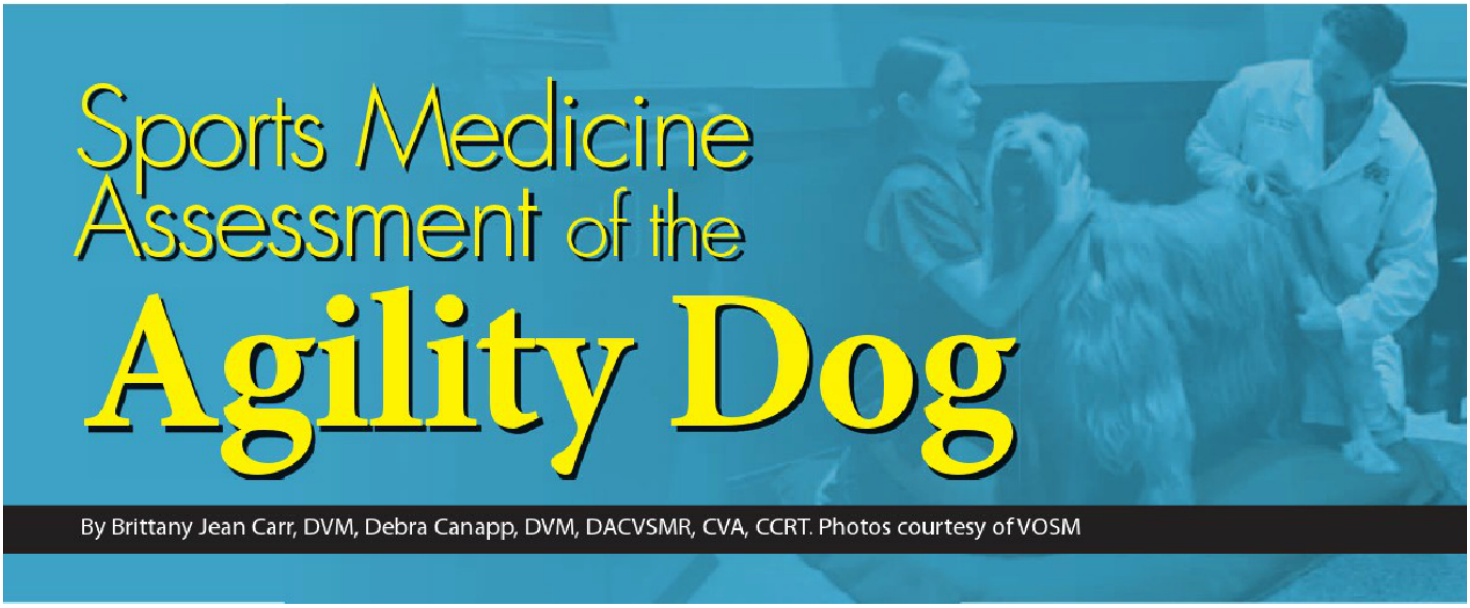


Sports Medicine Assessment of the Agility Dog

By Brittany Jean Carr, DVM, Debra Canapp, DVM, DACVSMR, CVA, CCRT. Photos courtesy of VOSM

Human athletes often have an entire team of health professionals devoted to maintaining and improving their health and fitness. Likewise, canine sports medicine and rehabilitation professionals can play a pivotal role in helping you keep your dog in top athletic condition, not only to maintain fitness but also to help prevent injury. Furthermore, canine sports medicine and rehabilitation professionals can help you understand your dogs' strengths and weaknesses in agility. This valuable knowledge can create an advantage, or help to avoid a disadvantage in agility, and can guide you in diminishing the potential for injuries.

Preseason Evaluation

A canine sports medicine and rehab veterinarian should conduct a preseason sports medicine evaluation and examination. A full physical exam and complete blood count and blood chemistry should be done to ensure that your dog is healthy for training and competition. Systemic disease can not only affect a dog's performance but also potentially predispose a dog to injury. A thorough orthopedic exam should be conducted to identify potential problem areas that could affect performance and establish a normal baseline in the event that problems or injuries arise. Particular emphasis should be placed on your dog's structure, posture, and gait.

Orthopedic Exam

The orthopedic exam should include thorough palpation and assessment of each joint and boney structure. Abnormalities in muscle tone, strength, symmetry, range of motion, and function should be noted. Goniometric measurements should be documented for each extremity joint to assess range of motion and detect restrictions or excessive joint angle. Muscle mass measurements should be recorded to confirm symmetry of the soft tissues. A neurological exam should be conducted to rule out any underlying neurological conditions that could affect performance. Additionally, a chiropractic exam can be performed to ensure that your dog's body is in proper mechanical alignment; malalignment can negatively affect performance and place a dog at a higher risk for injury.

