started and the alveolar bone has been removed to expose the bifurcation (*Figure 3A*), section or cut the teeth with diamond cutting discs and crosscut fissure burs (*Figure 3B*). When using a bur, the cut should be started at the bifurcation and progress toward the crown. Once sectioned, you can now consider each root to be a single root and extract it using the

same technique as the single-rooted teeth described previously (*Figures 3C* and *3D*). Once the teeth have been removed, clean the socket, debride, flush and suture the gingival flap (see *Creating effective dental flaps*, page 34).

### Complications

Taking radiographs before, during and after extractions will help minimize many potential complications:

- **Weakened teeth**, such as those with cervical line lesions, root resorption, carious lesions and severe root damage from periodontitis, tend to fracture more easily when attempting extractions.

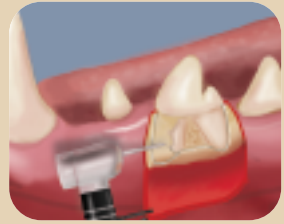
- **Retained roots** or fractured roots that are left in the alveolar sockets after tooth extraction will cause pain and subsequent abscesses to develop and need to be removed during the initial extraction procedure.

- **Deciduous teeth** have a long, thin and slender root structure and will fracture easily if care and patience are not taken. These root fragments need to be extracted as well; however, be careful not to be overzealous when retrieving the roots because damage to the permanent tooth bud may occur.

- **The mandible** may become pathologically fractured during extraction of the lower molar. The severity of bone damage caused by advanced periodontitis weakens the mandible and increases the possibility of jaw fracture. Sectioning the molar, reducing the amount of force used, careful elevating, using the opposite hand for support of the mandible and gently removing the tooth in a twisting fashion along the long axis of the tooth will minimize the chances of mandibular fracture. The most important point is to tell the

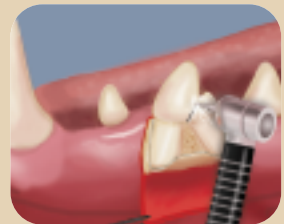
### Figure 3: Steps in Extracting Multi-Rooted Teeth

Figure 3A



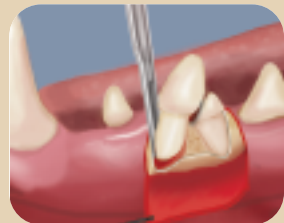
Remove the buccal bone

Figure 3B



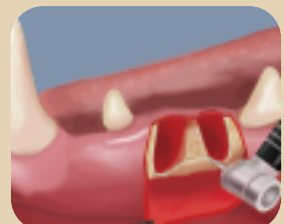
Section the tooth

Figure 3C



Elevate and remove the tooth

Figure 3D



Repair the alveolar bone defect



client, “There is quite a bit of bone loss present due to severe periodontal disease. It’s possible the jaw bone may fracture; however, it is imperative to extract the infected tooth or teeth to reduce further progression, pain and discomfort. We will take all precautions to avoid this.” It is also important in these cases to take preoperative radiographs to verify the degree of bone damage in case the jaw is already fractured.

- **Excessive hemorrhage** can occur during extractions, especially when pulverizing retained tooth roots. The use of hemostatic gel foam and pressure will generally stop the bleeding.

- **Local bone necrosis**, secondary infection and osteomyelitis may result when there is excessive trauma or excessive use of burs, when there is inadequate water irrigation or when local bone necrosis was already present due to periodontal disease, infection or oral neoplasia.

- **Iatrogenic trauma** due to overzealous use of elevators is possible. Careful extraction with proper exposure and technique will minimize these complications.


- **Oronasal fistulas** may be present or created after extracting the upper canine teeth, so be careful when the possibility of postextraction trauma may result in this complication.

### Postoperative considerations

Local nerve blocks using 0.5 percent bupivacaine last three to eight hours after the injection. An opioid pain medication, such as butorphanol, is optimal for continued pain control and can be repeated at one- to three-hour intervals as needed while the Pet is still hospitalized. Nonsteroidal medications can also be administered by injection while hospitalized and orally at home by the client for several days of postextraction

pain relief. Antibiotics should be administered by injection at the time of surgery and then switched to an oral form to be sent home with the Pet for at least 10 days. At home, the Pet should be offered soft or moistened food for seven to 10 days. Advise clients not to play tug of war or ball for at least two weeks to protect the surgical site. The small sutures will dissolve in 10 to 14 days in most Pets.

### Conclusion

Patience is the most important skill a veterinary practitioner can have when properly extracting teeth. It is important to get good exposure through gingival flaps when necessary, hold tension on the elevator while breaking down the periodontal ligament and repeatedly elevate until the tooth is loose. Practicing patience along with good technique will allow the practitioner to provide the best care possible to the Pet. 

### References

1. Shipp A, Fahrenkrug P. *Practitioner's guide to veterinary dentistry*. 1st ed. Beverly Hills, Calif: Dr. Shipp's Laboratories, 1992:120.
2. Niemiec BA, Mulligan TW. Vital pulp therapy. *J Vet Dentistry* 2001; 18:154-156.
3. Holmstrom S, Fitch P, Eisner E. *Veterinary dental techniques for the small animal practitioner*. 3rd ed. Philadelphia, Pa: WB Saunders Co. 2004: 294.
4. Zabell A. Dental radiographs offer a new view. *Banfield* 2005(1):38-44.

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