

Neutering Your Dog – Making an Informed Decision

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In the UK many vets are now neutering dogs routinely before their first season. As a practice we refuse to do this and to answer why, it is useful to put some facts on record.

But quite aside from these facts, our clinical experience suggests we see many more problems in neutered animals than those left entire, and even more in dogs that go through this procedure before puberty. As we see a lot of second opinion cases perhaps our views are coloured by that, but it remains a fact that neutering is banned, other than for clinical reasons, in at least 3 EU countries. It is quite arguably a mutilation with no arguable clinical benefit for the patient.

The main reason neutering is actually done, is for the perceived social benefit for the human population as:

1. It avoids some inconvenience and expense for owners.
2. It stops heat [in season] cycles.
3. No accidental pregnancies.
4. Prevents unwanted puppies being born. Some studies (USA) have shown as many as 56 per cent of litters born are unplanned;
5. It reduces the risk of abandonment of unwanted pets, resulting in mass euthanasia and neglect (but human nature will ever mean this exists somewhat as an issue), but do consider that some charities are now importing dogs from overseas to rehome here - presumably as we don't have enough unwanted dogs needing new homes in mainland Britain already?!
6. Male dogs are thought to be less likely to roam and are more likely to be better behaved - but more about that later.
7. Early neutering is said to offer breeders a chance to preclude others from using their bloodlines, allegedly also preventing use of substandard stock.
8. Vets also find that early neutering is often easier to carry out.

Point 7 is perhaps currently especially relevant as we have been seeing puppies sent to their new homes already neutered at only 8 weeks old!!! Some of these pups are proving aggressive, untrainable, allergic and suffering growth problems. It seems a problem particularly affecting some of the designer Poodle cross bred dogs and really, in our opinion, it is animal cruelty to subject these dogs to a lifetime of problems.

Since writing a former version of this article we have become increasingly concerned over the continued marketing of neutering as a health benefit despite articles in the veterinary literature debunking this myth, and arguing for decisions to be made on an individual evidence-based assessment of each patient.

The recently updated Animal Welfare Act puts a greater obligation on owners to consider their animals' health and welfare, including their ability to display normal behaviour. Clearly, certain behaviour patterns are prevented and there is no way all owners could manage their pet if all dogs were left entire, but we do need to consider some of the broad assumptions and statements about neutering from a Canine perspective that all owners should be made aware of when deciding if neutering is best for their pet.

So does neutering benefit a dog's health, and does early neutering (before the first season in bitches and from as early as nine weeks old) offer significant benefits over a later operation or, in fact, does it cause harm as we think it does?

Please note that all figures given in this article relate to the studies I could find on the subjects (and there aren't that many), and it is always difficult to research a negative result - and even harder to get funding for such! Accordingly all figures can only be viewed as approximate and will be defined better, I hope, by future research.

The following chart is a summary of the benefits and potential adverse events of Neutering in large- and giant-breed dogs published in the veterinary literature. Of note, much of the literature on this topic is retrospective and based on smaller select populations, so relative risk is difficult to determine for individual animals.

EFFECTS OF NEUTERING ON RELATIVE RISK

Condition	Effect of OHE on Relative Risk	Effect of Castration on Relative Risk
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
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.

Is Neutering is a relatively safe procedure?

Various studies incorporating neutering show that post-operative complications following elective surgery vary considerably. Some show frequencies between 1 and 24 per cent for all complications and 1 to 4 per cent for severe complications.

Some dogs do die, but as best I could tell this is reported at around 0.1 per cent (or one in 1,000). I could find no studies showing reduced mortality risk with early neutering but as you can imagine it is very difficult to design a study to research a negative result.

Pyometra

Ovariohysterectomy (OHE) prevents pyometra (a potentially fatal womb infection) since the uterus and ovaries have been removed. The incidence of pyometra by 10 years of age has been shown to be around 23/24 per cent which is significant. However, most cases of pyometra will be resolved by the bitch having a hysterectomy at the time, with death as a result of the condition being around 4 per cent. So, relatively speaking, whilst the risk of death from spaying routinely is 0.1 per cent the overall risk of death when older from Pyometra if left entire is possibly 1 per cent.

