



# Handling of aggression in shelter dogs

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## The aim of this paper

The aim of this paper is to be a guidance for the shelter personal. Correct handling increases the chances for aggressive dogs in shelters to get the best possible evaluation and treatment, and it thereby also increases the chances for the dogs to get adopted with good result.

## Behavior problems in dogs at a shelter

Many dogs are left at a shelter for rehoming. Many of them have behavioral problems like barking, spinning, digging, escaping, jumping, destruction, lunging, growling, panting, salivating, pacing, chewing, separation anxiety, depression, lethargy, housetraining issues, fearful behavior, avoidance and aggression. (Bollen & Horowitz 2008; Simonet et al. 2005).

Aggression towards family members and other animals is the most common behavioral problem in dogs. The largest group of dogs that arrive

to a shelter is entire/intact males, and male dogs also caused the most aggression (Blackshaw 1991). A dog that exhibit aggressive behavior could be very dangerous and is a challenge for the staff in the shelter, both to treat the dog and to find a suitable new home for it (Bollen & Horowitz 2008).

There are really only four main alternatives that the staff is faced with regarding behavioral problems: Avoiding triggers, modification of behavior or other treatment, rehoming/relinquishment, and euthanasia (Sueda & Malamed 2014).

The behavioral treatment increases the dog's welfare as soon as it starts and successful treatment allows earlier adoption. Untreated dogs may spend too much time at a shelter which ultimately can lead to euthanasia simply to make room for more homeless pets. The shelters staff can through guided handling reduce overall stressed behavior and increase pro-social behavior in the shelter. Happy dogs also makes a happy staff (Simonet et al. 2005).

## The environment in a shelter

During their stay in shelters, dogs are subject to a variety of psychological stressors, including general loss of control over environmental contingencies, disruption of familiar routines, exposure to unpredictable noise, isolation from former attachment figures and overall novelty. In laboratory animals these types of events activate stress-related systems (Hennessy 1997; de Boer et al. 1989; Muir & Pfister 1986; Hanson et al. 1976; Coover et al. 1971; Friedman & Ader 1967). Thus, even if a dog does not arrive at the shelter with a behavior problem, it may well acquire one during the stay (Tuber et al. 1999).

The cortisol (hormon related to stress) level in shelter dogs is higher than that of pet dogs at home environment (Hennessy et al. 1997; Stephen & Ledger 2006) and the level does not return to baseline until day 31. In other words the time spent in the shelter could affect the behavior of the dogs. That must be kept in mind in a test situation (Kis et al. 2013).

The best physical environment for animals is one that is large enough for them to achieve and maintain flight distance when needed. Another key element is possibility to hide from or avoid fearful stimuli, and control visual contact (Laule 2001). Visual barriers, screening and hiding places could be provided as purposeful enrichment and a very valuable tool in reducing fear (Laule 2005). Create a safe, emotionally stimulating but not stressful environment for the dogs (Polo et al. 2015). That includes a safe place for the particular dog (Odore et al. 2020).

A significant reduction of stress behaviors occur if there is a playback of "dog-laugh". It is a breathy pronounced forced exhalation that dogs use to initiate play (Simonet et al. 2005). Dogs hearing the dog-laugh expressed a pro-social behavior such as play-face, play-bow, approach and liplicking (Bekoff & Allen 1998). Staff may imitate the dog-laugh to initiate a change in the dogs behavior. This might reduce residency time (Simonet et al. 2005).

For many individuals, enrichment could mean the possibility to have cooperative behavior and

to be socially housed (Laule 2005). Dogs that are housed in pairs or groups sleep more, vocalize less and show fewer abnormal behaviors. The chance for them to get faster adopted is also greater and they are less often returned. Social enrichment may also immediate behavioral effects and improve welfare, increase public support and help maintaining good mental health in employees. Males that are housed alone are most affected by housed isolation (Coppola et al. 2005),

It is also important to train the staff to interact with the dogs in a positive attitude on a daily basis (Hemsworth & Coleman 1998).

