Neuter, Leave Intact, or What?

For many years the decision to neuter or leave a dog intact has rested on a foundation of science, dogma, and culture. Several recent peer-reviewed studies based on large populations deserve special attention. Researchers examined how sex hormones influence risk for disease or behavior problems

A team at the University of California-Davis focused exclusively on Golden Retrievers and hip dysplasia, cranial cruciate ligament tear, lymphosarcoma, hemangiosarcoma, and mast cell tumor. The study population was divided into six groups. Each sex had three groups – those left intact, those neutered before 12 months of age, and those neutered after 12 months of age. With reference to hip dysplasia, neutering after 12 months of age was more protective than being left intact or neutering before 12 months of age. The incidence of cranial cruciate ligament tears occurred less often in dogs left intact. Female dogs left intact had a lower risk of hemangiosarcoma while for males, neutering after 12 months of age was more protective against this cancer. Lastly, male dogs that were neutered before 12 months of age and female dogs left intact had the lowest risk of mast cell tumors.[1]

A University of California-Davis group was prompted, after the study above, to compare breeds – Golden and Labrador Retrievers. Several joint disorders were examined – hip dysplasia, cranial cruciate ligament tear, and elbow dysplasia. Cancers examined were lymphosarcoma, hemangiosarcoma, mast cell tumors, and mammary cancer. This study's results for the Golden Retrievers were very similar to the first study. However, there was a marked difference between the two breeds. The incidence of joint disorders after neutering at less than six months of age was greater with Labrador than Golden Retrievers. The researchers also concluded that female Golden Retrievers' cancer risks increased much more after neutering at any age compared to male Golden Retrievers and male or female Labrador Retrievers. Interestingly, no intact female Golden Retrievers in this study developed mammary cancer while 1.4% of the intact female Labrador Retrievers and 2% of the dogs neutered between two and eight years of age were diagnosed with mammary cancer. [2]

An older study from 1993 examining a large variety of breeds, as opposed to only one or two breeds as above, also supported that neutered dogs had a higher incidence of cranial cruciate ligament tears.[3]

Vizslas were the focus of another study, specifically how neutering affected risk for behavioral disorders and cancers. Results indicated that neutering at any age significantly increased risk for cancers and fear of storms.[4]

Two studies bear examination that focused exclusively on Rottweilers. Like humans, female Rottweilers live longer than males on average. However, if a female Rottweiler is spayed during the first four years of life, that survival advantage is eliminated.[5] An earlier analysis focused on bone sarcomas and found a three to four times greater risk of bone sarcoma for Rottweilers neutered before one year of age compared to Rottweilers left intact. The authors even stated that there was a 1.4% reduction in bone sarcoma risk for each additional month a Rottweiler was left sexually intact. [6]

Older studies have also shown marked differences between neutered and intact dogs though small sample sizes and questionable methodology bring their accuracy into question. Three different studies reported a two to four times greater risk of prostatic cancer in neutered male dogs over those left intact.[7, 8, 9] Conversely, no association was found between neuter and intact status and the development of prostatic cancer in another study.[10] Urinary incontinence may occur from two to eight times more frequently in neutered female dogs compared to those left intact, though age of neutering may also be important.[11, 12] The occurrence of hypothyroidism has also been examined with a greater risk found in neutered dogs versus intact.[13] Two studies found more behavioral reactivity or aggression in neutered female dogs compared to intact females. [14, 15]

Even the authors of some studies expressed cautions: that the results may not be applicable to other breeds, that neutering has greatly reduced pet overpopulation and subsequent euthanasia rates, and that there are well-done studies showing benefits of neutering with respect to other health and behavior issues.

For female dogs, prevention of two medical conditions—pyometra (infected uterus) and mammary cancer - is often cited as reason to neuter especially since 50% of mammary cancers are maligant.[16] Pyometra, a potentially life-threatening infection of the uterus, is mostly eliminated with traditional neutering. [17] Over 200,000 intact females dogs of various ages and breeds were the focus of a Swedish study with 23-24% experiencing pyometra by ten years of age.[18] For all breeds combined, a mammary cancer incidence rate of 13% by age ten was found for intact females.[17] For dogs neutered prior to 2.5 years of age, mammary cancer risk is greatly reduced by approximately two thirds.[19, 20]

A retrospective analysis of cause of death for over 40,000 dogs without regard to breed found that sterilization was strongly associated with longevity. Infectious disease and other causes of death were decreased in neutered dogs however; some causes of death such as cancers increased with neutering. The authors evenly divided their data into small, medium, large, and giant breeds to determine if size changed the results – which it did not.[21] This does bring to light some questions though. Are the deaths from infectious disease a reflection of a specific pet owning population that does not utilize veterinary services such as vaccination in addition to neutering? Are the increased cancer related deaths over infectious disease deaths for neutered dogs because these pet owners are providing better preventive care including vaccinations and lived longer? Longer lifespans are associated with a greater chance of developing cancer.