Incontinence (Females – urinary sphincter mechanism incompetence (USMI))

Studies vary considerably but, as best as I can determine, between 12 and 20 per cent of bitches are said to become incontinent to varying degrees after spaying, usually around two to three years later. Most will respond to long-term treatment, but not all. Incontinence is devastating, particularly for owners where the pet lives in close proximity and when she fails to respond to treatment it can be a reason for euthanasia or rehoming.

In general, large dogs (>15 kg) have a significantly greater risk for developing USMI than smaller dogs.^{4,5} Although dogs that have OHE before 3 months of age show an increased risk for USMI as compared with dogs that have OHE between 3 and 12 months of age,⁶ other data and analyses have not supported a causal link between age at time of OHE and risk for USMI.^{4,5,7,8}

Cystitis

Prepubescent OHE can result in a recessed or hypoplastic vulva in some dogs and may predispose these animals to perivulvar dermatitis and cystitis, particularly if they are overweight and have USMI. These findings may explain the greater reported incidence of cystitis in dogs undergoing OHE before 5.5 months of age.⁶

Prostate problems

Benign prostatic hyperplasia is seen in 50% of intact males by 5 years of age.⁹ Castration prevents benign prostatic hyperplasia as well as other associated diseases (eg, prostatitis, prostatic cysts, perineal herniation).¹⁰⁻¹²

However, in older intact males with simple enlargement of the prostate, sometimes due to testicular tumours, late castration is usually curative, as it is with most testicular cancer. However, prostatic cancer, which logically you would think not a problem in neutered dogs, some studies suggest is actually is up to 8 times more likely (see below)!

Overall Prostatic Cancer incidence is around 0.6% negating the benefit of the castration argument.

Musculoskeletal Considerations

Removing hormonal influence on the developing skeleton via Neutering can result in delayed physal (growth plate) closure^{13,14} and longer-limbed conformation. The latter may play a role in the development of orthopaedic disease, as shown in studies of Labradors and Golden Retrievers neutered <6 months of age. These dogs had a 2× to 5× increased incidence of ≥1 joint disorders as compared with intact dogs.^{15,16}

Canine Cranial Cruciate Ligament Disease

Large-breed dogs that underwent Neutering at <6 months of age have shown a 3× increased risk for excessive tibial plateau angle and predisposition for earlier canine cranial cruciate ligament (CCL) injury.¹⁷ Dogs that underwent Neutering at a non-specified age had a 2× to 3× incidence of CCL disease as compared with intact dogs.^{18,19} In a study of 750 Golden Retrievers, none of the intact dogs had CCL disease, compared with an incidence of 5% in castrated dogs and 7.7% in spayed dogs that underwent neutering at <12 months of age.¹⁶ Body Condition Score (BCS) was the same for dogs with and without CCL disease. This suggests that change in conformation—not just increased body weight associated with neutering—was responsible.¹⁶

Hip Dysplasia

Hip dysplasia may be influenced by patient sex and breed as well as timing of neutering. In the Golden Retriever study,¹⁶ incidence of hip dysplasia in males neutered at <12 months of age was double that of intact males, with an earlier onset of disease. The BCS of the males with and without hip dysplasia and neutered at <12 months of age was not far greater. No significant difference in hip dysplasia incidence was seen in the females.¹⁶ Spayed or neutered Boxers with a mean age of 3 years at the time of neutering had a 1.5× increased risk for developing hip dysplasia.²⁰ Data collected from a Veterinary Medical Database between 1964 and 2003 showed that neutering (at a non-specified age) increased the likelihood of hip dysplasia by 17%.¹⁸ Incidence of hip dysplasia was 6.7% in dogs that underwent neutering before 5.5 months of age and 4.7% in dogs that underwent neutering between 5.5 months and 1 year of age.⁶

Obesity

Obesity plays a significant role in the development and progression of many orthopaedic diseases and osteoarthritis.²¹ Although neutering is a significant risk factor for obesity,^{6,22,23} neutering alone is most likely less important than other environmental factors (eg, diet, exercise regimen).²⁴

Cancers

Mammary Tumors

Many Vets are aware of the effect and timing of spaying on incidence of mammary tumors based on Schneider, Dorn, and Taylor's 1969 study.²⁵ This is argued so often as a significant reason for neutering but does it really stack up?

