



BRAKYCEPHALIC SYNDROME IN DOGS.

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Brachycephalic syndrome, also known as BOAS (*Brachycephalic Obstructive Airway Syndrome*), is one of the most prevalent respiratory pathologies with the greatest clinical impact in small animal medicine. This syndrome is largely due to a desynchronisation in the development of soft tissues versus bone tissues in the head in brachycephalic dog breeds. It mainly affects breeds such as the English Bulldog, French Bulldog, Pug, Boston Terrier, Shih Tzu and Lhasa Apso, although cases have been reported in other brachycephalic breeds such as the Cavalier King Charles Spaniel and the Pekingese. The growing popularity of these breeds, especially the French Bulldog and Pug, has led to a parallel increase in the incidence of this disease, with significant consequences for the health and welfare of affected animals.

BOAS is not simply a localised respiratory condition; it is considered a multisystemic syndrome that also impacts thermoregulation, digestive function, behaviour and, ultimately, the patient's longevity. Several studies have shown that brachycephalic dogs have a reduced life expectancy compared to mesocephalic breeds, and that their quality of life is severely compromised by respiratory distress, exercise intolerance, and the constant risk of episodes of hypoxaemia or syncope.

In terms of its pathophysiology, brachycephalic syndrome results from a combination of primary and secondary anatomical abnormalities.

a) Primary alterations:

1. **Stenotic nostrils:** the reduction in the diameter of the nostrils significantly limits the flow of inspired air.
2. **Elongated and thickened/hyperplastic soft palate:** the redundant tissue projects towards the glottic rima, interfering with normal airflow.
3. **Aberrant nasopharyngeal turbines:** excess soft tissue in the turbines of the nasal cavity
4. **Hypoplastic trachea:** present in some individuals, characterised by a tracheal diameter smaller than expected for the breed.
5. **Macroglossia:** tongue disproportionate in size to the oral cavity, contributing to oropharyngeal obstruction.

b) Secondary alterations: these develop as a result of chronic high negative pressure exerted during breathing:

1. **Eversion of the laryngeal sacs,** initial stage of laryngeal collapse (grade I).
2. **Laryngeal collapse,** progressing from grade I to grade III.
3. **Hypertrophy and eversion of tonsils and inflamed pharyngeal tissue/mucosa.**



4. **Tracheal or bronchial collapse**
5. **Associated gastrointestinal disorders**, such as hiatal hernia, gastroesophageal reflux, and oesophagitis.

CLINICAL AND DIAGNOSTIC EVALUATION

The diagnosis of BOAS requires a comprehensive

approach. Clinical history:

Owners typically report constant upper airway breathing sounds (stridor), marked snoring during sleep, exercise intolerance, syncope after excitement or heat, and difficulty resting in the sternal decubitus position. In many cases, vomiting or chronic regurgitation is described as a consequence of associated gastroesophageal reflux.

Physical examination:

- Presence of stenotic nostrils.
- Audible inspiratory rales during consultation.
- Increased respiratory effort with use of accessory muscles.
- Cyanosis or obvious intolerance to manipulation.

Additional tests:

- *Chest and cervical X-ray*: useful for ruling out hypoplastic trachea or concurrent tracheal collapse and for ruling out secondary aspiration pneumonia.
- *Endoscopy and laryngoscopy under sedation*: for direct evaluation of the palate, laryngeal sacs, and larynx.
- *Functional exercise tolerance tests*: such as the *BOAS Functional Grading Scheme*, which assesses clinical severity after a walk.
- *Computed tomography (CT)*: allows evaluation of craniofacial anatomy and the presence of hidden nasopharyngeal abnormalities.

Classification of severity is essential to guide surgical prognosis. Grade II-III laryngeal collapse is the main risk factor for perioperative mortality and clinical recurrence.

PREOPERATIVE MANAGEMENT

- Fasting: a small amount of wet food 3-4 hours before anaesthesia reduces the incidence of gastroesophageal reflux.
- Preoxygenation before anaesthetic induction.
- Rapid and safe orotracheal intubation.
- Availability of equipment for emergency tracheotomy in cases of acute airway obstruction.

SURGICAL TECHNIQUES

The surgical approach must be tailored to each patient and include correction of all identified anomalies.



1. Resection of stenotic nostrils

The vertical or lateral wedge technique is traditionally used, although techniques using the modified Trader technique or vestibuloplasty have recently been described. It can be performed with a scalpel, electrocautery, or CO₂ laser. Evidence indicates that laser reduces intraoperative bleeding and postoperative oedema.

2. Palatoplasty

Resection of excess soft palate should allow the caudal edge to not interfere with the epiglottis. There are several techniques:

- **Traditional resection with scissors and sutures.**
- **Folded flap palatoplasty technique.**
- **Resection with CO₂ laser**, currently considered the technique of choice.

3. Removal of everted laryngeal sacs.

4. Management of laryngeal collapse. In advanced stages, techniques such as arytenoid lateralisation, partial cartilage resection, and even the placement of laryngeal prostheses have been described. However, results vary and complications are common.

5. Complementary techniques

- **Tonsillectomy** when hypertrophic everted tonsils contribute to obstruction.
- **Correction of nasopharyngeal abnormalities** identified by CT scan.
- **Simultaneous management of hiatal hernia or gastroesophageal reflux.**

PROGNOSIS

Several studies have demonstrated a significant improvement in quality of life after surgery.

- In a retrospective study of 606 dogs, perioperative mortality was 4%, with a significant increase in those with grade II-III laryngeal collapse (OR=4.6).
- A 36-month follow-up showed an overall mortality rate of 2.6% and a sustained reduction in respiratory signs in most patients.
- A prospective study in 2025 showed improvement in exercise tolerance and clinical dyspnoea score at 1 month after surgery; however, the animals did not achieve the physical capacity of healthy mesocephalic breeds.

The prognosis depends directly on the degree of laryngeal collapse, the technique used, and the patient's age. Early surgery, before the development of advanced secondary lesions, offers the best results.

BOAS is a procedure that carries anaesthetic and surgical risks. These include:

- **Immediate complications:** airway obstruction due to oedema, post-surgical haemorrhage, difficulty in extubation.
- **Early complications:** aspiration pneumonia, persistent regurgitation, pharyngeal pain.
- **Late complications:** persistence of respiratory noises, recurrence due to scarring, or progression of laryngeal collapse.



CONCLUSIONS

Brachycephalic syndrome represents one of the greatest contemporary challenges in small animal veterinary medicine. Although multilevel surgery provides significant clinical improvement and can prolong life expectancy, it does not completely eliminate physical limitations or the risk of complications.

The scale of BOAS pathology cannot be ignored. Selective breeding of breeds with extreme craniofacial conformations has resulted in animals predisposed to severe respiratory problems throughout their lives. Various veterinary associations, such as the British Veterinary Association, recommend:

- **Modify breeding standards**, avoiding rewarding exaggerated characteristics such as extremely short noses.
- **Educate breeders and owners** about the risks associated with these breeds.
- **Discourage the breeding of clinically affected individuals**, even if they have undergone surgery.

In some European countries, regulations have been proposed that limit the breeding of dogs with clinical signs of BOAS, reflecting a paradigm shift towards the protection of animal welfare. The real change lies in responsible breeding, based on standards that prioritise health and welfare over aesthetics. The veterinary community has a responsibility to lead this change by providing evidence-based information to both breeders and owners.

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