

This Ancient Practice Is Getting a Much-Needed Makeover

It's been a long-standing practice to spay or neuter a puppy before or at six months, without considering the needs of individual dogs and their caregivers. Now that these researchers have confirmed the health and behavioral risks associated with desexing, things may soon change.

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STORY AT-A-GLANCE

- In 2021, a pair of researchers at the University of California, Davis School of Veterinary Medicine published a perspective article calling for a new paradigm in canine spay/neuter decisions
- This team, along with other researchers, have amassed a sizable body of scientific evidence of the negative effects of one-size-fits-all desexing of dogs in the U.S.
- Earlier study results by the same research team show that health and behavioral risks associated with desexing are highly dependent on breed, and in mixed breed dogs, on adult size and weight
- The if and when of sterilizing dogs should be the decision of individual owners in consultation with veterinarians
- For the shelter population, an ideal solution would be to train veterinarians to perform sterilization procedures that leave the ovaries and testes intact

In 2021, researchers Lynette A. Hart and Benjamin L. Hart of the School of Veterinary Medicine at the University of California, Davis published a perspective article in the journal *Frontiers in Veterinary Science* titled "An Ancient Practice but a New Paradigm: Personal Choice for the Age to Spay or Neuter a Dog."¹

The Harts are among a small group of veterinary researchers intensely focused on the health and behavioral effects of spaying and neutering on dogs, and have built a solid case against the practice of automatically spaying or neutering every puppy by six months of age, or in some females, before the first estrus.

The Harts' 2021 study took the topic to another level by actually suggesting in the title that the time has come to replace the old paradigm with a new one that considers the needs of individual dogs and their caregivers when making spay/neuter decisions.

"In general, the idea is to replace the long-standing practice of expecting that the puppy should be spayed or neutered before or at 6 months, or in the case of some females, before the first estrus," the co-authors explain.

"Others also raise questions about this across-the-board timing that has been favored the past few decades.² Instead, the new paradigm is for the veterinarian and pet owner, or the pet owner alone, to use the available data-based information to decide on the best age for neutering."³

Why Early-Age Desexing Can Be Problematic

Doing away with one-size-fits-all spays/neuters is something I've advocated for many years. Unfortunately, early in my veterinary career, I was a vocal advocate for early-age desexing.

I began to see things more clearly when, about five years after I opened my practice, I noticed that many of my canine patients, several of whom I'd been treating since puppyhood, were developing endocrine-related disorders. These were dogs eating biologically appropriate, fresh food diets, who were not over-vaccinated, and whose owners were doing just about everything right. So, I began researching the topic of desexing and endocrine imbalances.

By 2006, the number of dogs I was diagnosing with hypothyroidism was at an all-time high. I started to wonder if the condition was a symptom of a deeper hormonal imbalance in many of my patients, because even after I got their thyroid levels balanced, the dogs still didn't appear to be vibrantly healthy or entirely well.

After a conversation with an expert in the field of veterinary endocrinology who confirmed my suspicions, I realized my insistence on early spays or neuters for every dog patient had left many of them with serious health problems. For many years, I insisted my clients follow my advice to spay or neuter their pets at or before 6 months of age, with some of them desexing their dogs at 3 months of age.

I realized that I had been making this suggestion not based on what was physiologically best for my patients, but rather what I felt was morally best for their owners. As patients I desexed at a young age cycled through my practice, many of them with irreversible metabolic and endocrine diseases, I started apologizing to my clients.

I apologized to my patients as well. Through my blanket recommendation that all pets be desexed because humans may be irresponsible with an intact animal, I had inadvertently made many of my patients very ill. As a doctor, this revelation was devastating.

The vast majority of my clients at that time were 100% committed, responsible pet parents, and I began advising them to leave their dogs intact whenever possible. Needless to say, many people outside my practice were and are unhappy with my revised position, and I completely understand their concerns. Pet overpopulation continues to be a serious problem in the U.S., and unwanted animals are still euthanized in shelters every day.

