

**THE PENNHIP METHOD OF DIAGNOSING HIP DYSPLASIA  
NEW X-RAY TECHNOLOGY FOR ASSESSING CANINE HIP HEALTH  
BY KATHLEEN R. HUTTON, DVM**

## **Introduction**

When canine hip dysplasia (CHD) was first described in the 1930s, it was thought to be a rare condition. Today we know it as the most common inherited joint problem of large breed dogs. Despite years of research and the combined effort of the Orthopedic Foundation for Animals and responsible dog breeders, it has been impossible to eliminate hip dysplasia from breeds of dogs like the Akita, German Shepherd Dog, Labrador and Golden retrievers, and the Rottweiler.

Diagnosis of CHD is based on breed, history, physical exam findings, and an x-ray of the dog's pelvis. The standard "hip-extended" view is taken with the dog on his back, his legs fully extended, and his knees inwardly rotated. The x-ray film is then evaluated for the general appearance of the hip joints as well as for signs of degenerative joint disease (DJD).

For 30 years, this same x-ray view has been used to subjectively grade hips as having excellent, good, or fair conformation and to try to predict which dogs are less likely to develop CHD. Breeders hoped that breeding the best dogs and removing others from the breeding program would eliminate hip dysplasia. Unfortunately, there is still a 20-25 percent chance of producing a puppy with CHD even when using the OFA method of hip evaluation. Clearly, a better diagnostic method is needed.

## **A New Test**

In 1983, Dr. Gail Smith, an orthopedic surgeon at the University of Pennsylvania School of Veterinary Medicine, began researching early diagnosis of CHD. Through his work, he has created the PennHip method for measuring joint laxity (looseness) the primary cause of degenerative joint disease. The distraction index (DI) used in the PennHip method serves as a measurement of passive hip laxity, the degree of looseness of the hip joint when the dog's hips are completely relaxed. Dogs with a DI of 0.3 have tighter hips and are less likely to develop DJD, while those with looser hips whose DI values approach 0.7 or more are at greater risk. The PennHip x-ray method is unique for several reasons:

- First, it is a well-researched, objective method following strict scientific protocols and published in peer-reviewed veterinary literature.
- Second, the distraction index assigned to each hip joint is based on precise measurements and mathematical calculations. Dr. Smith and his colleagues feel this is superior to a subjective description of "shallow acetabulum" as found in an OFA report.
- Third, veterinarians who wish to submit films to PennHip are required to be trained in the techniques and to be certified. This assures that standard protocols will be used in obtaining the films and helps insure accurate data.

## **PennHip and OFA: A comparison**

OFA x-rays can be done by any veterinarian, with or without anesthesia or muscle relaxants. The x-rays are examined by three radiologists who report their findings to OFA; the dog is rated severely dysplastic, mildly dysplastic, fair, good, or excellent or may be given a non-rating letter requesting submission of new x-rays in six months. Although dogs must be two years old or older to get an OFA rating, the foundation will evaluate preliminary x-rays on younger dogs. Recent

studies of the OFA method of hip evaluation reveals a wide variation in the conformational grade assigned by different radiologists. Not only might one radiologist disagree with another, but may even contradict himself and give different grades to the same film on different occasions. Tests comparing positioning shows that the hip-extended position used by OFA tends to drive the femoral head into the socket, masking the amount of laxity and artificially improving the look of the hip joint.

As part of the strict quality control with PennHip, all x-rays must be taken under anesthesia to provide the greatest amount of muscle relaxation. This is particularly important when using a special positioning device called a distractor to help demonstrate hip laxity. To maintain the integrity and validity of the PennHip method and its ongoing research, all x-ray films taken are submitted for evaluation. This prevents corruption of the data which occurs when films are screened and only the “best” are submitted for consideration.

PennHip evaluation reports are not pass-fail. Instead, each dog is ranked compared to other dogs of that breed. A dog with a percentile ranking of 30 percent has tighter hips than 30 percent of the dogs evaluated. In other words, 70 percent of the dogs evaluated have tighter hips than the patient.

## **Conclusion**

PennHip and International Canine Genetics, the company that markets PennHip and manages the data base, do not make specific recommendations about breeding specific dogs; they leave that decision to the breeder. In general, their advice would be to breed only those dogs in the top 50 percent, those with tightest hips (or the lowest DI) as compared to other dogs of that breed. It is presumed that, as dogs with tighter hips are bred to each other, the average DI will decrease, leading to tighter, healthier hips and a decreased incidence of hip dysplasia. While no one promises that the PennHip method of measuring hip joint laxity will be 100 percent accurate in predicting which dogs will develop hip dysplasia, it is superior to any other available diagnostic method. As more breeders become aware of PennHip testing and more veterinarians become certified in the method, it is sure to become more widely available and more familiar to dog breeders and owners.