How to Examine and Grade the Upper Airway at Public Auction

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1. Introduction

Endoscopic evaluation of the upper airway of horses presented at public auction is an important part of the overall assessment of sales horses for suitability for either racing or resale. Although considered a common and relatively simple procedure, there are aspects to the examination that can make it simpler to perform and more understandable for both sellers and potential buyers.

First of all, in order to facilitate the passing of the endoscope, it is advantageous to use an endoscope with a small diameter (fiberoptic endoscope with a 7.6-mm diameter that is relatively well tolerated by horses of all ages). This will decrease the discomfort that the horse experiences and therefore facilitate the passage of the endoscope. Also, once the distal tip of the endoscope has been introduced into the nares, the fingers should no longer contact the nares while advancing the scope given that horses tend to object to that contact and will settle down once nasal manipulation has ceased. This is important because many of the horses presented for sale at public auction will be scoped multiple times within 1 or more days prior to the sale so good technique can minimize a horse’s discomfort and possible trauma to horse and/or handler. Most veterinarians are introducing the scope into the right nares, but that is not universal. It must be remembered that as the scope is advanced to the level of the pharynx and larynx, there is by definition only one nasal passage being evaluated for any potential pathology regardless of which nares is entered. This is unlikely to be an issue in a population of primarily normal horses, but in the context of a horse with clinical signs of airway insufficiency both sides should be evaluated for a complete examination.

As in most medical procedures, the correct interpretation of the findings is more challenging than the actual performing of the procedure. In the case of upper airway examination and evaluation, it is not only the interpretation of the findings but the communication of that information to clients and colleagues that requires a standardized system. The use of a standardized system enhances the ability to describe the upper airway and communicate the findings with colleagues and clients. It is important that a standardized grading system for the upper airway incorporate the elements of being as objective as possible and easy to understand while being descriptive of the areas of interest. There are two standardized systems in current usage, the Havemeyer and the Modified Cornell.1–3 They are both standardized classification systems based on description of arytenoid function. The grade...
categories range from Grade 1 to Grade 4 with several subcategories. The number “1” is synonymous with the word “symmetric,” so Grade 1 arytenoid function means that the arytenoids open symmetrically, fully abduct, and hold their position. The number “2” is synonymous with the word “asymmetric.” Grade 2 function means that the arytenoids open asymmetrically, fully abduct, and hold their position. Grade 2 function is broken down into two categories, 2A and 2B (Modified Cornell) or 2.1 and 2.2 (Havemeyer). The “A” of 2A is synonymous with the word “mild.” A 2A or 2.1 designation would mean that the arytenoids open mildly asymmetrically, fully abduct, and hold. Similarly, the “B” of 2B is synonymous with the word “moderate.” Thus, a 2B or 2.2 designation means that the arytenoids have a moderate level of asymmetry when abducting, but the abduction is full and the arytenoids are able to hold in the fully abducted position. Grades 1, 2A, and 2B (or 1, 2.1, and 2.2) arytenoid function are all variations of a normal upper airway. Statistically there is no difference in the racing performance of horses with Grade 1, Grade 2A (2.1), and Grade 2B (2.2) function (note: present research suggests that racehorses with Grade 2B function are equivalent in earnings with their Grade 1 and 2A counterparts at age 3 years, but have decreased earnings at 2 and 4.\textsuperscript{4,5a}

Grade 3 function is the designation for an arytenoid that may either achieve abduction only transiently and with difficulty or may not fully abduct. There are three subdivisions of Grade 3 function in the Havemeyer system to designate the level of compromised function. Grade 4 function is the designation reserved for an arytenoid that does not move (laryngeal hemiplegia). Grades 3 and 4 arytenoid function are not normal. Grade 3 and Grade 4 airways do not meet Conditions of Sale at all four of the Thoroughbred sales companies in the United States. In the author’s opinion, the Havemeyer and Modified Cornell systems for grading laryngeal function are similar enough that any veterinarian employing one of these systems can fully understand the alternate system.

The epiglottis is evaluated separately from arytenoid function. It is graded as normal, mildly flaccid, moderately flaccid, or severely flaccid. The length of the epiglottis is noted as normal or short. Interestingly, given that the epiglottis is under autonomic nerve control, the appearance of the epiglottis can change from examination to examination or even within the same examination. If during the examination the epiglottic appearance changes from moderately flaccid to completely normal, the author’s approach is to assume that the structure has the capability to achieve normalcy. It is difficult to use the appearance of the epiglottis as predictive of upper airway dysfunction because there is no scientific evidence correlating mild or even moderate flaccidity of the epiglottis to clinical dorsal displacement of the soft palate.\textsuperscript{4} The position of the epiglottis is controlled by the hyoepiglotticus muscle, and its appearance can vary based on the degree of muscular contraction or relaxation.\textsuperscript{6} Eliciting swallowing during the examination can give the examining veterinarian an idea of whether there is dorsal displacement of the soft palate over the epiglottis, and if so whether the horse is able to easily replace the epiglottis in its normal position. Many horses at public auction will intermittently dorsally displace the palate due to nervousness related to new surrounding or the scoping procedure itself, and this should not be interpreted as predictive of clinical dorsal displacement of the soft palate creating airway insufficiency under racing conditions.\textsuperscript{4}

