

Early Spay-Neuter Considerations for the Canine Athlete

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Those of us with responsibility for the health of canine athletes need to continually read and evaluate new scientific studies to ensure that we are taking the most appropriate care of our performance dogs. This article provides evidence through a number of recent studies to suggest that veterinarians and owners with canine athletes should revisit the standard protocol in which all dogs that are not intended for breeding are spayed and neutered at or before 6 months of age.

Orthopedic Considerations

A study by Salmeri *et al* in 1991 found that bitches spayed at 7 weeks grew significantly taller than those spayed at 7 months, and that those spayed at 7 months had significantly delayed closure of the growth plates than those not spayed (or presumably spayed after the growth plates had closed).(1) A study of 1444 Golden Retrievers performed in 1998 and 1999 also found bitches and dogs spayed and neutered at less than a year of age were significantly taller than those spayed or neutered at more than a year of age.(2) The sex hormones promote the closure of the growth plates, so the bones of dogs or bitches neutered or spayed before puberty continue to grow. Dogs that have been spayed or neutered well before puberty can frequently be identified by their longer limbs, lighter bone structure, narrow chests and narrow skulls. This abnormal growth frequently results in significant alterations in body proportions and particularly the lengths (and therefore weights) of certain bones relative to others. For example, if the femur has achieved its genetically determined normal length at 8 months when a dog gets spayed or neutered, but the tibia, which normally stops growing at 12 to 14 months of age continues to grow, then an abnormal angle may develop at the stifle. In addition, with the extra growth, the lower leg below the stifle becomes heavier (because it is longer), causing increased stresses on the cranial cruciate ligament. These structural alterations may be the reason why at least one recent study has shown that spayed and neutered dogs have a higher incidence of **CCL rupture**.(3) Another recent study showed that dogs spayed or neutered before 5 1/2 months had a significantly higher incidence of **hip dysplasia** than those spayed or neutered after 5 1/2 months of age.(4) Breeders of purebred dogs should be concerned about these two studies and particularly the latter, because they might make incorrect breeding decisions if they consider the hip status of pups they bred that were spayed or neutered early.

Cancer Considerations

There is a slightly increased risk of mammary cancer if a female dog has one heat cycle. But my experience indicates that fewer canine athletes develop mammary cancer as compared to those that damage their cranial cruciate ligaments. In addition, only about 30 % of mammary cancers are malignant and, as in humans, when caught and surgically removed early the prognosis is very good.(5) Since canine athletes are handled frequently and generally receive prompt veterinary care, mammary cancer is not quite the specter it has been in the past. A retrospective study of cardiac tumors in dogs showed that there was a 5 times greater risk of **hemangiosarcoma**, one of the three most common cancers in dogs, in spayed bitches than intact bitches and a 2.4 times greater risk of hemangiosarcoma in neutered dogs as compared to intact males.(6) A study of 3218 dogs demonstrated that dogs that were neutered before a year of age had a significantly increased chance of developing **bone cancer**, a cancer that is much more life-threatening than mammary cancer, and that affects both genders.(7) A separate study showed that neutered dogs had a two-fold higher risk of developing bone cancer.(8) Despite the common belief that neutering dogs helps prevent prostate cancer, at least one study suggests that neutering provides no benefit.(9)

Behavioral Considerations

The study that identified a higher incidence of cranial cruciate ligament rupture in spayed or neutered dogs also identified an increased incidence of **sexual behaviors in males and females** that were neutered early.(3) Further, the study that identified a higher incidence of hip dysplasia in dogs neutered or spayed before 5 1/2 months also showed that early age gonadectomy was associated with an increased incidence of **noise phobias and undesirable sexual behaviors**.(4) A recent report of the American Kennel Club Canine Health Foundation reported significantly more behavioral problems in spayed and neutered bitches and dogs. The most commonly observed behavioral problem in spayed females was **fearful behavior** and the most common problem in males was **aggression**.(10) Yet another study showed that unneutered males were significantly less likely than neutered males to suffer **cognitive impairment** when they were older.(11) Females were not evaluated in that study.

