



## Gonadectomy and behavior in dogs

### *Gonadectomia e comportamento em cães*

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It the past few years, there has been a growing interest about the eventual side effects concerning gonadectomy in dogs and bitches. Most publications focus on health problems: obesity, cancers, osteoarticular or ligamentary disorders, longevity. Fewer articles have studied the effect of gonadectomy on behavior. Castration often reduces unwanted behaviors in castrated male dogs, but it may increase some types of aggressivity towards other dogs or even humans, depending on the age at neutering.

### **In male dogs.**

In male dogs, it is important to make the difference between undesirable behaviours potentially linked with testosterone, and behavioural disorders.

#### *Undesirable behaviours*

Urinary marking, roaming, mounting people's legs or inter-male aggressivity - are often considered by the owners as a normal phenomenon. In 2016, a study in France based on 610 male dogs' owners has showed that 2/3rd of them encounter at least one of these four undesirable behaviours (Etude Lightspeed GMI – February 2016). They are therefore frequent findings. Very often, the owners are bothered by them (for example in the same study 31% of the owners were bothered by inter-male aggressivity and 51% by urinary marking) but in the majority of the cases (nearly 75%), they don't speak about it with their veterinarian, or don't even think about mentioning it, because they think that they are normal behaviours in male dogs.

What is the effect of gonadectomy on these undesirable behavioural situations? Some studies have been conducted on this topic. For example, Maarschalkerweerd et al. in 1997 observed the modifications of behaviour in 122 dogs after surgical castration. Marking inside the house: decreased by 69% and was therefore greatly improved. Marking outside decreased by 23% but was not stopped completely. Roaming, when it was induced by bitches in heat, decreased by 64%, but roaming due to other causes (hunting dogs...) decreased only by 16%. In the same study, mounting on people's legs decreased by 57%, while mounting other males decreased by 43% and mounting on bitches decreased by 41%. Unfortunately, mounting on inanimate objects (cushions...) decreased only by 26% and was even increased by 5%. Concerning inter-males aggressivity, among 23 dogs showing this unwanted behaviour, 13 dogs were improved but one dog became even more aggressive after castration. Most other studies show similar figures, with slight modifications. For example, Andersson and Linde-Forsberg in 48 dogs found that 35 dogs (73%) did not show any modifications on urinary marking outside, while only 9 dogs (19%) had a decreased frequency of urinary marking, and 4 dogs (8%), even began to sit down to urinate, as pre-pubertal animals. We can therefore roughly estimate that, after castration, the undesirable behaviours decrease, but do not completely stop, in approximately 60% of the cases.

The relative failure of gonadectomy toward inter-male dominance or other unwanted behaviours is not surprising, when we read the study done in free-roaming dogs in Chile (Garde et al. 2016), which discovered that castrated dogs showed no reduction of sexual activity or fighting behaviour with other males. In other terms, these undesirable behaviour are only partly linked with testosterone.

Now there is a problem which is also enlightened in most studies. It concerns the aggressivity towards humans. In their article, Maarschalkerweerd et al. in 1997 showed that, among dogs presenting this problem, aggressivity towards unknown people decreased by 22% but was increased in 4%. In the same study, aggressivity toward familiar people was also increased by 4%. In other terms, after castration, some male dogs may be more aggressive towards other dogs, but also towards people. In 2018, Farhody et al. did a retrospective study on 13498 male dogs aggressive to humans and 13237 dogs aggressive to other dogs, using the C-BARQ scale (Canine Behavioral Assessment & Research Questionnaire), which is a standardized, behavioral evaluation tool. From this study, it appeared that some dogs became more

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aggressive with strangers, especially if castrated between 7 and 12 months of age, something which is commonly done in Europe. The authors anyway concluded that their data did not support the view that gonadectomy will predictably reduce the aggressive behaviour. This is something very important for veterinarians to remember, when the owners ask for the castration of their dog if the latter growls at them or at when a stranger enters the house. If after castration the dog becomes uncontrollable, the owners may complain and even take a legal action against their veterinarian if the dog bites someone, for example a child.

What is it about medical castration? In 2007, sub-cutaneous implants containing the GnRH super-agonist deslorelin (Suprelorin®) have been released on the European market. It was interesting to know if the effects of this medical castration towards undesirable behaviours were identical to what we could expect after surgical castration. De Gier and Vinke in 2010, comparing surgically castrated male dogs and dogs implanted with Suprelorin® 4.7 mg, demonstrated that the effects on mounting, urine marking, roaming and intermale-dominance were identical. In other terms, when a veterinarian hesitates to castrate a male surgically in front of an undesirable behaviour, not knowing if it will improve the behaviour of the dog or not, using an implant may be a good alternative to test the potential improving effect of castration. If it works, then the dog may be surgically castrated later, being more confident about the success of the procedure.

More recently, the effect of medical contraception using deslorelin implants has been tested in 49 military dogs, showing that chemical castration had no measurable effect on any of the test situations in comparison to intact males. (Gfrerer et al. 2019).

### *Behavioural disorders*

Are a more complicated matter, when we think about gonadectomy. Bamberger and Houpt, in a study of 1644 dogs, found that significantly more neutered male dogs were admitted in a teaching hospital for aggression and phobias, compared to the percentage of neutered dogs admitted in other departments of the same hospital. The authors concluded that « these findings deserve attention from the veterinary community and suggest to re-examine the recommendations of gonadectomy for dogs ». In other terms, gonadectomy may be useful in case of slightly unwanted behaviours, but may become contra-indicated in case of real behavioural disorders. In 2014, Zinc et al. studied 2505 male dogs from the Vizsla breed and found that castrated males had 1.3 more risk to develop a behavioural disorder, and even more if castrated before 6 months of age (1.8 more risk). All this tends to show that, in front of a dog presenting a potential behavioural disorder, it is wise first to get an advice from a behavioural specialist or at least to begin by a behavioural treatment before « jumping » on surgical gonadectomy. A letter to the editor in the *Veterinary Record* (12 January 2019) presents the case of a Lakeland Terrier suffering from anxiety separation and which was castrated by a vet who didn't even tell the owners that castration may increase the problem. After castration, it was a disaster, the dog did not improve at all, and even started to howl at night time. The author of the letter writes that it would have been clever to postpone the operation, waiting for the advice of a behaviourist.

The potentially negative effect of gonadectomy on behavioural disorders is especially interesting to bear in mind when we know that thousands of dogs are abandoned in Europe, many of them for unwanted behaviour. In 2018, Mc Greevy et al. found that different behavioural disorders may be associated with an insufficient length of exposure to gonadal hormones before castration. The authors wrote that « shelters are inundated by dogs displaying undesirable behaviours ». It would be interesting to know how many inappropriate castrations are at the origin of some of these abandonments.

### **In bitches**

Things are not so clear in females, although some publications suggest a potential increase of aggressions in castrated bitches (Podberscek and Serpell 1996, Reisner et al. 2005). O'Farrel and Peachey (2008) found that when considering « the dominance aggression towards family members », the scores of the spayed bitches showed a significant increase compared with their controls.

Balogh et al. (2018), in a study based on Labrador retrievers, found that owners of spayed bitches described more frequent or more intense fear reaction in their animals in response to loud noises, unfamiliar objects approaching on or near the sidewalk, or if they were approached by unknown dogs barking, growling or jumping. For these authors, in contrast to popular belief, gonadectomy did not



inevitably result in a behaviourally more stable dog. As in male dogs, caution should be taken by veterinarians when the owners are asking for ovariectomy in a bitch for behavioural disorders.

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