Guttural pouches are noted for whether or not there is an exudate of any kind emanating from the orifice, and the pharynx is evaluated for the presence and magnitude of pharyngitis as well as any polyps or abnormal structures. It is very common at public auction for weanlings, yearlings, and 2-year-olds in training to exhibit pharyngeal inflammation manifested by varying degrees of pharyngitis and exudate emanating from the guttural pouch openings. In my opinion, these findings do not constitute a reason for avoiding a purchase, but rather are an indication that an individual may require treatment and further evaluation after purchase.

Conditions of Sale
All US sales companies have “Conditions of Sale,” some of which refer specifically to conditions of the upper airway. These are included to protect the buyer from purchasing a horse with an upper airway condition that would be acknowledged to be pathological. Already referenced would be the horse with either a Grade 3 or Grade 4 arytenoid function. In the sales catalog, this would be listed as laryngeal hemiplegia (complete immobility or inability to fully abduct the cartilage). Other airway abnormalities that are covered by conditions of sale are listed below:

- Rostral displacement of the palatopharyngeal arch
- Epiglottic entrapment
- Permanent dorsal displacement of the soft palate
- Severe arytenoid chondritis or arytenoid chondroma(s)
- Subepiglottic cyst(s)
- Cleft palate

For any of these conditions, a post-sale endoscopic examination of the upper airway is sufficient to protect the buyer as a horse with any of these conditions would be subject to return. (Note: rostral displacement of the palatopharyngeal arch and epiglottic entrapment may each be transient, which is obviously problematic when a horse has been deemed normal on a pre-sale basis and exhibits the condition endoscopically post-sale).
The value of the pre-sale endoscopic evaluation of the upper airway at rest in the stall has proven to be less predictive of airway performance since the advent of dynamic or over-ground endoscopy. The purpose of “holding off” the horse’s air during the resting endoscopic examination is to cause the horse to breathe deeply to observe maximal arytenoid abduction, but dynamic endoscopy gives a better picture of the function of the upper airway at something approaching racing distance. It has been observed that many (if not most) of the pathological conditions resulting in airway insufficiency as diagnosed by dynamic endoscopy would not have been evident during a resting endoscopic examination in the stall. For this reason, it is important for practitioners to be cautious in making certain predictions: for example, potential laryngeal hemiplegia based upon a resting arytenoid asymmetry, or predicting a clinical dorsal displacement of the soft palate based upon a resting examination where the horse displaces. The more information that we get from dynamic upper airway examinations, the more that we realize that resting endoscopy is a screening tool for more obvious findings.

For example, there is another condition which, although not yet covered by Conditions of Sale at any of the Thoroughbred auction houses, has in recent years been recognized to predispose horses to a higher incidence of airway collapse than endoscopically normal horses. Subluxation (ventroaxial luxation) of the apices of the arytenoid cartilages, and the recognition of this condition, requires that the horse’s air be held off to stimulate deep breathing and maximal arytenoid movement. This is accomplished by collapsing the external nares with the same hand that is holding the scope in place on the horse to breathe deeply to observe maximal arytenoid abduction, but dynamic endoscopy gives a better picture of the function of the upper airway at something approaching racing distance. It has been observed that many (if not most) of the pathological conditions resulting in airway insufficiency as diagnosed by dynamic endoscopy would not have been evident during a resting endoscopic examination in the stall.

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In 2016 the idea of performing videoendoscopic exams of the upper airway of sales horses for pre-sale viewing at public auction resurfaced, and the American Association of Equine Practitioners (AAEP) was charged with providing guidelines for such examinations. The idea behind consignors providing pre-sale videos of the upper airway was to minimize the number of pre-sale scopes on any individual horse and thus minimize the potential for trauma to either the horses themselves or their handlers. An AAEP working group constructed the following Protocol for Pre-Sale Videendoscopic Examination of the Upper Airway at Public Auction which was subsequently approved by the AAEP Board of Directors:

- Equipment must be capable of producing a digital video image of excellent quality.
- Horse must be identified appropriately, and that identification must be in digital format with character generation on the screen, and/or video of the catalog page, followed by unbroken video of the face prior to introduction of the scope into the nares (right or left) and up to the larynx. This is a single stream video with no editing. The veterinarian performing the video or the consignor will submit each upper airway video on an individual flash drive or CD. Upper airway videos should be stored in a file separate from the radiographs in the repository in case of client request for one or the other.
- Standard technique must include maximal abduction of arytenoids induced by swallowing (multiple times) and nasal occlusion. The duration of the video must be sufficient to identify all laryngeal and pharyngeal structures as well as observing their maximal function within the context of a resting examination.
- The interval between the pre-sale videoendoscopic examination and the selling session will not exceed 10 days.

