



## **INFLUENCE OF NUTRITION AT YOUNG AGE ON CANINE HIP DYSPLASIA IN GERMAN SHEPHERD DOGS: A CASE-CONTROL STUDY FROM FINLAND**

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### **Introduction**

Canine Hip dysplasia (CHD) is one of the most common orthopedic problems seen in small animal practice. It is considered a polygenic multifactorial disease with quantitative trait inheritance leading to osteoarthritis. Additionally to the genes, also environment plays a key role in development of CHD. To be able to analyze the relationship between different type of food items or diets and disease, data were gathered through a huge owner oriented internet questionnaire: The DOGRISK data.

### **Materials and methods**

All German Shepherd dogs with well answered questionnaires and verified official hip radiographs were chosen: Those with severe CHD as the case group and with healthy hips as the control group. There were no significant demographical differences between the groups. Associations between diseases and 54 food items served at ages 2-6 months (n=54 severe/103 healthy) as well as >6-18 months (n=49/81, respectively) were analyzed using cross-tabulation and Pearson Chi-square test. The difference in percentage of ingested dry, other commercial, home-cooked, or bone and raw food (BARF) diets were analyzed using the Mann-Whitney U-test.

### **Results**

The diet at 2-6 months of age showed a significant association between the following raw food items and being free from CHD (Table 1): raw offal, raw meat, raw bone and -cartilage, raw tripe, raw fish, raw egg, and animal oils ( $p < 0.001-0.024$ ), whereas cooked meat, cooked bone and -cartilage significantly associated with an increase in CHD ( $p < 0.005-0.037$ ).

The diet at >6-18 months of age showed a significant association between the following food items and being free from CHD (Table 1): raw offal, raw meat, raw bone and -cartilage, raw tripe, and raw fish as well as cooked sausage ( $p < 0.001-0.024$ ), whereas table scraps, cooked meat, cooked bone and cartilage significantly associated with an increase in CHD ( $p < 0.005-0.044$ ). No other food items or feeds showed significant associations although there was a trend in many similar items.

At 2-6 and 6-18 months of age the dogs were eating significantly more BARF in the healthy group, compared to the CHD group ( $p=0.004$  and  $0.001$ , respectively) although 75% of all dogs were eating dry food a couple of days a week to daily, at both ages (Figure 1).

FOOD ITEM	2 - 6 MONTHS		6 - 18 MONTHS	
	$r_s$	P-value	$r_s$	P-value
Raw offals	-0.23	0.010*	-0.31	0.001*
Raw fish	-0.21	0.024*	-0.27	0.005*
Raw meat	-0.28	0.002*	-0.24	0.010*
Raw bone and cartilage	-0.38	0.000*	-0.39	0.000*
Raw tripe	-0.23	0.018*	-0.24	0.024*
Raw egg	-0.22	0.022*	-0.18	0.100
Cooked meat	0.26	0.005*	0.26	0.005*
Cooked bone and cartilage	0.17	0.037*	0.16	0.007*
Sausage	-0.02	0.380	-0.04	0.021*
Remains of a meal	0.08	0.235	0.1	0.044*
Oils, fats of animal origin	-0.22	0.022*	-0.18	0.092

Table 1. Significant (\*) associations between food items and CHD,  $r_s$  = Spearman's correlation coefficient.

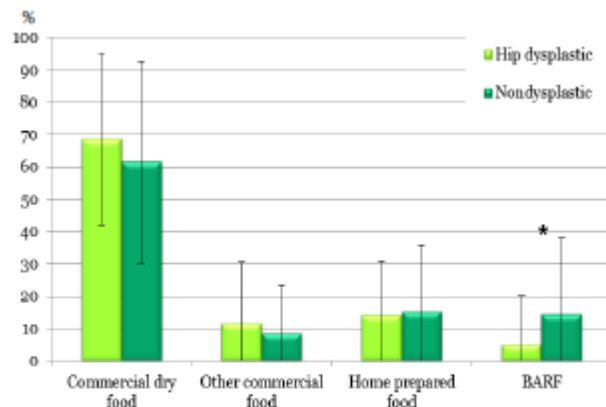


Figure 1. Portion of different foods fed to the puppy at the age 2-6 months, \* = significant difference on the level  $p \leq 0.05$ .

## Conclusions and clinical relevance

***The results indicate that raw food fed at young age could protect German Shepherd dogs from CHD. The study also suggests that the feeding cooked meat, bone and cartilage should be avoided, because they might increase the risk of CHD.***

***This was the first time that the influence of food, ingested as puppy and youngster (before hip x-ray), on the development of CHD, was studied. To test these results, prospective clinical studies are needed.***

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