

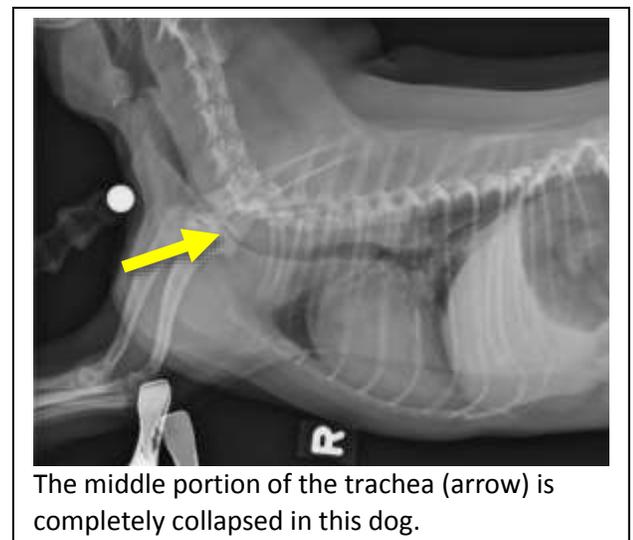
Tracheal Collapse
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Collapsing trachea is a progressive condition in which the supportive cartilage in the trachea (windpipe) and smaller airways (e.g., bronchi) start to degenerate and soften. With mild tracheal collapse, the membrane on the topside of the trachea starts to billow inward, partially blocking the airway. As the condition progresses, the C shaped rings that keep the trachea round begin to flatten out, allowing greater airway compromise. During coughing, the weakened walls of the airway slam together, causing inflammation and trauma, which stimulates more coughing. If the cycle of coughing is not broken, the airway can become temporarily obstructed, leading to respiratory distress and even death.



Collapsing trachea is usually diagnosed in toy breed dogs and is particularly common in Yorkshire and Maltese terriers, poodles, and Pomeranians. Clinical signs may be seen as early as 6 months of age, although most dogs are middle age when they present for diagnostics and treatment. Initially the primary sign is coughing, but it can progress to exercise intolerance, wheezy breath sounds, cyanosis (blue gums), and collapse. In rare cases dog present only with intermittent collapse (similar to what would be seen with a heart problem).

Collapsing trachea is often suspected based on the breed, clinical signs (a classic cough sounds like a “goose honk” if tracheal collapse is severe), and neck palpation (the cough can be stimulated, and sometimes the collapse can be felt). Definitive diagnosis may require chest and neck x-rays, fluoroscopy (“moving x-rays”), or even tracheoscopy (use of a scope to look at the trachea while the dog is under anesthesia). Chest x-rays are not always definitively diagnostic for tracheal collapse because other structures (such as the esophagus) can overly the trachea on the x-ray, making it hard to determine the exact shape of the trachea. Tracheoscopy is considered the “gold standard” for diagnosis; however, it requires anesthesia, and some dogs with severe tracheal collapse have trouble recovering from the procedure. Therefore, most veterinarians base their initial diagnosis on clinical signs and chest x-rays.



Medical management is the mainstay for treatment of tracheal collapse. The first step is to break the coughing cycle. Most often a syrup containing hydrocodone is used. This medication makes the dog sleepy, and some owners do not like the change in personality or loss of appetite. However, high or frequent doses are usually only used for a few days to a week, and they allow the dog (and its airway) to get some rest. If cough syrup is not sufficient to stop the coughing, your veterinarian may prescribe oral steroids to help reduce inflammation. Long term use of steroids can cause problems with weight gain, excessive drinking and urinating, liver disease, and increased risk of infection, so usually dogs are gradually weaned off the steroids.



Severely affected dogs may need oxygen.

Infection of the airways can worsen the condition, so your veterinarian may prescribe a short course of antibiotics. Based on the chest x-rays, your veterinarian may also prescribe a bronchodilator if the small airways in the lungs (bronchioles) appear to be affected. Since stress and excitement can initiate coughing, your veterinarian will probably prescribe a sedative (trazodone) or tranquilizer (acepromazine) that can be given at home when stress occurs or is expected (e.g., visitors, fireworks, thunderstorms).



Changes an owner can make include weight loss and use of a harness.

