

## Tech Tip



*Easier to breathe on my back!*

## BRACHYCEPHALIC AIRWAY SYNDROME (BAS)

Brachycephalic breeds have become more popular in recent years. We now recognize early intervention surgically, at a young age, will avoid the more difficult and expensive surgical procedures when these dogs are older. The initiating abnormality is stenotic nares. This is followed by elongation of the soft palate and everted laryngeal sacculles. We now do much more upper airway surgery than we did in the past. Early in the disease surgically removing the tissue narrowing the nasal openings and later in the disease when the classic triad is seen: Stenotic nares, Elongated soft palate, and Everted laryngeal sacculles.

Technicians play a key role in facilitating effective treatments to patients suffering from Brachycephalic airway syndrome (BAS). As exam room technicians you will begin to recognize the very narrowed nasal openings in young puppies when receiving their early vaccinations. As surgical technicians you are a vital part of the anesthetic and surgical management of the disease. BAS is a condition affecting short-headed dogs and cats. These patients may suffer from stenotic nares (narrowed nostrils), elongated soft palate, everted laryngeal sacculles, and hereditary hypoplastic tracheas. Pug, Pekinese, Maltese, Boston Terriers, Shih Tzu, French Bulldogs, and English Bulldogs are common canine breeds affected, and the Persian and Himalayan are among the cats. The symptoms are classic of many upper respiratory conditions, including inspiratory stridor and stertorous breathing, cyanosis, hyperthermia, exercise intolerance, excitability, leading to collapse in severely affected patients. Owner's may also report coughing, gagging, and vomiting.

Sedatives, such as acepromazine are often recommended to help relieve anxiety and excitement, as well as reduce the incidence of regurgitation. A complete physical exam, including auscultation of the chest and tracheal sounds, along with tracheal palpation for abnormalities is done on all patients. Right and left lateral, and ventrodorsal chest radiographs are taken to check for evidence of aspiration pneumonia or heart disease. Lateral cervical radiographs should be taken to determine tracheal diameter there as well, as they can have both cervical and thoracic hypoplastic tracheas. Radiographs can be taken with

the patient under light sedation, such as butorphanol (0.2-0.4 mg/kg) and acepromazine (0.01-0.03 mg/kg) given IM or IV and flow by oxygen delivered via face mask. Because there is a risk of vagal stimulation with many of these patients, an anticholinergic, such as atropine or glycopyrrolate (0.1 mg/kg IM), is given intramuscularly (IM) as a premedication to prevent bradycardia. Metoclopramide (Reglan) can be used to help reduce the incidence of regurgitation.

Other considerations for technicians is to always use a laryngoscope during oral exams and intubations. Just because you are capable of intubating without the aid of a laryngoscope, it does not mean you should. Light is necessary in recognizing potential irregularity or irritations of the oral cavity, that may be missed in the dark. Always have oxygen and a variety of endotracheal tubes (ETT) available when administering sedation to patients affected by airway disease, often the ETT size is over estimated for patients with hypoplastic tracheas. It is helpful to have a rigid stylet, such as a polypropylene urinary catheter, to aid in the intubations of cats or small dogs. Many of these patients are administered steroids, so nonsteroidal anti-inflammatory drugs, NSAIDS, should be avoided due to the risk of GI ulceration that can lead to GI perforation.

When the airway is obstructed by stenotic nares and the amount of air required by the lung is not achieved, the pressure on the area is increased. The increase in pressure acts like a vacuum and pulls on the soft palate and surrounding tissues. Stenotic nares greatly reduces the amount of air the patient can breathe. Surgical treatment is required to resolve the clinical signs. The surgery option available for stenotic nares varies but the ultimate result is the same, a larger nasal passage. Surgical repair is recommended at 3 -4 months of age, but can be done as early as 9 weeks in clinically affected patients. The sooner stenotic nares are fixed, the less likely the patient will have to be treated for elongated soft palate and everted laryngeal sacculs. An alar fold (obstructive nasal folds ) resection can be performed on very young dogs. Because the alar folds are too small to allow primary wedge removal and closure with sutures we no longer suture the tissue. Following removal of the nasal folds, at any age, they heal well without suturing. Laser can be used, however the owner should be warned the nares will be white afterwards but will turn back to the original color (usually black) within 2-4 months.

Dogs with elongated soft palates will suck the soft palate back during inspiration, covering the larynx. A computed topography (CT) evaluation of the soft palates of brachycephalic breeds were shown to be thicker than non-brachycephalic breeds. The soft palate is considered too long if it hangs down 1-3mm below the level of the epiglottis. During a soft palate resection surgery the patient is intubated, positioned in sternal recumbancy and the head is elevated so the mandible can hang open. Another method to keep the mouth open during pharyngeal/laryngeal surgery is to place two equal size mouth gags on the canine teeth to hold the mouth open. These can be held by the surgical tech to position the head so the surgeon can see the pharynx and larynx well during surgery. A bright, narrow focus light source is necessary for good visualization by the surgeon. The redundant soft palate tissue is excised, traditionally, by a cut and sutures technique, and a 3-0 or 4-0 monofilament absorbable suture ( PDS ) is placed to approximate the wound and control hemorrhage. Laser and radiofrequency cautery are both acceptable alternatives, often much faster than the traditional method and have similar clinical outcomes.

Laryngeal sacculs are located behind the arytenoid cartilages in the larynx and when everted they block the opening of the larynx. They are lateral to each vocal cord and " bulge " or "balloon " out obstructing the larynx. The surgeon may elect to remove the sacculs if they are significantly blocking the airway. Often the patient needs to be extubated for this procedure, so IV anesthetics (i.e. Propofol) should be

available during this procedure. The surgeon can simply remove the sacculles with long scissors or cup-forceps. There is no surgical treatment for hypoplastic trachea.

BAS patients are at risk for aspiration pneumonia when heavily sedated. In dogs the aspiration can be silent, so a rapid recovery and late ETT extubation is recommended. If there are any concerns, the patient's neck is shaved and prepped in case an emergency tracheostomy is needed. If the soft palate has been shortened a soft food diet is recommended for 10-14 days post-op. Steroids; prednisone (0.5-1.0 mg/kg PO) or dexamethesone (1 mg/kg IV) is given to decrease edema and inflammation after surgery. Antibiotics are recommended prophylactically for an appropriate period of time. The outcome is favorable in young dogs when treated early for stenotic nares. If nares surgery is not done at a young age then it is often necessary to correct the nares, soft palate and laryngeal sacculle protrusion in adulthood. At either age the results are often dramatic. They snore much less, can exercise more easily, become more tolerant of warm summer days, thus enjoying life more.