

# What 1,000 German Shepherds Taught Us About Hip Dysplasia

A common ailment in many large dog breeds, many consider it an almost inevitable part of owning a German shepherd. But a study found that there are multiple factors involved over which you have much control. Help your pup avoid this painful condition.

Analysis by Dr. Karen Shaw Becker

## STORY AT-A-GLANCE

- Recently, researchers identified the genes involved in canine hip dysplasia (CHD) in German Shepherds, one of several large breeds prone to the disease
- CHD is a polygenetic multi-factorial disease, meaning more than one gene is involved, and the disorder is caused by a number of other factors as well
- Whether or not a dog develops CHD, and the severity of it, depends on genetics, environment, and nutrition
- There are many things dog guardians can do to prevent or reduce the severity of hip dysplasia
- The genetic study should help German Shepherd Dog breeders make more knowledgeable breeding decisions

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Researchers at the Institute for Animal Breeding and Genetics, University of Veterinary Medicine Hannover in Hannover, Germany have identified important genetic variants and their interrelated pathways for the development of canine hip dysplasia (CHD) in **German Shepherds**.

The genes responsible for hip dysplasia are involved in the formation of bone and cartilage. Over 1,000 German Shepherds were genotyped, and the scientists screened a large number of single nucleotide polymorphisms (SNPs) (the most common type of genetic variation) for their association with CHD. Study results were published in the journal PLOS ONE.<sup>1</sup>

## Canine Hip Dysplasia Explained

Canine hip dysplasia is what is known as a polygenetic multi-factorial disease, meaning there is a genetic component to the disorder, more than one gene is involved, and it is caused by a number of factors, not all of which have been identified.

Dogs with genes for hip dysplasia may or may not develop the disease; a dog without CHD genes is in the clear.

A dog can have great OFA and PennHIP scores (which measure hip health) and still carry the genes for the disease, meaning future generations of puppies can develop CHD even if prior generations show no signs of it.

A dog is diagnosed with CHD if the ball and socket hip joint is malformed, causing separation of the two bones of the joint. In most cases, the socket is not deep enough for the ball to fit snugly into place.

In a dog with healthy hips, the ball (the head of the femur) at the top of the leg bone fits perfectly into the socket. In animals with CHD, the less-than-perfect fit causes the bones to separate. This separation is the result of abnormal joint structure coupled with weak muscles, ligaments, and connective tissue that support the joints.

The result is a joint that chafes and grinds rather than slides smoothly during movement. Often the body tries to compensate for the poorly fitting joint by producing hard, bony material in and around it in an attempt to stabilize it. This alteration can have the opposite effect, creating an even more unnatural fit.

The wear and tear on the joint from chafing and grinding eventually results in degenerative joint disease (DJD), which can be extremely painful and debilitating for the dog.

## **Symptoms of Hip Dysplasia**

According to PennHIP,<sup>2</sup> a dog with CHD may have one or a combination of the following symptoms:

- The disorder develops at 5 to 12 months for the severe form; later for the chronic form
- Low exercise tolerance
- Abnormal gait
- Reluctance to climb stairs
- Bunny-hopping when running
- Audible “click” when walking
- Thigh muscle atrophy
- Increased width between points of the hips
- Pain

Diagnosis of hip dysplasia is typically made either because a dog is showing symptoms, or as the result of a standard hip exam.

If your pet is symptomatic, there will be signs of mobility problems and pain. The vet will perform a complete physical exam and take x-rays. Problems with a joint are often easily seen on x-rays of dogs exhibiting symptoms. Your vet may also be able to feel looseness in your dog’s hip joint, and note pain when a rear leg is extended or flexed.

In dogs without symptoms, CHD is often diagnosed during the OFA and/or PennHIP certification process intended to establish the health of an animal’s hips.

## **Which Dogs Develop CHD?**

Certain large breeds are more prone to CHD than others and include the Newfoundland, Saint Bernard, Old English Sheepdog, Rottweiler, German Shepherd, Golden Retriever, Alaskan Malamute, Labrador Retriever, and Samoyed.

Hip dysplasia also occurs less commonly in smaller breed dogs and cats.

Other markers for CHD can include:

- A body that is longer than it is tall
- High BMI (body-to-mass) ratio
- **Spayed or neutered**
- Dogs less than one year old diagnosed with hip joint damage and microfractures of the hip socket
- Young to middle-aged dogs with pain and lameness linked to osteoarthritis

Whether or not a dog develops CHD and DJD/osteoarthritis, and the severity of it, depends on both nature (a genetic component) and nurture (environment and nutrition).

## **Environment, Nutrition, and Canine Hip Dysplasia**

There are things you can do as a pet owner to help prevent or reduce the severity of hip dysplasia in your dog. For example, if you're planning to get a large or giant breed puppy, find breeders who PennHIP certify their dogs. OFA certification is still the established standard, but PennHIP is a much better indicator of hip health.

The amount of calories your dog consumes, especially from 3 to 10 months of age, can have a significant impact on whether a puppy with CHD genes will go on to develop the disease. High calorie, high carbohydrate diets can cause frame growth that is too fast for the cartilage in the body to keep up with, especially in large breed pups. A portion-controlled, balanced, species-appropriate diet will provide your pet with the right nutrition in the right amounts throughout his life.

In a 1997 study of Labrador Retriever puppies, the dogs fed "free choice" had a much higher rate of hip dysplasia than their littermates who were fed the same food, but in controlled portions that amounted to 25% less than the free fed pups.<sup>3</sup>

The free-fed dogs were also quite a bit heavier as adults than the controlled portions group -- by about 22 pounds on average.

Obesity can increase the severity of dysplasia. Extra weight can accelerate the degeneration of joints. Dogs born with genes that make them prone to hip dysplasia, if allowed to become overweight, will be at much higher risk of developing the disease, and subsequently, arthritis as well.

Exercise your dog with activities like running and swimming. The goal is to maintain good muscle mass, which can decrease the incidence and severity of CHD.

Avoid activities that require your pet to jump or suddenly change direction or stop. Don't allow your dog to exercise or spend significant time on slippery surfaces.

## **Study Will Prompt Better Breeding Choices**

According to Lena Fels, co-author of the study, dog breeding will significantly benefit from this research:

*“Despite the use of estimated breeding values (EBVs) for CHD, dogs affected with CHD are not uncommon and often unexpected according to the parental EBVs. This presents large problems for dog breeders. Handling of CHD-affected dogs is often difficult and dogs frequently suffer from the painful condition.”*

Fels believes CHD can be prevented much more effectively thanks to these study results. The genome-wide CHD-test is available at the Institute for Animal Breeding and Genetics, and can be provided to all breeders and owners of German Shepherds.

## **Sources and References**

[idw-online](#)

<sup>1</sup> [PLOS ONE, May 6, 2014](#)

<sup>2</sup> [PennHIP.org](#)

<sup>3</sup> [Journal of the American Veterinary Medical Association, January 15, 1997, Vol. 210, No. 2, pp 222-225](#)

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