It is said that spaying after the third estrous cycle and after 2.5 years of age appears to provide minimal protection against mammary tumour development.^{25,26} However, a 2010 systematic review of this and other studies on the protective effect of OHE concluded that the evidence is weak because of

confounding factors and bias.²⁷

Whatever, the statements are somewhat misleading. Unneutered bitches have only a 3.4 per cent chance of developing this problem with age, with 50 per cent of those cases being malignant. Early neutering reduces this risk to 0.5 per cent of the 3.4 per cent (= 0.017 per cent), but spaying the bitch after the first season and before the second reduces it also to eight per cent of 3.4 per cent (= 0.27 per cent).

So the argument for early neutering over leaving the bitch to have one season on the basis of this without considering all the other issues doesn't really stack up as particularly significant to my mind.

There is also a downside as regards to Cancer generally which is that some studies show increased incidence of other cancers following neutering including some of those discussed below.

Reproductive Tumors & Tumors Influenced by Hormones

Neutering eliminates the potential for developing uterine, ovarian, and testicular tumors through removal of the primary organ.³¹ Perianal gland tumors in male dogs are treated successfully via castration.³² OHE is protective against vaginal leiomyomas and can decrease recurrence, even with incomplete surgical resection.^{33,34} Neutered male dogs had 2× to 8× the incidence of prostatic carcinoma as compared with intact male dogs^{34,35}; however, the overall prevalence of prostatic cancer is <1%.³⁵⁻³⁷

Lymphoma

A large population study showed that intact female dogs had a significantly lower risk for developing lymphoma as compared with dogs that underwent Neutering (at a nonspecific age) or intact male dogs.³⁸ This finding was consistent in studies of golden retrievers and vizslas, although castration at <12 months of age was also found to be a risk factor.^{16,39}

Mast Cell Tumors

Neutering has been associated with 2× to 4× the risk for mast cell tumors, particularly in female dogs.^{16,39,40} However, estrogen receptors have not been identified in mast cell tumors, so a direct hormonal link has not been established.⁴¹

Hemangiosarcoma

Golden retrievers that underwent OHE after 1 year of age had 4× the incidence of hemangiosarcoma as compared with intact females or females that underwent OHE before 1 year of age.¹⁶ No significant differences in incidence of hemangiosarcoma were found in male Golden Retrievers.¹⁶ Similar findings were noted in a study of Vizslas, although dogs that underwent OHE before 1 year of age or castration after 1 year of age also had increased risk.³⁹ Other non-breed-specific studies have shown similar findings for splenic and cardiac hemangiosarcoma.^{42,43}

Osteosarcoma

An increased risk for osteosarcoma was seen in Rottweilers that underwent OHE or castration before 1 year of age, although the overall 13% incidence of bone sarcomas in this study group seems disproportionately high.⁴⁴ Historic studies have reported a 1.3× to 1.9× increased risk for osteosarcoma in animals that underwent neutering at a non-specified age.^{45,46}

Transitional Cell Carcinoma

Female dogs are more predisposed to bladder transitional cell carcinoma than male dogs, and neutering (at a non-specified age) increases the risk up to 3× in both male and female dogs.^{47,48} An 8× increase in prostatic transitional cell carcinoma has also been reported in male dogs that underwent castration at a non-specified age.³⁶

Neutered pets are better behaved, and early neutered ones better still – NOT SO!

Quite apart from the fact that most behaviour problems are created by owners failing to understand and/or train their dogs properly, knowing factors relative to the breed and individual characteristics, and possibly also failure to provide an appropriate environment, there are a number of arguments to consider here.