Willen et al. (2019) showed that most fearful dogs undergoing human-centered enrichment completed an aggression test successfully while most fearful dogs without this enrichment failed. When the dog had just arrived and was in its shelter-room, and the staff was passing by, they dropped a small treat without making eye-contact. In the outdoor-area the staff spoke softly to the dog without making eye-contact and without petting it. The enrichment consisted of two 15-minutes sessions per day the first five days. Most of the time was spent in a special room that was furnished and designed to look like an ordinary home, with dog toys, classical music, diffused light, oil of lavender, chew treat and a blanket. Interaction generally consisted of petting, speaking softly to the dog, play and treats.

Human handling can reduce cortisol levels in shelter dogs (Coppola et al. 2006; Menor-Campos et al. 2011) and adult dogs can form an attachment relationship with the handler in the staff after a few handling sessions. As dogs show more aggression when tested with their owners, the handler in the staff could play the role of the owner during aggression tests (Gácsi et al. 2001).

The presence of a human companion may be more effective in reducing stress than a canid companion, in novel or threatening situations (Pettijohn et al. 1977; Tuber et al. 1996)

There is a great need for animal behavior experts in shelters. Since human interaction and

basic conditioning procedures can reduce the impact of the shelter environments impact on the dogs, and thus ease the transition into adoptive homes, it would be an opportunity for shelters to provide help from students who needs to make animal-related exercises and limited research. The students could also help the shelter in marketing dogs for adoption, correct behavioral vulnerabilities, and prepare the dog for transition to a new home. That would be to the benefit of all involved (Tuber et al. 1999).

## Evaluation

Since the shelter environment can be stressful for the newly arrived dog, it is important that it is given sufficient time to adjust to the shelter before the evaluation is made. When the dog is eating and drinking normally and willing to exit for walks without exhibiting fearful body postures it can be considered to have adjusted sufficiently. The majority of dogs need between 48 and 96 hours. Some dogs may benefit from a temporary foster home prior to evaluation (Bollen & Horowitz 2008).

The goal of the evaluation is to ensure that more informed decisions are made concerning the disposition of the dogs, identify dogs with a propensity for aggression, make better matches with the adopting families (Bollen & Horowitz 2008) and provide the best quality of life for both the dogs and their new owners (Sueda & Malamed 2014).

It is important to identify problems as soon as possible because then the treatment prognosis is better (Sueda & Malamed 2014). When the behavior source is identified and understood it often can be overcome with, confidence-building activities, training and time (SPCA 2021). As all animals can cause harm, even as part of normal behavior, an accurate diagnosis is critical (Crowell-Davis 2008).

A correct behavioral evaluation helps identify dogs with aggressive tendencies and reduce return rate and the likelihood of post-adoption behavior problems including aggression (Bollen & Horowitz 2008).

A behavior evaluation can determine the basic temperament of the dog and its threshold level for aggression. The tests are designed to record the dogs response to common situations in a pet dogs's life (Bollen & Horowitz 2008).

The evaluation should include demographic information (age, breed and sex), the history (including behavioral history) of the dog (Bollen & Horowitz 2008), current behavior status, family dynamics, the historic intensity of aggression (Crowell-Davis 2008), description of the dog's everyday life, routines, rules, the dog's occupation, history of diseases, bad experiences and so on (Hellgren 2005). This information can help to improve the understanding of the dogs disposition and make a more correct evaluation (Bollen & Horowitz 2008).

When implementing an evaluation routine the adoption returns for aggression are reduced (Bollen & Horowitz 2008). A formalized behavioral evaluation should be used since it predicts problem behavior better than the subjective opinion of the shelter staff (Bollen & Horowitz 2008).

The evaluation is perhaps most important in predicting aggressive behavior towards humans or other dogs, especially if the dog's behavior history is unknown. One must remember though, that behavioral evaluations cannot predict completely accurately. (Bollen & Horowitz 2008).

