



RESEARCH PROGRESS REPORT SUMMARY

Grant 01840: Health Implications of Early Spay/Neuter on Canine Health

Principal Investigator: Dr. Benjamin L Hart, DVM, PhD

Research Institution: University of California, Davis

Grant Amount: \$146,589.00

Start Date: 2/1/2014 **End Date:** 1/31/2016

Progress Report: Mid-Year 2

Report Due: 7/31/2015 **Report Received:** 7/29/2015

Recommended for Approval: Approved

(Content of this report is not confidential. A grant sponsor's CHF Health Liaison may request the confidential scientific report submitted by the investigator by contacting the CHF office. The below Report to Grant Sponsors from Investigator can be used in communications with your club members.)

Original Project Description:

This project extends our just-completed ACORN grant with Golden Retrievers, where we found that spay or neuter was related to a significant increase in risk in five diseases of concern: hip dysplasia; cranial cruciate ligament tear; lymphosarcoma; hemangiosarcoma; and mast cell tumor. Importantly, the disease risk was dependent upon whether the dogs were female or male and whether the spay or neuter was performed early (before one year of age) or late. Mammary cancer occurred so infrequently that it could not be analyzed.

Because breeds differ in vulnerability to joint disorders and risks of various cancers, we propose to expand this approach, on a breed-by-breed basis, to additional popular breeds and analyze all important joint disorders and cancers in each breed. We propose to include in this phase Labrador Retrievers, German Shepherd Dogs and Dachshunds. Upon negotiation with CHF, we will include 1-2 additional breeds, such as Rottweilers, Chihuahuas, Standard Poodles or Miniature Poodles.

We now know the numbers of subjects needed for each breed and the minimum number of disease cases needed to perform statistical analyses. For the breeds mentioned above, our database has sufficient subjects. The expected results will be of immediate benefit to caregivers of the breeds wishing to reduce the likelihood of various devastating diseases.



Grant Objectives:

To develop a generalized understanding of the impact of early spay and neuter on disease risk in dogs.

Publications:

Hart, B.L., L.A. Hart, A.P. Thigpen and N. H. Willits. 2014. Long-term health effects of neutering dogs: Comparison of Labrador Retrievers and Golden Retrievers. PLoS ONE 9(7): 10.1371/journal.pone.0102241.

Report to Grant Sponsor from Investigator:

Adverse Long-term Health Effects of Neutering in Different Breeds of Dogs

Background

The long-term goal of this project is to evaluate, using one consistent and uniform database at our large veterinary medical center with 50,000 cases per year, the breed-specific effects of neutering (referring to both neutering and spaying) at different ages on joint disorders (hip dysplasia, cranial cruciate ligament tear and elbow dysplasia) and some cancers (lymphosarcoma, hemangiosarcoma, mast cell tumor). The effects of neutering at various ages are also examined with regard to mammary cancer, urinary incontinence, and pyometra in females. Our previous studies were on the Golden Retriever and Labrador Retriever (supported by CHF), published in two papers in the open-access journal, PLOS ONE (doi: 10.1371/journal.pone.0102241 and doi: 10.1371/journal.pone.0055937).

This report of unpublished research since this earlier work, will give a rough idea of the findings.

German Shepherd Dog

Using a database for this breed of 1,250 cases, we found that 7 percent of gonadally intact males and 5 percent of intact females were diagnosed with one or more joint disorders. But neutering in the first year increased the incidence of one or more joint disorders by 3-fold over that of the intact dogs. The occurrence of the cancers we followed in this breed was at a low 3 percent in the intact males and females, and was not affected in either sex by neutering. The take-home message is that delaying neutering until the dogs are at least 1 year old markedly reduces the likelihood of one or more disabling joint disorders.



Rottweiler

Using the database for this breed of 696 cases we found that 9 percent of intact males and 16 percent of intact females had at least one joint disorder. Neutering during the first year increased the likelihood of a joint disorder in both sexes by up to 3 times. The occurrence of one or more of the cancers in the intact dogs was relatively high, 12-13 percent, but neutering at any age did not increase the rate. Delaying neutering in this breed until the dog is well past a year of age should avoid increasing the already high risk of a joint disorder.

Boxer

With a database for this breed of 646 cases, we found that the occurrence of one or more joint disorders in intact males and females was just 2 percent, and there was no indication of an effect of neutering at any age. We are tentatively attributing this to the somewhat wide stance of this breed. The underlying occurrence of at least one of the cancers in intact dogs was high; 12 to 16 percent respectively in males and females, but there was no indication of an increase in this measure for any neuter period with the exception of a higher cancer occurrence in the 1-year neuter period of males. Until the statistical analyses are done, it seems like avoiding neutering males at the age of 1 to 3 years would be advised.

Small breeds: Chihuahua, Yorkshire Terrier and Shih Tzu

The complete data sets available for analyses were: Chihuahua, 831 cases; Yorkshire Terrier, 553; and Shih Tzu, 322 cases. In all three breeds there was no diagnosis of a joint disorder in intact males and females, and almost complete absence of any indication that neutering increased the incidence of joint disorders. For cancers in the small breeds, the occurrence in the intact males and females ranged from 0 to about 2 percent. For the Chihuahua and Yorkshire Terrier neutering at one time or another increased the occurrence only slightly. In the Shih Tzu the occurrence of one or more cancers increased somewhat in females neutered at 1 year; this is still under analysis. Other than this it appears there is no disease-related issue with regard to age of neutering in these breeds.

Dachshund

With a database for this breed of 548 cases, we found that the occurrence of joint disorders was zero in both the intact and neutered dogs. The occurrence of cancers was also very low in intact males and females with little indication of an effect of neutering. There was a strikingly high level of occurrence of intervertebral disc disease diagnosed in intact males and females, 45 and 35 percent respectively, but this disease was not increased by neutering. It appears that there is no disease-related issue with regard to age of neutering in this breed.