Comparing and Contrasting:
OFA and PennHIP methods

Christine M. Scruggs, VMD
Copyright 2006

As time moves forward it is always encouraging when a new method of genetic testing becomes available to breeders. Unfortunately, quite often the new method is misunderstood and "suspect" by the very breeders who should be embracing it. Any testing available that enables breeders to improve the breed is important, considering how little genetic testing is out there compared to how many genetic diseases are present in the canine population. As a graduate of the University of Pennsylvania Veterinary School, and a certified PennHIP veterinarian, I have found that there is some confusion over the PennHIP method, and a "fallback" to breeders preferring the OFA method of hip evaluation for a variety of reasons. This article will discuss the origins of each method of hip evaluation, how each method is performed, and what each method is measuring or evaluating.

Beginning with OFA, or the Orthopedic Foundation for Animals, this organization was founded in the mid 1960s as a not-for profit organization. Currently OFA has over 15 databases of genetic issues, including hip dysplasia. The "OFA" method of evaluating the hip joint employs the use of the radiographic extended view of the pelvis. A preliminary evaluation can be attained before 24 months of age, or a permanent evaluation on or after 24 months of age. The dog is also recommended to have permanent identification (microchip or tattoo), which is noted in the published database results. OFA does recommend chemical restraint (either sedation or general anesthesia) but does not require it for evaluation.

Hip extended view
Obtaining this view involves placing the dog on its back, with it legs extended, pelvis symmetric, and stifles rotated internally to each other.

OFA lists its objectives on its website (www.offa.org) as follows: 1) "to collate and disseminate information concerning orthopedic and genetic diseases of animals, 2) to advise, encourage, and establish control programs to lower incidence of orthopedic and genetic diseases, 3) to encourage and finance research in orthopedic and genetic disease in animals, 4) to receive funds and make grants to carry out these objectives." For the OFA method there are seven different categories, three of which are considered normal. The three normal categories are hips which are evaluated as 1) excellent – "superior conformation in comparison with animals of the same age and breed", 2) good – "slightly less than superior, but a well formed congruent hip joint", 3) fair – "assigned when minor irregularities in the hip joint exist". In the evaluation of the hip joints there is also a borderline category and three failed categories of mild, moderate, and severe dysplasia. The final category a particular dog rates is determined by a subjective evaluation of the x-ray films by three board certified radiologists who grade the films based on a review of nine different anatomic areas of the hip.

The OFA method does not evaluate laxity, or looseness, within the hip joint itself. The nine anatomic areas of the hip which are evaluated for each film rely upon the subjective experience of the radiologist himself/herself in the determination of what he/she feels is normal based for the age and breed of the animal. The three radiologists which rate a particular x-ray film are drawn randomly from a pool of approximately twenty to twenty-five participating individuals within the United States who range from private practice to academia. The final rating is determined by the consensus opinions of the three radiologists, i.e. if two rate a dog as good and one rates the dog as fair, the dog is scored as good. For more specific examples on the rating system, please refer to the OFA website. A "passing" score (excellent, good, or fair) is recorded within the OFA database and can be accessed via their website. A "failing" score is not entered within the published OFA database unless the owner has initialed permission to do so.

OFA does not recommend evaluating bitches while they are in season, due to their belief that hormonal effects may affect the reliability of diagnosis. They also do not recommend to evaluating the hips of an animal which has had a period of prolonged physical inactivity. The organization also mentions that nutrition and environmental factors can influence the conformation of the hip joint. Lastly, their recommendations to buyers and breeders include consulting with the OFA database to evaluate whether or not parents, siblings, half-siblings, etc. have obtained OFA numbers and ratings. OFA has reported that hip scores do improve over time when using their method of evaluation.

So, in contrast, what is PennHIP? The acronym stands for the University of **Penn**sylvania **H**ip **I**mprovement **P**rogram and the website is www.pennhip.org . This method involves evaluating the canine hip both qualitatively and quantitatively. The qualitative aspect involves assessing the hip joint conformation and any evidence of dysplastic changes, and the quantitative aspect involves measuring the joint itself for laxity. PennHIP claims that this "method of evaluation is more accurate than the current standard in its ability to predict the onset of osteoarthritis…the hallmark of canine hip dysplasia." Dr. Gail Smith from the University of Pennsylvania School of Veterinary Medicine developed this method in 1983. After conducting research and determining

that the method was capable of estimating future susceptibility to developing hip dysplasia, Dr. Smith established PennHIP as a public program in 1993. PennHIP is also a not-for-profit organization, and has an established database although individual scores are not currently published on the website.

