

# Study gauges best canine sterilization ages by breed and gender

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*A new study connects disease risk for joint disorders, cancers, urinary incontinence, and pyometra with reproductive status and sterilization timing in different canine breeds and both sexes.*



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Recent research links sterilization in some dog breeds with various maladies. One study of over 40,000 dogs found that neutered males and females were more likely to die of cancer than those left intact.<sup>1</sup> Another highlighted the absence of estrogen in spayed females as an accelerant for brain aging.<sup>2</sup> In dachshunds, neutering was reported to be a risk factor for intervertebral disk disease (IVDD).<sup>3</sup> All-breed data revealed higher rates of hip dysplasia and cranial cruciate ligament tears in neutered than intact males and females.<sup>4</sup>

Focusing specifically on golden retrievers, Labrador retrievers, and German shepherds, studies have demonstrated an increased incidence of 1 or more joint disorders in dogs neutered before 1 year of age, which is two- to fourfold that for intact dogs.<sup>5-7</sup> In female golden retrievers, spaying appeared to increase cancer risk significantly.

## Probing perils

The aim of the present study<sup>8</sup> was to expand this database by an additional 32 canine breeds (including 3 varieties of poodle). Using retrospective data from medical records at the University of California, Davis Veterinary Medical Teaching Hospital, investigators tracked 3 joint disorders (hip dysplasia, elbow dysplasia, and cranial cruciate ligament rupture) and several cancers (lymphoma, mast cell tumor, hemangiosarcoma, and osteosarcoma). They also looked at mammary cancer, pyometra, and urinary incontinence in female dogs, as well as IVDD in Welsh corgis (Pembroke and Cardigan) and dachshunds.

Disease rates were recorded for intact subjects and for those neutered within each of the following age periods: less than 6 months of age, 6 to 11 months, 12 to 24 months, and 2 to 8 years. Diseases were traced until dogs were 12 years of age or were last seen at the hospital, whichever came later.

The researchers then incorporated these data into guidelines for neutering decisions that minimize disease risk. For almost 40% of the breeds studied, sterilization did not appear to increase the risk for cancer or joint disease; the study authors concluded that those wishing to neuter individuals of the following breeds should decide for themselves on the appropriate age to do so:

- Cavalier King Charles spaniel
- Chihuahua
- Dachshund
- English bulldog
- Great Dane
- Jack Russell terrier
- Maltese
- Miniature schnauzer
- Pomeranian
- Toy poodle
- Pug
- West Highland white terrier
- Yorkshire terrier

## All in the breeding

For a number of breeds, and particularly for small breeds, neuter age did not appear to impact the risk for joint disorders or cancers. But for 3 of the largest breeds—German shepherds, Rottweilers, and Labrador retrievers—the investigators extrapolated their findings into a concise admonition: Sterilize males and females late. Waiting beyond 6 to 12 months of age in Rottweilers and Labrador retrievers, and at least 2 years in German shepherds, cut the risk for the joint disorders studied.

In male beagles, golden retrievers, and miniature poodles, the risk for joint disorders was reduced by delaying neutering until at least 1 year of age, and 2 years in Bernese mountain dogs. For female cohorts, sterilization age did not impact the risk for joint disease. However,

for female Australian cattle dogs and Saint Bernards, the chance of joint problems was significantly lowered by waiting until at least 6 months of age to spay.

When it comes to cancer, the results were similarly breed-centric. The 2 breeds for which both males and females demonstrated vulnerability were the border collie and the boxer. In boxers, spaying before age 2 increased cancer risk from 11% (intact females) to 20%; for males, the corresponding risk increased from 17% (intact males) to 32%. Both sexes carry the recommendation to delay sterilization until after age 2. For border collies, cancer prevalence dropped in both genders when sterilization was delayed past 1 year of age.

For males alone, delaying neutering apparently cut cancer risk in Boston terriers, golden retrievers, Irish wolfhounds, and standard poodles. For females, collies and shih tzus seemed to benefit similarly from deferred spaying. Surprisingly, female golden retrievers experienced significantly lower cancer rates when left intact.

Looking specifically at mammary cancer, however, Welsh corgis and Rottweilers left intact were at particularly high risk (> 8%). But in other breeds, spaying during certain age intervals—6 to 11 months, for example—wrought a greater likelihood of mammary cancer than not spaying at all.

In several breeds, the reproductive tract was shown to be something of a menace. Left intact, female Saint Bernards, Rottweilers, and Shetland sheepdogs were heavily (> 12%) plagued by pyometra.

Perhaps nowhere is the horsepower of hormones more evident than for urinary incontinence, which is often associated with estrogen loss from spaying. The investigators found that, for certain breeds, spay timing can impact this risk. In the Shetland sheepdog, for example, one-third of dogs spayed at age 1 year experienced urinary incontinence (hence the directive to delay spaying these individuals past 2 years of age). Similarly, the authors advocate postponing spay surgery until age 2 in German shepherds and until after 1 year in collies, English springer spaniels, and West Highland white terriers.

The investigators also looked at IVDD in the chondrodystrophic breeds. For dachshunds, altering did not increase IVDD occurrence in males or females. In corgis, there was also no increase with spaying females. But for males neutered before 6 months of age, the rate skyrocketed from 3% to 18%.

## Understanding hormone play

This study illustrates the breed differences and gender impact with regard to cancer and joint disorders, pyometra, and urinary incontinence associated with altering at various ages. This information can be used by dog owners and their veterinarians to earmark ideal sterilization ages for their companion dogs.

The mechanism by which early sterilizing may precipitate joint problems likely is disruption of long bone growth plate closure by gonadal hormone secretion in maturing juveniles.<sup>9,10</sup> The authors conclude that this continued growth enables the bones to reach greater length, which may disturb joint alignment.

For joint maladies, body size appears to impact vulnerability. Small-breed dogs, such as Yorkshire terriers, Pomeranians, Chihuahuas, and toy poodles, rarely experience joint problems, nor do they manifest neutering-related increases in joint disorders compared with larger breeds. Small breeds are also somewhat spared of cancer, whether intact or sterilized.

When looking at cancers, the results of this study may not reflect actual neutering-related risk. Cancers generally occur in later life stages, but the number of dogs included in this study over age 8 was small; in fact, the mean age of last hospital record entry was 4.5 to 5.5 years. For mammary cancer, in particular, the mean age at last hospital visit fell short of the late-onset mean age for mammary cancer in intact females. Hence, the low occurrence of mammary cancer in intact females studied herein may not reflect actual lifetime incidence.

Another limitation of the study is that it incorporates relatively few of the recognized registered breeds. Those included were chosen either because they were the most popular—providing a data set of 200 to 500 cases, sufficient for statistical analysis—or because they enabled sampling of the largest range of breed sizes.

While the study substantiates the variable impact of hormones on several disease processes in different breeds of dogs, it concludes that for many of the breeds studied, sterilization can be done at any age without affecting risk for joint diseases and cancer.

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