

# CANINE HIP DYSPLASIA

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For us to understand this hereditary disease, we must clarify the basic reasons why it repeatedly occurs and look for possible solutions, if this unfortunate disease is in anyway controllable.

This article is not meant to replace the existing scientific publications, but widen the understanding of this disease. Furthermore, the idea is to give the reader some further background information why this disease occurs, how it occurs, as well as some methods of controlling its development through nutrition.

With this information, we hope to increase your knowledge about this disease, so that you will have sufficient background information to make rational breeding choices and allowing you to discuss this disease in detail with your vet and nutritionist, based on actual scientific knowledge.

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## HIP DYSPLASIA

Hip Dysplasia is one of the most contradictory and widespread diseases occurring in mainly large breed dogs. Many different beliefs, misconceptions, stories and even lies, have confused the issue. Not all readers will like what they read, but we believe the information here will allow every reader to have more knowledge and better understanding of the issue, and through understanding, can possibly also have some control of this difficult problem.

Hip Dysplasia is one of the most common problems in dogs weighing over 25 kg's. Hip Dysplasia is a hereditary disease. It is a multigenetic, i.e. there are several genes responsible, but the Hip Dysplasia is also a nutritional and environment based problem

A Hip Dysplastic dog is born healthy. The development of Hip Dysplasia occurs when the puppy grows. The unbalanced simultaneous development of hip joints bone- and soft tissue parts during the first 6 months of the puppies life result to Hip Dysplasia. Nutrition and environment have a much larger part in the development of Hip Dysplasia than previously believed. The genetic concept of heritability's effect is now believed to be around 25 % ONLY, in comparison to previously believe 75-100 % Nutritional consequences are qualitative as well as quantitative. (Diets with low nutritional value and/or excesses in daily feeding amounts).

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## The beginning

At birth, the hip bone and the joint are pure cartilage. The quality of nutrition during the pregnancy has already affected the development of cartilages. When a puppy grows, the cartilage becomes bone. This is part of the growth process controlled by hormones. The bone formation and growth change the stress factors on the joint and if the opposing forces are too weak to hold the hip together, looseness develops which will cause mechanical damage to the joint and the hip bowls (femoral) upperparts and edges. This develops into inflammation resulting into thickening and stretching on the joint cap, further stretching of cartilage and results to excess bone formation. One must understand that the joint contains the all important synovial fluid. The most important ingredient in this fluid is nutrients. Nutrients are derived from daily diet. Should the daily diet have excess or lack of any required nutrients, joint damage is bound to occur.

The development of joint damage:

- Joint capsule thickens
- Joint cartilage thins and wears from the stress points.
- The bone will try to correct this by thickening its bone mass.
- Cracks develop on the joint cartilage.
- The regenerative and elastic properties of the articular cartilage are reduced and result into loss of lubrication and nourishment.
- Scar tissue develops replacing the cartilage.
- The femoral head is flattened resulting to abnormal wear of the articular cartilage developing bone-cartilage formations.
- On stress points bone cartilage is worn-out and the bone is bared.
- Result is a painful and movement restrictive joint damage.

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## POSSIBLE REASONS TO HIP DYSPLASIA

We must understand the fact that Hip Dysplasia does not occur from one single reason, but there are several different culprits that jointly degeneratively affect the hip joint.

The growth deformation of the hip is a signal of bone formation, which does not only occur on the hip, but also on all other joints.

In spite of above mentioned multiple factors being responsible, hip dysplasia is the most common joint weakening and often painful problem. The joint effort by responsible breeders and vets are bearing fruit, although there are several matters not yet known to us, but what is known is that this disease is hereditary.

The breeders need to set aside earlier beliefs and misconceptions in analysing the different existing theories about genetic, nutritional and environmental reasons, which all play a part in the development of hip deformation.

The genes are the reason for Hip Dysplasia. Without the hip dysplastic genes, there is no Hip Dysplasia. Hip Dysplasia is not what a puppy may get, it either has these genes or doesn't.

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## **Nutrition**

In following, we will try to outline why we believe nutrition is so important, but first we need to understand what we do mean with nutrition:

Proper nutrition is important to your dog's health. A diet with only one or two meat protein sources may not be enough, three should be minimum, four is ideal. Vegetables have much lower biological values and are not recommended as pure protein sources. Proper nutrition is not only important to your dog's daily nutrition, but it is imperative in recuperation from different illnesses or injuries.

In knowing the basic requirements on nutrition, one can be assured of feeding the pets correctly for a long and healthy life.

Dog's nutrition must contain 6 nutritional groups.

### **Water:**

Water is the most important single nutritional item.

### **Protein:**

Proteins are the building blocks of the body. The blocks are called (tiles, boards) amino-acids, of which the body uses to maintain and build itself. The better building block, the stronger body.

### **Carbohydrates:**

These are the starting fluids for energy and the conveyor belts for (conveyor belts) transporting the nutrition and sugar chains.

## **Fats:**

Fats give energy. Fat is also needed for utilization of fat-soluble vitamins. (Electricity, heating oil) Fats and oils are important sources of unsaturated fats, the sources for good skin and shiny coats.

