

Deciding Whether and When to Neuter a Golden Retriever 2022 Update

A focus on the serious issue of pet overpopulation has led to the common practice of neutering dogs prior to sexual maturity, often near the age of six months. While this clearly helps reduce unplanned breedings and thereby may serve the public interest, research is increasingly showing that it may not be in the best health interests of an individual dog with a responsible owner. Breeds of dogs vary considerably with regard to their rate of maturity and risk for specific diseases, and the interactions of these factors should be taken into consideration when deciding whether to neuter and/or when to neuter a dog. However, appropriately tailoring neutering recommendations to a breed requires awareness of the ways in which neutering and the age of neutering affect specific breeds, and it may be impossible for veterinarians to know this in detail for every breed.

Therefore, below is a review of health and temperament considerations to include when deciding whether and/or when to neuter a Golden Retriever. The term “neuter” refers to either sex. “Early neuter” generally refers to under 12 months of age for a male and prior to the first heat cycle for a female; and “late neuter” is after those milestones.

Please note that there can be both risks and benefits associated with neutering and various neutering ages, so decisions will need to balance these complex factors. It is relevant to consider what conditions are more or less common in the breed, and also what conditions have the greatest impact on quality of life, so that information is also provided when available. As to be expected, research studies are not in full agreement for some complex conditions, and owners are encouraged to discuss topics further with their veterinarian.

Risks and Benefits Associated with Neuter Status and Age of Neutering

Orthopedic Disease

- Goldens neutered prior to sexual maturity have an increased incidence and/or severity of orthopedic diseases such as **hip dysplasia, elbow dysplasia, and torn cruciate ligaments** compared to intact Goldens or late-neutered Goldens. Hip and elbow dysplasia are common in Goldens, and torn cruciate ligaments are less common but not rare. Mildly affected dogs can sometimes be managed without surgery, but many require costly surgery with variable success that depends on many factors. These diseases can have a significant impact on quality of life.

Cancer Risk

- There are many conflicting studies regarding the impact of neutering, and early neuter vs late neuter, on the risk of cancer. In general, numerous studies report that neutered dogs live longer than intact dogs, but these often do not detail breed, size of dog, cause of death, age at neutering, and other important factors that may influence results. An owner-related factor that can influence such results is that owners who neuter are generally considered to seek veterinary care more frequently, and to be more responsible owners who keep their dogs safe from other

hazards that may shorten lifespan. Few studies report details specifically about cancer risk and age of cancer or age of death in neutered vs intact Golden Retrievers. Two that do are of special interest because they each conducted analyses using the same database (the UC Davis Electronic Medical Record System) during an overlapping period of time. Key differences and cancer findings are presented below.

- 1) **Neutering dogs: effects on joint disorders and cancers in golden retrievers.** Hart BL, et al. PLoS ONE. 2013. PMID: 23418479
 - a. Key Difference: included Goldens from 1-8 years old
 - b. Findings: Almost 10 percent of early-neutered males were diagnosed with lymphoma, 3 times more than intact males. The percentage of hemangiosarcoma cases in late-neutered females (about 8 percent) was 4 times more than intact and early-neutered females. There were no cases of mast cell tumors in intact females, but the occurrence was nearly 6 percent in late-neutered females*.
 - * Statistical significance could not be calculated

- 2) **Association of cancer-related mortality, age and gonadectomy in golden retriever dogs at a veterinary academic center (1989-2016).** Kent MS, et al PLoS ONE 2018. PMID: 29408871
 - a. Key Difference: included Goldens of any age for which necropsy had been performed
 - b. Findings: For those GR dying of cancer, the median age of death for intact male dogs was 9.5 years; for castrated male dogs was 9.62 years; for intact female dogs was 8.45 years; and for spayed female dogs was 10.14 years. The median age for GR dying of a cause other than cancer was 6.93 years while those dying of cancer had a median age of 9.83 years. The difference in age between those with a cancer-related mortality and non-cancerous causes of mortality remained significant when looking within each sex category, indicating that those dogs dying of cancer lived longer than those dying of non-cancerous causes.

