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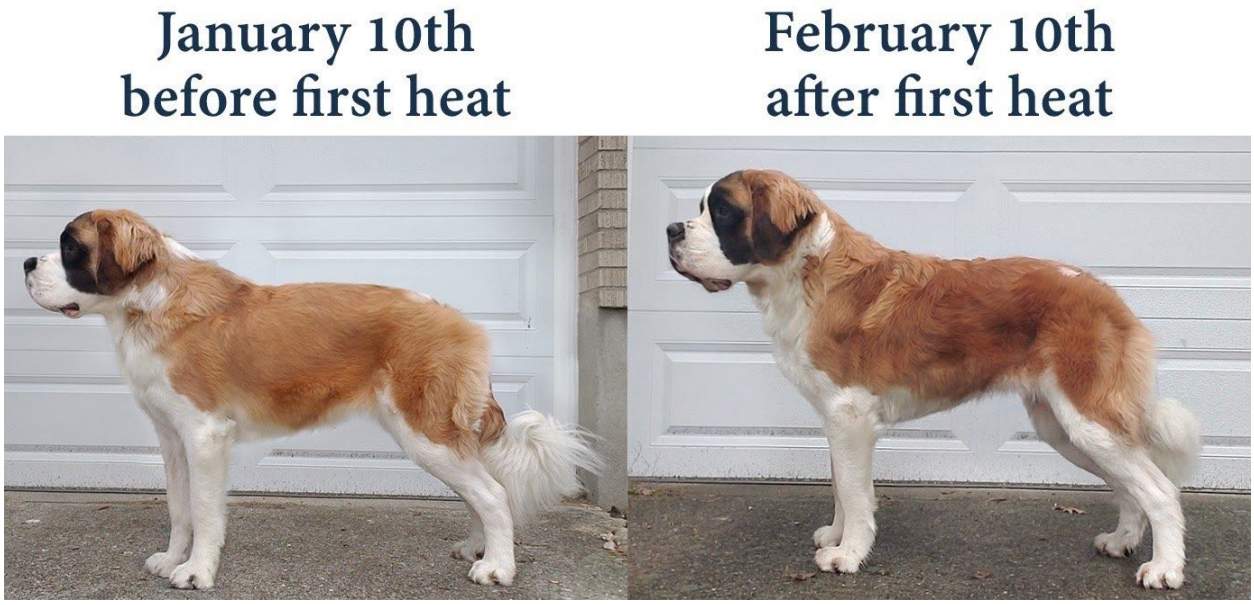
Risks Associated with Pediatric Neuter:

Cancer risks, orthopedic concerns, and behavioral issues



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"Help control the pet population, have your pet spayed or neutered" (Barker). If you were a fan of *The Price is Right* like I was when I was younger, then you likely heard this phrase often. Not only was it a statement that was made on every episode and continues to be said today, it demonstrates our society's viewpoint on why we should spay or neuter our pets. It is done so primarily out of concern for population control, and not necessarily out of concern for what is best for our pets in the long term. For this research, I will refer to both processes of spaying and neutering by the gender-neutral term of neutering and I will be referring strictly to dogs.

I have spent many years working with animals of various species in many different scenarios, but most recently I have spent approximately three and half years working in a veterinary clinic as a technician mainly working with dogs and cats. In my time working as a veterinary technician, the majority of the dogs I have seen have been neutered and most of the surgeries I have assisted in have been the process to neuter. In my desire to make sure that I was always making the best choices regarding my dogs' health, I dove into researching the pros and cons of neutering and when the best age to do so was.

The most commonly recommended age by which to neuter is 6 months and is based on the average age that female dogs begin their first estrous cycle (Flaim 15). This is often referred to as pediatric neutering. The estrous cycle begins at the onset of puberty and occurs cyclically. (Romich 165). The overall purpose of the cycle is to prepare the uterus for fertilization (Romich 165). The process for neutering a female dog, also referred to as a bitch, involves the surgical removal of both ovaries and the entire uterus, while neutering a male dog involves the surgical removal of both testicles (Polak). These processes, though quite simple, are fairly invasive especially for the bitches.

Population control is the most popular reasoning the average person neuters their dogs. For example, in a survey of over 3,000 people, 35.3% responded that the reason they chose to neuter was to prevent unwanted litters and another 30% stated that the shelter they had adopted from had already done it (Hutslar). That is over 65% of the dogs in question who were neutered to prevent unwanted puppies. In addition to population control, there are a couple reasons that are commonly given as to why neutering before maturity is preferred, including prevention of mammary cancer and prevention of pyometra. The risk of mammary cancer in developing bitches has been listed as 0.5% when

spayed prior to their first estrous cycle, 8% when spayed after their first cycle, and 26% when spayed after their second cycle (Zink 5). With that being said, more recent studies have concluded that there is little evidence supporting this, so it should not be the final basis for recommendation (Zink 5). Pyometra is an infection of the uterus that results from hormonal changes in the reproductive tract following the estrous cycle (Ward 1). The elevated hormones cause the lining of the uterus to thicken, which can eventually lead to the development of cysts creating a perfect environment for bacteria (Ward 1). Should a pyometra infection occur, the preferred choice of treatment is surgical removal of the uterus and ovaries (Ward 16). While pyometra is an ever-lingering concern, there are many other variables to consider.

