Endoscopy

Potential purchasers of yearlings and even foals at public sales increasingly ask for endoscopic examinations (‘scoping’) of the larynx and pharynx to be performed in an attempt to assess ‘soundness of wind’. With this has come a concomitant rise in questions and queries from vendors and purchasers alike.

What is an endoscopic examination?
An endoscope is an instrument designed to look inside the body. It can be inserted into any body cavity, either through a natural opening or through an incision made by a surgeon. Two types of endoscope are now used for horses:

- **Fibreoptic endoscope** – this is currently the most common type of portable endoscope used routinely for horses. It consists of a bundle of optical fibres (very narrow glass threads) inside a waterproof rubber tube. Bright light produced by a connected light source is transmitted along the fibres to illuminate the area of the horse to be examined and then back along the fibre bundles to the eyepiece where it is available for one person to view at a time.

- **Videoendoscope** – these more modern and sophisticated endoscopes have a microchip video camera at the tip of the scope. Its image is transmitted electronically back along the scope to a television monitor. Better light management and computer technology lead to a brighter and better image, which can be viewed by several people at the same time. Video sequences can be recorded and viewed later.

Inside both of these endoscope’s protective coverings are channels down which air or gas may be blown, to expand a body cavity so that it can be effectively viewed and examined. There are also channels down which water can be flushed to clean the optics in order to get a clear picture and channels through which instruments can be passed to take biopsy samples (for microscopic examinations) or to snare and/or remove foreign bodies, cysts or small tumours.

Videoendoscopes are more expensive, larger and not as readily portable as fibreoptic endoscopes so their use under horse sales’ conditions is somewhat limited. However, as videoendoscopes become available at veterinary clinics, pre-recorded videos made prior to the sale are becoming increasingly more commonly offered for viewing by vendors or their veterinary advisors at sales.

Why ‘scope horses?
At the sales, the scope is used to look specifically at the structure and function of the larynx. The larynx is a complex valve located at the top of the trachea (‘windpipe’). The larynx is made of cartilage, muscle and nerves and is covered by a mucosal surface. It is found at the top of the windpipe, at the back of the throat. It, and particularly the arytenoid cartilages which form the front of the larynx, act as a valve to prevent food from being inhaled when the horse eats (it closes tightly during swallowing) while allowing the maximum amount of air to enter the lungs during exercise (it opens fully when the horse breathes in). Also, it provides the function of voice production. While this is most important in humans it is of secondary consideration for the racehorse.
An important and not uncommon condition of racehorses causes the muscles of the larynx to function improperly, because the nerves that supply them become diseased. This means that the larynx cannot open fully during inspiration (breathing in). If the valve at the top of the windpipe cannot be opened fully when the horse is at exercise, the horse effectively becomes 'short of breath', diminishing its athletic ability. This disease has several names including idiopathic laryngeal hemiplegia, recurrent laryngeal neuropathy and laryngeal paralysis or paresis. Colloquially the condition has been called 'roaring' or 'whistling', depending on the type of abnormal noise that the horse makes when it breathes in. The left side of the larynx is most commonly affected, although right-sided cases do occasionally occur. It is worth mentioning that laryngeal paralysis can be a consequence of a number of other diseases, but we shall concentrate on the form most commonly seen and for which young potential racehorses are screened at sales.

**How is laryngeal hemiplegia diagnosed?**
The condition is suspected when the horse makes an abnormal inspiratory (when the horse breathes in) noise (roaring or whistling) during strenuous exercise (lunging or galloping). The diagnosis is confirmed by endoscopic examination, when the arytenoid cartilages are seen not to open properly.

**What causes laryngeal hemiplegia?**
The precise cause remains unknown. It appears that the nerve that supplies the laryngeal muscle, which is responsible for opening the arytenoid cartilage, becomes damaged. The nerves supplying the left and right sides of the larynx follow different courses although both start from the base of the brain, inside the skull. The nerve on the right travels more directly along the throat and to the muscles of the larynx. The nerve on the left side follows a considerably longer and more tortuous path; travelling down the neck and into the chest where it wraps around part of the heart before coming all the way back up to the larynx (hence its name 'recurrent left laryngeal nerve'). This long pathway is thought to predispose to degeneration within the left nerve. Hence the left side of the larynx is more commonly affected than the right.

**So why is there controversy over ‘scoping?**
Unfortunately, the diagnosis of laryngeal hemiplegia is not straightforward. There is a large ‘grey area’ between what is considered normal, and what is considered diseased.

When the larynx is viewed through an endoscope, the horse’s left side appears on the right of the image. The left arytenoid cartilage is carefully examined while the larynx opens and closes as the horse breathes in and out. Paralysis is seldom complete and it can be difficult to recognise early signs or apparent asynchronies may be misinterpreted, leading to false positive and negative diagnoses. Even in normal horses, the left arytenoid cartilage sometimes moves more slowly than the right one. It may not move at precisely the same time or through the same range of motion as the right-sided cartilage.

