CONDITIONING AND TRAINING IN THE CANINE ATHLETE
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Key Points
- Recognizing the athletic demands of the working dog patient
- Clinical presentation variances of the canine athlete
- Understanding canine performance
- Clinical workup and performance evaluation methods for the athletic dog

The canine athlete can present uncommon challenges to the general practitioner. If a pet owner is only interested in companionship, minimal stress will be placed upon the pet's body. In general, exercise and activity are healthy for the dog. Athletic and working dogs usually perform tasks and activities at an energy level above the typical companion dog. Many are out of bloodlines that are known for their abilities to perform these activities or have been selected because they have exhibited a unique ability related to the selected activity. These dogs are typically performing these activities frequently and are conditioned in such a way that the activities minimally stress their metabolic and structural system. The trained and conditioned canine athlete or working dog’s metabolism performs at a different level than the pet dog. Some variation can be related to the breed of the dog, but a healthy, conditioned athletic dog can exhibit metabolic variants that have the potential to confuse the general practitioner or anyone not accustomed to these peculiarities.

As the athletic demands on the dog increase, there is a proportional increase in the physical demands placed upon the animal's body. A certain level of energy is needed to maintain homeostasis, and additional energy is utilized during physical activity. In any dog there can be times when an activity stresses the dog’s metabolic processes to extremes. There are two types of patients in these cases. One is the under-conditioned dog participating in an activity that it is not conditioned to handle or working in an environment for which it is not acclimated. The other is the properly conditioned dog (or athletic dog) that engages in an activity that it is above the level that it is prepared to handle. In these cases there are two scenarios of exercise induced medical problems. One is the case where a dog is involved in an activity that stresses the body’s metabolism past the point it can function. The other case is where a specific activity either exposes an underlying problem or the specific activity causes a medical problem. Some examples of these cases include overheating, hypoglycemia, and exertional rhabdomyolysis.

Another area that is somewhat new to the small animal practitioner is the science of canine performance. The veterinary profession is currently witnessing an increased demand from our clientele for information concerning performance of the canine athlete. The expectations come as a result of the scientific advancements in human sports medicine. When discussing performance there are many different descriptions and levels that need to be considered. To be able to communicate and discuss performance we must apply basic definitions to these descriptors of performance. There are three basic aspects to assess performance: (1) the type of skill, or event, the dog is going to perform; (2) the performance definitions of this skill or event; and, if relevant, (3) the competition level and competition type that is required for this event.
Athletic performance itself is defined as either personal or relative. Each individual strives for their best personal performance. Training and conditioning are focused towards the best personal effort as the end result. Relative performance compares the individual's performance relative to the competitor's performance. In relation to the competition an individual's peak performance may not always provide a winning result.

In the athlete, canine performance is influenced by internal factors and external factors. The external factors include: dog interaction, environmental climate and location, housing, type of work, and work factors. The internal factors include: anatomical make-up, physiological function, and psychological influence. The areas that influence these internal factors are: genetics, health, nutrition, training, and conditioning. The best athletic performance will come from the dog with the correct anatomical build, is in peak condition, and is psychologically ready to perform its particular duties. Any change in performance can then be attributed to an anatomical lameness, a medical illness or imbalance, or a psychological alteration.

The veterinarian will need to identify metabolic parameters and variances of those parameters in the athletic or working dog that they can use to assess the medical status of the dog or to evaluate performance of the dog. Blood work and urinalysis are two diagnostic tools that can be used to evaluate the dog’s metabolic state. A non-invasive technique that both veterinarians and handlers can use is the dog’s vital signs. Everyone who handles athletic and working dogs should have an understanding of their dogs working vitals.

