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### **Restoring hormone levels in a neutered dog leads to health improvements**

A case study published in *Topics in Companion Animal Medicine* details the first report of hormone restoration therapy applied to a dog suffering from diverse physical and psychological symptoms following castration. Treatment resulted in normal levels of testosterone and luteinizing hormone, improved mobility, and reduced anxiety.

### **Disruption of hormones due to spaying and neutering**

Part of responsible pet ownership in the United States has included spaying or neutering your dog to reduce pet overpopulation. Other benefits include fewer diseases associated with the sex organs, such as mammary, ovarian, and testicular cancers, pyometra and prostate disorders. But growing research on this practice indicates that removal of the gonads (testes or ovaries) and associated sex hormones can have significant health and welfare impacts on dogs as well. Obesity, urinary incontinence, various cancers, immune-mediated diseases, musculoskeletal disorders, and cognitive and behavior problems are more common in spayed and neutered dogs. This is likely because natural hormone feedback mechanisms become unregulated in neutered dogs. For example, without sex hormones signaling the pituitary gland and hypothalamus in the brain, levels of luteinizing hormone (LH) continue to increase. Emerging research indicates that the high levels of unopposed luteinizing hormone likely influence the development of diverse health disorders. The relationships between sex hormones, health and wellness are not simple and may be influenced by many factors, including the dog's sex, breed, age, and environment.

To avoid the potential health issues due to spay and neuter surgery, many informed pet owners are opting for hormone-sparing sterilization (like hysterectomy or vasectomy) for their dog. But what about the millions of dogs who have already been spayed or neutered and now suffer from ailments that do not respond to traditional medical treatment? Restoring and balancing the hormones of neutered dogs is uncommon in veterinary medicine, with the only published accounts including treatment for incontinence. The case study published in *Topics in Companion Animal Medicine* chronicles the health issues, hormone treatment procedures, and outcomes in a neutered male dog.

## **Background and health issues**

A male mixed breed dog named Toby was adopted from a county animal shelter at about 7 months of age. Like most shelters and rescue centers in the United States, castration was required before he could go home to his new family. The young dog arrived as an active, healthy, sociable pet but his health quickly deteriorated over the next few months. When he was one year of age, the owners took him to the veterinarian to address reduced mobility, limping in the right hip, rapid weight gain, and fear of unfamiliar people. The veterinary team treated Toby over the next three years with trials of pain medication, joint supplements, thyroxine, antidepressant, and significant diet restrictions. Frequent carprofen administration and daily joint supplements helped to reduce limping, but mobility was still poor. Weight stabilized on a strict diet but fear and anxiety around strangers continued to worsen.

## **Treatment resulted in significantly improved health**

By four years of age, Toby's owners were no longer able to take him out of the house due to his extreme anxiety, and his inability to run and jump exacerbated his overweight condition. When a new younger dog was adopted, Toby's health deficits were even more apparent as he could not run and play. The owners knew about the possible health impacts resulting from the lack of normal hormone levels after spay or neuter, and wondered if this may be the cause of Toby's problems? Working with Dr. Michelle Kutzler, a veterinary endocrinologist at Oregon State University, the decision was made to try hormone therapy to restore his hormones to a normal level.

Castrated male dogs have very low testosterone and can have high levels of LH. Toby's LH level was three times higher than what is normal for a neutered dog. He was started on a regimen of weekly testosterone shots, which he accepted readily with positive reinforcement training. Within three months, the treatment significantly increased muscle mass, reduced limping and improved mobility. Fear and anxiety were somewhat decreased. However, his LH concentration did not come down to normal levels, so a gonadotropin-releasing hormone (GnRH) agonist was implanted. The treatment brought the dog's testosterone and LH levels back to normal, and health improvements continued.

After hormone restoration therapy, Toby's appetite was reduced, and fear of people became manageable. Toby's owners now take him for walks in public parks and he has no problem running, jumping, and keeping up with the other family dog. There were no known side effects, and the owners were pleased with the outcome. He has been continued on the treatment, with his health monitored through standard bloodwork, testosterone and LH levels, and prostate exams.

"The improvement in Toby's health and behavior has been amazing", said Linda Brent, owner of the dog and lead author of the publication. "After years of trying traditional medical treatments with little effect, returning his hormones to normal levels has given him a chance for a happy and healthy life."

## **Next steps and information for dog owners**

This research concluded that hormone restoration may be effective in improving health in neutered dogs, but also raised many questions about the optimal methods and potential risks.

“This case report provides evidence to support lowering LH concentrations with GnRH downregulation and gonadal hormone supplementation in spayed and neutered dogs displaying clinical signs of the long-term adverse health effects of gonad removal”, commented Dr. Michelle Kutzler. She added, “Controlled randomized clinical trials are needed.”

While data from an individual animal cannot be generalized to other dogs, the authors hope that it encourages dialogue and further research on the topic of hormone therapy for spayed or neutered dogs.

Dog owners and veterinarians can find research on the impact of spay and neuter in dogs and information on hormone-sparing sterilization procedures at [www.parsemus.org/pethealth/hormone-sparing-sterilization/](http://www.parsemus.org/pethealth/hormone-sparing-sterilization/). If you feel that your dog’s health issues may be related to spaying or neutering, consider consulting with a theriogenologist (a veterinarian trained in reproduction) who may wish to measure your dog’s LH level.

**Article link:** The article is available online from *Topics in Companion Animal Medicine* at: <https://doi.org/10.1016/j.tcam.2021.100565>

**About the Parsemus Foundation (San Francisco):** The Parsemus Foundation works to create meaningful improvements in human and animal health and welfare by advancing innovative and neglected medical research. The foundation’s focus is on supporting small proof-of-concept studies and then pursuing press coverage of the results, so that the advances change treatment practice rather than disappearing into the scientific literature. Many of the studies we support involve low-cost approaches that are not under patent. Focus areas include male contraception, nonsurgical and hormone-sparing dog and cat sterilization, non-invasive treatment of benign prostatic hyperplasia, and breast cancer treatment. More information on the Parsemus Foundation and the work presented here can be found at: [www.parsemus.org](http://www.parsemus.org)

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