

## INQUIRY

Dear US&R Veterinary Group,

There have been some incidences during training where a search dog, specifically a Labrador retriever, collapsed during training. There has been some concern about a collapsing syndrome in Labradors, and the possible problems associated with this.

## RESPONSE

The disease you may be referring to is called Exercise Induced Collapse (EIC), which is seen in Labrador retrievers who are otherwise healthy and very athletic. There are many possible causes for collapse episodes in dogs, and these need to be checked in an effort to discover the underlying cause of collapse. EIC used to be a diagnosis of exclusion (ruling out all other possible causes) but a blood test is soon to be available to identify both carriers and affected dogs.

Veterinarians Diane Shelton and Susan Taylor have been involved with the study of this disease and written articles about EIC, and have kindly allowed us to place their information here. The section about EIC in Dr. Shelton's article in the *Veterinary Comparative Orthopaedics and Traumatology* Journal is reproduced with permission from both the author and the publisher. Dr. Taylor also has a footnote added at the end of her paper.

## **EXERCISE INDUCED COLLAPSE IN LABRADOR RETRIEVERS**

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Exercise intolerance and collapse (EIC) is being observed with increasing frequency in young adult Labrador Retrievers. Black, yellow and chocolate Labradors of both sexes are affected. Clinical signs first become apparent in young dogs - usually between 5 months and 3 years of age (average 14 months). In dogs used for field trials, hunting and search and rescue work, this usually coincides with the age at which they enter heavy training. Affected dogs are usually described as being extremely fit, muscular, prime athletic specimens of their breed with an excitable temperament and lots of drive.

Affected dogs can tolerate mild to moderate exercise, but 5 to 20 minutes of strenuous exercise with extreme excitement induces weakness and then collapse. Hind leg incoordination and collapse is most common, but some dogs exhibit weakness or incoordination in all four limbs, a problem maintaining their balance or complete collapse on their side. Severely affected dogs may collapse whenever they are exercised intensely - other dogs only exhibit collapse sporadically. All of the factors important in inducing an episode of collapse during a given exercise session have not been well established, but high ambient temperature, the dog's level of excitement and the intensity of the exercise seem to be the most critical factors.

**NOTE: A few affected dogs have died during exercise or while resting immediately after an episode of exercise-induced collapse so an affected dog's exercise should ALWAYS be stopped at the first hint of incoordination or wobbliness.**

Most dogs recover quickly and are normal within 5 to 25 minutes with no residual weakness or stiffness. Dogs are not painful during the collapse or after recovery. Massage of the muscles or palpation of the joints or spine does not cause discomfort. Affected dogs are not stiff or sore or limping upon recovery.

Nervous system, cardiovascular and musculoskeletal examinations are unremarkable in dogs with EIC as is routine blood analysis at rest and during an episode of collapse. These dogs do not experience heart rhythm abnormalities, low blood sugar, electrolyte disturbances or respiratory difficulty that could explain their collapse. Body temperature is remarkably elevated during collapse (average 107.1F [41.7C], some dogs up to 108F [42.2C]), but this magnitude of body temperature elevation has been found in normal exercise-tolerant Labradors as well. Affected dogs are negative for the genetic mutation known to cause malignant hyperthermia.

EIC is the most common reason for exercise/excitement induced collapse in young, apparently healthy Labrador Retrievers. Until recently, EIC could only be diagnosed by systematically ruling out all other disorders causing exercise intolerance and collapse and by observing characteristic clinical features, history and laboratory test results in affected dogs. Any Labrador Retriever with exercise intolerance should always have a complete veterinary evaluation to rule-out treatable conditions causing or contributing to their collapse such as orthopedic disorders, heart failure, anemia, heart rhythm disturbances, respiratory problems, low blood sugar, cauda equina syndrome, myasthenia gravis, hypoadrenocorticism, and muscle disease prior to testing for EIC.

Symptomatic dogs are rarely able to continue training or competition. It seems that if affected dogs are removed from training and not exercised excessively the condition will not progress and they will be fine as pets. They are able to continue to live pretty normal lives if owners limit their intense exercise and excitement and if they discontinue any exercise at the first sign of weakness/wobbliness.

EIC is a genetic trait, inherited in an autosomal recessive manner. Researchers at the University of Minnesota (Patterson, Mickelson and Minor) identified the chromosomal locus for an EIC gene using microsatellite DNA markers and recently they found the probable causative mutation. Preliminary testing of field trial Labrador populations suggests that over 35% of dogs are carriers for this mutation. A genetic test for confirmation of affected dogs and identification of carriers should be commercially available sometime in 2008.

