

Hip dysplasia susceptibility in dogs may be underreported, according to comparative study

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A study comparing a University of Pennsylvania method for evaluating a dog's susceptibility to hip dysplasia to the traditional American method has shown that 80 percent of dogs judged to be normal by the traditional method are actually at risk for developing osteoarthritis and hip dysplasia, according to the Penn method.

The results indicate that traditional scoring of radiographs that certify [dogs](#) for breeding underestimate their osteoarthritis susceptibility. The results are of clinical importance to several populations, most notably veterinarians, breeders and pet owners.

The two hip [screening methods](#) -- the standard Orthopedic Foundation for Animals, or OFA model, and Penn Vet's PennHIP model -- were applied to a sample of 439 dogs older than 2 years. The four most common breeds included in the study were German shepherds, Labrador retrievers, golden retrievers and Rottweilers, all breeds commonly susceptible to [hip dysplasia](#).

According to Penn researchers, even if breeders were to selectively breed only those dogs having OFA-rated "excellent" hips -- the highest ranking but in some breeds, a very small [gene pool](#), the study suggests that 52-100 percent of the progeny, depending on breed, would be susceptible to hip dysplasia based on the Penn Vet scoring method.

"We believe the lower rates of hip laxity detection using the OFA methods are not the fault of the expert radiologist reading the radiograph but rather a deficiency of the radiographic view," said veterinary surgeon Gail Smith, professor of orthopaedic surgery, lead author and director of the PennHIP Program. "We believe many veterinarians are not using the best test to control a disease. In many ways this is an animal-welfare issue."

The findings point to a weakness in current breeding practices. If breeders continue to select breeding candidates based upon traditional scores, then, according to the Penn study, breeders will continue to pair susceptible dogs and fail to improve hip quality in future generations. Despite well intentioned hip-screening programs to reduce the frequency of the disease, canine hip dysplasia continues to have a high prevalence worldwide with no studies showing a significant reduction in disease frequency using mass selection.

Canine hip dysplasia, or CHD, is defined by the radiographic presence of hip joint laxity or osteoarthritis with hip subluxation (laxity) early in life. A developmental disease of complex inheritance, it is one of the most common orthopaedic diseases in large and giant-breed dogs and causes pain and loss of mobility.

The traditional OFA screening method relies heavily on conventional hip-extended, or HE, radiographs, which the study contends do not provide critical information needed to accurately assess passive hip joint laxity and therefore osteoarthritis susceptibility.

"We suspect that all hip-screening systems worldwide based on the HE radiograph have similar diagnostic deficiencies," Smith said. "Hopefully, our results will motivate veterinarians and breeders to consider this newer approach."

To achieve genetic control of CHD, researchers said, an accurate test must minimize false-negative diagnoses which mistakenly permit the breeding of dogs that carry genes coding for CHD. Particularly for a late-onset disease such as CHD, dogs remaining in the gene pool must not only be free of obvious signs of CHD at the time of evaluation (2 years of age for OFA) but ideally should not be susceptible to the osteoarthritis of CHD that occurs later in life.

The PennHIP method quantifies hip laxity using the distraction index, or DI, metric which ranges from a low of .08 to greater than 1.5. Smaller numbers mean better hips. The PennHIP DI has been shown in several studies at multiple institutions to be closely associated with the risk of osteoarthritis and canine hip dysplasia. It can be measured as early as 16 weeks of age without harm to the puppy.

Specifically, the PennHIP method considers a DI of less than .3 to be the threshold below which there is a near zero risk to develop hip osteoarthritis later in life. In contrast, dogs having hip laxity with DI higher than .3 show increasing risk to develop hip osteoarthritis, earlier and more severely, as the DI increases.

Comparing the overall results of the study, 52 percent of OFA-rated "excellent," 82 percent of OFA-rated "good" and 94 percent of OFA-rated "fair" hips all fell above the PennHIP threshold of .3, making them all susceptible to the osteoarthritis of CHD though scored as "normal" by the OFA. Of the dogs the OFA scored as "dysplastic," all had hip laxity above the PennHIP threshold of .3, meaning there was agreement between the two methods on dogs showing CHD or the susceptibility to CHD.

The key feature of the PennHIP radiographic method is its ability to determine which dogs may be susceptible to osteoarthritis later in life. Because dogs are recognized as excellent models for hip osteoarthritis in

humans, the authors are interested in the prospect of applying this technology to humans. Knowing a dog's risk for osteoarthritis early would allow veterinarians to prescribe proven preventive strategies, like weight loss, to lower the risk of this genetic disorder. Also, dog breeders now have a more informative measure to determine breeding quality to lower the risk of hip [osteoarthritis](#) in future generations of dogs.

"In humans, with appropriate studies of course, it is conceivable that mothers of susceptible children — and there are many — may adjust a child's lifestyle, including diet, to delay the onset or lessen the severity of this genetic condition," Smith said.

PennHIP is currently in common use by service-dog organizations such as the U.S. Air Force, the U.S. Army and numerous dog-guide schools. There are approximately 2,000 trained and certified members currently performing PennHIP procedure worldwide.

Provided by University of Pennsylvania

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