Other Health Considerations

A number of studies have shown that there is an increase in the incidence of **female urinary incontinence** in dogs spayed early.(12) Interestingly, neutering also has been associated with an increased likelihood of **urethral sphincter incontinence in males**.(13) This problem is an inconvenience, and not usually life-threatening, but nonetheless one that requires the dog to be medicated for life. A health survey of several thousand Golden Retrievers showed that spayed or neutered dogs were more likely to develop **hypothyroidism**.(2) This study is consistent with the results of another study in which neutering and spaying was determined to be the most significant gender-associated risk factor for development of hypothyroidism.(14) **Infectious diseases** were more common in dogs that were spayed or neutered at 24 weeks or less as opposed to those undergoing gonadectomy at more than 24 weeks.(15) Finally, the AKC-CHF report demonstrated a higher incidence of **adverse reactions to vaccines** in neutered dogs as compared to intact.(10)



For these reasons, I have significant concerns with spaying or neutering dogs before puberty, particularly for the canine athlete. And frankly, if something were healthier for the canine athlete, would we not also want that for pet dogs as well? But of course, there is the pet overpopulation problem. How can we prevent the production of unwanted dogs while still leaving the gonads to produce the hormones that are so important to canine growth and development? The answer is to perform vasectomies in males and tubal ligation in females, to be followed after maturity by ovariectomy in females to prevent mammary cancer and pyometra. One possible disadvantage is that vasectomy does not prevent some unwanted behaviors associated with males such as marking and humping. On the other hand, it has been my experience that females and neutered males actively participate in these behaviors too. Really, training is the best solution for these issues. Another possible disadvantage is finding a veterinarian who is experienced in performing these procedures. Nonetheless, some do, and if the procedures were in greater demand, more veterinarians would learn them.

I believe it is important that we assess each situation individually. If a pet dog is going to live with an intelligent, well-informed family that understands the problem of pet overpopulation and can be trusted to keep the dog under their control at all times and to not breed it, I do not recommend spaying or neutering before 14 months of age. In the case of dogs that might be going to less vigilant families, vasectomy and tubal ligation will allow proper growth while preventing unwanted pregnancies.

References:

1. Salmeri KR, Bloomberg MS, Scruggs SL, Shille V.. Gonadectomy in immature dogs: effects on skeletal, physical, and behavioral development. *JAVMA* 1991;198:1193-1203
2. <http://www.grca.org/healthsurvey.pdf>
3. Slauterbeck JR, Pankratz K, Xu KT, Bozeman SC, Hardy DM. Canine ovariectomy and orchietomy increases the prevalence of ACL injury. *Clin Orthop Relat Res.* 2004 Dec;(429):301-5.
4. Spain CV, Scarlett JM, Houpt KA. Long-term risks and benefits of early-age gonadectomy in dogs. *JAVMA* 2004;224:380-387.
5. Meuten DJ. *Tumors in Domestic Animals*. 4th Edn. Iowa State Press, Blackwell Publishing Company, Ames, Iowa, p. 575
6. Ware WA, Hopper DL. Cardiac tumors in dogs: 1982-1995. *J Vet Intern Med* 1999 Mar-Apr;13(2):95-103
7. Cooley DM, Beranek BC, Schlittler DL, Glickman NW, Glickman LT, Waters D, *Cancer Epidemiol Biomarkers Prev.* 2002 Nov;11(11):1434-40
8. Ru G, Terracini B, Glickman LT. Host related risk factors for canine osteosarcoma. *Vet J.* 1998 Jul;156(1):31-9.
9. Obradovich J, Walshaw R, Goullaud E. The influence of castration on the development of prostatic carcinoma in the dog. 43 cases (1978-1985). *J Vet Intern Med* 1987 Oct-Dec;1(4):183-7
10. http://www.akcchf.org/pdfs/whitepapers/Biennial_National_Parent_Club_Canine_Health_Conference.pdf
11. Hart BL. Effect of gonadectomy on subsequent development of age-related cognitive impairment in dogs. *J Am Vet Med Assoc.* 2001 Jul 1;219(1):51-6.
12. Stocklin-Gautschi NM, Hassig M, Reichler IM, Hubler M, Arnold S. The relationship of urinary incontinence to early spaying in bitches. *J. Reprod. Fertil. Suppl.* 57:233-6, 2001
13. Aaron A, Eggleton K, Power C, Holt PE. Urethral sphincter mechanism incompetence in male dogs: a retrospective analysis of 54 cases. *Vet Rec.* 139:542-6, 1996
14. Panciera DL. Hypothyroidism in dogs: 66 cases (1987-1992). *J. Am. Vet. Med. Assoc.*, 204:761-7 1994
15. Howe LM, Slater MR, Boothe HW, Hobson HP, Holcom JL, Spann AC. Long-term outcome of gonadectomy performed at an early age or traditional age in dogs. *J Am Vet Med Assoc.* 2001 Jan 15;218(2):217-21.