Yes, neutered male dogs are less likely to take it upon themselves to roam freely and, yes, they are less likely to exhibit normal behaviour and try to assert male dominant behaviour, but all these things can be controlled by human interventions.

However, the American Kennel Club Canine Health Foundation reported significantly more behavioural problems in neutered dogs and bitches. Other studies have also shown early neutering to be associated with increased incidence of noise phobias and undesirable sexual behaviour! Quite the opposite of what one would logically expect if neutering was a benefit. The most commonly observed problem in spayed bitches was found to be fearful behaviour, and in male dogs aggression (the very thing we castrate them for!). I wonder if some of the latter could well be due to confusion as to the individual's place in dog society as an adult-sized animal locked into a state of permanent puppyhood?

On the upside, separation anxiety and inappropriate toileting when frightened have been found to improve. Perhaps the result of a suppression of mental development?

Ageing

Longer term, studies have also shown sexually intact males to show slower cognitive impairment with age than neutered dogs. Results with bitches were inconclusive.

Hypothyroidism

Studies on several thousand Golden Retrievers showed that those neutered were more likely to develop hypothyroidism and this affects mental function amongst its other concerns. Certainly I have diagnosed early neutered dogs that have developed this condition as early as seven months of age, and also have seen early neutered dogs fail expensive training programmes when they develop it young. This perhaps is the reason why behaviourists are telling me they are being called upon to help owners finding these early neutered individuals so hard to train?

Other studies have confirmed this **Hypothyroid** link and, for interest, the most common clinical findings in hypothyroidism include obesity, seborrhoea (greasy skin), alopecia (hair loss), weakness, lethargy, bradycardia (slow heart rate), and pyoderma (skin infection). Skin diseases make up a lot of the work in current veterinary practice and most dogs are neutered – as they say in the USA “go figure”.

I could go on, but it would be impossible within the scope of this article to cover all the possible other

minor issues seen as a result of neutering, so I shall stop there!

In Conclusion

While existing studies on the benefits and detriments of performing neutering in large- and giant-breed dogs <12 months of age provide some conflicting data, and most literature is retrospective. In addition, because pet longevity is in some studies suggested as increased with neutering,^{31,49} the risk for developing cancer may be higher. On their completion, comprehensive prospective studies such as the Lifetime Golden Retriever study⁵⁰ could provide clearer guidelines on when to perform OHE and castration if required by the owner.

It is important that owners make an informed choice for their pet, but I would venture to ask 'where are the benefits for the individual dog in all this?' It should be accepted that most of the benefits are clearly associated with societal, human behaviour and convenience arguments. Many years ago dogs were domesticated and perhaps this is the price they pay as part of that bargain?

Clinically the arguments for neutering dogs do not, in my opinion, stack up to much at all and it may actually be a negative action when looking at their long term health. While for bitches there are some apparent positive benefits, they are still minimal in my opinion, when compared to the risk factors and long term health issues should the individual be unfortunate enough to suffer them.

Ultimately the choice an owner makes (and the choice should be the owners) will mostly depend on personal circumstances, the breed and how you wish the dog to interact with your family – all human factors.

With regards to early neutering owners should be aware of the long term issues that appear to be associated with early neutering over letting the dog mature, and be prepared to cope should they happen. Promotion of early neutering without explanation of the risks is in my opinion unethical, and we have decided as a practice we will not do it anyway as the negatives are just too many and so it is contrary to our ethos.

A decision as regards to whether or not to have your dog neutered should be an informed one - it does not have to follow others' agendas and media campaigns - and, hopefully, I have gone some way to helping with that.

If the Decision is to Neuter

I generally recommend OHE between the first and second estrous cycles in female dogs and castration after musculoskeletal maturity in male dogs.

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Age of Neutering in Large and Giant-Breed Dogs. Article in Clinicians Brief by Clara S.S.Goh BVSc MS DACVS, ACVS Founding Fellow (Surgical Oncology), Colorado State University. August 2016. From which many of the references and some of the text in this article are taken.