A NEW WAY TO DIAGNOSE BREATHING PROBLEMS

Breathing problems are the second most common cause of poor performance in racehorses. The nasal passages and throat (pharynx and larynx) in their simplest form represent a tube for the flow of oxygen from the atmosphere to the lungs. Disorders which cause a reduction of the diameter of the pharynx and larynx (upper respiratory tract) during exercise occur commonly, resulting in restriction of airflow and subsequent loss of performance. Horses with disorders of the upper respiratory tract experience a reduction in racing performance and exercise tolerance and may make abnormal respiratory noises.

Racehorses are required to perform at extremely high exercise levels in order to win races. During exercise, large volumes of air must be inhaled to meet the oxygen demands of the body and prevent early fatigue. In the process of meeting these oxygen requirements, the horse creates large negative pressures within the upper respiratory tract during inhalation. The downside to these negative air pressures is a tendency for unsupported parts of the pharynx and larynx to collapse into the airway creating an obstruction to airflow. This in turn limits the oxygen supply to the lungs and causes poor performance.

Disorders of the larynx and pharynx are routinely diagnosed using a fibreoptic- or video-endoscope. With the horse held at rest, the endoscope is passed up the horse's nasal passage to a point where the pharynx and larynx can be clearly viewed. The majority of commonly occurring upper airway conditions can be identified by this procedure, routinely referred to as a 'scope'.

Although most upper airway conditions can be diagnosed at rest, a number of conditions only become apparent during exercise when negative air pressures are greatest. There are also several conditions which appear of minor or questionable significance in the horse at rest, but when examined during exercise result in complete collapse of the airway. Therefore, the presence of a minor or absence of an abnormal finding during resting endoscopy does not necessarily mean there is not a performance limiting problem.

Equine veterinarian's ability to examine the horse's upper airway during high speed exercise became a reality ~ 20 years ago when treadmills were adapted to accommodate a horse working at near racing speeds. Whilst high speed treadmill video-endoscopic examination is valuable diagnostic procedure, it has several significant limitations. Unfortunately high speed treadmill facilities represent enormous capital investment and are limited to some universities and a small number of referral veterinary practices. Subsequently, horses need to be transported to the nearest facility and require acclimatisation (typically 1 days training) to the treadmill in order to exercise at galloping speeds safely. Exercise on the treadmill is associated with some risk of injury and the surface is firmer than normal track conditions. Although racing and training conditions may be replicated to a limited degree during high speed treadmill exercise, it is not

possible to truly duplicate the training or racing conditions in which the horse is experiencing the suspected breathing problem.

Recently a revolutionary new technique has become available to overcome the limitations of high speed treadmill endoscopy. The system developed consists of a flexible video-endoscope which is inserted up the horse's nostril as normal to visualise the larynx and pharynx. The endoscope is then secured to a specially made headpiece worn by the horse (fig 1). The horse also wears a custom made saddle pad which contains equipment to record and transmit the images coming from the video-endoscope (fig 2). While being examined, the horse is able to wear its normal tack and gear and the jockey or driver can work the horse as normal (fig 3). The entire training session is video-recorded and also watched in real time on a remote monitor. (fig 4). This exercising endoscopic system is referred to as a *dynamic respiratory scope.*

This system represents an enormous leap of progress in the diagnosis of causes of poor performance in racehorses, sport horses and pleasure horses. As the system is portable and adaptable to all horses and conditions, veterinarians are now able to examine the upper airway of horses exercising with their regular jockey, track work rider or driver, in their regular training environment, wearing their normal tack and gear. This advancement allows the exact conditions that precipitate the horse's problem to be reproduced at the same time the pharynx and larynx is being visualised.

The ability to readily examine horses in their normal working environment has meant that many horses that previously would have had undiagnosed or not fully diagnosed conditions, due to the inconvenience of high speed treadmill endoscopy, are now able to be fully assessed. Interestingly, some horses that have one condition identified on a resting scope, display more than one problem when examined at exercise using the dynamic respiratory scope. This then allows a more complete treatment recommendation to be formulated.

Conditions in which exercising endoscopy is particularly useful include horses with mild cases of paralysis of the left laryngeal cartilage, commonly referred to as 'roarers'. At rest they may appear to have adequate laryngeal function, but during strenuous exercise, the dynamic respiratory scope is able to document the left laryngeal cartilage collapsing into the airway, greatly reducing the size of the airway (see fig 5 & 6). Horses can only breathe effectively through their noses, therefore if their soft palate moves upward out of its normal position ('dorsal displacement of the soft palate'), an upper airway obstruction results. In many horses suffering from this condition, endoscopic examination of their upper airway at rest appears normal, despite reports of the horse performing poorly and making an abnormal, loud breathing noise during racing. When these horses are examined while working with an exercising video-endoscope system, the intermittently displacing soft palate is observed and the cause of their poor performance identified (see fig 7). In addition to these commonly seen conditions,

due to the convenience of this new technology, examination of a greater number of horses has allowed veterinarians to identify more unusual conditions (see fig 8 and 9) that occur during exercise but may not be appreciated on the traditional resting ‘scope’.

Respiratory or ‘wind’ problems can be frustrating conditions to diagnose and treat in the racehorse. The development of this new exciting endoscopic technique during exercise has greatly advanced veterinarians’ capabilities to diagnose and, in turn, more accurately treat affected horses.

Figure 5 and 6: Mild asymmetry of the laryngeal cartilages at rest (left) and marked collapse of the left side of the larynx in the same horse during exercise (right).

Figure 7: Dorsal displacement of the soft palate. Note that the tongue shaped epiglottis has disappeared beneath the soft palate greatly reducing the size of the airway.

Figure 8 and 9: A horse with a normal appearing larynx at rest (left) and the same horse displaying unusual collapse of the larynx at exercise (right).

Fig 1 – The endoscope is held securely in placed by the custom made headpiece

Fig 2 – The endoscopic images of the horses throat are recorded and transmitted from the equipment attached to the custom made saddle cloth.

Fig 3 – Horse undergoing a dynamic respiratory scope examination.

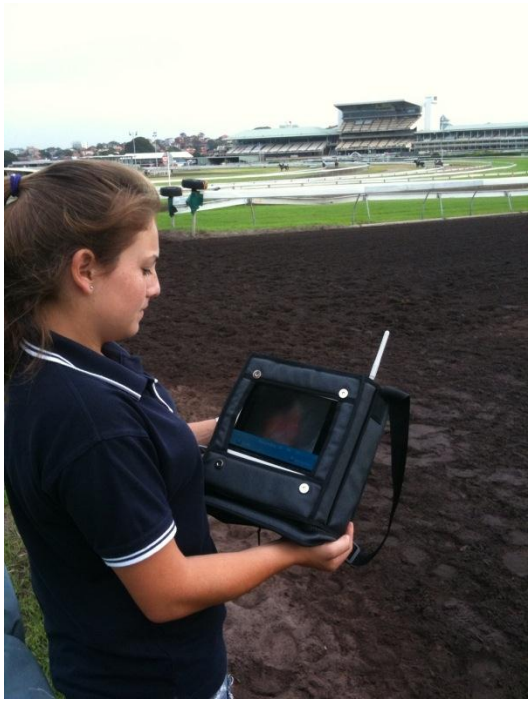

Fig 4 – Video-endoscopic images are monitored remotely while the horse exercises