Discussion: By limiting inclusion to dogs 1-8 years old, Study 1 could not measure the effects of neutering/age of neutering on a dog's lifetime cancer risk or overall lifespan – endpoints that are the primary concerns for most owners. Cancer in Goldens peaks over the age of 8 (around 10 years old), so Study 1 misses the majority of cancers in the breed. Study 2 reinforces that cancer is a disease of aging, finding that age itself is the primary risk factor for cancer.

Important Notes: Since both of these studies were done at a tertiary referral center, cancer rates may be amplified and reported lifespan may be decreased as compared to Goldens seen in primary care practices. (Average lifespan of Goldens is generally accepted to be within the 10–12-year-old range predicted by height and structural body mass.)

Although the above studies contribute a great deal to the field, the impact of neutering on the risk of cancers in Goldens is not yet settled science. There have been conflicting studies for a number of years, and this is likely to continue because cancer is many different diseases; most research includes varied breeds/mixes and sizes of dogs; and cancer risk is a complex mix of random chance mutations, and largely unknown heritable and environmental/lifestyle-choice factors.

A more comprehensive study of the effects of neutering/age of neutering on cancer risk – using a large sample of Golden Retrievers; including many kinds of cancer; and that follows dogs for their lifetime – is needed. The ongoing Golden Retriever Lifetime Study (GiRLS) was designed to meet this challenge, and hopefully will improve clarity on these issues.

- Several studies indicate that the incidence of **osteosarcoma (bone cancer)** is higher in neutered dogs than in intact dogs, but there is some evidence that this increase is not as great when neutering occurs after sexual maturity. This cancer affects about 5% of Goldens, and is not considered to be curable.
- Females neutered prior to their first heat cycle have less than ½ of 1% chance of developing **mammary cancer (breast cancer)**. Numerous studies report that for females neutered after the first cycle but before the second, this risk increases to 4%; and if not neutered until after her second heat cycle, risk increases to about 13%. If detected early through regular mammary exams, many but not all mammary cancers can be treated successfully with surgery and sometimes additional therapies.
- Males with one or both testicles located in the abdomen (**cryptorchidism**) have an elevated risk for **testicular cancer** and should be neutered prior to 15 months of age, which eliminates this risk. It is not necessary to neuter these dogs prior to sexual maturity to avoid testicular cancer. Testicular cancer is rare (less than ½ of 1%) in dogs with both testicles normally descended into the scrotum.
- **Prostate cancer** is uncommon in the breed, but is more common in neutered males than intact males.

Other Health Conditions

- Goldens neutered before 1 year of age appear to have a higher incidence of **hypothyroidism (low thyroid)** than do intact Goldens or Goldens neutered over 1 year old. Hypothyroidism is a common but generally treatable disease in the breed.
- Dogs neutered prior to sexual maturity (early neuter) grow taller than their natural genetic potential, and their **bone structure is altered toward a more narrow, lanky appearance with a longer, narrower head shape**. On average, taller Goldens have shorter life spans than shorter Goldens. Among male Goldens, the shortest males live an average of 2.2 years longer than the tallest males; and among female Goldens, the shortest females live an average of 1.1 years longer than the tallest females. It is unlikely that neutering a Golden prior to sexual maturity will alter the dog's potential height from extremely short to extremely tall, but it will make a noticeable difference in height. It is unknown whether this may affect lifespan.
- Neutered females may have an elevated risk of **urinary incontinence** as compared to those not neutered, but there is evidence that this risk is less significant for dogs neutered after sexual maturity. Urinary incontinence is neither common nor rare in Goldens, and can often (but not always) be treated successfully.