The 10-day interval mentioned above was considered by all to be a compromise between the desire to evaluate the upper airway as close to the selling session as possible and the practicality of performing a large number (perhaps thousands) of videoendoscopic examinations in a short window of time (1–2 weeks). Ideally, buyers like their veterinarians to perform that examination either on the day of the sale or 1–2 days prior due to the possibility of a deterioration of the upper airway function during the time between the examination and selling date. The idea has been introduced that a condition of sale be created to ensure that the upper airway of the horse as observed endoscopically on a post-sale basis approximates the pre-sale videoendoscopic examination. An example of the wording that has been discussed for a new condition of sale would be:

Post-sale endoscopic examination of the upper airway must be performed within 24 hours of selling session while the horse is still on the salesgrounds. In the case that the upper airway does not meet conditions of sale as delineated in Condition ____, the horse shall be returned. If the opinions agree that the upper airway is significantly different from the pre-sale video but still technically meets conditions of sale, the seller may get an opinion from the veterinarian of his or her choice. If the opinions disagree, a panel of three veterinarians will render an opinion and that opinion shall be binding.
Such a condition could be a potential solution to the timing of the videos, but is not currently being considered as the concept of upper airway videos at the sales is in its infancy. The positive result of such a condition would be that it addresses the issue of any changes that may occur in the upper airway during the 10 days between the pre-sale videendoscopic examination and the selling session. The negative aspect of creating such a condition of sale would be that instead of a sale being final at the drop of the hammer, the horse could be subject to return even if its upper airway technically meets the traditional conditions of sale.

After the evaluation of the upper airway by endoscopy, it is important to communicate the findings to the client in a way that is understandable and conveys the information as risk assessment. Findings, in and of themselves, do not necessarily eliminate a horse from consideration for purchase. Especially in the case of pre-sale examinations, it is important to emphasize that the risk level is predicated upon observations regarding populations of horses, and that it is not possible to predict what will occur with any individual horse. For example, although Grade 2B arytenoid asymmetry is considered to be a variation of normal, many express concern that the examination is just one point in time and that a subsequent examination may reveal the asymmetry to have progressed to dysfunction. If the horse in question is presented for sale as a yearling, and may have had a Grade 2B arytenoid function score as a weanling, the historical information allows practitioners to report a stable arytenoid function over time. It is important to communicate all these considerations to the client while discussing their level of risk tolerance. Clients with greater understanding of the conversation typically have a higher risk tolerance, and they also understand that the upper airway findings are but one factor in the making of a racehorse, albeit an important one. Radiographic findings, pedigree, conformation, history, and other factors also play a part in a client’s ultimate decision as to whether or not they will purchase any given individual horse.

In summary, the appropriate equipment and technique can greatly facilitate the examination of the upper airway under resting conditions at public auction. The anatomical areas of interest are the nasopharynx and larynx, with particular emphasis on the structure and function of the arytenoid cartilages as well as the appearance of the epiglottis. The endoscopic examination of the upper airway in the resting horse, when performed properly, is capable of detecting some structural and functional abnormalities, but is limited in the sense that there are some abnormalities that can only be detected under dynamic conditions (i.e., over-ground endoscopy). The purpose of pre-sale endoscopy is to not only identify observable abnormalities of the upper airway, but also to identify and describe variations of normal which may be interpreted differently regarding their level of risk by various veterinarians and thus affect the market value of the individual horse. A comprehensive discussion of how to communicate the aforementioned findings to sellers or potential buyers is difficult because each client has their own unique level of understanding and risk tolerance, so the suitability of any given individual horse may vary depending upon the client. In other words, the same horse may be suitable for one client but not another. This is true of all findings, whether they are endoscopic findings of the upper airway, radiographic findings of the specified joints in the repository radiographs, or physical examination findings.

Ideally, the examining veterinarian should strive to communicate to the client what is known from the literature regarding the upper airway examination:

1. Thoroughbred yearlings with Grade 1 and Grade 2 arytenoid function had significantly better racing performance as adults, compared with yearlings with Grade 3 arytenoid function.
2. Epiglottic flaccidity and palatine abnormalities were not predictive of inferior racing performance; however, a short epiglottis was associated with decreased racing performance.

The purpose of post-sale endoscopy is primarily to identify any abnormalities of the upper airway that would be covered by conditions of sale and therefore negate the purchase of the horse. Any variations of normal that would be identified on a post-sale examination should be communicated to the buying client as potentially affecting resale of the horse, but would not make the horse eligible for return to the seller.

Acknowledgments

Declaration of Ethics
The Author has adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest
The Author has no conflicts of interest.

References and Footnotes


