PennHIP Revisited
Teri Fleming, Beardie Bulletin
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In a previous issue of the Bulletin, I wrote an article regarding the PennHIP method of hip evaluation. Recent discussions on an internet list lead me to believe that there is further interest in the subject.

Methodology. During a PennHIP evaluation, 3 x-ray views of the hip are taken with the dog under deep sedation or general anesthesia. The standard hip extended view, the same view used by other hip evaluation organizations, is done to evaluate for the presence of arthritic changes. The other two views are also taken with the dog lying on its back, with hips in the neutral position, at a near 90degree angle to the spine as they are with the dog standing. A compression view, one where the hips are pressed in to the hip socket (acetabulum) is taken to evaluate how well they fit together. A distraction view is accomplished by use of a fulcrum between the legs and pressure applied to the knee area. This lifts the head of the femur out of the socket to the point of its passive laxity (looseness). This is the view from which measurements for the Distraction Index comes. On film, the distance between the center of the acetabulum and the center of the femoral head is measured. Then to correct for the size of the dog (bone) this is divided by the radius of the femoral head resulting in a number between 0 and 1, the Distraction Index. This is the number which is reported by PennHIP as the dog's score and represents the percent the femur can potentially move out of the socket. For example, a dog scoring .21 means 21% of the femoral head will move out of the acetabulum on distraction.

The value and the theory.

1) PennHIP scores as a predictor. They found that the DI (distractionindex) is a very high predictor or risk factor for the development of hip dysplasia. Dogs who score 0.3 or less have an extremely low chance of developing hip dysplasia, in fact in their research NO dog with a DI of 0.2 or less ever did. Scores 0.7 or greater were associated with a dog that did develop or had dysplasia, in their study. For scores between those values there was a correlation between the DI and the rate of dysplasia

2) Early Screening. They found that the DI changes very little over the life of the dog. At 4 months, the collective scores in their study were very

similar to those taken at 24 months. Other methods of evaluation have a poor correlation between the readings at that age versus the final outcome. I think most of us see the inherent value of knowing early on, what that dog's hip status is in regard to laxity. So that if the dog rates at less that 0.3, you can, according to their research, count heavily on a dog that is going to have healthy hips. And if it is over 0.7, you can be sure that this puppy will become dysplastic. This certainly is valuable if you are trying to decide whom to keep. If the numbers are high. it can also alert you to that fact early enough to allow for close monitoring of the dog's clinical status and allow for those early intervention surgeries that improve the dog's quality of life.

3) <u>Objective Data</u>. When vets are properly trained, the findings don't vary appreciably from one vet or from one occasion to the other. This is of course according to the researchers. Only vets that are trained by the staff at PennHIP are certified to do the testing and ALL films that are done MUST be submitted. If any vet were found to be withholding submission, they would be removed from the approved list of qualified examiners. This allows the staff at PennHIP to evaluate the technique of the examiners and assure that proper technique is being used. The other advantage inherent in this is that the distraction index is a mathematical calculation. The distance being measured is not a question of a reader's interpretation, and therefore not subjective as other hip evaluations are.

4) <u>High</u> <u>Inheritability.</u> They found that joint laxity is a more heritable than actual findings of dysplasia. This is quite important. It indicates that if you select for tighter hips you will have a greater ability to influence the outcome in subsequent litters than using hip clearance (of any flavor) alone. In other words puppies more closely inherit the degree of laxity, than they do the mere presence or absence of dysplasia. This is pretty exciting, especially in a breed that has a high percentage of dysplasia. Based on this finding you should be able to influence the outcome of your litters more directly than using standard films alone, and breed tighter, or as tight hips in successive generations. This I think could be the greatest value of PennHIP. You could have two litter mates or close relatives of equal quality with passing OFA ratings and select for the one with tighter hips. There are certainly numerous factors that go into the selection of a mate, not the least of which is the way each would compliment the mate in question. Using the dog with a lower PennHIP score as PART of the basis for your decision as to which dog - or bitch - to use in your breeding program should, if the laxity theory is sound,

improve the hip health of the litter. And again, as the degree of laxity is more heritable than the mere presence or absence of dysplasia alone, you should have a more direct impact on the litter's hip health.

PennHIP & the Bearded Collie.

As some as aware, few Beardies have been evaluated by PennHIP. That means that at this point, without a database for breed average, the only indicator we have for comparison in Beardies is the overall data that relates to all breeds. The only real predictions that the statistics have born out as being concrete, relate to dogs who score 0.3 or less (as not being related to an incidence of dysplasia) and those who score 0.7 or greater (as always being a predictor of a dog that will develop or has dysplasia).

PennHIP as a clearance? Some have questioned why the AKC and the BCCA don't accept PennHIP scores as a means of hip clearance as they do OFA. I think that the above information this should make this clear. PennHIP itself states it does not and will not issue ratings or pass/fail status. There are a great number of dogs in many breeds that rate between 0.3 and 0.7. What is to be done with ratings like that? Even if you use the statistics to infer that values below 0.3 or over 0.7 were a firm diagnosis, that leaves the middle ground as not indicative clearly of anything, and therein lies the problem. Even when the breed average becomes established, some random percentile rank would have to be picked as acceptable in order for PennHIP to be used as an accepted method for rating hips for clearance. This would probably be arbitrary and, in some cases, inaccurate. While the rate of dysplasia appears to increase proportionately with the higher DI scores, as far as what has been published, there is no other statistic or research that indicates that anything firm may be concluded for those in-between scores (0.31 to 0.69).

For now I feel that PennHIP is an excellent way to gather additional and/or early information on hip status. If used, we could also identify those dogs that clear OFA, and yet have less than optimal hip laxity, and therefore have even more information on which to base our breeding decisions. Use of PennHIP often does represent addition cost, and if done as an early screen prior to a 2 year clearance film, would represent an additional anesthetic event. However, if done in conjunction with OFA films it may be an excellent tool to add a lot of information to the picture of your dog's hip health.