- Females that remain intact have a significant risk for developing **pyometra, a life-threatening uterine infection** that can occur at any age, but risk increases with every heat cycle, particularly after the age of five years. Pyometra is a common and rapidly progressing disease that can be a medical emergency, and should be treated without delay.
- Males that remain intact commonly develop an **enlarged prostate gland (benign prostatic hyperplasia)** as they age, particularly over the age of seven years. This is not usually a serious disease, and while it can sometimes be managed medically, neutering affected dogs is generally curative. This is not to be confused with **prostate cancer**, which is uncommon in the breed, although more common in neutered males than intact males.

Behavioral Considerations

- **Fear of thunderstorms and submissive urination** that continues into adulthood are more common in dogs neutered early vs intact dogs and late-neutered dogs.
- Most male Golden Retrievers do not display male-to-male **dominance/aggression**, whether intact or neutered. In those that do, neutering can usually reduce or eliminate this behavior, and possibly also reduce **roaming and urine marking**. Neutering a male after two years of age may have less impact on behavior, so if these are concerns, neutering should be done closer to 12-15 months than 24 months old.
- **Mounting behavior** can occur in a male or female, and even in very young puppies (long before sexual maturity). It can be directed toward a person, another animal, or even a blanket, and is typically a result of boisterous play, boredom, anxiety, pent-up energy, or just plain habit. Since this behavior is not hormonally driven, it is not usually changed by neutering. It should be corrected immediately just like any other unwanted behavior.

General Recommendations

Taking all of the above factors into consideration, there is evidence to support that it is in the best overall health interests of the dog to neuter female Golden Retrievers after sexual maturity, which is usually around 8-12 months old (6-15 mos range). This typically allows a female to have one heat cycle but not two, which keeps the risk of mammary cancer low while still providing her with some important health benefits gained by maturing with natural hormones. Of course, she must be kept securely away from intact males for the full three weeks of her heat cycle to avoid unwanted pregnancy, so this should not be undertaken unless the owner is able to be certain that there is no possibility of an accidental breeding. Generally, it is advised to wait about 3 months after a heat cycle to neuter.

In addition to traditional spay in which both uterus and ovaries are removed, owners are sometimes offered (or request) either **ovary-only spay (laparoscopic spay)** in which only the ovaries are removed, or **ovary-sparing spay** in which only the uterus is removed. Owners often choose ovary-only spay because the procedure can be done laparoscopically (minimally invasive surgery) using two approximately 1/2-inch incisions, resulting in less pain and more rapid healing. Traditional spays and ovary-sparing spays are typically done with a single 3–4-inch incision, and may be more widely available because performing a laparoscopic spay requires more training. Owners choosing

ovary-sparing spay usually do so because they prefer the overall health/temperament risk profile (as presented in this discussion) associated with the hormones of intact dogs.

Dogs undergoing ovary-sparing spay would be considered to have the same overall risk profile as an intact dog (except that without a uterus, they would not be at risk for pyometra or be able to get pregnant). For the purposes of this discussion, dogs undergoing laparoscopic spay are simply neutered dogs, and would be either early-neutered or late-neutered based on age at neutering.

Owners who choose to allow their female to have one or more heat cycles (or that had ovary-sparing spay) should perform **regular monthly mammary examinations** by gently feeling for any lumps along the entire mammary chain (usually 5 glands on each side), beginning at about 4-5 years of age. Do this first by straddling her as she stands, and with the tissue between your fingers, feel both mammary chains from above; then do the exam with her rolled on her back. About 50% of mammary lumps are benign so don't be alarmed if a lump is felt, but the most important factor to predict whether mammary cancer is curable is the size of the tumor when discovered, so this exam shouldn't be neglected.

There are no clear significant health benefits to neutering a normal male, so this decision should be based on factors other than the health of the dog, such as behavioral factors or preventing unwanted breedings. If a male is going to be neutered, there is good evidence to support that it is in the overall best health interests of the dog to neuter male Golden Retrievers after sexual maturity, over approximately one year of age.