Poor Performance in the Horse – Diagnostic Workup

Poor performance is a common presenting complaint in all disciplines and breeds and can encompass many different scenarios such as a decline in performance, exercise intolerance, not performing as expected, or not being able to perform at all. The most common causes of poor performance are lameness, followed by respiratory, cardiovascular, muscular, gastrointestinal, neurological, and metabolic causes in different orders depending on the population studied.
A recent study in trotters identified gastric ulcers as the second most prevalent diagnosis after moderate equine asthma and followed by exercise-induced pulmonary hemorrhage, dynamic upper airway obstructions, cardiac arrhythmias, and exertional myopathies as the most common diagnoses in horses presented with poor performance.

Due to the multifactorial nature of the issue, a comprehensive and systematic approach to the diagnostic workup is essential. A suggested diagnostic approach to a horse with poor performance is the following:

- Medical history including the presenting complaint, consistent or intermittent poor performance, specific circumstances, and any particular observations such as respiratory noise during exercise. Other important factors include changes in management, rider, nutrition, turnout, and changes in demand on the horse.
- Clinical examination and laboratory screening: Initial assessments include a thorough clinical examination and basic laboratory tests to rule out general health issues. In some instances, the clinical exam already gives signs of the affected body system, such as the presence of an irregularly irregular heart rhythm in atrial fibrillation.
- Locomotor examination: Lameness examinations and gait analysis.
- Exercise testing: A fundamental part of the diagnostic work-up of a horse with poor performance to evaluate the horse during exercise. The test can be performed as an ridden exercise test, on the track or for example on the treadmill. In some instances, a lunging test can also be enough.
    - Graded exercise tests. Heart rate and lactate levels are measured at specific time points (every 2 min) to differentiate between healthy and subclinically affected horses
    - Standardized exercise test on the treadmill. Primary used in research settings to determine different fitness parameters such as Vmax and HR max.
    - Diagnostics during exercise:
        - Dynamic endoscopy. Dynamic airway obstructions are a common finding.
        - ECG to detect arrythmias and monitor heart rate druing exercise.
        - Post-exercise chemistry to detect exertional myopathies.
        - Ridden horse pain ethogram for musculoskeletal pain

Further diagnostics

- Evaluation of the respiratory system
    - Endoscopy with tracheal aspirate and broncho-alveolar lavage
    - Arterial blood gases
    - Lung radiographs and ultrasound
    - (Lung biopsy)

- Evaluaton of the cardiovascular system
    - Echocardiography
    - Holter ECG
    - Myocardial troponin I
    - Implantable loop recorder in cases of intermittent poor performance
- Evaluation of the muscular system
    - Muscle enzymes (CK and ASAT) before and after (4 h and 24 hours) exercise
    - Muscle biopsy
    - EMG/AMG
- Other diagnostic tests depending on the medical history, clinical examination etc.
    - Gastroscopy
    - Neurological exam
    - Complete blood work
    - Scientigraphy
    - CT

A possibility to monitor horses during their daily training environment are fitness trackers. They offer a range of functionalities, from GPS tracking and heart rate monitoring to stride analysis and may be useful especially in intermittent poor performance.

Conclusion

Diagnosing performance issues in horses requires a multifaceted approach, utilizing musculoskeletal assessments, respiratory evaluations, cardiovascular testing, and biochemical analyses. These methods help identify underlying subclinical diseases that may impair performance, allowing for targeted treatments.

References

Ellis, K.L., Contino, E.K. & Nout-Lomas, Y.S. (2023) Poor performance in the horse: Diagnosing the non-orthopaedic causes. *Equine Veterinary Education*, 35, 208–224. Available from: https://doi.org/10.1111/eve.13712

Lo Feudo, C., Stucchi, L., Conturba, B., Stancari, G., Zucca, E., & Ferrucci, F. (2023). Medical causes of poor performance and their associations with fitness in Standardbred racehorses. *Journal of Veterinary Internal Medicine*, 37, 1514 - 1527. https://doi.org/10.1111/jvim.16734.

Martin, B., Reef, V., Parente, E., & Sage, A. (2000). Causes of poor performance of horses during training, racing, or showing: 348 cases (1992-1996).. *Journal of the American Veterinary Medical Association*, 216 4, 554-8 . https://doi.org/10.2460/JAVMA.2000.216.554.

Morris, E., & Seeherman, H. (1991). Clinical evaluation of poor performance in the racehorse: the results of 275 evaluations.. *Equine veterinary journal*, 23 3, 169-74 . https://doi.org/10.1111/J.2042-3306.1991.TB02749.X.

Van Erck Westergren, E. (2014), Value of Field Trials to Investigate Poor Performance in Sport Horses. Equine Vet J, 46: 14-14. https://doi.org/10.1111/evj.12267_43