**Recurrent Laryngeal Neuropathy**

The most common laryngeal condition is paralysis which presents as left sided laryngeal hemiplegia or hemiparesis. Laryngeal hemiplegia is a disease that affects the upper airway in horses. It causes a decrease in airflow to the lungs and can cause exercise intolerance. Horses with the disease are called “roarers” because they make a characteristic respiratory noise that sounds like “roaring” when exercised. The larynx (similar to the voice box or Adam’s apple in humans) is the structure that connects the nasal passage to the trachea (also known as the windpipe). It consists of a group of cartilages that allow air to pass into the trachea and protect the airway during swallowing. Laryngeal hemiplegia is caused by paralysis of one or both of these cartilages (called the arytenoid cartilage; Figure 1), due to lack of innervations causing atrophy to the muscle that moves the arytenoid cartilage. The left arytenoid cartilage is the most common side affected (up to 95%). In a normal horse, the arytenoids (commonly called flappers) allow maximal airflow into the trachea during abduction (the outward movement of the arytenoid cartilages to open the entrance into the trachea). Horses with laryngeal hemiplegia have paralysis of the arytenoid cartilage, which prevents them from abducting or opening their throat during inspiration. This leads to decreased airflow into the lungs due to obstruction from the paralyzed cartilage resulting in respiratory noise and exercise intolerance.

Laryngeal hemiplegia is most commonly reported in the racing Thoroughbreds but it also occurs in other performance horses including Warmbloods, Draft horses, Standardbreds, and Quarter Horses.

**Signs and Symptoms**:

•Usually seen in horses between 3–7 years old
•Exercise intolerance that has gotten worse over weeks to months
•Classic “whistling” or “roaring” noise heard during exercise (usually while cantering or higher activity)
•Sound of the horse’s whinny may change
•Gasping for breath after exercise
•Veterinarians may note muscle atrophy (or shrinking) at the throat latch area

**Diagnosis**:

Laryngeal hemiplegia is a graded on a scale of 1–4, with 4 being complete paralysis of the cartilage. Standing endoscopy or “scoping” can diagnose cases that are grade 3–4 and some cases that are grade 2. High-speed treadmill endoscopy or over ground dynamic respiratory examination may be necessary to diagnose cases that are questionable on standing endoscopy and can be used to ensure that no other concurrent upper airway problems are contributing to the exercise intolerance or respiratory noise. Additionally, laryngeal ultrasound can be used to evaluate the density of laryngeal muscle fibers to determine if they are correctly innervated.

**Grade 1**: A normal larynx, that opens fully during inspiration at rest and after exercise.

**Grade 2**: A larynx that opens fully, but some level of movement such as fluttering is seen in the muscles of the left side of the larynx.

**Grade 3**: The larynx can no longer open fully; some movement of the left side is present when the horse breathes in and out.

**Grade 4**: At rest there is an obvious weakness in the left larynx muscle and the horse appears to be unable to open this side of the larynx at all.

**Grades 1** and **2** are considered to be within the limits of a normal horse. **Grade 4** is abnormal and these horses will produce the abnormal respiratory noise at exercise. A **Grade 3** larynx is slightly in the grey area. If showing clinical signs, such as poor performance, these horses will usually benefit from treatment, but a lot will depend upon the level of competition at which the horse is expected to perform.

**Treatment**:

There are **4 treatment options**, as described below: prosthetic laryngoplasty (a "tie-back surgery"), ventriculectomy +/- cordectomy, arytenoidectomy, Tracheostomy / tracheotomy, neuromuscular pedicle graft and retirement to a less athletic career.

There are **four factors** to consider before selecting which surgical technique to use on a patient:

1. The horse's intended use--Horses don't suffer ill effects from RLN unless they're carrying out an athletic activity. Affected pleasure horses, for example, might not require surgery to correct RLN. Similarly, retiring an affected competition horse to a less athletic pursuit is a reasonable management option.
2. Disease severity--Horses with more severe RLN are often candidates for different surgical options than those with less severe disease. Thus, veterinarians typically assign a grade from I to IV (with IV being the most severe disease) to horses with RLN.
3. Which clinical signs are present--To some owners, respiratory nose is the principle issue whilst other owners wish to primarily address reduced athletic performance. Others may wish to treat both concurrently. Whilst there is a degree of overlap for most surgical procedures, some primarily seek to reduce respiratory noise and others aim to improve function.
4. Costs and risks involved--Not surprisingly, more complex surgical options and those that require general anesthesia generally cost more financially and carry more risks when compared to less complex procedures.

There are several **other conditions** which may cause a horse to make an abnormal inspiratory noise:

1. Lymphoid hyperplasia is a term used to describe a condition where lymphoid (immune) tissue lining the pharynx becomes inflamed and nodules form. It is a condition affecting young horses and most cases improves with age.
2. Cysts (fluid-filled sacs) may form beneath the epiglottis. The epiglottis is a triangular cartilage at the base of the larynx. Its job is to prevent food material from going down ‘the wrong way’ i.e. down the windpipe. If a cyst forms under it, the epiglottis is pushed up and it obstructs the opening of the larynx causing a noise. Large cysts require surgical treatment to remove them.
3. Infections, tumours etc. in the nostrils or nasal passages may result in the horse making an abnormal noise.
4. Epiglottic entrapment is a term used to describe a condition where the epiglottis is trapped under an abnormal fold of tissue and cannot move normally. Treatment consists of cutting the abnormal tissue, for which a surgical procedure is required.
5. Congenital problems are conditions of the pharynx and larynx which are present from birth. In general terms, these conditions cannot be treated.