Baseline Diagnostics

It is not uncommon for agility dogs to present subtle alterations of gait, many of which are so subtle they may not be identified as an overt lameness. It is critical to understand and establish a baseline normal gait. Both subjective and objective gait analysis should be performed.

Subjective Gait Analysis

In the subjective gait analysis your dog should be evaluated at both the walk and the trot from multiple angles and directions. It is also very helpful to view videos of the dog at a walk and trot, preferably in slow motion if available. Changes in gait not visible to the naked eye, such as a slight shortening of stride, can often be captured on video and identified in slow motion, making slow-motion video a valuable tool. Viewing videos of your dog training and performing can provide the canine sports medicine and rehab professional with useful information on how the dog engages his body while working. Dogs with subtle injuries often change the manner in which they perform a skill, which places them at a higher risk to not only further injure the initial site, but also develop compensatory injuries. These subtle adaptations are often easily detected on video. Thus, it is ideal to have videos of your dog, in both training and performance, to share with your canine sports medicine and rehab vet.

Objective Gait Analysis

A baseline objective gait analysis should also be done because this can provide a multitude of data on your dog's gait characteristics. Pressure-sensing walkways provide information on a dog's total pressure index, stride length, step length, and stance time. Should a change in performance, subtle lameness, or injury arise, a baseline gait analysis can be helpful for comparison and to establish a diagnosis.

Dr. Sherman Canapp performing an orthopedic evaluation

Goniometry being performed on a patient.

Muscle mass measurements being performed on a patient.

Any abnormalities detected on examination or gait analysis should be further investigated with the appropriate diagnostics, such as radiographs, diagnostic ultrasound, or other advanced imaging modalities. While subtle abnormalities may not require treatment, it is important to establish/record a baseline in the event that a problem arises in the future, since progression can be tracked and monitored.

Conditioning and Training Program

Once your dog has been fully evaluated, his structural strengths and weaknesses for agility should be discussed. This is important so that an appropriate conditioning and training program can be designed to take advantage of your dog's strengths and mitigate his weaknesses. A balanced training and overall conditioning program should include strength, endurance, balance and proprioception (body awareness), and flexibility training. This will not only help maximize performance but also help decrease the chance of injury.

Strength Training

Strength training in dogs is often accomplished through resistance training in which the dog's muscular effort is performed against an opposing force. The goal of resistance training is to slowly and gradually overload the musculoskeletal system so that it gets stronger. Commonly the dog's own body weight is used as the opposing force. Both isotonic and isometric exercises are frequently incorporated into resistance training. An isotonic exercise is one in which the body part is moving against the force, which acts to strengthen the muscle through the entire range of motion of the exercise. Contrarily, an isometric exercise is one in which the body is holding still against a force and there is no net movement. Thus, isometric exercises strengthen the muscle at the specific joint angle at which the exercise is performed.

A canine sports medicine and rehab professional can design an appropriate strength training program tailored to your dog's fitness level and goals. Strength exercises should target the forelimbs, hind limbs, and core body muscles. As your dog gets stronger, the type of exercises, number of repetitions and sets, tempo, and speed can be adjusted to continue to challenge him. This should be done under the guidance of a canine sports medicine and rehab professional.

Endurance Training

Endurance training enhances both the cardiovascular and musculoskeletal system. A canine sports medicine and rehab professional can recommend an appropriate endurance training program for your dog. Generally, endurance training can be achieved by having a dog trot for at least 20 minutes continuously on land or swim continuously for at least 5 minutes. If performed on land, it is best to have the dog be at a trot because this is both the working gait and also the only gait that requires each leg to function alone, without assistance from the contralateral limb. Swimming is also a great option for endurance training, especially for dogs that enjoy being in the water.

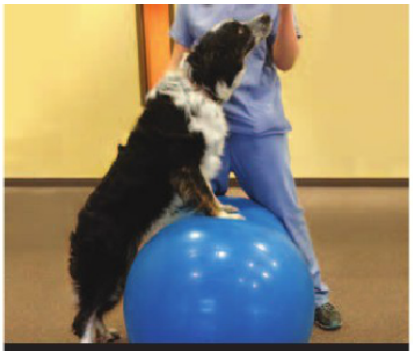
Land treadmills can be used for endurance conditioning as long as the treadmill is at least 2.5 times the length of the dog's body. It is important to realize that trotting on a treadmill does not exercise as many muscles as trotting over ground, which requires the limbs to power across the ground rather than having them pulled out from under the body. For this reason, treadmills are generally not recommended as the main source of endurance training for an agility dog. However, treadmills can be a great way to occasionally introduce variety into an endurance training program or provide an alternative in the event of inclement weather.

