



## **Brachycephalic Obstructive Airway Syndrome (BOAS)**

This syndrome includes/can include the following abnormalities:

- stenotic nares (nostrils are too narrow/small)
- elongated soft palate (the soft palate is too long, sometimes reaching the throat)
- everted laryngeal sacculles (these are structures in the throat, that could expand inwards and obstruct the lumen)
- hypoplastic trachea (the lumen of the windpipe is too small, and this might interfere with the amount of air that can pass through)

### **Indications for Surgery:**

Pets with BOAS might struggle to breathe, have difficulty sleeping, and will have exercise intolerance – especially in warmer and more humid months and environments. If left unaddressed, the disease might progress to a thickened palate in addition to the elongation, and laryngeal collapse might develop. Everted laryngeal sacculles are a first stage of this (mucosa of the larynx being pulled/sucked into the airway), but with chronicity, the laryngeal cartilages might get pulled into the airway as well, leading to a much more severe disease, and more involved treatments being needed.

### **Preoperative workup and other diagnostics:**

- General physical examination, including external assessment of the nostrils/nares.
- Preoperative laboratory work (for a young, healthy animal typically only baseline)
- Respiratory watch, with sedation if needed
- Thoracic radiographs, including assessment of the trachea, and aspiration pneumonia. In addition, some dogs with BOAS might have a hiatal hernia, which sometimes is seen on radiographs.
- Oropharyngeal exam to assess the soft palate, larynx and laryngeal sacculles.
- In some refractory or recurrent cases, a CT or rhinoscopy might be recommended to assess the nasal turbinates.

### **Procedure & treatment:**

#### *BOAS:*

- stenotic nares: a small area of the outside, visible part of the nose is removed, after which the edges are sutured. This will widen the opening and increase airflow.
- elongated soft palate: the excess tissue of the palate is trimmed. This can be excess length, or excess width as well. This can either be done with a sutured or a sutureless technique. If sutures are used, they will absorb, and do not have to be removed.
- everted laryngeal sacculles: if the everted tissue is occluding the airway, these can be trimmed, and are generally not sutured.

#### *Laryngeal collapse:*

This is not typically a part of BOAS surgery. Surgical treatment might be a lateralization technique (similar to laryngeal paralysis), or if that fails, a permanent tracheostomy.

*Hiatal Hernia:*

Initially, the BOAS is treated, as the hiatal hernia is often secondary by the increased respiratory effort. Concurrent medications to treat gastroesophageal reflux might be prescribed as well. However, if the hiatal hernia (or clinical signs associated with the hiatal hernia) persists after BOAS surgery, or the symptoms are so severe that additional treatment is needed, surgery is recommended. Surgical treatment of hiatal hernia is performed via an abdominal surgery, and consists positioning the stomach back into the abdomen, and securing it in place by creating adhesions between the stomach and the body wall ('pexy'). In severe cases, or if the diaphragm around the area where the esophagus passes through the diaphragm is severely affected, a plication or esophageopexy might be performed as well to tighten this area.

**Complications:**

As with any surgical procedure, there are always risks associated with general anesthesia.

- Anesthetic risk (and recovery) is increased in brachycephalics as well as after airway surgery. We will therefore hospitalize & recover your pet in ICU for close monitoring of their breathing.

- Residual noise during breathing: this is not necessarily a complication as some airway noise & snoring will remain in brachycephalic breeds, even after surgery.

- bleeding from the naroplasty site: this can occur if they rub their nose during the first couple of days, but will typically resolve w/o need for intervention.

Your surgeon will discuss these complications in more detail during your pet's visit.

**Postoperative Care:***In hospital:*

We will closely monitor your pet during recovery and after surgery. One of the concerns is swelling of the airways, which would restrict airflow. We would therefore keep your pet in ICU under close monitoring. It is important to keep the pet quiet after surgery, and in a stress free environment. For this reason, we try to keep the duration of hospitalization short (typically one night after surgery).

*At home care:*

If car rides stress your pet out, please let us know, and we could give your pet something to help keep them calmer during the ride home. Similarly, to give the airways the chance to heal, and for the surgical swelling to decrease, keeping your pet calm at home for the first 2 weeks is advised.

**Prognosis**

While some airway noise will remain, the risk for airway obstruction and for continuing development of laryngeal collapse will be greatly reduced.