It is time to reconsider our thought process and the accepted timeline on when it is best to neuter our dogs. The question we need to be asking ourselves is: What are the health and behavioral risks of pediatric neutering? While arguments can be made in favor of neutering early in life, I believe that new studies demonstrate that pediatric neutering does more harm than good on the basis of increased cancer risks, higher orthopedic concerns, and behavioral issues.

Cancer of any kind can be one of the most heartbreaking diagnoses you can receive for your dog, so it stands to reason that we should be doing everything we can as pet owners to minimize those risks. First, we must determine what those risks are.

Research done on Golden Retrievers at the School of Veterinary Medicine, University of California-Davis, UC Davis, showed significant increases in the risk of Lymphosarcoma and Mast Cell Tumors in early neutered dogs (Torres et al 3 & 5). Lymphosarcoma is a cancer of the lymphatic system, which plays a large part in the immune system and mast

cell tumors are malignant growth of the cells that produce histamine (Romich 215 & 135). In regard to Lymphosarcoma, the rate of occurrence in intact dogs was lower than in early neutered dogs, dogs neutered prior to 12 months of age, however difference in occurrence was most significant in males (Torres et all 3). No cases of the disease were observed in late neutered dogs, dog neutered after twelve months of age, but the early neutered males were nearly 3 times more likely to be affected than intact males (Torres et al 3). When studying occurrence of mast cell tumors, MCT, researchers found that it did not occur in any of the intact females studied, but was observed in 2.3% of early neutered females and 5.7% of late neutered females (Torres et al 5).

Another cancer that has been observed is hemangiosarcoma, an often-fatal cancer of vascular tissue (Romich 215). The risk of this cancer jumps significantly in females after being altered (Torres et al 2013). In one form of the disease, cardiac hemangiosarcoma, neutered males were 1.6 times more likely than intact males to develop the disease, but neutered females were more than 5 times more likely than their intact counterparts (Zink 1). When observing splenic hemangiosarcoma, researchers noted that neutered females were at more than double the risk than intact females (Torres et al 5).

Another often fatal cancer that has proven to be a greater risk for early neutered dogs is osteosarcoma, a malignant cancer of the bones (Romich 215). Prematurely neutering essentially cuts off the hormones necessary for the appropriate closing of the growth plates. (Flaim). This causes longer limbs and narrower heads and chests which allows for a higher risk of osteosarcoma (Flaim). According to a Rottweiler specific study, dogs that were neutered prior to one year had more than a three times greater risk of developing osteosarcoma when compared to intact Rottweilers (Zink 1). A separate study

unspecific to breed found that neutered dogs in general had a 2.2 times greater risk than their intact counterparts did of developing bone cancer (Zink 1). These are only a few of the countless possible cancers that our dogs can succumb to, but when looking at the statistics for just these few alone, the results are staggering. Neutering is often promoted as a way to prevent cancer in your faithful, furry best friends, so it is quite a shock to see that the odds are stacked against neutered dogs when it comes to these cancers with often poor prognoses.

Orthopedic concerns are often a disruption to an active dog's normal way of life, with injuries like CCL ruptures taking weeks to months to heal and disorders like hip dysplasia possibly never allowing a dog to fully return to unrestricted activity levels. In addition to the elongated limbs due to the premature shut off of hormones to the growth plates mentioned previously, there are a few orthopedic concerns that pediatric neutering heightens the risk of including cranial cruciate ligament, CCL, ruptures and hip dysplasia.

A comparison study done at UC Davis examined the rates of CCL tears and hip dysplasia in Labrador Retrievers and Golden Retrievers. They examined their results by breed and by sex. For male golden retrievers, 27% of dogs neutered prior to 6 months of age had been diagnosed with at least one joint disorder (Hart et al 3). If the age of neuter was delayed to between 6 and 11 months of age, the diagnosis rate dropped to 14% (Hart et al 3). These incident rates were 5 and 3 times that of the intact male goldens respectively, which had a diagnosis rate of 5% (Hart et al 3). For Labrador retrievers, the diagnosis rate for either disorder in intact males remained the same at 5%, while the dogs neutered before 6 months increased to 12.5% (Hart et al 4). There was a smaller increase in risk for the disorders in male Labradors, but an increase just the same.