Practitioners use a dog’s vital signs to give a brief overview of the dog’s general health status. The vital sign measurements usually include body temperature (T), heart rate or pulse (HR, P) and respiration (R). They are sometimes referred to as the dog’s TPR. Having a normal temperature, resting heart rate, and resting respiratory rate are important indicators of good health. It is therefore important to know TPR normals in highly trained, conditioned dogs. Vitals signs can be taken at rest, during activity or for medical reasons. It should be noted that in most working dogs the metabolism can be affected by both the anticipation to perform as well as the actual work itself. The dog’s vital signs taken at rest (away from the activity), before, during and after a working event give a good assessment of how the dog’s body is handling the activity the dog is performing. When taken at various times during the conditioning period, the vital signs are a good indicator of the condition level of the dog.

Normal values are usually defined as values falling within a predefined normal range. These normal ranges have been defined by veterinarians for use in the general veterinary practice. The range for a dog’s heart rate is 70-160 beats per minute. The range for a dog’s rectal temperature is 101° – 102.5° Fahrenheit (F). The range for a dog’s respiration rate is 10–30 breaths per minute. These values relate to the healthy pet dog population at rest.

**Current Reported Vital signs in Athletic Dogs**

Temperature definitions are based upon normal resting values of the pet dog. Hypothermia is when the body temperature is less than 98° F, Homeostatic temperature is between 98° F and 102° F, Hyperthermia occurs when temperatures are 102° F to 108° + F. This can create confusion when evaluating the working dog. Normal recorded temperatures of working dogs are between 100° F – 108° F. Reported temperature values include Greyhounds 104° F - 106° F (47.5 - 41.5 C), Labradors, 102° F - 107° F (39.0 - 41.8 C), Pointers 103° F - 106° F (39.5 - 41.2 C), and Sled Dogs 104° F - 108° F (40.0 - 42.2 C). These dogs do not show any clinical signs of heat stroke or heat exhaustion.
A dog’s heart rate usually increases with work. Working heart rates range from 115 – 240. Training and conditioning has a positive effect on heart rate. Sled dogs showed that conditioning created a significant decrease in the working heart rates, although their resting rates were not significantly affected. Therefore work itself can cause an increase in heart rate, and the proper conditioning program prepares the dog’s body to handle higher levels of work. The rehabilitation program should also take into account this increased level of work.

It is important to understand that the excitement and anticipation to participate can itself cause an increase in heart rate. Most athletic and working dogs are very excited to participate in their work. This was seen when comparing running greyhounds to observing greyhounds. The greyhounds participating in the project were all former race dogs. The running greyhounds chased an artificial lure 100 yards. The observing greyhounds were held by a handler 30 yards from the running path at mid-point of the sprint run and were able to observe the lure during the running period. Both groups had a significant increase in heart rate between pre-run and post-run samples, but there was no significant difference in the heart rates between the two groups. This shows that the excitement to run can stimulate the heart as much as the running itself. There was a significant difference 5 minutes after the run where the observing greyhounds had a higher heart rate than the running greyhounds. This occurs in many types of working dogs. Many dogs get very excited to work and the act of work will release this emotional energy. The heart rate will actually slow down once the work is performed. In general, work will stimulate an increase in the dog’s heart rate and it looks like exercise itself has both a positive physical and a positive psychological affect on the dog.

A dog’s respiration can be affected by body temperature and by carbon dioxide (CO₂) blood levels. Work usually causes an increase in body temperature and also creates an increase in circulating CO₂. This will result in an increased respiration rate. The working respiration rates can vary from 100 breaths per minute (BPM's) to panting. Respiration plays a very important role in maintaining the dog’s body temperature. It is very important that it is functioning properly to prevent the body temperature from increasing to deleterious levels.

Veterinarians who have athletic and working dogs as patients should familiarize themselves with working dog vital signs. Working with the athletic dog patient can be very rewarding. These patients can present with some very interesting case work-ups.

References


• (Rose & Bloomberg, 1989)
• (Matwichuk, Taylor, et al, 1999)
• (Gillette, clinical field work, 1999)
• (Gillette, clinical field work, 2006)