

# Overground Endoscopy and Upper Airway Disorders

## WHAT IS OVERGROUND RESPIRATORY ENDOSCOPY?

Overground endoscopy is a method of observing the horse's upper airway whilst it exercises. Unlike the previously used treadmill endoscopy examinations, these examinations are performed in ridden animals with a small unit mounted and positioned in front of the saddle.

A small rigid camera (endoscope) is placed up the horse's nose. This is linked to a box that is secured to the bridle. This box is in turn is linked to a computer and light source that sit either side of the withers. The endoscope is passed up the right nostril and directed by remote control to point at the soft palate and larynx.

The system is well tolerated and the camera can normally be placed without the use of sedation or even a twitch.

For racehorses this system means that the horse may be examined during normal exercise as part of the normal string with minimal disruption to training, and the horse does not have to be hospitalised for a period of treadmill training. For sports horses, pleasure horses and hunters, it means that they can be examined while working in their normal routines and ridden in a style they are more accustomed to. This is not only more natural for the horses but it is often essential for

the accurate diagnosis of some conditions. Unbroken and non-ridden horses can be exercised on the lunge during the examination and driving horses can be examined whilst pulling a carriage.

## What sort of problems is overground endoscopy useful for?

The overground endoscope can be used to investigate two main problems; firstly, horses that make a noise when they breathe during exercise and secondly for investigating horses that may be performing poorly.

## What conditions do we see with overground endoscopy?

The conditions that we commonly see with overground respiratory endoscopy fall into two broad categories – problems associated with the larynx and problems associated with the soft palate.

## LARYNGEAL PROBLEMS

### Recurrent laryngeal neuropathy (RLN)

Left RLN (also known as laryngeal hemiplegia or "roarer syndrome") is perhaps the most commonly thought of wind problem in many types of horses. The horse is unable to hold the left side of the larynx out of the airway as the horse exercises, and causes



Figure 1a,b: A horse undergoing overground endoscopy on a frosty morning

obstruction of the airway. Horses severely affected usually will exhibit a lower pitched “roaring” noise or more mildly affected horses will make a higher pitched whistling noise, coinciding with inspiration. In its severest form RLN can be diagnosed by conventional resting endoscopic forms. With milder forms of the disease the laryngeal muscles may still be fully functional while the horse exercises, and the horse will no experience and airway obstruction. In these cases, the examination with exercising endoscopy will ensure that these horses are identified.

### Axial deviation of the aryepiglottic folds

Another cause of high pitched whistling noises in the exercising horse has been identified as axial deviation of the aryepiglottic folds (ADAF). This condition is caused by loose tissue associated with the larynx getting pulled into the airway during inspiration. This may be a cause of poor performance and causes anything from a subtle to severe upper airway obstruction. When working at maximum speed any obstruction of the airway can cause a decrease in performance. ADAF can cause obstruction without necessarily causing an upper respiratory tract noise.

### Vocal Fold Collapse and Billowing of the Ventricles

Other conditions that may or may not be linked to left laryngeal hemiplegia are billowing of the small sacks of tissue that lie behind the vocal cords in the larynx, the so called ventricles. If air rushing in and out of the lungs as the horse breathes, catches the sacks, it causes a whistling noise and mild obstruction of the airway. Billowing of the left or right vocal cord may also occur and can cause a variety of respiratory sounds.

Vocal fold collapse is often related to RLN, and in less severe cases, or in horses not competing at high levels of physical exercise the only problem appreciable is increased respiratory noise. Diagnosis of this condition by exercising endoscopy, in such horses, may allow

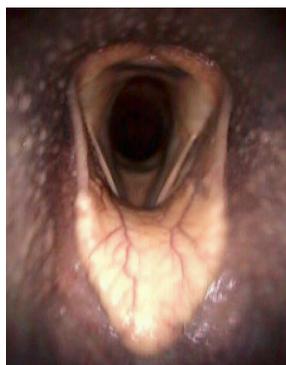


Figure 3: Endoscopic still image from a normal larynx and soft palate at exercise



Figure 4: Endoscopy image showing collapse of the left side of the larynx typical of left laryngeal hemiplegia



Figure 5: Overground endoscopy image showing collapse of both aryepiglottic folds into the airway



Figure 6: Overground endoscopy image showing collapse of both vocal folds (and aryepiglottic folds) into the airway

less invasive treatment to be recommended.

### Epiglottic entrapment & Sub-epiglottic cysts

Epiglottal entrapment is where tissue underneath the front part of the larynx, the “epiglottis”, folds back on itself around the epiglottis. This will often cause poor performance and may be associated with severe increase of respiratory noise.

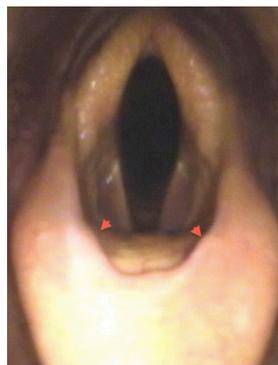


Figure 7: Endoscopy image showing an entrapped epiglottis



Figure 8: Overground Endoscopic image showing a sub-epiglottic cyst

Sub-epiglottic cysts are fluid filled structures that form underneath the epiglottis. Their presence in the airway obstructs the passage of air, and can predispose the horse to epiglottal entrapment and palatal dysfunction. These conditions can be recognised by conventional standing endoscopy exam, but if the cyst or entrapment of the epiglottis is only visible intermittently, then they may only be detected on overground endoscopy.

### PALATE PROBLEMS

#### Palatal Instability and Intermittent Dorsal Displacement of the Soft Palate

Horses that seem to ‘choke’, ‘swallow their tongues’ or suddenly pull up or tail off while working may be suffering from intermittent dorsal displacement of the

soft palate (DDSP) or palatal instability. The condition is thought to be due to a dysfunction in the muscles of respiration around the palate and therefore may respond to conservative therapy such as a “tongue tie” and a general increase in fitness.

### Pharyngeal Collapse

This is another condition associated with dysfunction of the respiratory muscles of the upper airway. Pharyngeal collapse manifests as collapse of the roof and walls of the upper airway during an exercise, even at slower speeds, causing a fairly severe harsh noise.



Figure 9: Endoscopic image displacement of the palate over the top of the epiglottis



Figure 10: Endoscopic image displacement of dorsal and lateral pharyngeal collapse

## A REVOLUTION IN THE WAY WE THINK ABOUT RESPIRATORY CONDITIONS

Traditionally it has been the left side of the larynx or the palate that have been implicated in the majority of breathing conditions. Problems do occur more commonly on the left side because of the specific anatomy of nerves that supply the larynx. However with the use of exercising endoscopic examinations we have understood that a significant proportion of problems relate to both sides of the larynx and to other, previously overlooked, structures. Also, we are aware that many horses are affected by more than one abnormality at any one time. Exercising endoscopy has become an essential step in the diagnosis of respiratory conditions, providing a much more accurate diagnosis, and as such increasing the likelihood of successful treatment.