## **Minerals:**

Minerals have important control functions. Macro minerals (Calcium, (plaster, glue) phosphorus, magnesium, potassium and soda) are the largest group. Micro minerals (iron, zinc, copper, manganese and selenium) are very important in controlling bodily functions and keeping it alive.

## **Vitamins:**

The main actions are to control bodily functions. Vitamins are divided (bosses telling each into two groups; Fat-solubles (A, D, E, and K) and water-solubles (Thiamine, ingredient to do its riboflavin, niacin, pantothenic acid, folic acid, B6 and B12-vitamins. specific job)

**If one of the ingredients is not in balance with the others, they are all imbalanced!!**

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To continue our quest for answers in controlling this disease,

### **What can we do to control this disease and REDUCE its effects?**

The recent studies have shown the importance of nutrition to the development of puppies. Puppies fed with a lower protein diet during the greatest growth period, were found to have better and stronger hip joints than the ones fed with very high or very low protein diets.

Even though these studies proved to the scientists the importance of nutrition, no conclusions could be made as to why. One of the theses was that the nutrition somehow affected the pH-value of the synovial fluid and this was believed to affect

the thickness of the synovial fluid and its lubricating properties. The thickness then depends on dissolved nutrition which is the basis for joint pressure.

In earlier studies, the amount of synovial fluid was thought to make stronger joints, but this theory was later proven wrong, the amount of synovial fluid did not make a difference.

The latest studies have shown undisputedly that wrong nutrition is one of the main culprits to hip dysplasia. Lack or excess of nutrients are the reasons that catapult the genes to create the problem. We now know that this can be partially controlled through nutrition. Reason:

## **SYNOVIAL FLUID = NUTRITION FOR THE CARTILLAGES**

The cartilage will get all its nutrients from the synovial fluid. The synovial fluid gets its nutrients from the diet eaten. The better the diet's nutritional value, the thicker (more nutrients) the synovial fluid.

The synovial fluid is inside a fibrous capsule. This capsule is formed of the inner part and outer part. Within this capsule is where the synovial fluid is. The studies conducted clearly show that the pathological formations are caused by the biological changes in the synovial fluid and this is the area where hip dysplasia occurs. Why is not yet fully known.

Nutrition has shown to play a very important role which must be taken seriously. The balance and quality of nutrients play a paramount role. By selecting a wide based, scientifically balanced diet, especially for the pregnant bitch and the puppies, one can nutritionally reduce the depth and development of this disease.

It is extremely important to note the effects of minerals and vitamins in a given diet. These together influence the formation of enzymes. Enzymes make metabolism to function. It is of no importance what diet the animal eats, if the vitamins and minerals in the diet are not in balance. For anybody who understands the function of vitamins and minerals, it is easy to conclude what an imbalance of vitamins and minerals can do, especially in a pregnant bitch or puppies. This imbalance will prevent the metabolism to function.

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### **What can we do in practise?**

The industrial feeds have tremendous nutritional differences. These differences can be seen in any dog's health. In growing puppies these differences can culminate into serious growth deformations and illnesses. A diet wide in its raw material base (several meats as protein sources), and well balanced vitamin and mineral content, will give the growing puppy the base on which its healthy development is based. If the diet does not contain all nutritional raw materials, the puppy cannot develop in best possible form. The puppy's development is directly linked to its diet.

Many breeders flatly blame the genes when faced with hip dysplasia. This is the easiest and simplest way of finding the "guilty" party.

We must be able to look at this problem from actual facts. The effects of given diet is paramount. Correct balanced nutrition = correct building blocks, are the basis for healthy development and growth.

The speed of growth is astonishing and this speed sets the demands for the quality of nutrition. When the puppy grows, these demands change. The problem with large breeds is too fast growth. The growth process needs to be supported with heavier nutrition during the first 3-4 months. After this, the nutrition needs to be controlled downwards. We recommend a very strong puppy diet (32 % protein, 20 % fat) for the first 3-4 months. After this a drastic reduction in nutrients (protein 21 %, fat 12 %) for the following 10-14 months. By doing this, we can control the speed of growth and most importantly, do not allow any excess amounts in the nutritional level of the synovial fluids resulting into the mentioned overgrowth of cartilage and through this, bone deformation.

We must also recognise that a high quality diet also improves and maintains a higher immunity level in the animal. A puppy which has been fed with a highly nutritional diet has better chances in fighting diseases than the one fed with a diet with lower nutritional values. Puppies that have been fed with a highly nutritional diet, do not suffer from skin- or coat problems. Also allergies will not be able to freely form as the puppies immunity level is high, allowing it to properly fight off any intruding disturbance before it can transform into an allergy.

Our experience is based on breeding. We rely on scientists to tell us how the body functions and why. Rest we learn from actual breeding of puppies. The scientist themselves admit that when a study is over 4 years old, it has normally been proven false. We cannot stare at a study made in the 70's and 80's, unless there are studies in the 90's proving the earlier studies correct.

