Elongated soft palate resection with a flexible fiber CO₂ laser

By William E. Schultz, DVM
For The Education Center

Congenital obstructive upper airway disease is common in the brachycephalic breeds. Symptoms include noisy and/or labored breathing during sleep and wakefulness, snoring, lowered exercise tolerance and increased heat sensitivity. Excessive weight is an aggravating factor. Dogs with the syndrome may suffer from one or a combination of abnormalities, including stenotic nares, elongated soft palate, everted laryngeal sacculae and hypoplastic trachea. In this issue, we will only address the resection of the elongated soft palate.

The procedure can be performed with a scalpel, electrocautery or a CO₂ laser. Conventional scalpel surgery requires suturing the soft palate and leaving suture material in a sensitive area. Removal with electrosurgery may cause a large band of necrosis and severe tissue edema. In my practice, a CO₂ laser is always utilized for this procedure. CO₂ laser surgery produces an incision with no tissue friction (cutting and vaporization are done in a non-contact manner, with a highly focused beam of light) and the level of hemostasis that allows for excellent visualization of the surgical site and precise incision (due to the high vascularity of the soft palate, efficient hemostasis is afforded by the CO₂ laser is especially beneficial). The damage to healthy adjacent tissue is very small. Numerous human studies have shown that when compared to a scalpel blade, CO₂ laser surgery results in decreased postoperative pain and discomfort and improved healing with reduced wound contraction and scarring.

Patient
Rosie, a 2-year-old French bulldog, was presented with noisy breathing. Rosie was evaluated—full examination requires sedation and an endoscope is helpful to assess the trachea. The exam revealed normal nares, trachea and laryngeal sacculae. Her soft palate, however, was very long, extending into the laryngeal opening.

Anesthesia
Pre-anesthetic complete blood count (CBC) and chemistry panel were normal. The results of the heartworm test and tick screen were negative. Rosie was premedicated with torbutrol and maintained on an initial propofol bolus, with propofol only as needed. An endotracheal tube and gas anesthesia are nearby during the procedure in the event that intubation and forced oxygen are needed. Intubation during the surgery may be necessary in extremely compromised cases (the endotracheal tube, however, decreases the size of the surgical field). In intubated patients, the endotracheal tube should be protected from inadvertent lasing with saline-soaked gauze. Cardiac and oxygen monitoring are performed for the entire procedure. Maracaine or other local anesthetic is used topically before the surgery. The level of anesthesia is constantly monitored and maintained at a light level (patient may occasionally swallow).

Laser Equipment and Settings
A flexible fiber CO₂ laser was used for this surgery (Aesculight® manufactured by LightScalpel, LLC, in Woodinville, Wash.). The laser is set to 15 watts in the continuous-wave mode. A handpiece, equipped with a metal backstop, is used with a 0.4-mm focal spot size ceramic tip (Figure 1). The backstop prevents inadvertent damage to the tissue behind the soft palate when the laser beam passes through the target tissue. Alternately, a saline-soaked gauze sponge can serve as a backstop (only if intubation is used).

Procedure
The patient is placed in sternal recumbency with the maxilla suspended by gauze. A determination is made as to how much tissue to excise. An experienced surgeon can make a visual estimation of the amount of tissue to remove, but for less experienced surgeons, marking the planned incision is strongly recommended. If intubation is used in the procedure, marking is done when the patient is extubated. The initial marking incision is made at the level of the caudal aspect of the tonsillar crypt, which is also at the level of the dorsal aspect of the epiglottis. For marking, the laser is used in the pulsed mode.

After the amount of redundant tissue is determined, the patient may be re-intubated. The pendumous portion of the soft palate is held with soft-tissue thumb forceps and retracted rostrally (Figure 2). Gentle traction is applied to the soft palate during the procedure to facilitate cutting. The incision is made along the initial markings with several passes, minimizing the amount of smoke inhaled. Smoke evacuation is used and held at the edge of the mouth to prevent negative air pressure in the throat. The incision is deepened until the redundant part of the soft palate is completely removed (Figures 3A-D). The oxygen monitor is important during this phase. If the oxygen saturation drops into the low 90s, the procedure is halted until the saturation returns to the mid to high 90s. The use of a local anesthetic sprayed...
on the surface of the soft palate allows for a lighter stage of anesthesia during the procedure. With a CO₂ laser, bleeding is unlikely; if bleeding occurs, it may be controlled by defocusing the laser—increasing the tip-to-tissue distance—and spot-lasing the area of the bleeder. Recovery is usually uneventful, and quieter breathing is noted immediately on waking.

Postoperative instructions
Immediately following the resection of the soft palate, the patient may be intubated or masked with oxygen until awake. Rosie was sent home on low dose prednisone—to reduce the possibility of inflammation—and a broad-spectrum antibiotic for one week postoperatively. She was only allowed limited exercise, and the owners were instructed to walk her in a harness for the first five days following the surgery.

Summary
Early detection and surgical correction of the elongated soft palate can minimize the airway pathology progression. Flexible fiber CO₂ laser technology has dramatically changed the procedure by controlling hemorrhage without the tissue damage associated with electrosurgery and by enhancing visual field for the surgeon. Resection of the elongated soft palate with a CO₂ laser results in decreased postoperative pain and reduced edema, inflammation and scarring. These benefits, along with ease of use, make CO₂ laser surgery a compelling addition to most small animal surgical procedures.

Dr. Will Schultz graduated from Michigan State University in 1973 and opened his companion animal practice in the fall of 1974. Dr. Schultz has been a board member on the Synbiotics Reproductive Advisory Panel, The Society for Theriogenology and The Theriogenology Foundation. He has held speaking engagements at several veterinary conferences, veterinary associations and national specialties because of a special interest in canine reproduction. Dr. Schultz is also interested in soft tissue and orthopedic surgery. He has over 20 years of experience with laser surgery. Dr. Schultz uses a 40-watt flexible hollow waveguide CO₂ laser.