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Practice Management:
Re-Thinking Animal Rehabilitation

Case Collection:
Surgery

Soft Palate Resection in Brachycephalic Dogs

By A. D. Elkins, DVM, MS, DACVS

SURGERY
Case Collection

Soft Palate Resection in Brachycephalic Dogs

By A. D. Elkins, DVM, MS, DACVS

Most brachycephalic breeds make some respiratory noise. Elongated soft palate, a common congenital problem in brachycephalic breeds, can cause this noise and may lead to episodes of dyspnea. It frequently occurs as a syndrome, along with stenotic nares, everted laryngeal saccules, hypoplastic trachea, and tracheal collapse. Laryngeal collapse, an uncommon late-term complication of upper airway obstruction, may require permanent tracheostomy.

In dogs affected by elongated soft palate, the caudal aspect of the soft palate extends beyond the glottal opening and tip of the epiglottis and may act as an upper air obstruction, thus producing respiratory noise. If this problem is not addressed early in the dog's life, upper airway abnormalities may progress and result in severe pulmonary disease and/or laryngeal collapse. Animals with clinical signs of inspiratory stridor, gagging and vomiting, or exercise intolerance should have the redundant soft palate excised.[1]

Resection Techniques

Many techniques for resection of elongated soft palate have been described,[2] but the three primary techniques are conventional scalpel or scissor excision, laser resection, or radiosurgery (my preference). The most recent is the use of carbon dioxide laser.[3,4] One study comparing laser resection with conventional surgical resection found no difference in the short- or long-term results.[3]

Practitioners need to be aware of the complications following resection of the soft palate before proceeding with the procedure. Complications can include hemorrhage, swelling, and edema, resulting in upper airway obstruction. Therefore, pre- and postoperative corticosteroids can be administered to diminish swelling and edema. I administer prednisolone preoperatively at 1 mg/kg IM to help prevent swelling and edema. In addition, preoxygenation with rapid anesthetic induction and tracheal intubation is ideal when anesthetizing an airway-compromised patient and should be used in all three procedures.

The following information reflects my opinion of the advantages and disadvantages of these techniques as well as offers some practical tips on radiosurgery as the resection technique of choice.

Scalpel or Scissor Resection

The advantages of excision with a scalpel or scissors are its comfort level in most surgeons' hands and relatively inexpensive cost (*Table 1*). The disadvantage is increased risk for hemorrhage.

Hemorrhage can be prevented by clamping the soft palate with a straight hemostat at the tip of the epiglottis and then excising one-half of the soft palate. The clamp is removed and the mucous membranes closed with monofilament absorbable suture using a continuous pattern. The clamp is then reapplied to the other half, which is excised and sutured. Any areas of active hemorrhage can be dealt with by direct pressure or placement of additional interrupted sutures. The use of excessive electrocoagulation is discouraged to avoid tissue swelling.

Table 1 Advantages and Disadvantages of Resection Techniques

Technique	*Advantages*	*Disadvantages*
Conventional scalpel or scissor	Comfort level of surgeon Relatively inexpensive cost	Increased risk for hemorrhage Need for suturing
Laser resection	Quick procedure No hemorrhage No need for suturing	High equipment cost Risk to operating personnel and patient (ignitable, need for smoke evacuator)
High-frequency radiosurgery	Controls hemorrhage while reducing heat damage to tissue One-tenth the equipment cost of laser resection	Need for suturing Some smoke plume occurs

Laser Resection

The advantages of using a laser are its speed and the lack of hemorrhage—the laser can seal blood vessels up to 0.6 mm in diameter[3]—and thus suturing is not required. The disadvantages to laser resection are high cost, safety risks involving both operating personnel and the patient, and the need to use a smoke evacuator. It has been postulated that laser resection is superior to other techniques because it decreases postoperative pain by sealing small nerve endings. However, one study comparing excision of the soft palate using laser or conventional techniques found no difference in postoperative pain.[3]

Laser surgery requires accurate technique. In addition, addressing some serious safety issues needs to be a top priority of any surgeon performing laser resection. The laser beam introduces fire and skin hazards in the surgical suite if appropriate guidelines are ignored. All operating personnel should wear proper eye protection and must use nonreflective instruments and materials. Because the laser beam can ignite an endotracheal tube or surgical drape,[4] all combustible materials must be covered with moist sponges.[4] Operating personnel can also inhale the hazardous laser plume, which can contain tumor cells and viral or bacterial particles.[4] A smoke evacuator is therefore required.

Resection Using High-Frequency Radiosurgery

The use of low-temperature, high-frequency radiosurgery offers the advantage of controlling hemorrhage while reducing lateral heat damage to remaining tissue. An additional advantage is that a state-of-the-art radiosurgery unit is approximately one-tenth the cost of a laser. The disadvantages are that suturing is still necessary and some smoke plume occurs. A majority of the time, however, an evacuator is not needed.

