

Understanding Hip Evaluations

Keith T. Weber, LadyHawke Great Pyrenees

Since 1966, the Orthopedic Foundation for Animals (OFA) has been conducting qualitative hip evaluations to help breeders and pet owners understand and reduce the rate of hip dysplasia in their dogs. Hip dysplasia is a debilitating disease of the hip which, in extreme cases, leaves the dog unable to use its hind legs. Due to increased breeder awareness hip dysplasia has been reduced in some breeds while in other breeds it remains like a plague.

The problem with the “campaign to eliminate hip dysplasia” is that the disease itself is not fully understood. While there is still debate about the role nutrition plays, it is becoming fairly well accepted that hip dysplasia is a polygenic disease that can only be exacerbated --and not caused-- by poor nutrition or other environmental factors.

Assuming this is indeed the case, the solution seems fairly straight forward; have hip evaluations performed on all breeding stock and those with “poor hips” are removed from the breeding pool. Only breed the “best hips” to the “best hips” (see the “Breeding to the Hips” sidebar).

If things were only this simplistic! Because OFA hip evaluations are qualitative (meaning they grade a dog’s hips as excellent, good, fair, borderline, mild, etc.) there is an element of subjectivity in the test results. The long-term effect of this type of evaluation was demonstrated clearly in a study which revealed that even when a sire and dam are both graded excellent, there is still a 2.3% probability that puppies from that litter will be dysplastic (in other words, 2.3% [1 in 50] of the puppies will have hip dysplasia)(see the table below).

Female > Male v	1 (excellent)	2 (good)	3 (fair)	5 (mild)	6 (moderate)	7 (severe)
1 (excellent)	2.3	9.5	10.6	13.6	13.3	0
2 (good)	12.3	13	15	20.3	22.9	20
3 (fair)	12.8	16.2	19.2	24.1	27.9	50
5 (mild)	33.3	21.2	50	25	33.3	100
6 (moderate)	33.3	23.5	40.6	10	11.1	NA
7 (severe)	NA	25	16.7	NA	0	NA

(Source AVMA.)

Breeding to the Hips

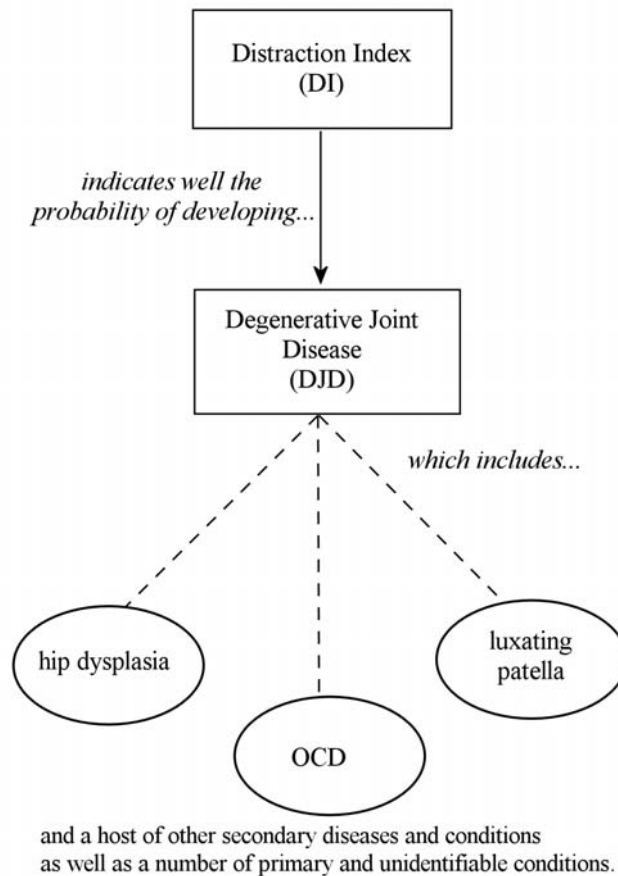
Breeding is an art and a science with the goal to produce the perfect specimen of the breed. The formula for perfection is a blend between the three points of the breeder’s triangle: type, soundness, and temperament.

Knowledgeable breeders know that putting focus on only one point of the triangle will lead to disastrous results later on. They also know they need to place emphasis on the most important traits or issues within their breed or their line to make progress toward their goal. Hip dysplasia (certainly a *part* of the soundness segment of the triangle) may *not* be a priority for breeders that are coping with high rates or cancer or other more pressing issues.

“So”, you may be thinking, “if the *qualitative* approach is not working, what about a *quantitative* one?” This indeed is the line of reasoning followed by the PennHIP program. In a nutshell, PennHIP hip evaluations measure the laxity (looseness) of a dog’s hips under the assumption that loose hips lead to hip dysplasia. While the opposite seems to be true –that tight hips mean the dog simply cannot be dysplastic—loose hips do *not* always lead to hip dysplasia (though there is an increased probability that the dog will develop some

form of degenerative joint disease [DJD]). It is important to understand that PennHIP results relate hip laxity to DJD, and not hip dysplasia per se. DJD is osteoarthritis which can be caused by any number of problems including hip dysplasia. In essence, the PennHIP evaluation addresses the problem of hip dysplasia through a generalized pathway (see the chart below) and this distinction is an important one for breeders to comprehend.

The Mission: Eliminate Hip Dysplasia



If we are to appreciate hip evaluations for what they are, we must understand that there exists only a 64% correlation (as indicated by the heritability index) between the PennHIP distraction index (DI; the term given to the PennHIP looseness measurement) of the parents and that of the puppy. What this means is that even with this *quantitative* approach, fully one-third of the hip dysplasia puzzle remains an unexplained mystery.

The bottom line is that without first identifying the genetic markers responsible for hip dysplasia and second, using reliable genetic testing of both the sire and dam, hip dysplasia *cannot* be eliminated by breeders. Hip dysplasia is one of those chances we take when we bring a new puppy into our homes and into our lives; a chance that is minimized as much as possible when we work with a reputable breeder and generations of sound dogs.