

**PROVINCIAL OFFICE**

1245 East 7th Avenue, Vancouver, British Columbia, V5T 1R1  
P 604.681.7271 • F 604.661.7022 • 1.800.665.1868 • spca.bc.ca  
Charitable Registration # BN 11881 9036 RR0001

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Pediatric sterilization review of literature

**Support**

Pediatric spaying and neutering is supported by a multitude of professional animal health organizations.

*“The AVMA supports the concept of pediatric spay/neuter in dogs and cats in an effort to reduce the number of unwanted animals of these species.”*

*“The CVMA strongly supports early (6-16 weeks) neutering of cats and dogs at animal shelters.”*

*“The American Animal Hospital Association supports the concept of neutering cats and dogs as young as 8 weeks of age in order to help reduce the overpopulation problem affecting companion animals.”*

*“The Association of Shelter Veterinarians supports early-age (i.e., 6 to 18 weeks of age) sterilization of dogs and cats as part of a comprehensive non-lethal population control strategy.”*

*“The American Association of Feline Practitioners supports neutering early in life as a safe and effective method of decreasing cat overpopulation, and one which confers long-term medical and behavioral benefits to the individual cat.”*

**Concerns**

Most concerns from veterinarians regarding pediatric sterilization are in two main areas:

**1. Anesthetic & Surgical Risk/Difficulty**

Anesthetically, pediatric patients are at no greater general risk as long as consideration is given to some basic physiological differences. First, it is important to minimize hypoglycemia, which can be achieved by a limited (2-4hr) fasting period and offering food immediately upon recovery. Second, hypothermia can be avoided through careful monitoring of body temperature and the use of warming devices such as hot water recirculating and/or forced air blankets. In general, the same anesthetic protocols used in adults can be used in pediatric patients, however it is recommended to include atropine or glycopyrrolate in the premedication, as their cardiac output is dependent on heart rate.

Surgically, pediatric spays and neuters are simpler, faster, and less stressful than older age procedures. There is less fat obscuring the field and interfering with ligatures, and less bleeding due to the immaturity of the organs. Once proficient, a surgeon can often complete a pediatric surgery in a fraction of the time required for a mature surgery. In addition, pediatric patients experience less stress and recover much quicker than their adult counterparts.

## **2. Long Term Health Effects**

Opponents often cite concerns regarding possible long-term medical consequences of early spay/neuter, however there are no conclusive studies to suggest increased medical problems compared to "traditional-age" surgeries. In addition, conflicting study results make it difficult to determine a single medically optimal age for spay/neuter, if in fact there is one at all. Some concerns include the following:

### **a. Hip Dysplasia**

A study of 269 shelter dogs by Howe et al. 2001 demonstrated no significant difference in the incidence of hip dysplasia between dogs neutered either <24 weeks of age or >24 weeks of age.

A study of 1842 shelter dogs by Spain et al. 2004 showed a roughly 2% increase in the incidence of hip dysplasia in dogs neutered at <5.5 months of age (6.7%) vs. those neutered at >5.5 months of age (4.7%); however, the dogs neutered in the older group that developed hip dysplasia were 3x more likely to be euthanized due to the severity of the condition.

The 2013 PLOS one study of 759 Golden Retrievers showed that female dogs had no significant differences in rates of hip dysplasia between the early and late neutered groups. In males, the incidence of the condition in early neutered dogs was 10% vs 3% in late neutered dogs.

A second PLOS one study in 2014 which also included 1015 Labrador Retrievers, showed that there was no significant difference between early and late neutered groups in the incidence of hip dysplasia in either sex, although in females the incidence was statistically significant between neutered and intact groups. (This study is difficult to interpret as the authors only highlight the statistically significant differences between neutered and intact groups, not those between the early and late groups when compared to one another)

Since hip dysplasia is known to be a multifactorial disease affected by many variables, the conflicting study results are not surprising, even amongst closely related breeds.

### **b. Other Orthopedic Diseases**

The 2013 Golden Retriever study showed that early neutered dogs had a higher - 5.1% (male) to 7.7% (female) - risk of CCL injury than late neutered dogs (<1%). In the 2014 Labrador Retriever study, only males neutered before 1 year of age had an increased risk of CCL injury (5% vs. <1%). Other studies examining CCL and the age of neutering only compared risk of neutered vs. intact dogs and did not consider the age at neutering.

The 2014 Labrador Retriever study showed an increase in Elbow Dysplasia in males neutered at <6 months old (4%) when compared to intact dogs (0.5%) but there was also a significant increase in dogs neutered between 2 and 8 years of age (2%).

Although there are no studies directly comparing the age at neutering and capital physal fractures in neutered male cats, results of other studies on the condition suggest that an overweight body condition is the most significant factor.

### **c. Urinary Incontinence**

The Spain 2004 study referenced above showed an increase risk urinary incontinence in female dogs spayed before 3 months of age (13%), vs after 3 months of age (5%).

A 2009 study of 370 dogs by de Bleser et al showed no significant association between early spaying and urinary incontinence.

A study of 566 dogs by Forsee et al. 2013 showed an overall incidence of urinary incontinence in spayed female dogs to be 5.12%. There was no correlation between the incidence of the condition and the age at neutering, however the incidence was significantly increased in larger sized dogs (>15kg).

In 2017, a study by Byron et al. involving 356 dogs showed that larger breeds were generally at more risk of urinary incontinence; and that there was an increased risk of the condition as the adult body weight increased and age at neutering decreased. This correlation was statistically significant starting at 25kg. For smaller dogs, the differences between age of neuter and the incidence of urinary incontinence was not significant.

#### **d. Obesity**

Very few studies specifically looked at the prevalence of obesity when comparing pediatric to traditional age neutering; however in the Spain 2004 study the proportion of obese dogs was actually lowest in the pre-pubertal gonadectomized group.

#### **e. Neoplasia**

In the PLOS one Golden Retriever and Labrador Retriever studies, only early neutered male Golden retrievers had an increased risk of Lymphoma (9.6%) vs those neutered later (3.5%).

In the same studies, only Hemangiosarcoma in Golden Retrievers females was influenced by age of neutering, however in this case, the risk was greatest in late neutered dogs (7.4%) and early neutered dogs had a risk similar to intact females (1.8/1.6%).

Similarly, in female Golden Retrievers, Mast Cell Tumors were more common in the late neutered group (5.7%) vs the early neutered group (2.3%).

#### **f. Behaviour**

A study by Porter et al of 800 kittens showed no difference in behavioural problems between those gonadectomized prepubertally vs those done at the traditional age.

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Dr. Kim Yuill, Prince George Spay/Neuter Clinic