

Brachycephalic (Upper) Airway Syndrome

ABOUT THE DIAGNOSIS

Brachycephalic means short-headed (short-nosed), and many breeds of dogs have been bred for this type of appearance. Bulldogs, boxers, Boston terriers, Pekingese, pugs, and shih tzus are all examples of breeds with a short-nosed, “pushed-in,” or brachycephalic, face. The bones and associated structures of the head are shaped in such a way as to give these dogs the typical appearance of their breed. However, this shape also causes mild to severe breathing problems because the upper airway often is too small—especially the nasal passages, glottis (throat), and trachea (windpipe).

The term *brachycephalic upper airway syndrome* describes the anatomic abnormalities and the respiratory problems associated with having an excessively short nose and face. This applies to short-nosed dogs more often than short-nosed cats like Persians. There are four different ways in which the upper airway of brachycephalic dogs can be misshapen and cause problems. Any or all of them may be present in a particular dog.

- **Stenotic nares:** Narrow, small nostrils make it difficult for the dogs to draw in air through the nose.
- **Elongated soft palate:** Excessive tissue of the soft palate can obstruct the flow of air through the pharynx and larynx (upper throat). This is the most common component of the brachycephalic upper airway syndrome.
- **Everted laryngeal sacculles:** These small sacs in the very back of the throat are normally inverted (tucked away) and cannot be seen. With excessive negative pressure, which occurs when these dogs inhale, they can be sucked inside out—everted—and further obstruct the airway.
- **Hypoplastic trachea:** The windpipe, or trachea, may be narrower in diameter than normal, resulting in increased resistance to air flow during inspiration and expiration.

The symptoms of this syndrome vary based on the severity of the anatomic irregularities described above. The abnormal structures are present from birth, but visible problems often do not arise until the dog is over 2 years of age because the tissues attain their adult size around this time. Some dogs only develop mild symptoms and do not require intervention. Heavy snoring during sleep, or the typical “snorting” of an excited bulldog or Boston terrier are mild examples, and many dogs are not otherwise affected. However, at the other extreme, some dogs develop such a degree of airway obstruction that they have trouble breathing at all, especially on inhaling.

The condition tends to slowly worsen over time. Elevated resistance of airflow over a long period of time can cause increased obstruction and weakening of other parts of the throat, and complications such as laryngeal collapse can occur. Such severely affected dogs may become cyanotic (bluish tongue and gums caused by oxygen deprivation) and experience exercise intolerance and syncope (fainting). These very serious symptoms are exacerbated by obesity, hot weather, and excitement, and dogs with brachycephalic upper airway syndrome should avoid these conditions, especially if respiratory difficulty is noted to worsen. If an episode of dyspnea (difficulty breathing) is severe enough, the dog could die from brachycephalic upper airway syndrome.

Confirming that brachycephalic upper airway syndrome exists in a certain dog is based on your description of the symptoms you have observed, any medications or treatments and whether they made any difference, and so on. Your veterinarian will be interested

in details such as when the breathing difficulties occur, how severe they are, and if they are worsening (more severe, more frequent, or both) over time. There are many respiratory disorders that produce symptoms similar to brachycephalic upper airway syndrome but that are completely different disorders. Therefore, your veterinarian will want to identify whether any of the four components of the syndrome is present in order to choose the best treatment. The physical examination can confirm stenotic nostrils, but the other three components of the syndrome require testing. Under sedation, an inspection of the larynx using a laryngoscope (speculum with a light) can detect an elongated palate and everted laryngeal sacculles. Radiographs (x-rays) of the chest may be taken to rule out other airway of lung diseases and to visualize the trachea.

LIVING WITH THE DIAGNOSIS

It is important to realize that this condition is chronic and progressive. If you are living with a brachycephalic dog, you should discuss possible problems with your veterinarian and follow instructions. Many mild cases can be managed at home by avoiding stress, avoiding overheating, and preventing obesity (see below). In more advanced cases, surgery may be recommended to trim excess soft tissue from the nostrils, palate, or larynx. Overall, prevention and precaution are the keys to taking care of dogs with mild or moderate brachycephalic upper airway syndrome.

Brachycephalic upper airway syndrome does not necessarily affect life expectancy. However, an episode of respiratory distress can quickly worsen into an emergency situation. You must monitor your pet closely to avoid these situations and to intervene early if complications (such as replacement of the pink color of the gums and tongue by a blue color—cyanosis) occur. A dog having difficulty breathing can easily panic and increase his or her respiratory efforts, which in turn can create swelling in the structures of the upper airway and cause a self-perpetuating decline in respiratory function. In such cases, it is important to keep the animal cool and calm while heading directly to a veterinary facility.

TREATMENT

Home management consists mostly of avoiding situations that can lead to respiratory problems. Obesity increases the work of breathing, so it is important to make sure that dogs with brachycephalic upper airway syndrome are not overweight. Overheating and prolonged panting can be dangerous to these dogs. Keep your dog cool on hot humid days and never leave him or her in a car, outside on a hot day, or in an enclosed kennel.