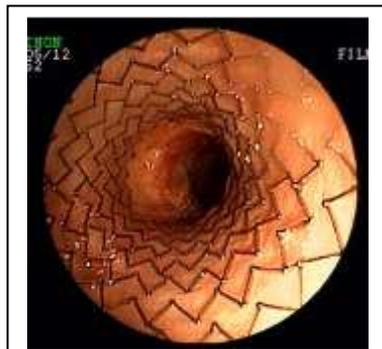
Other important aspects of initial management are environmental changes to reduce airway irritation. Dogs with tracheal collapse should not be exposed to wood or cigarette smoke, perfumes, and other airway irritants, either in person or on clothing, rugs, or fabric. They may need humidification if the environment is low in humidity (e.g. during the winter when the heater is on), and they may need air filtration (e.g., air conditioning) when pollen counts are high. Harnesses should be used instead of leashes and collars. Exercise may need to be limited until coughing has decreased.

The most important part of long term medical management is weight loss. Many toy breed dogs with tracheal collapse are overweight, and 70% of these dogs will improve dramatically once they have slimmed down. A good weight for a dog is one where the ribs can be easily felt but not seen. Owners should work with their veterinarians to determine the best weight for their pets. Weight loss can be

challenging in a dog on steroids or exercise restriction, so nutritional control is critical for managing these dogs.

When medical management is no longer sufficient, more aggressive intervention with a tracheal stent may be required.

In some cases, stents are placed surgically around the trachea (“extraluminal stents”) through a long incision in the neck that may extend into the chest. Most commonly, however, an expandable tracheal stent is placed nonsurgically inside the trachea (“intraluminal stent”) by a specialist using fluoroscopic or endoscopic guidance



Endoscopic view of an intraluminal stent.



The trachea is held open with the stent.

Owners should expect to spend \$3800 to \$5200 for uncomplicated stent placement. Most dogs undergoing stent placement will spend 1 to 3 nights in the hospital. Because the stents are expensive, the specialist may have only a limited number of sizes. If the appropriate size stent is not available, the dog may need to be hospitalized on sedatives and oxygen until the appropriate sized stent can be obtained by express delivery. After stent insertion, the dog is placed on steroids for at least a month, plus sedatives, cough syrup, and potentially other medications. The steroids will be gradually decreased over 4 to 6 weeks to every other day treatment and discontinued if they are no longer needed. Chest and neck x-rays are often taken 1, 3, 6 and 12 months after stent placement to make sure there are no detectable problems.

Because intraluminal tracheal stents are essentially “foreign bodies” (imagine inhaling a piece of metal!), they are expected to cause coughing, particularly the first 1 to 3 months after placement. In fact, some dogs cough the rest of their lives after tracheal stent placement and must be kept on steroids to prevent it. Therefore, stents are usually not placed in dogs in which the only sign is coughing. Instead, those dogs are managed medically until their signs are severe enough that they are having bouts of exercise intolerance at a walk, cyanosis, or collapse or are considered to have a poor quality of life. The average lifespan of dogs undergoing stent placement is about 2 years, but many dogs live longer than 4 years.

Besides coughing, complications of stent placement include disruption of the normal mucous flow up and out of the trachea, which could increase the risk of infection or airway obstruction. If the stent is too loose, it can actually be coughed out. If the stent is too short, the trachea can collapse around it. Irritation from the stent may cause “granulation tissue” (inflammatory tissue) to grow through and around the stent, blocking airflow. If the dog coughs excessively, the stent may break, requiring placement of a second stent or even euthanasia. Stents do not prevent collapse of the bronchi, and they do not correct collapse of the larynx (the upper opening of the airway) or elongation of the soft palate (the soft tissue separating the nasal and oral cavities), both of which may be present from longstanding tracheal collapse.

In other words, tracheal stenting is not a cure for tracheal collapse, only another means of managing it.

If you are unsure as to whether a tracheal stent is right for your dog, your veterinarian can contact the University of Tennessee Veterinary Medical Center for consultation. Veterinary consults about stent placement are directed to the Soft Tissue Surgery Service, while consults about diagnosis and treatment of chronic airway disease are directed to the Internal Medicine Service.

