

Dachshund screening program against IVDD in Denmark at 2009

We believe that the screening program is an instrument that over time will enable us to reduce the number of Dachshunds affected by IVDD.

We believe that the most prevalent health problem in the Dachshund breed today is IVDD, not just in Denmark but all over the world. Almost all studies worldwide show a frequency between 15 and 20%.

Scientific background

In 2000, veterinary surgeon Vibeke Frokjasr Jensen (VFJ) defended her phd. thesis concerning Intervertebral Disc Disease and disc calcification in Dachshunds. VFJs studies follow up on a number of earlier studies. In her study, VFJ found some of the missing links from the earlier studies. The most important ones are:

- 1 It is scientifically proven that the number of intervertebral disc calcifications are hereditary to a very high degree (heritability of 0.64-0.89)
- 2 Calcified discs are in the highest number when the dog is between two and three years old. Before this age the number of calcified discs build up. After this age the calcified discs become more dense, but part of the calcifications begin to disappear most likely in relation to rupture of the disc. If the number of calcified discs should be evaluated by radiographic screening, it is preferred that the dog is between the ages of two and three and a half years old. At this time the number of visibly calcified discs reach a maximum. The high heritability estimates rest on radiographic screening in this age-interval.
- 3 X-rays will be a useful tool in the selection of breeding animals, as long as it is managed properly.

Furthermore, new studies have shown that the risk of disc herniation is closely associated with the number of calcified discs at two years, with a 60% risk of disc herniation in dogs with more than 5 calcified discs. The x-ray examination covers the entire vertebral column of the dog. The dog receives a sedative injection before the examination, to make sure that it is completely calm. The examination consists of five latero-lateral x-rays of the vertebral column of the dog while it is positioned in right recumbancy. It is of vital importance that the x-rays are taken with a correct exposure and that the dog is positioned correctly. In Denmark it has been shown, that not all veterinarians have x-ray equipment that is sufficient to make x-rays of a satisfactory quality. It has also appeared that it takes training and education to take x-rays of a sufficiently high quality. The high heritability rests on a high and uniform x-ray quality. Therefore, the dog owner cannot bring the dog to any veterinarian, because the quality on the x-rays is crucial for a correct and uniform judgement of the number of calcifications. In Denmark app. 10 veterinary surgeons have been enrolled in the program, after they have proved that they are able to produce the x-rays in a sufficient quality to make sure that it is possible to count the calcifications present with a uniform sensitivity. When the x-rays are taken it is equally important that they are judged uniformly. To minimize the variation in x-ray evaluation, we have chosen to use only three x-ray interpreters. Thus all the x-rays in Denmark are judged by Vibeke Frokjaar Jensen, in Norway by Oyvind Stigen and in Finland Anu Lappalainen, who all have extensive experience in evaluating vertebral x-ray images for the presence of intervertebral disc calcification. They evaluate both the quality of the x-rays and count the number of calcifications.

When the quality of the x-rays taken is not good enough, new x-rays images are required.

It has been shown that the number of calcified discs increases until the dog reaches the age of two years and after the age of three years the calcifications can disappear (usually in the most calcified discs, presumably due to rupture of the disc). That is why we - in Denmark - recommend that dogs are screened by spinal radiographic between the ages from 2-3 years. Only results from dogs who are x-rayed at the correct age (2-3 years) will be registered at The Danish Kennel Club (DKK)..

Organization of the program

In Denmark, there has not been a prerequisite of screening for intervertebral disc calcification before breeding until 2009.

Since the upstart of the program in 2001, the Danish Dachshund Club (DGK) has chosen to have a central enrolment. This implies that it is not possible to obtain x-rays with the purpose of screening for calcifications without joining the DGK screening program. To ensure this a number of regulations have been made:

- 1 Before a dog is x-rayed the owner has to inform the secretary of the DGK. DGK sends the papers to the x-raying vet and provides the dog a "secret code". All the x-rays have to be radiographically marked with this code, to ensure that the images

- were not taken before enrolment in the program.
- 2 The approved veterinarian (see above) obtains the x-rays but is not allowed to inform the dog owner about the ("estimated") result. The x-rays are sent for central radiologic evaluation.
 - 3 The results of the radiologic evaluation are then sent to the secretary of DGK, who makes sure that the results are published in the magazine "Gravhunden". The results are also sent to The Danish Kennel Club (DKK). If a dog is x-rayed at the age from 2 -3 years, the result is then added on to the studbooks of all the offspring from the dog in mention.

It has been important to publish the results since we have not had a restriction for breeding. If the results were not published, it would be possible to use dogs with severe genetic disposition for IVDD (many calcified discs) without anyone knowing it. Thus it is an important tool for the breeder looking for new breeding material. As a guidance for breeders, DGK have made the following recommendations for breeding:

- 1 All dachshunds born after the 1st of July 1998 should be x-rayed before they are used for breeding.
- 2 Breeding dogs with 0,1 or 2 calcifications are recommended for breeding,
- 3 Dogs with 3 or 4 calcifications should only be used restrictedly (2 litters at the most) and the mate should have 0 or 1 calcified disc at screening.
- 4 Dogs with 5 or more calcifications should not be used for breeding.

The recommendations are designed to exclude 25 % of the dogs with the most calcifications.

The disease has a very high heritability estimated at around 0,60 or more, depending on the sensitivity of the test (quality of x-ray and evaluation). Therefore we believe it is possible to minimize the frequency of disc herniation in our dachshunds.

Breed restriction and index calculations

Right now around 500 dachshunds have been screened for calcified discs. Based on these results scientists have been working on index calculations. The analysis based on the present data shows that the breeding value of the wirehaired breed has progressed by 16 % since the program started. From the 1st of July 2009 the program will be "a restriction for breeding". This means that all breeding dogs have to be x-rayed before they start their possible breeding career. Instead of "K numbers" (number of calcified discs) we will use index calculations, this gives a more exact indication for the animals breeding value and it is being adjusted regularly in accordance with the progress in the population.

This was a very short introduction to the Intervertebral Disc Disease and disc calcification screening program.

Best regards,

Majbritt Hansen,
Veterinary Surgeon, member of DGK's Health Committee.

Literature:

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The results have also been published in international journals; Jensen VF, Beck S, Christensen KA, Arnbjerg J. Quantification of the association between intervertebral disk calcification and disk herniation in Dachshunds. J Am Vet Med Assoc, 2008 Oct 1;233(7): 1090-5.

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