

Investigation of Poor Performance

Introduction

In some cases of poor performance, there is an obvious reason for the horse's inability to perform well, such as lameness or a cough and nasal discharge. However, many problems that result in poor performance can be quite subtle and, very often, the horse appears fit and healthy when examined at rest. In those circumstances, the cause of poor performance may only be evident during exercise, and some form of exercise testing is frequently required to make a diagnosis.

When evaluating poor performance it is important to remember that there is often more than one cause, and multiple body systems may be involved in horses with reduced athletic capacity. The basic evaluation of any athletic horse with poor performance centres on obtaining a detailed history and performing a detailed clinical examination using appropriate diagnostic aids as well as specialised techniques.

Sadly the most common cause of poor performance is simply a lack of ability. Therefore, it is important to establish whether a horse has had a decline in its performance levels or isn't reaching expectations.

History

The duration and severity of poor performance needs to be established. It is important to determine whether a horse has had a chronic and progressive decline in performance or an acute unexpected decrease in exercise capacity. With this in mind, keeping track of your horse's training and competition accomplishments in a work diary will provide vital information for any investigation of poor performance. It is also important to document any changes you note in your horse's performance, such as a reluctance to change leads or go in one direction, a tendency to pull to one side, an abnormal noise during exercise, or a higher than normal heart rate during and after exercise. Each of these observations can help a veterinarian develop an approach to diagnosing your horse's problem.

Clinical Examination

A detailed clinical examination is a vital step in the investigation of poor performance. Particular emphasis is placed on the examination of the musculoskeletal, respiratory and cardiovascular systems. These systems can be assessed both at rest and in response to exercise as needed.

A large number of horses with poor performance are lame at the time of presentation, and the trainer or owner may not recognise this. Therefore, the starting point of any poor performance workup is a lameness evaluation. While it is not possible to diagnose a lameness problem as the main contributing factor to poor performance, resolution of the problem often results in an improvement in exercise capacity. Since mild to moderate lameness can contribute to poor performance, perhaps by decreasing the efficiency of movement, it is important that the cause of lameness be identified and treated to determine its role in poor performance. If poor performance persists after these steps, then further evaluation is necessary.

There are several options to consider for examining a horse during exercise. The horse could be exercised out in the field using a set course, or an exercise test could be carried out on a treadmill. Each of these options has advantages and disadvantages, depending on what needs to be assessed and the types of measurements that must be collected.

Field tests can be useful for detecting a tying-up problem, and some respiratory and cardiovascular problems. However, there are only a limited number of diagnostic tests that can be performed in the field.



If a thorough physical examination, lameness evaluation, field-based exercise testing and special diagnostic procedures fail to determine the cause of poor performance, then a more comprehensive investigation will require the use of a high-speed treadmill.

Diagnostic Procedures

Blood haematology and plasma biochemistry

Blood tests can be useful in detecting underlying disease. However, in many cases of poor performance a horse's blood work will be normal.

Muscle damage incurred during exercise as a result of "tying-up" can be readily detected in blood samples by assessing the levels of the enzymes creatine kinsase (CK) and aspartate aminotransferase (AST) in samples collected before and after exercise.

There is a tendency to place too much emphasis on mild changes in a horse's blood test results. For horses that are "overtrained" there is no universal measure that indicates this.

Endoscopy



This is used to examine the upper respiratory tract and should be a routine part of a poor performance evaluation. Since many problems will not show up at rest, upper respiratory tract endoscopy during treadmill exercise is often necessary.

Bronchoalveolar Lavage (BAL)

An endoscope or a specially designed flexible tube is positioned in one of the lower airways (a bronchus). A small volume of fluid (saline) is instilled and aspirated through the endoscope or tube. A BAL is also commonly referred to as a "lung wash".

The sample is analysed for the number and types of cells. This procedure is valuable for the assessment of lower airway conditions that impair performance (e.g. "bleeding" or lower respiratory tract inflammation), and it helps in the development of treatment recommendations.

This procedure can be performed after exercise to look for evidence of "bleeding".

Electrocardiography

Electrocardiography (ECG) is used to evaluate the rhythm of the heart. A serious dysrhythmia, with effects on performance, is atrial fibrillation. However, not all heart rhythm problems will be evident at rest or at the time an ECG is being performed. Therefore, an ECG can be collected during exercise (Telemetric electrocardiography) or a horse's heart rhythm can be monitored for a 24-hour period (Holter monitoring).

Echocardiography

This is an ultrasound examination of the heart. It provides useful information if a horse has a heart murmur. Many heart murmurs in horses are physiological and do not contribute to poor performance. Echocardiography is needed to determine the significance of a heart murmur. Some people also perform a pre- and post-exercise ultrasound examination to detect other heart problems such as altered contractility.

Diagnostic Imaging

If lameness has been detected then there are several imaging modalities that can help pinpoint the cause of the problem. These are generally used after the lameness has been localised to a specific location.

- **Ultrasonography**

Ultrasound is invaluable in assessing the soft tissue structure of the legs, such as the flexor tendons or the suspensory ligament. It can also be used to evaluate muscles, joints, or even pelvic or scapula fractures.



- **Radiography**

X-rays are particularly suited for examining the bones, once lameness has been localised to a specific location. It is important that the lameness has been localised to be sure that findings on X-rays are the cause of lameness.

X-rays can also be useful in evaluating a horse's lungs with both bleeding and lower respiratory tract inflammation being easily detected.

- **Nuclear Scintigraphy**

Nuclear scintigraphy or bone scanning involves injecting a special radioactive "marker" that localises in areas of "damaged" bone or inflamed tissues. A special gamma camera is used to measure the amount of "marker" taken up by bone or tissue. It is especially helpful in localising the sources of lameness in horses with multiple limb problems, horses with potential stress fractures, and in assessing the causes of back pain.

Treadmill Exercise Testing

Treadmill exercise testing is helpful in many difficult cases to determine the cause of poor performance. It is useful for the diagnosis of problems which would otherwise be hard to detect, as well as helpful in evaluation of the significance of findings such as heart murmurs and abnormal BAL results, where the significance of findings may be questionable.

Measurements that can be made while a horse is running on a treadmill include endoscopy of the upper airway, heart rhythm using telemetry, arterial oxygen and carbon dioxide levels, oxygen uptake (VO_2), stride length, heart rate, blood lactate concentration, sweat rate and run time to fatigue using a standardised exercise protocol. Each of these measures can be used to better determine what might be causing a horse's poor performance.



In summary, a comprehensive clinical evaluation that focuses on the musculoskeletal, respiratory, and cardiovascular systems in combination with treadmill exercise testing has greatly improved our ability to diagnose problems contributing to poor performance in horses.