Warming up and cooling down
Importance of getting the body ready to compete and letting it unwind slowly after exertion
By Kenneth L. Marcella, D.V.M.

Elite human athletes devote great attention to detail in developing warm-up and cool-down strategies before and after competition. This devotion to detail illustrates the importance these practices for overall performance.

One would expect volumes of good research to exist that provide insight into the best methods to warm-up both humans and horses for specific events and the appropriate cool-down routines to use, but, surprisingly, such information does not exist. This may explain why there is no consensus as to the best way to warm up or cool down horses competing in various events and why some trainers pay close attention to their pre- and post-exercise routines, while others seem to all but disregard this aspect of competition.

“Truthfully, little is known as to the specific benefits of warming up horses before exercise, and while more research has been done on humans, even human exercise physiologists are divided in their opinions as to its benefits,” said David Freeman, Ph.D., animal scientist and nutritionist at the Oklahoma State University Cooperative Extension Service.

Limited research in horses shows that warming up increases energy availability and use, but these benefits generally are seen only in those horses that do aerobic work. Anaerobic exercise, such as spring racing, barrel racing, pole bending, and cutting, may not see similar benefits. Racehorses, elite jumpers, and other equine athletes whose competition times last under two to three minutes also may not exercise aerobically enough to benefit from specific warm-up protocols.

Freeman pointed out that good research does show that five minutes of work at 60% to 70% maximum heart rate (160 to 170 beats per minute) causes the spleen to contract and to dump a significant amount of red blood cells into the circulation. This splenic contraction increases the red blood cells available to the body and increases the horse’s ability to carry oxygen to the muscles, which ultimately provides a performance edge. Yet, as Freeman explained, “The spleen is under endocrine control and it may contract (and increase the concentration of red blood cells) from the sheer anticipation of performance; and thus, a warm-up may not be needed.”

Anyone watching runners being walked around before post time, endurance horses awaiting an early-morning mass start, or an eventer pacing in the start box will easily notice excited horses anticipating exercise and see that anticipation may well be all the warm-up needed to increase red blood cells. Yet, research provides more evidence or warm-up benefits.

Warm-up benefits
Warming up a horse prior to exercise allows for greater utilization of fatty acids in early work so that less lactic acid is produced in subsequent work. Lower lactic acid levels, according to research in horses and humans, leads to less fatigue and, specifically in horses, fewer injuries. Fewer muscle, ligament, and tendon injuries are recorded in horses working after appropriate warm-up periods. It is felt that the increase in temperature in these tissues of even a few degrees produced by warming up increases the rate of oxygen exchange and the speed of chemical reactions necessary for energy-producing muscle function.

“These warmed-up horses also see increased range of motion; increased stride
extension and gait coordination; and decreased likelihood of tears, sprains, and strains,” Freeman said.

While there is some debate as to the exact benefits derived from warming up, even more debate exists as to what constitutes a proper warm-up. Hilary Clayton, B.V.M.S., Ph.D., a veterinary researcher and holder of the Mary Anne McPhail dressage chair in equine sports medicine and Michigan State University, addresses the proper warm-up in her book *Conditioning Sport Horses*. She concludes that each warm-up should be part basic physiological conditioning and part sport-specific.

“An effective warm-up has the dual benefits of enhancing performance and reducing the risk of injury,” Clayton wrote.

She continued that the typical warm-up should start with the horse walking on a loose rein, with the length of this walk adapted to the individual horse and its recent level of activity. Following this, the exercise intensity is increased to an active trot or canter. The key word, according to Clayton, is “active” because this part of the warm-up must work the muscles hard enough to increase circulation, to warm up the muscle fibers, and to encourage splenic contraction.

The choice of gait is dependent on the individual. Some horses with stiff muscles or with prior injuries and scar tissue or fibrosis are better served with very active warm-ups, including fast canter or gallop work to initially stretch out tight body areas. Then these horses often can be brought back to slower gaits and successfully warmed up if they are allowed to extend and stretch initially. Other horses will benefit more from the traditional approach of a long, low walk, then trot, then canter.

After five to ten minutes of this physiological conditioning, Clayton suggests sport-specific and sometimes “individual-specific” warm-up should begin. For example, racehorses may be cantered or galloped slowly prior to approaching the starting gate.

Some horses need a lot of activity to help them focus and calm down, and they should be worked a bit harder in warm-ups. Other nervous but quiet horses need to be calmed and reassured, so their warm-up may include less active work and more repetitive or routine tasks such as walking spirals or tight turns.

An astute trainer will learn which horse needs what type of warm-up and what practices to avoid for specific horses. Some horses may need a warm-up that does not cause them to become so excited that they expend too much energy and “wash out” or not deliver their peak performance, or overly quiet horses may need a sharper warm-up.

Horses also require mental focusing and, as creatures of habit, they respond to routines. Warming up a horse in the same pattern and sequence will help reduce stress, avoid nervousness, and aid in getting that equine athlete to focus on the task at hand. Even if the facility is unfamiliar to your horse, as you begin your warm-up, your horse will fall into step with each part of a learned routine, bringing it closer and closer to competition.

“Horses respond to consistency and repetition in training,” Freeman said. “A consistently done warm-up may provide a cue for mental preparedness of an impending performance.”

**Cool-down**

Just as important to performance is the post-exercise cool-down, yet this activity also is the subject of debate. Many times a cool-down is impossible because of immediate post-exercise requirements, such as the successful racehorse that must visit the winner’s circle and be photographed before being walked and cooled out.

Here, science is a bit more unified. Most research shows that active cooling
down (maintaining a slow trot or canter for five to ten minutes) is exceedingly more beneficial than passive cooling-down (simply walking or standing still). Most jockeys are aware of this, so they lope their mounts back to the awaiting groom near the finish line after a race.

“The objective of the cool-down period is a progressive reduction in exercise intensity allowing for a gradual redistribution of blood flow, enhanced lactate removal from muscles, and a reduction of body heat through convection and evaporation (both of which are aided by movement),” Clayton wrote.

Most horses are not cooled down as actively as is recommended, and residual lactate might be a factor that adversely would affect performance if the horse were required to compete again soon after maximal exercise. Fortunately for Thoroughbred racehorses, this is not a factor.

Horses should be stretched following exercise to both release muscle tension and reduce soreness and to be able to pick up on any possible injuries that might require attention.

A complete and proper cool-down will result in a horse that is cooled, quiet, and free from injuries and, in Clayton’s words, “finished with the day’s work, relaxed in mind and body.”