In terms of the shelter population and irresponsible pet owners, we're not yet at a place where every dog can safely remain intact. With that said, there are procedures that render animals unable to reproduce, but which spare their ovaries and testes and the vital hormones those organs produce, such as pediatric vasectomy and hysterectomy (involving removal of the uterus, but not the ovaries).

I absolutely believe those procedures should be taught in veterinary schools and offered by veterinarians as alternatives to the complete removal of all sex hormones.

Many Risks Associated With Desexing Are Breed-Specific

In a 2020 research article, the Harts and colleagues published the results of a 10-year study of the effects of desexing on 35 dog breeds,⁴ including:

- Australian Cattle Dog

- Labrador Retriever
- Cavalier King Charles Spaniel
- Rottweiler
- German Shepherd Dog
- Bernese Mountain Dog
- Pomeranian
- Collie
- Shih Tzu
- Irish Wolfhound
- Boxer
- Poodle-Toy
- Bulldog
- Pug
- English Springer Spaniel
- Beagle
- Miniature Schnauzer
- Cocker Spaniel
- Shetland Sheepdog
- Great Dane
- Boston Terrier
- Poodle-Standard
- Dachshund
- Yorkshire Terrier
- Doberman Pinscher
- Australian Shepherd
- Maltese
- Chihuahua
- Saint Bernard
- Golden Retriever
- Border Collie
- Poodle-Miniature
- Corgi (both types combined)
- West Highland White Terrier
- Jack Russell Terrier

The study suggests that vulnerability (health problems) from neutering varies tremendously from one breed to the next.

*"There is a huge disparity among different breeds," lead study author Benjamin Hart said in a news release. "Some breeds developed problems, others didn't. Some may have developed joint disorders but not cancer or the other way around."*⁵

According to Hart, there's no "one size fits all" when it comes to health risks and the age at which a dog is neutered or spayed, and I couldn't agree more.

Age at Desexing Doesn't Appear to Affect Risk Level

The UC Davis researchers analyzed 15 years of data from thousands of dogs who were seen each year at the university's Veterinary Medical Teaching Hospital. They looked for joint disorders including elbow and hip dysplasia and cranial cruciate ligament tears, as well as cancers including lymphoma, hemangiosarcoma, mast cell tumors, and osteosarcoma.

The study results suggest that for most of the 35 breeds, the risk of developing problems was not affected by the age at which spaying/neutering was performed. The risk for joint disorders was found to be related to body size.

As you might guess, smaller breeds typically don't develop the problem, but a majority of larger breeds do — with two surprising exceptions: Great Danes and Irish Wolfhounds. Neither of these giant breeds showed an increased tendency to joint disorders, no matter the age of desexing.

Another finding was that the incidence of cancer in smaller dogs, both desexed and intact, was low, again, with two exceptions. In both Boston Terriers and Shih Tzus, spaying/neutering was associated with a significant increase in cancer. Interestingly, the sex of the dog made a difference in some cases.

Female Boston Terriers spayed at six months had no increased risk of joint disorders or cancers compared with intact females; however, the males neutered before one year of age had a significantly increased risk.

A previous UC Davis study found that spaying female Golden Retrievers at any age increases the risk of one or more cancers from 5% to up to 15%. According to the UC Davis researchers, there are at least two major limitations to their study:

"First, relatively few breeds are covered compared to those included in the various breed registries of kennel clubs and canine organizations. This limitation was necessary so as to apply the same diagnostic criteria for diseases covered across all breeds, using the same database, and the necessity of having sufficient cases for analyses.

Second, no information is available as to the reasons the owners or others chose to neuter, or not to neuter their dogs. In California, the vast majority of dogs are neutered, and since 2005 it is legally required for dogs to be neutered prior to adoption from an animal shelter or humane society; many breeders impose the same requirement."