***Personal Communication:***

I have personally evaluated a couple of Labradors with EIC who were involved with search and rescue work. One had to be retired because of frequent collapse, the other seems to be able to manage as long as praise in training is kept low-key to try to decrease the dog's excitement level (and thus decrease the likelihood of collapse). In these S&R dogs, although the activity is strenuous and constant, I think it is the excitement that is debilitating.

# What's new in muscle and peripheral nerve diseases?

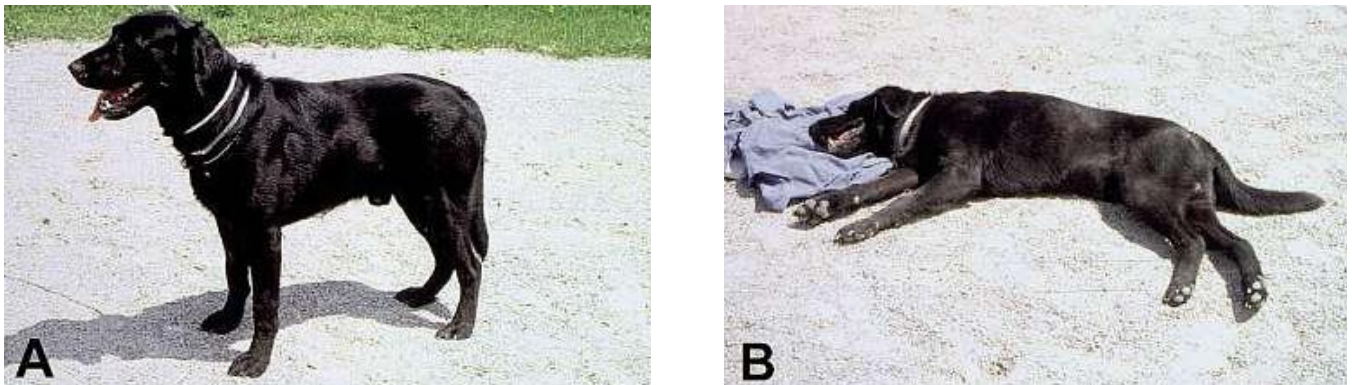
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## Exercise induced collapse in Labrador Retrievers (EIC)

A syndrome of exercise intolerance and collapse has been observed with increasing frequency in young adult Labrador Retrievers. Most, but not all, affected dogs have been from field-trial breeding. Black, yellow and chocolate Labradors of both sexes can be affected. Clinical signs become apparent in young dogs as they encounter heavy training or perform strenuous activity, but usually between seven months and two years of age. Affected dogs are described as being extremely fit, muscular, and prime athletic specimens of their breed (Fig. 4A) with an excitable temperament and lots of drive (unpublished data).

Affected dogs can tolerate mild to moderate exercise, but following 5–20 minutes of strenuous exercise they develop profound ataxia followed by collapse (Fig. 4B). Several dogs have died during exercise, or while resting immediately after an episode of EIC, hence exercise should always be stopped at the first sign of ataxia. This is not a malignant hyperthermia. Affected dogs are rarely able to continue training or competition; however, if they are removed from training and not exercised excessively, the condition will not progress and they will be fine as pets. Until now, a presumptive diagnosis of EIC could only be made by ruling out other muscle disorders and by observation of characteristic clinical features with a typical history. While a specific therapy currently does not exist, the avoidance of strenuous activity should result in a relatively normal lifespan.



**Fig. 4** A) Labrador Retrievers with exercise induced collapse are normal in appearance at rest and have no problems with non-strenuous activity. B) Following a period of intense exercise with excitement, affected dogs become ataxic progressing to collapse. (Pictures courtesy of Dr. Susan Taylor, University of Saskatchewan, Canada).

A DNA based test for this interesting syndrome is on the horizon ([http://medicine.ucsd.edu/vet\\_neuromuscular](http://medicine.ucsd.edu/vet_neuromuscular), October 2006 Case of the Month). The chromosomal locus for an EIC gene has been identified with microsatellite DNA markers and an associated DNA mutation has been found. A genetic test for confirmation of affected dogs and identification of carriers should soon be available. This valuable test will hopefully help to eradicate this disabling disease from breeding populations.