Sometimes the left side opens fully but closes slightly before the opposite side. The movements of the arytenoid cartilages are therefore described in terms of synchrony and symmetry. They may be described as abducting (upward and outward movement) poorly or weakening prematurely.
In order to ease communication and to help observers describe and document their findings, several grading systems have evolved. Each system rates the larynx, according to how it ‘performs’ during visualisation with the endoscope. A commonly used system grades a horse’s larynx ‘out of five’:

1. A totally normal horse in which all the movements of the larynx occur simultaneously and in complete harmony. Both sides of the larynx open fully and hold their open position as required. In reality, this is rarely seen.

2. This larynx can do all the movements required, but sometimes the left side moves a little later than the right side. When viewed with the horse breathing quietly, it looks a little ‘top-sided’ because there is ‘resting asymmetry’. Most Thoroughbred horses fall into this category.

3. This larynx shows premature weakening, i.e. its left side opens fully but sags downwards whilst the right side remains fully open.

4. The left side of the larynx cannot open (abduct) fully.

5. This larynx shows total or near total paralysis, i.e. the left side cannot move at all.

Consequently, when a veterinary surgeon examines the horse with an endoscope, he or she assigns the horse to one of these five categories. If the examination is being performed on behalf of a potential purchaser (i.e. before going through the sales ring) the information is relayed to the purchaser or agent and a decision is made as to the horse’s suitability for purchase as an athlete. This is where the situation becomes potentially difficult and there are several potential pitfalls:

- The appearance of the larynx will vary slightly, even in the same horse, between examinations. This means that during one examination, the larynx shows no signs of abnormality but at another examination it may show some premature weakening. The larynx may therefore be graded as a ‘two out of five’ during one examination and a ‘three out of five’ at the next, apparently ‘jumping groups’.

- Laryngeal disease is progressive. A purchaser may have bought a horse with a ‘three out of five’ larynx one year only for it to deteriorate sufficiently to require wind surgery twelve months later. This is not an uncommon occurrence. This purchaser may subsequently demand that horses bought for him have ‘perfect’ or ‘near perfect’ endoscopic results before he considers it good enough to bid for.

- Horses are commonly and routinely examined at rest, whereas the real test of its functional capacity comes when it is galloping at full speed, as in a race. The larynx works at its best (and worst) when the horse is performing at maximum effort. Endoscopic examinations can be performed on a high-speed treadmill with a horse exercising at full speed and results sometimes show abnormalities that are not detectable when the horse is at rest. Conversely, some horses that show signs of poor laryngeal function during routine endoscopic examinations will race well, with no apparent wind problems, and when examined on a treadmill, the larynx opens fully and normally. Paradoxically, some horses that perform poorly and make abnormal inspiratory noises at exercise on and off the treadmill have no demonstrable laryngeal abnormalities.

Therefore, veterinary surgeons acting on behalf of potential purchasers try and discuss their findings cautiously, in the light of current knowledge, so that the individual can reach an informed decision. Unfortunately there is no doubt that many perfectly able athletes are rejected on the basis of an endoscopic opinion.
What about the wind test performed on behalf of the purchaser?

Horses affected with significant degrees of laryngeal hemiplegia often make an abnormal noise (a high pitched ‘whistle’ or less commonly a lower pitch ‘roar’) when they breathe in. It is important to be able to distinguish these noises from other respiratory noises caused by other throat problems, e.g. infections or simply lack of fitness.

Veterinary surgeons who look at horses after they are sold do so on behalf of the purchaser. At Tattersalls (Newmarket), if a purchaser requests a ‘wind test’ the horse is initially examined at exercise by a veterinary surgeon of their choice. For yearlings this involves lunging at the sales paddocks, but for horses in training the examination may take place on the gallops, i.e. off the sales premises. If the horse makes a suspicious inspiratory noise, it will be examined with the endoscope. If a significant degree of laryngeal dysfunction is diagnosed, it will be ‘returned’. These horses are then examined by three highly experienced veterinary surgeons (the ‘wind panel’) who act on behalf of, and are paid by, the sales company. This is important because, from this point on, the criteria laid down in the conditions of sale become overriding factors.

The veterinary surgeon acting on behalf of the purchaser will return a horse if there is any doubt that there may be a wind problem. The panel will only deem a horse returnable if it fulfils the conditions of the sale with respect to wind problems i.e. that it makes a characteristic inspiratory noise and shows endoscopic signs of significant laryngeal hemiplegia. This is not a perfect solution to the problem, but it does at least try and provide the fairest environment for both buyers and sellers. Strictly speaking, the conditions of sale refer only to laryngeal hemiplegia, and not to any other diseases of the airways, although some may similarly adversely affect a horse’s athletic ability.

This client information sheet is based on material written by Deidre M. Carson, BVSc, MRCVS & Sidney W. Ricketts, LVO, BSc, BVSc, DESM, DipECEIM, FRCVS. Used with permission under license. ©Lifelearn Ltd, PO Box 16, Newmarket, Suffolk CB8 7TH.