Welfare Aspects of Gonadectomy in Dogs and Cats

Elective gonadectomy of dogs and cats is one of the most commonly performed veterinary surgical procedures in the United States. Most veterinarians currently recommend spays and neuters take place between six and nine months of age for dogs and four and six months for cats. However, there does not seem to be a clearly defined literature-based consensus in regards to optimal timing for gonadectomy surgery as it relates to the short- and long-term welfare of the patient. As new literature focused on this issue continues to make novel suggestions, it tends to debunk previous data, and in the process contradicts what was previously recommended. Therefore, the current recommendations are largely arbitrary and loosely based on the limited data at our disposal. In many situations, the actual age at which a puppy or kitten (or dog or cat) is surgically altered depends largely on the animal's circumstances. It is important to weigh the costs and benefits of age-of-gonadectomy surgery from not only an evidence-based platform, but also from an animal welfare perspective.

Many shelters across the United States regularly practice pediatric gonadectomies in animals as young as eight weeks of age. It is estimated that between 3 and 4 million dogs and cats are euthanized every year by American shelters because they never find a home. Early neutering undoubtedly increases the chances of adoption for any given puppy or kitten by making the adoption process more convenient for the new owner. While smaller patients typically allow for shorter surgery times, thus theoretically reducing the potential for anesthetic side effects, there are inherent risks involved with pediatric anesthesia that must be considered. These include a higher risk for anesthetic hypothermia given less subcutaneous fat and a smaller body size, which translates to a higher surface area to volume ratio, coupled with the limited ability to regulate serum glucose under fasted conditions. Many shelter veterinarians would probably agree that pediatric gonadectomy surgery is not ideal. In many cases it is done largely out of necessity and is often the lesser of evils when the choice between increased anesthetic risk and potential euthanasia due to overpopulation for many puppies and kittens is taken into account.

It is well known that gonadectomy surgery has a positive impact on overall longevity, as spayed and neutered dogs and cats generally live longer. These pets are less likely to die of infections, like pyometra, and trauma associated with roaming. These animals tend to have fewer undesirable behaviors that can be directly linked to having gonads. However there is a long list of health issues that can be directly linked to desexing. Gonadectomized patients have a moderately increased risk for obesity independent of age at time of neutering. Prepubescent spay has been linked to delayed physeal closure, which can result in longer-limbed conformation, mild inceased risk for urinary sphincter mechanism incompetence and recessed or hypoplastic vulva and associated cystitis.

The focus of many scientific studies on age at gonadectomy has been relative cancer risk, which is arguably the elephant in the room when considering optimal timing of surgery. It has been known for decades that spaying female dogs prior to their first estrus virtually eliminates the risk for mammary neoplasia later in life, and prevents uterine, ovarian, and vaginal tumors. The risk for mammary tumors increases significantly with subsequent heat cycles. Neutering male dogs at skeletal maturity prevents testicular tumors and markedly reduces the risk of BPH. However, canine lymphoma studies have shown that intact female dogs actually have a significantly lower risk for developing lymphoma when compared to altered females (age of gonadectomy non-specific) and intact males. Multiple studies showed that

females of various breeds spayed after one year of age had a 2-4 fold increased risk for mast cell tumors. Another study showed that golden retrievers spayed after one year of age had a four-fold increase in hemangioasrcoma as compared to females spayed at less than one year of age and intact females.

There has also been some recent light shed on the removal of hormonal influence on skeletal development in large and giant breed dogs. Studies have shown that large breed dogs gonadectomized at less than six months of age had a three-fold increased risk for predisposition for cranial cruciate ligament rupture sue to excessive tibial plateau angle development. Compared to intact dogs, desexed patients, in general and regardless of age, have a two to three-fold risk of rupturing their CCL. In one golden retriever study, the incidence of hip dysplasia in males neutered prior to 12 months of age was double that of intact males, and showed an earlier onset of disease. No significant difference in incidence was noted in females. Please see Table 1 for a summary of age at gonadectomy health risk for associated conditions.

TABLE 1

EFFECTS OF GONADECTOMY ON RELATIVE RISK

Condition	**Effect of OHE**	**Effect of Castration**
Overall longevity	Mild increase in longevity	Mild increase in longevity
Obesity	Moderate increase	Moderate increase
Cranial cruciate ligament disease	Moderate increase*	Moderate increase*
Hip dysplasia	Mild increase*	Mild increase*
Mammary tumors	Marked decrease*	N/A
Uterine, ovarian, vaginal tumors	Prevents	N/A
Testicular tumors	N/A	Prevents
Perianal gland tumors	N/A	Marked decrease
Prostatic carcinoma	N/A	Mild increase
Lymphoma	Mild increase	Mild increase*
Mast cell tumors	Mild increase	N/A
Hemangiosarcoma	Mild increase*	Mild increase
Osteosarcoma	Mild increase*	Mild increase*
Transitional cell carcinoma	Mild increase	Mild increase
Urinary sphincter mechanism incompetence	Moderate increase*	N/A

Condition	Effect of OHE	Effect of Castration
Cystitis	Mild increase*	N/A
Benign prostatic hyperplasia	N/A	Marked decrease
Perineal hernia	N/A	Moderate decrease

*Age at time of surgery may be important. Table Credit: Clinician's Brief

It must be realized that many of these studies are retrospective and very breed-specific and may not adequately represent the overall canine population. Feline-specific studies are altogether lacking in representation. However, with all this information taken into account, there is still no clear black-and-white answer when considering the optimal age of gonadectomy. While there are costs and benefits from a welfare perspective at any given age, each individual animal's circumstances, intended use, breed, size, and current life stage must be considered and the best judgment used to make an informed recommendation. As veterinarians, it is our duty to make these recommendations on a daily basis with the intent of maximizing patient welfare; specifically, we want there to be a good surgical outcome while preventing pregnancy and lowering the incidence of growth-related orthopedic diseases, obesity, urinary incontinence, and cancer later in life. It is our job to educate the public on the pros and cons of early and late gonadectomies using the best current knowledge at our disposal, while still recognizing the potential for change in those recommendations as new information comes to light.

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