



Difficult Tooth Extractions

Mini Series

**Session Three: Extraction techniques in
dogs including local anaesthetic
techniques**

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Closed extraction

A closed extraction is performed without incising the gingiva (other than within the gingival sulcus) or sectioning the tooth.

Common indications for closed extractions

- Small, single-rooted teeth
- Maxillary second molars in the dog often have three partly fused roots, so these teeth are also usually extracted in a non-surgical manner.
- Significant bone loss and the resulting increase in mobility associated with periodontal disease usually leads to uncomplicated tooth extraction.

The technique here utilises luxation and axial elevation when appropriate. The luxator should be introduced into the periodontal ligament space, and then advanced using a 'wrist rocking' technique, as close to the apex of the root on that same side. This will cut the ligament and compress the alveolar bone and create a space into which the tooth root can move. The luxator should then be removed and inserted into the opposite side of the periodontal ligament space, and again advanced to the root apex. This will now force the root into the previously created space, tearing the remaining periodontal ligament fibres, and loosening the root.

Surgical extraction

A surgical extraction is anything other than a closed extraction, where gingival or mucosal incisors are made and mucoperiosteal flaps raised, where alveolar bone is removed or where the tooth is sectioned.

Common indications for surgical extractions

- Most multi-rooted teeth.
- Canine teeth in most cases; non-surgical extraction of the maxillary canine tooth predisposes to oronasal fistula.
- Periodontally healthy teeth where considerable resistance to extraction may be encountered.
- If radiographs reveal dilaceration or other abnormalities in root morphology.

Mucoperiosteal flap design

Mucoperiosteal flaps are employed for surgical extractions and they refer to a section of soft tissue (gingiva and/or mucosa and periosteum), which is:

- outlined by a surgical incision
- contains its own blood supply
- allows access to underlying tissues
- can be replaced in its original position
- expected to heal after being sutured in place.

The mucoperiosteal flap must:

- be big enough to allow adequate exposure of the surgical area
- have a base of flap as wide or wider than the free margin to preserve its blood supply
- have edges which lie over intact bone
- consider adjacent vital structures
- minimize tension on the suture line and prevent a defect in the attached gingiva following healing, and therefore vertical releasing incisions should be made at line angles of adjacent teeth rather than directly on the buccal aspect of a tooth
- have incisions which are not over the furcation of adjacent teeth as raising a mucoperiosteal flap will result in about 1mm of alveolar bone loss which can be particularly significant in the furcation of multi rooted teeth.

Types of mucoperiosteal flap:

- An **envelope flap** is a gingival flap (i.e. not extending apical to the mucogingival junction) created by making a sulcular incision and elevating some of the attached gingiva on the lingual and buccal aspects and no vertical releasing incisions.

- An **extended envelope flap** is useful for extraction of several adjacent teeth. They are mucogingival flaps, i.e. incisions extend apical to the mucogingival junction. Flaps used for extraction procedures are full-thickness flaps that also include the periosteum.
- A **triangle flap** is a mucogingival flap consisting of a sulcular incision and one vertical releasing incision
- A **pedicle flap** is a sulcular incision with two vertical releasing incisions, this flap provides the best exposure.

For a surgical extraction, an incision is made through the gingival sulcus. If a mesial vertical releasing incision is to be made, an incision is placed at the distobuccal line angle of the adjacent tooth through the mucogingival junction and extending into the mucosa. A second distal vertical releasing incision may be made beginning at the mesiobuccal line angle of the adjacent tooth. Alternatively, this incision may be made interproximally, if the interproximal space is wide enough. Incisions should extend apical to the mucogingival junction, so that the flap is as long as the root(s) of the tooth. Once the incisions are created, a periosteal elevator is introduced into the sulcus and is used to tear the periosteum with overlying gingiva or mucosa from the underlying bone. The periosteal elevator is then used with pushing and rotating strokes apically and distally to reflect the mucosa and periosteum from the bone. Using a round diamond (or carbide) bur in fine, sweeping motions, the buccal alveolar bone is removed (alveolectomy) beginning at the alveolar margin and moving as far apically as desired. Minimal alveolectomy is often required for teeth affected by periodontitis, and removal of up to 75% of the buccal alveolar bone will facilitate extraction of teeth with little to no bone loss, or ankylosed teeth. A small round bur may be used to cut the periodontal ligament and make space for an elevator or luxator. A tapered bur on a high-speed hand piece is used to section the teeth, beginning at the furcation and progressing coronally, so each root may be separately extracted.

Luxation can then be carried out as outlined for 'closed' extractions. In addition, elevators can be used in two different ways:

1. Using an elevator as a first class lever

Place the elevator blade into the periodontal space, parallel to the long axis of the tooth. Gently rotate to push the root away from the elevator, tearing the periodontal ligament and expanding the alveolar bone slightly. Hold the elevator in the rotated position for several seconds to fatigue the periodontal ligament. The alveolar bone is used as a fulcrum.

2. Using an elevator as a wheel and axle lever

The elevator blade is placed at the level of the alveolar margin, perpendicular to the long axis of the tooth, and rotated with the concave surface against the tooth. Care must be taken not to wedge the elevator against adjacent teeth, as they may be displaced or fractured.

Following tooth removal, sharp bone edges present after luxation and/or elevation will delay healing of the gingival flap and lead to postoperative discomfort. Therefore, an **alveoplasty** (the removal of these sharp bone edges) is performed with a round diamond bur on a high-speed hand piece or by using bone rongeurs. Following alveoplasty, the empty alveolus is cleared of debris. In cases of advanced periodontitis, gentle curettage of the alveolus should be performed to remove pocket epithelium and any remnants of sub-gingival calculus.

Suturing

Following surgical extraction, the mucoperiosteal flap should be sutured back in place. Size 5-0 and 4-0 *poliglecaprone* (Monocryl) is currently the most compatible suture material for intraoral use. Monocryl loses 20 to 30% of its original tensile strength after 2 weeks, and is completely absorbed by hydrolysis in 90 days. The reverse-cutting needle, which has a flat surface along its inner curvature preventing the inadvertent cutting of tissue, is the most commonly used needle in oromaxillofacial surgery. There should be **no tension** on the suture line at all, as this is the most significant pre-disposing factor to suture dehiscence. If necessary, bluntly dissect the flap submucosally towards the lip margin in order to gain more tissue. Free the edge of the palatal/lingual mucosa by gently inserting the periosteal elevator between the bone and soft tissue. The periosteum, may be incised if necessary, to ensure closure without tension. Lowering the margin of remaining alveolar bone using a

round diamond bur will also help reduce tension. If it is not possible to fully close the flap without tension, then leave an opening. Sutures should be placed 3mm apart, with the needle introduced 3mm from the margin of the incision, and the suture ends should be left 3mm long.