You can find a chart with the study's suggested **[guidelines for age of neutering of the 35 breeds here](#)**; the **[full study is here](#)**, and contains more information for each of the breeds.

Desexing Risks Higher for Large Mixed Breed Dogs

In a second very similar study published in 2020, the same UC Davis researchers looked at mixed breed dogs across five weight categories.⁶ The research team found that mixed breed dogs weighing over 44 pounds as adults are at higher risk for one or more joint disorders if desexed before 1 year of age. Dogs 43 pounds and under are at no increased risk.

Since it's the norm in both the U.S. and much of Europe to spay or neuter dogs by 6 months of age, these study results suggest dog owners should consider desexing options carefully.

*"Most dogs are mixed breeds," lead study author Benjamin Hart said in a news release. "We hope this study will influence the spay or neuter process in order to give people wishing to adopt a puppy the time to make an informed decision on when to spay or neuter."*⁷

The team evaluated common canine joint disorders including hip dysplasia, elbow dysplasia and cranial cruciate ligament (CCL) tears, in five weight categories:

- Under 22 pounds (739 dogs)
- 22 – 42 pounds (546 dogs)
- 43 – 64 pounds (992 dogs)
- 65 – 86 pounds (604 dogs)
- 88+ pounds (258 dogs)

They also looked at cancers including lymphoma, hemangiosarcoma, mast cell tumors, and osteosarcoma based on weight but found no increased risk in any weight category compared to intact dogs. Per the study:

*"There was no clear picture with the cancers followed, undoubtedly reflecting the diversity of breeds involved in mixed breed dogs and the breed-specific differences with regard to vulnerability to different cancers."*⁸

Previous studies indicate that purebred dogs are twice as likely to develop certain cancers, with desexed Rottweilers four times more likely to develop bone cancer than intact dogs.⁹

The researchers concluded that risk of joint disorders in dogs over 43 pounds can be up to a few times higher compared to intact dogs. For example, for female dogs over 43 pounds, the risk jumped from 4% for intact dogs to 10% - 12% for dogs spayed before 1 year of age.

What About Shelter Dogs Adopted as Puppies?

*"The study raises unique challenges," co-author Lynette Hart said in a news release. "People like to adopt puppies from shelters, but with mixed breeds it may be difficult to determine just how big the dog will become if you don't know anything about the dog's parents."*¹⁰

If you've adopted a canine family member from a shelter or rescue organization, you know that most dogs — regardless of age — are desexed before they go home with their adoptive families. Breeders also often include a future spay/neuter commitment in their contractual agreements with purchasers of their puppies.

The study co-authors recommend that shelters, breeders and humane societies consider adopting a standard of spaying/neutering at over a year of age for dogs who will be large as adults. They also believe their study is especially relevant for people and organizations raising service dogs.

"They need to take a serious look at this," said Hart. "Joint disorders can shorten a dog's useful working life and impact its role as a family member."

Having worked at a shelter for years, I don't believe the author's suggestion is wise to wait to sterilize dogs; the world is full of well-intentioned humans who are not responsible. In my opinion, dogs should be unable to reproduce when they leave the shelter, but they should also have completely functional hormonal systems that are not permanently altered by the sterilization surgery.

So again, this means veterinarians need to learn alternative surgical techniques to accomplish both goals. Shelters can perform hysterectomies and vasectomies at any age and not hinder a dog's endocrine axis; why aren't we teaching vet students these simpler, potentially health-extending techniques?

Yes, It's Time for a Paradigm Shift in Spay/Neuter Decisions

As was the case with the study of purebreds, the mixed breed study covers just a few joint disorders and cancers that occur in dogs; there are several additional health conditions linked to desexing, and behavioral issues as well.

In the U.S., spaying and neutering dogs is considered the right thing to do to prevent pet overpopulation and all associated problems, and desexing procedures are typically performed before the age of six months. Like the study of purebreds, this study also puts the brakes on automatic, across-the-board, early-age spaying and neutering, and instead suggests that dog parents carefully consider when and if they should have their pet desexed.