The first step in the PennHIP method involves finding a veterinarian who is certified. Such veterinarians attend a training course, purchase necessary equipment, and are required to submit training films to be certified. In addition to meeting the requirements for certification, participating veterinarians are required to employ sedation or general anesthesia (for accuracy in achieving proper films), label films with specific information, and all animals which are evaluated must have the films submitted to the analysis center. There are three x-ray films which are taken for the method to be complete: 1) distraction view, 2) compression view, 3) hip extended view (the same view as the OFA method). An explanation for views 1 and 2 are seen below, with pictures obtained from www.pennhip.org – view 3 has already been explained.

Compression view
Obtained with the dog on its back, legs held perpendicular to the table ("stance-phase orientation") and hips gently compressed into the sockets.

Distraction view
Obtained with the dog on its back, legs held perpendicular to table (same as compression view), and distraction device placed over femoral heads of hip joint. The femoral heads are "distracted" away from the hip socket to varying degrees dependent upon hip joint laxity.

These two x-rays, as well as the one above in the OFA section, are of the same dog as submitted to PennHIP. It is easy to see when comparing the three films that very different information is present on each one. The compression view shows how well the femoral head or "ball" of the joint fits into the acetabulum or "socket" of the hip joint. Any incongruities in conformation of the hip joint can be evaluated in this view as well as view number 3, the hip extended view. The distraction view, however, shows a very different picture. In this film one can see the actual laxity, or looseness of the joint itself, based upon a quantitative evaluation of the distraction of the femoral head from the socket. Note that in this view the hips appear much looser than in a simple evaluation of the hip-extended view alone. "On average, the distraction view has been shown to reveal 2.5 to 11 times more hip laxity (depending on the breed) than the hip-extended view." PennHIP claims that the "degree of hip joint laxity, as measured by the PennHIP method, has been shown to be the most important risk factor in determining whether a dog is prone to developing…hip dysplasia." To summarize, the PennHIP method uses three

views for a total evaluation of the hip joint, including any conformational or dysplastic changes present, and obtaining an actual measurement of hip joint laxity.

The PennHIP method can be performed on animals as young as 16 weeks of age, although many films are taken at one year or later. The films are submitted to the PennHIP analysis center which then processes the evaluation of the films and sends a report to the owner and veterinarian. The report includes information on the owner (name, address, etc.), information on the dog (breed, age, sex, microchip number, etc.), qualitative evaluation including evidence of dysplasia, etc. and quantitative measurements including distraction index (DI). There is also a line graph at the bottom of the report, which demonstrates where the dog's DI falls in a percentage comparison amongst other dogs of the same breed.

The line graph ranges from 0% to 100%, with 50% as the median. Dogs to the left of 50% have higher percentage "scores" and tighter hips. Dogs to the right of 50% have lower percentage "scores" and looser hips. For example, a dog with a 90% PennHIP rating has hips tighter than 90% of the rest of the population in the database for that breed. This would be an excellent dog to breed to if gaining tighter hips is the objective. Conversely, a dog with a 30% rating has hips tighter than only 30% of the rest of the population – in other words 70% of the population in the database for this breed has tighter hips than this individual. This dog would not be a good breeding individual if the goal is to produce tighter hips. It is recommended to breed dogs to the left of the median (in other words towards tighter hips) if the goal is to produce hips with less laxity and therefore less hip dysplasia.

As a veterinarian, one of the questions I am most frequently asked is how OFA and PennHIP scores compare to each other. The answer is, they cannot be compared (much like to saying, comparing apples to oranges…). The two methods are evaluating different criteria and a PennHIP score of 90% cannot be equated to an OFA score of excellent. They are two different measurements. People have told me that they know their dog will "pass" OFA, even if with a fair rating, but they are concerned that the same dog may "fail" PennHIP, and so they do not want to use that method. My answer is that breeders need to use *every* tool available to them for evaluating breeding stock, and *be honest* about the results of those evaluations. How a breeder uses those tools are at his/her own discretion, but ignoring a particular method because of fear of the results is detrimental to any breed. Another complaint I have heard is that PennHIP is too expensive. Breeders must understand that the specialized training, equipment, and personnel required for the PennHIP method are more demanding than for OFA. Three x-ray films are taken instead of one, the distraction view requires two people to take, and the dog must be sedated or anesthetized.

Overall, both the OFA and PennHIP methods are evaluating the hip joint. The OFA method utilizes one radiographic view to evaluate conformational changes within the hip joint as subjectively examined by board certified radiologists. The PennHIP method utilizes three radiographic views to evaluate both conformational changes and quantitative measurements of hip laxity. There are publications from both methods

claiming that a breeder can successfully reduce hip dysplasia in a breeding program by using their method of evaluation. PennHIP is the newer method of hip evaluation and often "suspect" by breeders who are afraid their dogs will "fail" the test. I would encourage breeders to see both methods as tools they can use in their breeding programs, and to understand the advantages and disadvantages of each method. Ultimately, how breeders makes decisions on breeding programs will determine the future of their breed. Any new tool available should be embraced as another chance to produce dogs of higher quality and improve on the lives of our canine companions.