Stress also poses a major risk. In dogs with brachycephalic upper airway syndrome, it is important to discourage excited behavior such as persistent barking at visitors or pulling on a leash. Use a harness instead of a collar to avoid pressure and swelling to the neck.

If your dog has this condition and it worsens to the point of requiring hospitalization in an emergency situation, treatment may include the following: tranquilization to calm the dog down, antiinflammatories given by injection to decrease swelling in the nose and throat, and supplemental oxygen. The veterinarian may need to perform a temporary tracheostomy (surgical opening into the throat) if the condition has reached a life-threatening state. As for humans, such a procedure involves a plastic tube that is surgically placed into the trachea for a few hours or a day or two to bypass a swollen or collapsed larynx so that the dog can breathe.

If your dog has brachycephalic upper airway syndrome, your veterinarian will be able to help you decide if surgery is appropriate to increase the size of the airway and reduce the risk of future breathing difficulty. Referral to a special surgery facility may be necessary since the surgery is often delicate, and complications if the surgery is improperly done can be difficult to manage. Surgery most often involves resection (trimming) of stenotic nares to widen the nostrils, resection of the soft palate, and/or resection of everted laryngeal sacculles. An important consideration is that surgery may be most effective if performed on young dogs before there is a problem. Once the soft tissues structures of the larynx are chronically inflamed, surgery may be less helpful.

DOs

- Take a brief, 1-2-minute videorecording (including audio) of your dog's symptoms if you think they might be caused by the brachycephalic upper airway syndrome. Showing this video to your veterinarian during an appointment can provide valuable information when the symptoms are occurring only intermittently and not "on demand" in the veterinary hospital during your appointment. Remember, however, that no veterinarian can confirm brachycephalic upper airway syndrome on a video clip alone; an appointment is necessary to evaluate your dog and see the video clip at the same time.
- Realize that many brachycephalic dogs do not realize the limitations of their narrow airways and will not hold back their enthusiasm or physical activity until a respiratory crisis is well underway. You should be your dog's safeguard in this way, knowing when to stop on a walk, or during play, especially in warm weather.
- Proceed with surgical correction if your veterinarian recommends it. Dogs that have proper correction of even just part of the brachycephalic upper airway syndrome generally lead much happier, much more comfortable lives because they can breathe better. If uncertainty exists about the diagnosis, a second opinion is possible with a veterinarian specialized in surgery. A list of these specialists can be found at www.acvs.org.
- Follow your veterinarian's instructions regarding weight loss and stress/excitement avoidance. If your dog is carrying excess weight, weight loss is an extremely effective way of helping to reduce the risk of having a respiratory crisis.
- Train your dog to exhibit calm behavior in stressful situations, such as when the doorbell rings or meeting other dogs.
- Monitor your dog closely for worsening of symptoms, in terms of intensity of symptoms, frequency of symptoms, or both.

DON'Ts

- Do not use neck collars and do not allow your dog to pull while on a leash. Use a harness or Gentle Leader-type face collar instead.
- Do not allow your dog to become overheated.
- Do not allow strenuous exercise.

WHEN TO CALL YOUR VETERINARIAN

- If your dog seems very anxious for no apparent reason, or is having trouble breathing, or if he/she collapses or faints, call your veterinarian immediately. In dogs with brachycephalic

upper airway syndrome, any of these symptoms is often an emergency and may be life-threatening.

SIGNS TO WATCH FOR

The following are signs of worsening of brachycephalic upper airway syndrome:

- Increasingly noisy breathing (stridor)
- Respiratory distress (more than just panting—fighting to breathe)
- Difficulty swallowing
- Excessive snoring or restless sleeping habits (dog cannot sleep deeply)
- Exercise intolerance
- Cyanosis (gums and tongue turning blue) or syncope (fainting)

ROUTINE FOLLOW-UP

- Follow instructions regarding postoperative care if your pet has surgery.

ADDITIONAL INFORMATION

- Other conditions can appear with similar symptoms:
 - Reverse sneezing, a generally harmless, sporadic burst of very loud raspy sounds during inspiration.
 - Heart failure, lung disease, or bronchial problems can all cause signs of breathing difficulties.
 - Masses in the upper airway (nose, larynx, or trachea) can obstruct respiration.
 - Laryngeal paralysis and tracheal collapse are other disorders that cause difficulty breathing.
- For this reason, routine tests including chest radiographs (x-rays) are often essential to help narrow the possible causes of the breathing problems.
 - Laryngeal collapse is an end-stage condition that can follow years of living with brachycephalic upper airway syndrome. The cartilages of the larynx become weak and are no longer able to hold the airway open, causing severe obstruction of the airway. This advanced stage may benefit from surgery in some cases, but laryngeal collapse should be made less likely by having brachycephalic upper airway syndrome identified and surgically corrected early.

Other information that may be useful: "How-To" Client Education Sheet:

- How to Count Respirations and Monitor Respiratory Effort

Practice Stamp or Name & Address