"We think it's the decision of the pet owner, in consultation with their veterinarian, not society's expectations that should dictate when to neuter," said Benjamin Hart of the earlier study. "This is a paradigm shift for the most commonly performed operation in veterinary practice."¹¹

My approach, a veterinarian with lifetime relationships with my patients and clients, is to work with each pet parent to make decisions that will provide the most health and behavioral benefits for the dog.

Whenever possible, I prefer to leave dogs intact. However, this approach requires a highly responsible pet guardian who is fully committed to and capable of preventing the dog from mating (unless the owner is a responsible heritage, functional or preservation breeder and that's the goal).

It's important to note that I'm not advocating the adoption of intact shelter animals to people who may or may not be responsible pet owners. Shelter veterinarians don't have the time or resources to build a relationship with every adoptive family, so the dogs in their care must be traditionally spayed and neutered (until shelter vets learn how to perform hormone-sparing pediatric techniques) prior to adoption to prevent more litters of unwanted dogs.

My choice when adopting dogs out to strangers (most rescues and shelters) is to sterilize without desexing so the testes or ovaries can continue to produce hormones essential for the dog's health and well-being. This can be accomplished through vasectomy or hysterectomy (which removes the risk of pyometra).

Rarely, older, intact male dogs develop moderate to severe benign prostatic hyperplasia (an enlarged prostate) that may be improved with conventional neutering. Intact females can also be at risk of pyometra as they age, which now appears to have a strong genetic component.

Generally speaking, mature intact dogs have had the benefit of a lifetime of sex hormone production, so the endocrine imbalances we see with spayed or neutered puppies don't commonly occur when dogs are desexed in their later years.

Mammary cancer in dogs is multi-factorial, similar to humans. The Royal Veterinary College researchers concluded that, "Due to the limited evidence available and the risk of bias in the published results, the evidence that neutering reduces the risk of mammary neoplasia, and the evidence that age at neutering has an effect, are judged to be weak and are not a sound basis for firm recommendations."¹²

As you can see, we have a lot to learn about all of the health repercussions associated with surgical decisions we once thought were set in stone. Currently, veterinary schools in the U.S. only teach full spays and neuters, so unless your own vet has obtained additional training in sterilization techniques that spare the ovaries or testicles (which is unlikely), you may have only one surgical option available to sterilize your pet.

In this case (and if you can guarantee no unwanted pregnancies), my suggestion would be to wait until your dog has reached full musculoskeletal maturity, and if you have a female, I'd also wait until she's completed her second estrus cycle before scheduling a traditional spay.

If you'd like the Association of American Veterinary Colleges to teach vet students alternative sterilization surgical techniques, you can [**email this suggestion to them here**](#), or to the Canadian Veterinary Medical Association [**here**](#). For a list of veterinarians who offer hysterectomies or vasectomies, [**click here**](#).

Thankfully, these confusing hormonal issues do not appear to affect cats nearly to the extent of dogs, so cats can be desexed at any age, preferably waiting until 6 months of age to allow for healthy urogenital development.

Sources and References

^{1, 3} [Hart, L. and Hart, B. Frontiers in Veterinary Science, March 19, 2021](#)

² [Dawson, J.K. et al. Frontiers in Veterinary Science, July 22, 2019](#)

⁴ [Hart, B.L. et al. Front. Vet. Sci., 07 July 2020](#)

⁵ [UC Davis, July 15, 2020](#)

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^{7, 10} [UC Davis News Release, August 13, 2020](#)

⁹ [Cooley, D.M. et al. Endogenous Gonadal Hormone Exposure and Bone Sarcoma Risk, Cancer Epidemiol Biomarkers Prev \(2002\) 11 \(11\):1434-1440](#)

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¹² [Beauvais, W. et al. The effect of neutering on the risk of mammary tumours in dogs—a systematic review, J Small Anim Pract, 2012 Jun;53\(6\):314-22](#)
