

Health Considerations of Early Spay and Neuter Surgeries		
Health Risk	Finding	Source(s)
Hip Dysplasia & Torn Cruciate Ligaments	Sex hormones are needed to achieve peak bone density. Neutering before puberty produces taller dogs by delaying the closing of the growth plates and allowing the dog to continue to grow past puberty. Body proportions and the relative length and weight of various bones are altered, which can lead to increased incidence of hip dysplasia and torn cruciate ligaments.	Slauterbeck JR, Pankratz K, Xu TK, Bozeman SC, Hardy DM. <i>Clin Orthop Relat Res.</i> 2004;429:301-305.; Zink C. Early Spay-Neuter Considerations for the Canine Athlete: One Veterinarian's Opinion. 2005. www.caninesports.com/SpayNeuter.html ; Gilsanz V, Roe TF, Gibbens DT, Schulz EE, Carson ME, Gonzalez O, Boechat MI. <i>Am J Physiol.</i> 1998; 255:E416-E21.; http://www.ncbi.nlm.nih.gov/pubmed/18052804
Decreased Life Span	Neutering before puberty produces taller dogs, and increased height corresponds with shorter life spans in Golden Retrievers. The shortest male Golden Retrievers live 2.2 years longer than the tallest males; the shortest bitches live 1.1 years longer than the tallest bitches.	Waters DJ, Kengeri SS, Clever B, Booth JA, Maras AH, Schlittler DL, Hayek MG. <i>Aging Cell.</i> 2009;8(6): 752-755.; Golden Retriever Club of America National Health Survey, 1998-1999.
Hypothyroidism	Golden Retriever males neutered before 1 year of age have an 80 percent greater risk of hypothyroidism. The risk is 60 percent for Golden bitches spayed before 1 year of age.	Zink C. Early Spay-Neuter Considerations for the Canine Athlete: One Veterinarian's Opinion. 2005. www.caninesports.com/SpayNeuter.html ; Panciera DL. <i>J Am Vet Med Assoc.</i> 1994;204:761-767.; Golden Retriever Club of America National Health Survey, 1998-1999.
Hemangiosarcoma	A retrospective study showed neutered dogs and spayed bitches have a two to five times greater risk of cardiac hemangiosarcoma. Hemangiosarcoma is the cause of death for one in five Golden Retrievers.	Zink C. Early Spay-Neuter Considerations for the Canine Athlete: One Veterinarian's Opinion. 2005. www.caninesports.com/SpayNeuter.html ; Ware WA, Hopper DC. <i>J Vet Intern Med.</i> 1999;13(2):95-103.; Golden Retriever Club of America National Health Survey, 1998-1999.
Osteosarcoma	Osteosarcoma affects 5 percent of Golden Retrievers, and several studies have shown the cancer to be significantly more common in neutered and spayed dogs.	Zink C. Early Spay-Neuter Considerations for the Canine Athlete: One Veterinarian's Opinion. 2005. www.caninesports.com/SpayNeuter.html ; Cooley DM, Beranek BC, Schlittler DL, Glickman NW, Glickman LT, Waters D. <i>Cancer Epidemiol Biomarkers Prev.</i> 2002;11(11):1,434-1,440.; Golden Retriever Club of America National Health Survey, 1998-1999.
Urinary Incontinence	Results of studies are not consistent, but early spaying seems to increase the occurrence of urinary incontinence in bitches. Early neutering also may correlate with increased urethral sphincter incontinence in males.	Zink C. Early Spay-Neuter Considerations for the Canine Athlete: One Veterinarian's Opinion. 2005. www.caninesports.com/SpayNeuter.html ; Stocklin-Gautschi NM, Hassig M, Reichler IM, Hubler M, Arnold S. <i>J Reprod Fertil. Suppl.</i> 2001;57:233-236.; Aaron A, Eggleton K, Power C, Holt PE. <i>Vet Rec.</i> 1996;139:542-546.
Mammary Cancer	For bitches not spayed before the second heat cycle, the risk of mammary cancer increases to 26 percent. If allowed to have one heat cycle, the risk is 8 percent, and if spayed before the first heat cycle, the risk decreases to less than 0.5 percent.	Schneider R, Taylor CR, Taylor D. <i>J Natl Cancer Inst.</i> 1969;43:1,249-4,261.