Recently underwater treadmills have become a popular modality for both endurance and strength training since water adds a significant amount of resistance. Underwater treadmills use buoyancy, resistance, and hydrostatic properties of water to promote strength and endurance while having minimal impact to the joints. Underwater treadmills can be tailored to meet the specific requirements of each dog since speed, incline, and height of the water can all be adjusted accordingly and modified as the dog develops stamina and endurance over time.

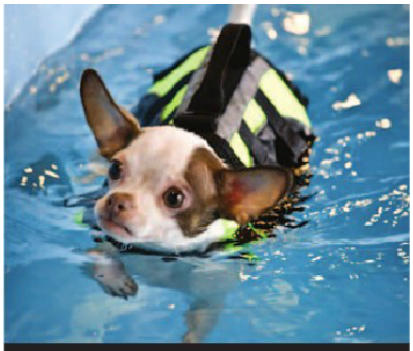
Balance and Proprioception

Having good balance and proprioception (body awareness) is also important for agility dogs and can improve your dog's overall performance. Improving and maintaining good proprioception also helps lessen the chance for injury. This is often accomplished by having the dog perform exercises that challenge his balance and awareness of his

Dr. Britt Carr performing objective gait analysis using a pressure-sensing walkway.



A patient performing exercises with physioball for core muscle strength training.



Patient swimming for endurance training.

limbs and feet in space. Examples of such exercises include slowly walking over the rungs of a ladder or cavalettis. A canine sports medicine professional can recommend exercises to incorporate into your training program to help improve your dog's balance and proprioception.

Warm-Ups and Cool-Downs

Warm-ups and cool-downs are essential for reducing the risk of injury as well as improving flexibility and overall performance. Consulting with a canine sports medicine and rehab professional is strongly recommended when constructing an appropriate warm-up and cool-down program. While warm-ups and cool-downs should be incorporated into your training program, certain warm-up and cool-down techniques are thought to be more beneficial for the agility dog. Recent studies suggest that dynamic warm-ups in which the body is moved through the motions that will occur during the sport are superior to static warm-ups where the limbs are passively moved in stretched positions.

Athletes who participated in dynamic warm-up routines were found to have improved performance in flexibility and jumping when compared to athletes who participated in static warm-up routines. Additionally, a recent study shows that passive stretching can be detrimental to performance times. Generally, good warm-up routines for agility dogs incorporate active movements that put the joints through full flexion and extension cycles. This could include 2-3 minutes of walking then trotting that is followed by side-to-side movements or tugging, and then dynamic stretches that mimic the range of motion required by agility. Examples of these dynamic stretches include paws-up, wave, spin, bow, and beg exercises. Just as the warm-up routine is an essential part of the training program, the cool-down routine is equally important in preventing injury and improving performance.

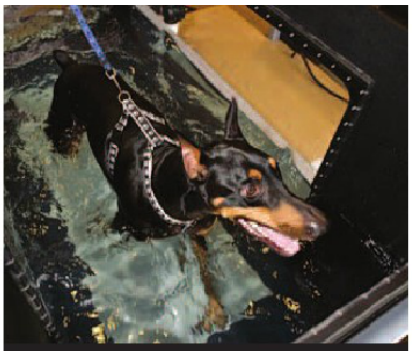
The cool-down routine should consist of a gradual reduction in exercise followed by a brief whole body rubdown and passive range of motion of each extremity. A gradual reduction in exercise may consist of light trotting followed by walking. After a brief whole body rubdown, each extremity should be placed through passive range of motion. Having the dog lay on his side and gently moving the dog's leg to recreate a typical walking stride can accomplish this. During the cool-down it is important to be vigilant for signs of injury. One of the most common signs of injury is stiffness or when performing the cool-down. Should you notice these signs, please contact your canine sports medicine and rehab veterinarian promptly.

Joint-Health Supplements

In addition to maintaining a healthy diet and training program, joint-health supplements have also become important in the training regime of a canine athlete. In general, the use of joint health supplements is recommended for performance dogs because of the stress they place on their joints during training and competition. Repeated stress on the joints causes excessive wear and tear on the joint cartilage and supportive soft tissue structures, which can eventually progress to osteoarthritis.