Other effects of sex hormones should also be considered. A neutered male dog is less likely to roam, engage in aggressive behavior toward other dogs, urine mark, and mount.[22, 23] Traditional spay and neuter eliminate the risks of ovarian and testicular cancer respectively though both have low incidence to begin with. While testicular cancer can occur in intact male dogs, it is rarely malignant and death is uncommon. Intact male dogs will be more likely to experience benign prostatic enlargement, other non-cancerous prostatic diseases, perineal and inguinal hernias, and non-malignant perineal cancers than

neutered dogs. Bacterial prostatic infections, which can be life threatening, are more common in intact male dog than those neutered.[24] Hormone driven mating behavior can lead to sexually transmitted diseases, physical injury, and a stressed out household. And let's not forget the mess of a female dog in heat.

So how can owners make informed decisions regarding allowing their dog to keep their sex hormones or not in light of such studies? There is no one answer regarding neutering or leaving a dog intact that is applicable to every dog and every situation. One option is learning which medical and behavioral conditions a particular breed is prone and how sex hormones influence those conditions. The decision whether to neuter should be individualized, taking into account breed, age, the intended use of the dog, sex, household environment, owner preferences, and dog's temperament. To avoid returning to previous overpopulation and euthanasia rates yet consider the benefits of sex hormones – a new option is emerging – sex hormone sparing sterilizations.

If an owner has excellent control of their male dogs at all times so as to be able to prevent roaming behaviors and the accompanying injuries that can result, a vasectomy (removal of a portion of the spermatic cord) instead of a traditional castration is an option. While an owner can leave a male dog completely intact, even one unintended pregnancy can add to a community's overpopulation problem or throw a wrench into a planned breeding program. Why not eliminate that risk through vasectomy? If this route is chosen, regular testicular and prostate examinations should be performed regularly to identify medical issues early. A small risk of spontaneous spermatic cord healing, restoring fertility, can rarely occur.

The decision for a female dog is a bit more complicated. A female dog has three options – remaining intact, traditional spay (ovariohysterectomy), or an ovary sparing spay (hysterectomy). The latter involves removing the uterus and cervix, while leaving one or both of the ovaries intact for physiologic, health, and/or behavioral reasons. One ovary will still produce the same hormones and allow the dog to cycle the same as if both ovaries remained, but halves the risk of ovarian cancers. With an ovary sparing spay, the ovary is still functional, so, while the female cannot become pregnant, heat cycle behavior and small amount of bleeding (from vaginal membranes) will still occur. She will still attract males and will stand to mate. A dog with an ovary sparing spay should still be confined away from males for the full three weeks of the heat cycle, to reduce the risk of injury from the attempted act of breeding and sexually transmitted diseases. Owners must stay alert to this possibility of mammary tumors—the only significant health risk remaining after a hysterectomy, as their dog ages, with regular examinations.

Overall, several reasons for considering an ovary sparing spay or vasectomy exist.

- When puppy contracts require sterilization yet owners desire the benefit of sex hormones;
- When performance and show dogs will not be used for breeding;
- When certain dog breeds are prone to diseases and condition that may occur more often when sex hormones are removed.

Studies have been performed on some breeds examining various disease and behavior developments. Results indicate that the health benefits of keeping sex hormones may outweigh the health risks of

removing them. One should not assume that the presence of sex hormones will outweigh the benefits of traditional ovariohysterectomy or neuter for all breeds. No perfect study examining the removal of the sex organs' effects on all breeds, all medical conditions, and all unwanted behaviors can be performed. Thus, no single sterilization recommendation can fit every dog and owner however, the new sex hormone sparing sterilizations represents an exciting opportunity to individualize such medical decisions yet still prevent reproduction.

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