Surgical Technique

The technique for excising an elongated soft palate using high-frequency radiosurgery can be easily mastered. The key is to measure the soft palate to the point at which it intersects the tip of the epiglottis and mark this with a marking pencil. To realize the best results, the soft palate should be excised to this point (*Figure 1*). By placing a suture in the lateral most point of the soft palate, the surgeon has a means of stabilizing the tissue. Next, a line should be drawn from the suture through the intersection point with the epiglottis. A fine-wire electrode (36-gauge wire) can be used in a blended current mode (50% cut and 50% coagulation). A partially rectified waveform provides this blend of 50% cutting and 50% coagulation, resulting in good hemorrhage control while decreasing any damaging lateral heat. The ideal frequency for incising tissue with minimal damage to surrounding tissue is 3.8 to 4.0 MHz.

First, the surgeon should excise one-half of the soft palate and inspect it for hemorrhage. If suturing is required, a simple continuous pattern of monofilament absorbable material can be used. The remaining half of the palate can then be excised. Any remaining area of hemorrhage can be controlled by using electrocoagulation.

In my experience, a majority of dogs do not require suturing. In addition, I do not suture smaller dogs because the mucous membrane edges are reasonably opposed following resection.

Case Results

Over the past four years, I have successfully managed 17 cases with elongated soft palate by using high-frequency radiosurgery. All of the cases had a successful out-

come with minimal complications. In addition, the owners reported less respiratory noise and greater exercise tolerance. Of the 17 cases, only four required suturing. All of the cases involved English bulldogs with a thicker soft palate. The only complications observed were gagging and hemoptysis in the immediate postextubation period. No animals required oxygen or re-intubation. Twelve of the patients were discharged the same day of surgery.

Radiosurgery is successfully used in humans to excise a portion of the soft palate to correct excessive snoring.[5] In human facial plastic surgery, it is well documented that high-frequency (3.8 to 4.0 MHz) radiosurgery yields less scarring and fewer complications than laser excision.[5]

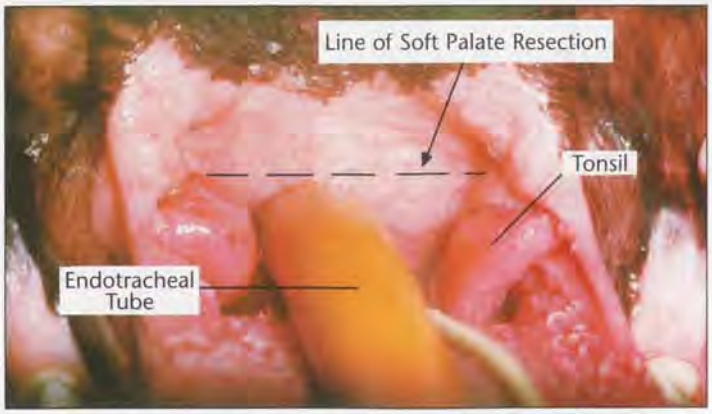

Figure 1. A brachycephalic dog with endotracheal tube in place. The *dashed line* indicates the area of elongated soft palate excision.

Postoperative Complications, Care, and Monitoring

Regardless of the surgical technique chosen, the endotracheal tube should remain in place as long as possible. Because extubation of the patient after soft palate resection is regarded as a high-risk period, these patients need to be intensively monitored for 24 hours. In addition, oxygen should be available as needed. In severe cases, supplemental oxygen therapy or tracheal intubation may be required.

In addition, it may be necessary to suction or swab saliva and mucus from the pharyngeal region, as many patients may gag and expectorate blood and saliva that has accumulated in this region. However, in my experience, once the animal has fully recovered from anesthesia, it has been able to maintain a clear airway.

Some surgeons recommend tracheostomy before surgery to prevent these problems and promote visibility during surgery.[3] However, tracheostomy can increase the likelihood of morbidity.[3] In addition, most postoperative complications occur in patients receiving tracheostomy.

According to the literature, one-third of dogs with upper airway signs may not survive surgery.[6,7] However, the articles cited represent older data. In one more recent study of 20 brachycephalic dogs comparing carbon dioxide laser with conventional incisional elongated soft palate resection, the clinical outcomes appear to be similar.[3]

Summary

Elongated soft palate excision is within the scope of most veterinary surgeons. However, general practitioners may want to refer larger brachycephalic breeds, such as English bulldogs, to a referral specialist because they can pose a higher postoperative risk. Good surgical technique and close postoperative monitoring are the keys to successful resection. Regardless of the surgical technique chosen, clinical improvement in a majority of these patients is usually noticeable in 7 to 10 days.

Reviewer Comment

This report describes three techniques, but in the author's opinion, high-frequency radiotherapy is offered as the best alternative for use in soft palate resection. The author provides practical suggestions as well as details some legitimate concerns regarding the treatment of brachycephalic breeds affected by upper airway disease. Practitioners should find the information useful.

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