Switching the spotlight over to the females, intact golden retrievers also had a 5% rate of diagnosis for either CCL ruptures or hip dysplasia (Hart et al 4). Neutering prior to 6 months had a 4-fold increase in the rate of diagnosis for female goldens, upping that percentage to 20% of dogs examined (Hart et al 4). Female goldens neutered between 6 and 11 months had a diagnosis rate of 13%, twice that of the intact females but still less than the earlier neutered females (Hart et al 4). Similar to the male Labradors, the females also had a 5% diagnosis rate for either disorder when intact (Hart et al 7). Female Labradors specifically were vulnerable to hip dysplasia when neutered early (Hart et al 7). The incidence rate of hip dysplasia in an intact female Labrador was 1.5%, whereas the early neutered females had a 4-5% rate of diagnosis (Hart et al).

In her article “Early Spay-Neuter Considerations for the Canine Athlete”, Dr Chris Zink discusses possible reasoning for the increased risk in CCL ruptures in early neutered dogs. She cites a study of agility dogs that displayed that in dogs that were neutered prior to 8 months of age their tibia and radius were significantly longer than the femur and humerus. This relates to previous discussion of delayed growth plate closure causing elongated and heavier limbs. According to Zink, premature removal of the sex hormones affects the genetically predetermined relationship between the femur and tibia altering body proportions. These abnormal proportions can result in an unusual angle at the stifle, comparable to the knee in humans, and a longer, heavier tibia which would then place an increased amount of stress on the CCL.

These heightened risks of orthopedic concerns are especially troublesome if you live a particularly active lifestyle with your dogs and wish to do high impact activities, but they

are something that every dog owner needs to consider as no one wants their companion to live a life of pain.

Neutering is often given as a quick fix solution to various behavioral problems. Many people are of the idea that neutering reduces aggression, reactiveness, and excitability, when in fact, the research shows exactly the opposite. In a study done on 2,505 Vizslas, groups of dogs neutered prior to 6 months, between 7 and 12 months, and after 12 months of age were followed. They were examined for various behavioral disorders such as: separation anxiety, aggression, hyperactivity, fear biting, and various noise anxieties. The dogs neutered prior to 6 months of age had a significantly higher risk of developing a behavior disorder than those neutered later or those left intact (Zink 314). Additionally, when examining the age the behavior disorder was first diagnosed, it revealed that the earlier the dog was neutered, the earlier a behavioral problem was diagnosed (Zink 314).

Another behavioral study examined over 10,000 dogs through the use of the Canine Behavior and Research Questionnaire. This peer reviewed and proven reliable questionnaire consists of 101 questions that examines behavioral characteristics, including aggression, fearfulness, excitability, and trainability (Farhoody 1). The dogs examined in this study were split into groups based on the age of their neuter: those neutered at or prior to 6 months, between 7 and 12 months, between 13 and 18 months, and those neutered after 18 months. Those age groups were also compared to intact dogs. In relation to aggression, fear, anxiety, and excitability, neutered dogs of all ages scored significantly higher than intact dogs in all categories (Farhoody 1-3). For aggression, anxiety, and fear, their results showed that the earlier the neuter, the worse the behavioral problem (Farhoody 1-3).

These studies and others like them are proving that surgery as a behavioral fix is not only a drastic measure, but it could very well be enhancing the very behaviors we are trying to rectify.

From these studies, it would seem that dog owners have been drastically misguided in the pursuit of what is best for their dog's health. Despite the constant line of neutering being a preventative for many cancers and other issues, the research is proving that there is an increased risk in everything from cancer to orthopedic concerns to even behavioral problems due to the early removal of sex hormones.

Examination of the standard neutering protocols, although it is beginning to happen more, is not happening frequently enough. Many people are still of the opinion that the benefits outweigh the risks, or they are completely unaware of the risks altogether. For myself personally, being aware of these risks is of the utmost importance because I want my dogs to live the longest, healthiest lives possible. I imagine that for many dog owners, that sentiment is shared strongly. We need to do best by our dogs and to do so we need to arm ourselves with knowledge and challenge the status quo.

With this education out there, our next step should be exploring other options of sterilization for those owners who do not feel comfortable in their ability to prevent a completely intact dog from procreating. There are several less invasive procedures including tubal ligation, hysterectomies, and vasectomies that are typically faster, less risky, and less costly that allow the dog to retain their sex hormone producing organs while being unable to reproduce (Becker). These surgical options are more difficult to come by as veterinary schools in the United States typically do not teach these procedures (Becker). By becoming more educated on the risks associated with pediatric neutering and on

alternative sterilization techniques, we can create a greater demand for these kinds of procedures which would then give veterinary schools a reason to begin teaching these procedures as the norm. The more we educate ourselves on these issues, the better choices we can make for our dogs, and in turn ideally the longer amount of time we will get to spend with them.

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