There has been tremendous leaps made in recent years in the science of finding out exactly what makes the bone grow. At the end of the article we will have the text of the abstract. What this finding means is simply that these scientists found the tiny small protein that makes bone grow and found away to use it in the benefit of sick dogs. It took them close to 10 years to conduct this study, but it shows how far our scientists are getting in their quest of finding the answers. Soon they will find a way to control BSE (a protein gone crazy) and AIDS (a virus breaking down immunity).

There are so many things yet unknown, but sooner or later these secrets will be relieved. While we wait, we can take steps to correct problems as we know of today. Back to our own real life experiences directly linked with bone growth problems:

- A 4 month old puppy of a New Foundlander, front paws turned outwards (O.D.). Diet consisted of home cooked diet together with low quality (low cost) industrial feed. The puppy moved to 100 % Eagle Maintenance/Senior diet. At 8 months, paws straight, today a healthy adult. No coat or skin problems, no allergies.

- German Shepherd, breeder had recommended a grain based industrial feed. At 8 months of age, front legs badly turned outward, joints very loose and bent. Changed to Eagle Maintenance/Senior, legs started to visibly normalize in 4 weeks, at 12 months straight and well formed healthy legs.
  - Breeder (+30 years) of golden retrievers. Earlier with home cooked, later with "latest" high quality industrial feeds. Hip Dysplasia rate 32 %, (in spite of carefully analysed feeding). Average hip dysplasia rate in the country 44 %. Changed totally into Eagle diets in 1991. After 7.5 years, Hip Dysplasia rate 18.8 %. Not only this, but average litter size increased from 5-7 to 8-10 puppies per litter. No allergies, no skin or coat problems. Survival rate increased from 88 % to 98 %. Bitches and puppies fed Eagle Growth. Puppies until 4 months, then switched to Eagle Maintenance/Senior for 4-12 months, then Eagle Adult and/or Lamb & Rice as adult diet.
  - Puppy buyer, from the above breeder, "saved" money and fed cheap grain based diet. Puppy grew up on this low quality diet. Had puppies from a healthy dog, 6 puppies altogether, one did not survive, 1 puppy was healthy, 4 had hip dysplasia.
  - Maremmano Abruzzese, 9 months, front legs turned outward, heavy cartilage accumulation at joints, clearly visible. Switched to Eagle Maintenance/Senior diet. Legs corrected, but some of the excess cartilage remained. At 12 months changed to Eagle Lamb & Rice diet.
  - Great Dane 7 months. Front legs turned inward. Change to Eagle Maintenance/Senior diet. In 2 weeks visible improvement seen, within 4 weeks legs normal. At 18 months changed to Eagle Adult.
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## Conclusions:

Even though our experiences are not "scientifically" based, these give a clear signal of the paramount effects that the daily diet has. These experiences of ours, together with the information flowing from the scientists, confirm our belief of the importance of nutrition.

Every dog has to be monitored as an individual. Every dog's metabolism works a little differently. Many aspects influence this. Environment is one big issue. Does the animal live under stressful conditions? This alone can mean up to 30 % more nutrients being consumed.

It is impossible for anybody to give exact feeding amounts to any breed of dogs. Even within a litter, there are considerable differences in the utilization of nutrients from a diet. For breeder of large breed dogs, a hint of potential problems is:

**Front legs turning inward = Not enough nutrients, especially high quality proteins.**

**Front legs turning outward = Too much protein**

All breeders know the importance of the balance between calcium and phosphorus. However, many breeders do not follow the daily feeding amounts. Calcium and phosphorus values on the bag of food are given as percentages. If a dog is on a diet which is 80 % digestible, the actual intake of these minerals is proportionally much higher than on a diet of 90 % digestibility. This is one of the reasons for imbalances and arises from improper feeding amount. Never supplement with calcium on an industrial feed. Calcium is one of the cheapest raw materials, so one can be assured that maximum amount are in the bag. It is more important to follow ratios. Good balance is 1.6 % calcium, 1.1 % phosphorus.

The balance of vitamins and minerals is of extreme importance. When preparing diet at home, it is almost impossible to have the correct, optimal balance. (None of us has a laboratory at home to inspect each raw material of their vitamin and mineral contents). This is best to be left with the manufacturer.

Proteins being the basic building blocks, there should be several sources of different protein sources. A diet consisting of chicken, meat, fish and egg, is recommended. If on every bite the dog eats, it gets all of these, the changes for satisfying the dog's needs are better met, than with a singular protein source. Vegetable based materials should not be protein sources. They are cheap as raw materials, but the utilization of vegetable based proteins by the dog is very low and we really see no reason why vegetables should be used as protein sources as meats are so much better.

We hope this article sheds some light to this difficult question. Below are several references where you can continue your own research. Our aim is to have healthier dogs bred. Anything that can be done to achieve this aim is welcome.

Author:

References: Prf em PhD DMV S.Paatsama, PhD DMV P.Axelsson, Prf PhD MD T.S.Lindholm, Phd MD T.J.Gao, R.D.Kealy, S.E.Olsson, D.F.Lawler, J.C.Cargill, G.Lust, W.T.Beilman, V.T.Rendanom S.J.Morgan

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