Reproductive and sexual behavioral problems in dogs

Petra A. Mertens *

Veterinary Clinical Sciences, University of Minnesota College of Veterinary Medicine, 1352 Boyd Avenue, St. Paul, MN 55108, USA

Abstract

This paper reviews the influence of genetics on canine sexual behavior, the causes of common sexual and reproductive behavioral problems in dogs as well as treatment approaches, including environmental management, behavior modification, and pharmacological intervention.

© 2006 Elsevier Inc. All rights reserved.

Keywords: Behavior genetics; Behavioral problems; Reproductive behavior; Sexually dimorphic behavior; Aggression

1. Sexually dimorphic behavior

Behaviors that are typically specific to gender include social behaviors, postures during voiding, roaming, some mating behavior, and maternal behavior.

It is a commonly held notion that male dogs are generally more likely to show intraspecific aggression when compared to female dogs [1]. However, aggression can occur in a variety of circumstances, depending mostly on the dog’s motivation to react aggressively. Female dogs are much more commonly presented for aggression to other dogs within the same home (approximately 70%) when compared to male–male pairs (20%) or female–male pairs [2,3]. This behavior occurs in sexually intact as well as ovariohysterectomized females, but could be worse during the estrous cycle. Mating privileges are of high value. Therefore, a female dog shows less inhibition to react aggressively in case of a conflict, especially if both dogs are close in social rank. Conflicts occur or escalate during estrus. Cycle synchronization through pheromones (dormitory effect) will ensure that female dogs within the same home enter estrus at approximately the same time [1]. It appears that dogs enter estrus in the order of their social rank, with the highest ranking female showing signs estrus first. At this time, dogs are more likely to compete over priority access to valuable resources. The dog with the greatest overall ability to monopolize resources such as food, resting spots, toys, owner attention, and access to preferred areas is higher in rank. Her ability to succeed in these encounters will secure her priority mating rights. Lower ranking females that are not bred successfully have a high likelihood to enter into pseudocyesis and lactatio falsa. These dogs will ultimately support the higher ranking female in her efforts to raise her litter. Since females in groups of wild carnivores are typically closely related, this altruistic behavior helps ensure the survival of the offspring that carries the genes of both the mother and the ‘helper at the nest’.

Most cases of dog–dog aggression in the same home present when the younger animal within a dyad reaches sexual or social maturity, when one animal ages, or when medical issues affect the dog’s resource guarding potential. Many owners support one dog over the other, hoping to control the dogs or to change the dogs’ social dynamics. Most commonly, the well-intentioned intervention leads to an escalation of fighting. This increases the risk of injury or even fatal outcome. The prognosis
for cases is best if fights are rare occurrences, if fights are predictable to the owner, and if fights have not led to injuries.

Treatment is based on avoidance of situations that may lead to conflicts. In addition, owners are instructed in techniques that help them support natural ranking between dogs. Female dogs that fight solely during estrus should be separated from each other if the owner intends to breed them. If the dogs are not used for breeding, ovariohysterectomy is recommended. Intervention with psychotropic drugs, such as fluoxetine, a selective-serotonin-reuptake inhibitor, is used by some and may be useful in specific cases if surgical intervention remains unsuccessful.

Fighting between intact male dogs is mostly seen upon first encounter between two males or in competition over a female in estrus. The conflicts are highly ritualized and bare a lesser risk for serious injury. Both sexually intact and neutered male dogs can exhibit this form of aggression [4].

Urine marking within the house is most commonly seen in sexually intact male dogs, in multi-dog homes, and in homes with conflicts between dogs. Higher ranking female dogs will void small amounts of urine to urine mark. This behavior is more commonly seen in sexually intact male dogs, in multi-dog homes, and neutered male dogs can exhibit this form of aggression [4].

Urine marking within the house is most commonly seen in sexually intact male dogs, in multi-dog homes, and in homes with conflicts between dogs. Higher ranking female dogs will void small amounts of urine to urine mark. This behavior is more commonly seen during estrus as social conflicts escalate. In addition, marking serves to communicate the dog’s reproductive status through the pheromones, such as methyl-p-hydroxybenzoate, that the animal emits.

Treatment of intact animals is mostly based on ovariohysterectomy or castration. Careful supervision and housetraining techniques can be successful. Owners must remove the scent of previously marked areas very carefully. As long as dogs are able to perceive the odor they are likely to mark the same spot repeatedly.

Intact male dogs tend to roam when they perceive the scent of a dog in estrus. However, a female dog in standing estrus will also actively seek male dogs, leaving the owner’s dwelling if given the opportunity. Dogs that normally obey commands reliably may not respond as usual, since the motivation to seek a mate may not be suppressed by pending punishment or rewards offered for desirable behavior. Roaming is controlled successfully through proper management and containment.

2. Mating behavior

Reluctance or refusal to mate occurs in inexperienced individuals, in animals that experience pain or fear, and in cases in which social ranking or mate preferences prevent successful breeding. Ritualized displays of aggression directed to the male are common if the female is not in standing estrus. Some females in standing estrus mate promiscuously, whereas other females demonstrate very clear preferences for particular males or certain physical characteristics of male dogs. It appears that some males are more commonly accepted by a variety of females than others [5,6].

Male dogs that appear to lack libido should be tested for physical problems that may impair their willingness to mate. Young males may refuse to mate with older, higher ranking females or in the presence of other, higher ranking male dogs.