Several supplements are commercially available. These products aim to support joint health by enhancing cartilage matrix synthesis, inhibiting enzymes that degrade cartilage, and/or reducing joint inflammation and pain. Administering joint-health supplements to all performance dogs, not just those that already have osteoarthritis, may provide protection and slow down damage to joint cartilage. At VOSM, glucosamine-chondroitin sulfate products and omega-3 fatty acids are recommended for most performance and working dogs.

Glucosamine and chondroitin both comprise the normal cartilage matrix. When given in combination they support cartilage production and protect existing cartilage by inhibiting enzymes that break down cartilage. Recently, glucosamine-chondroitin sulfate products such as Dasuquin (Nutramax Laboratories in Edgewater, Maryland) have been combined with additional anti-inflammatory products such as avocado soybean unsaponifiables (ASU), green tea polyphenols, and methylsulonylmethane (MSM). These ingredients have been shown to work synergistically with glucosamine-chondroitin sulfate to reduce the expression of harmful inflammatory mediators within the joint and provide additional pain relief. Omega-3 fatty acids, particularly those found derived from marine sources, are also believed to reduce inflammation and block the expression of certain genes that perpetuate the development of osteoarthritis.



Patient using an underwater treadmill for endurance training

An example of passive range of motion as part of a cool-down routine.

Patients participating in active stretching.

Conditioning in the Off-Season

Just as human athletes are susceptible to overtraining and subsequent injury, so are canine athletes. Overtraining has been documented in both humans and horses to lead to reduced fitness, increased susceptibility to injury, and alterations in immune function. It is recommended to vary the duration, frequency, and intensity of your training program throughout the week, not only to add variety and provide cross training but also to reduce the risk for overtraining. To further prevent overtraining, your dog should be given at least 1 day off per week and ideally 30 consecutive days off per year. During the off-time, your dog should not participate in skill training and should only do mild to moderate strength and endurance training.

Just as human athletes participate in training in the off-season to maintain fitness, canine athletes should participate in mild to moderate strength and endurance training in the off-season. Recent studies support that continued exercise in the off-season is essential to maintain fitness and also reduce the risk for injury. Underwater treadmill and swimming are exercises that combine both endurance and strength training exercises while having minimal impact on the joints, making them ideal for training in the off-season. A canine sports medicine and rehab professional can help develop an off-season training program for your dog to help maintain fitness while avoiding the risk of overtraining.

Conclusion

Once a full sports medicine assessment has been performed and your dog's strengths and weaknesses for agility have been identified, a balanced training program should be developed that includes strength, endurance, balance and proprioception, and flexibility training. Training programs for both the competition season and off-season should be developed and adjusted accordingly to meet your dog's needs and maximize performance while diminishing the potential for injuries.

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Dr. Britt Carr earned her B.S. in biology from Furman University in Greenville, South Carolina. She then attended the Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech in Blacksburg, Virginia. After earning her DVM, Dr. Carr completed a small animal rotating internship at the Animal Specialty Group in Los Angeles, California and a surgical internship at Veterinary Orthopedic and Sports Medicine Group (VOSM) in Annapolis Junction, Maryland. She is currently a therapist and an American College of Veterinary Sports Medicine and Rehabilitation resident at VOSM. Dr. Carr's research studies include objective gait analysis, regenerative medicine, and return to sport following cranial cruciate ligament injuries.

Dr. Debra Canapp, who is board certified in the new American College of Veterinary Sports Medicine and Rehabilitation, is co-principal and Medical Director of Veterinary Orthopedic and Sports Medicine (VOSM) Group. As a Diplomate of the American College of Veterinary Sports Medicine and Rehabilitation, Dr. Canapp provides first class sports medicine and rehabilitation care to canine athletes, working dogs, and companions. Dr. Canapp is certified in canine rehab through the Canine Rehabilitation Institute, in the art of traditional Chinese veterinary medicine and acupuncture by the International Veterinary Acupuncture Society, and in stem cell therapy. Recently, Dr. Canapp's exclusive area of interest, clinical work, lecturing, and research has been focused on canine sports-related injury, sport rehab and performance. Currently, she is practicing sports medicine, acupuncture, musculoskeletal ultrasound, and rehabilitation at VOSM while doing clinical trials involving sports medicine and rehabilitation. For more information, visit www.vosm.com.