

EXERCISE INTOLERANCE: Part 1

THE UPPER AIRWAY

The respiratory system is second only to the musculoskeletal system as a cause of lost training in racehorses. Multiple body systems may be responsible for exercise intolerance. Many horses have more than one body system affected, making determination of the relative contribution of each system difficult. Upper respiratory sources of exercise intolerance are common in all breeds of horses. The frequency of specific conditions, the degree to which each condition limits performance, and the method of treatment and corresponding success vary with the breed, age, and intended use of the horse. As a general rule, horses engaged in racing have the highest requirements for airflow and show exercise intolerance with lesions that may be inapparent during examinations performed at rest. Horses engaged in less strenuous activities require more airway obstruction before performance limitation is apparent. These lesions are usually apparent at rest.

The upper airway accounts for the majority or total respiratory resistance during exercise. Resistance to airflow is inversely proportional to the radius of the airway to the fourth power. Therefore small reductions in airway size lead to large increases in airway resistance. Increases in airway resistance require increased respiratory work to generate the same airflow.

Airway obstruction leads to the generation of airway noise as a result of tissue vibration and turbulent airflow. Obstructions of the upper airway are accompanied by noise in all horses, although not all horses with airway noise have exercise intolerance. The presence of airway noise increases the likelihood that airway obstruction is responsible for

the exercise intolerance compared to horses that show poor performance without respiratory noise. For many causes of upper airway obstruction, the noise is characteristic. Trainers and owners are valuable sources for information and careful questioning can lead to a strong suspicion for a certain condition before examining the horse.

Endoscopy using a flexible fiber endoscope or videoendoscope is essential for diagnosis. This allows the veterinarian to determine the location of the problem and the severity of the inciting cause.

Treadmill examination can be helpful in some instances. Treadmill exercise evaluations

allow for simultaneous evaluation of the musculoskeletal, cardiac, and respiratory systems. Videoendoscopy allows for direct visualization of the airway during exercise. Treadmill examination offers the additional advantage of providing objective measurements of fitness levels to differentiate poor conditioning as a cause of exercise intolerance. Exercising under tack or harness to simulate conditions under which the owner or trainer reports the noise to occur can be helpful as well. Numerous examples exist of intermittent airway obstructions that occur only during exercise and that are demonstrable only during videoendoscopy on a treadmill. These cases are few in proportion to all the horses examined for airway obstruction. The majority of upper airway obstructions can be diagnosed us-



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Silverado Equine Performance, LLC was established in 2013. With 15 years experience in the performance horse industry, Dr. Hutchins' goal was to create a practice that fulfilled a special niche: provide the absolute best care available for each horse with all necessary diagnostic tools available for your equine athlete and be able to bring it to you in the comfort of your farm or stable. The scope of the practice is primarily lameness and sports medicine although other services are available upon request. This allows Dr. Hutchins to stay on the leading edge of performance medicine. It takes a team to keep a finely tuned athlete going, so when necessary, recommendations and referrals to the most qualified professionals for a given condition are made.

ing history, signalment, endoscopy, and other techniques available to your veterinarian. Treadmill evaluation is indicated for those horses showing airflow limitation or airway noise that cannot be identified by endoscopy at rest or after exercise.

Endoscopic examination should be performed in the unsedated horse in a systematic manner such that the entire upper airway is examined. Examination should not stop at confirmation of the suspected lesion because some horses have more than one problem. The examiner should ascertain whether the lesion in question is compatible with the history and the signs that the horse is exhibiting.

Some conditions are not apparent at rest. Exercising the horse under tack or harness under the conditions in which the owner or trainer reports the problem is helpful. Endoscopic examination is then performed at the conclusion of exercise. Racehorses may be examined on the track during training by waiting near the finish line to hear any noise generated and to perform an endoscopic exam at the termination of work.

The following list is not all inclusive; rather, it covers the most common upper respiratory causes of exercise intolerance in performance horses in descending order of frequency. Differences in clinical presentation and response to therapy in horses engaging in different activities can create some overlap in diagnostic perception.

- Laryngeal Hemiplegia
- Dorsal Displacement of the Soft Palate
- Epiglottic Entrapment
- Epiglottic Hypoplasia
- Arytenoid Chondritis
- Ethmoid Hematomas
- Pharyngeal Cysts
- Hyperkalemic Periodic Paralysis
- Maxillary Sinus Cysts
- Guttural Pouch Empyema and Retropharyngeal Abscesses
- Alar Fold Obstruction
- Nasal Collapse

The respiratory system is a frequent cause of exercise intolerance in performance horses. Labored breathing, fatigue during performance and prolonged recovery after exercise are common complaints. Inadequate fitness level and diseases of the cardiovascular system are differential diagnoses that share these complaints and should be investigated. Generation of increased airway noise is a clinical sign that implicates the upper respiratory system. A careful history from the owner, trainer, and endoscopy of the upper airway are the most useful tools. Endoscopy during exercise on a treadmill is indicated when the airway lesion is not apparent with endoscopy at rest. Treatment of the respiratory obstruction may differ with the level of performance required.

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...Next month – Part 2 'THE LOWER AIRWAY'

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