Masturbation is a normal behavior in male and female dogs. Prolonged or frequent licking of prepuce and penis or the vulva can lead to secondary problems that will in turn induce licking. Treating problems that may induce irritation and licking is a crucial part of treatment. Punishment of dogs that masturbate may lead to later problems if the dog is used for breeding, since fear of punishment can inhibit sexual behaviors. It is best to redirect and distract the dog, followed by rewards for behaviors other than masturbation.

Mounting dogs of the same or the opposite gender can be due to a variety of motivations other than sexual behavior, including play and exploratory behavior. On occasion, mounting leads to sexual arousal and friction movements. However, the behavior is considered completely normal and should not be punished. Homosexual behavior has been described as a normal part of sexual behavior in hundreds of species [7]. There is no evidence that male–male or female–female mounting has any negative effects on either animal involved. Mounting dogs of the same gender does not affect future mating behavior with dogs of the opposite sex. In some cases, mounting may be part of ritualized social behaviors that aim at establishing social dominance. It has been reported that some shampoos contain methylparben, a substance that resembles the pheromone emitted by the bitch in estrus [1]. Owners of dogs that are more commonly mounted could be using dog grooming products that induce sexual interest in other dogs. Mounting humans and objects is best redirected to more desired behavior. Interventions that intend to punish the dog may cause fear of the owner or reinforce the behavior if the attention that owners pay the dog is perceived as a reward by the dog.

3. Maternal behavior

A lack of maternal behaviors may be due to individual differences in behavior, a lack of experience, pain and discomfort, or suboptimal environmental
conditions. Dogs should be allowed to engage in their species-specific behaviors before, during and after parturition to prevent issues. Unnecessary disturbances or interventions that may induce fear or discomfort should be avoided in order to prevent delays in the process of whelping or undesirable responses of the dog to the offspring, ranging from lacking maternal care to aggression that may escalate to infanticide or kronism (ingestion of the offspring).

Oxytocin plays a prominent role in the olfactory control of mother–offspring bonding. The release of oxytocin increases the mother’s sensitivity for pheromones in the olfactory bulb. A lack of oxytocin may account for bonding problems that lead to aggression of the mother towards her offspring [8]. In such a case, the litter must be separated and hand-raised if it is unsafe to allow the mother to nurse while muzzled or otherwise humanely restrained. If problems persist or if females show problems with more than one litter, breeders should consider whether it is desirable to breed the dog again.

While aggression to her own offspring is not normal, it is considered completely normal for a dog to show maternal aggression to individuals in her environment, including dogs, other pets, or humans. Maternal aggression may start as early as the onset of nest building behavior and it may last up to 3 weeks postpartum. This time marks the beginning of the weaning period as well as the socialization period (3–16 weeks of age). The offspring will begin to leave the nest site to explore the environment and engage in interactions with littermates as well as humans. Maternal aggression that persists beyond the beginning of the dogs’ socialization period is considered abnormal and has negative long-term consequences for the offspring.

4. Behavior genetics and its implications for breeders

Recent findings in behavior genetics have lead to many changes in this area of research that may soon revolutionize the technology available to select behaviorally sound dogs for breeding.

The process of domestication from the gray wolf began 100,000 years ago, and selective breeding lead to great physical and behavioral diversity among dog breeds. When Lindbald-Tok et al. [9] recently published a map of the canine genome, they identified over 2.5 million individual genetic differences among dog breeds (single polymorphisms or SNPs) that account for physical differences, behavioral traits, as well as diseases.

Studies that look at behavioral traits of breeds that we selected over generations find a great variety in heritability of these traits. While the heritability ($h^2$) of so-called hunting eagerness in English setters is low ($h^2$: 0.22), other behavioral traits are more likely influenced by the dog’s genetic make up (tracking in German short-haired pointers $h^2$: 0.48; nervousness in the Labrador retriever $h^2$: 0.58) [10].

While genetics play an important role in behavior medicine, studies from Scott and Fuller [11] showed early on that the individual behavioral differences within a breed are equivalent to the difference between breeds. If puppies of different breeds are allocated into two groups (one group gets to interact with a handler any way they wish (indulged) and the other group is physically disciplined to sit, come and heel (punished)), breeds react differently in test situations later on in life. When the adult dogs were stopped from eating a meal by a slap on the muzzle and a loud ‘no’, Shetland sheep dogs and Basenjis responded in breed-specific patterns. Basenjis ate the meal despite the reprimand. Shelties of both groups (indulged or disciplined early on) did not eat the meal. The behavior of Beagles and Fox terriers, however, varied depending on their experiences as puppies. Puppies that were not punished early on took longer to approach the food dish after the punishment in the test situation as an adult than the dogs who had been punished as puppies.

Another area of behavior genetics that will affect the work of behaviorists and breeders soon is psychiatric research. Psychiatric research has revealed genes responsible for certain dopamine and serotonin receptor types that affect specific pathologies. These receptors are responsible for the regulation of mood and emotions in all species. They are the target for anxiolytic drugs, antidepressants, and stimulants. One example is the D4 receptor. People who tend to be novelty seeking have a high rate of an exon 3 domain on the D4 receptor. Exploration of this dopamine receptor in dogs showed that Shiba Inus with strong territorial behavior have longer construction of this domain than non-territorial Golden retrievers [12].

In humans, more than 30 genes have been named in the context of behavioral issues. Future findings may help us better understand behavioral problems in humans and dogs, facilitate the development of pharmacological treatment, and help exclude dogs that are carriers of genes responsible for behavior problems and medical issues from breeding populations.

References