If the dog is showing aggressive behavior, in a situation that humans perceive as a friendly interaction or not interaction at all, it is critical to accurately identify the motivation for the behavior (Crowell-Davis 2008), be it physical or behavioral (Sueda & Malamed 2014). There is always a reason for aggression. If the motivation for the aggression is misdiagnosed, then the attempts to treat the problem can have undesirable consequences (Crowell-Davis 2008).

Despite the use of a standardized procedure, caution should be taken with dogs that have a history of severe aggression. The tester should be informed about the behavioral history prior to the evaluation of these dogs, so that safety precautions can be taken. (Bollen & Horowitz 2008).

A dog with an aggressive history including inflicting multiple penetrating deep bites during aggressive interactions is probably more likely to cause harm in a future aggressive interaction than a dog that has exhibited inhibited bites or snapping at the air and then backed off from the situation (Crowell-Davis 2008).

It is important to be aware of early signs of aggression since prevention is more effective than treatment. The clinical sign of aggression warrants formulation of a list of differential diagnoses, including both physical and behavioral causes (Sueda & Malamed 2014).

The evaluation and handling of aggressive dogs should be based on the dog and not the humans, who might want to solve the problem quickly. Investigation and treatment takes time and needs to do that. A thorough investigation is essential. No treatment is good enough if the diagnosis is wrong (Hellgren 2005).

## Behavioral evaluation

The choice of a behavioral test is depending on practicality and importance of sensitivity – see the list of examples in the end of this heading.

The evaluation process in the study of Bollen & Horowitz (2008) was based on Sternberg's (2002) "Assess-a-pet-procedure" and comprised nine components, each of which consisted of observing the dog's reaction to a specific situation and describing the behavior (snarled, growled, lunged etc). The dogs were classified in "passed" (no-issue, unsocial and borderline) or "failed" (Bollen & Horowitz 2008). Unfortunately this test can not recognize the dog's propensity for two of the incidents that reflected 30 % of the returning dogs: response to children and territorial aggression (Bollen & Horowitz 2008).

The study evaluated 2017 dogs and 61 % passed as no-issue, unsocial or borderline. The odds of failing the evaluation example were for males almost twice those for females, and intact males were more likely than neutered ones to be aggressive. Adolescent and adult dogs also had significant higher odds of failure than pups.

Among the dogs that had a positive-aggressive history (11 %) a majority (90%) failed one or more of the components in the test, and the odds for them to fail were more than 11 times as high as for dogs without an aggressive history. Regarding returns after adoption, the odds of borderline or unsocial dogs returned for aggression were about twice those of no-issue dogs (Bollen & Horowitz 2008).

Examples of behavioral evaluations:

- "Behavioral evaluation Assess-a-pet procedure" (Sternberg 2002).
- "Obtaining behavioral information", p 601 (Sueda & Malamed 2014).
- "Tests to assess the temperament and aggressiveness partially validated or in the process of validation" pp 529–530 (Polo et al. 2015).
- "The Relationship Assessment Tool" (helps define the dynamics that are possibly causing or at least exacerbating conflict) (Clothier 2014).
- "Behavioral evaluations" pp 123–124 (Bollen & Horowitz 2008).

## Aggression types

One must remember that aggression is not a diagnosis. There could be many reasons for exhibiting aggression directed to humans; fear, conflict, possessive behavior, territorial behavior, redirected aggression, play, predatory behavior, pathophysiologic reasons (like pain) (Sueda & Malamed 2014), protective (Crowell-Davis 2008), dominance, competitive, intermale (sexual), maternal, learned, sibling rivalry, and the least common, idiopathic rage (Blackshaw 1991). Another reason could be that the dog is defending itself (Crowell-Davis 2008). In the study of Hart & Hart (1985) dominance aggression and territorial aggression were the most common behavioral problems, and dogs may also have more than one type of aggression (Crowell-Davis 2008) but in Hellgren (2005) dominance and fear-aggression is the most common types. However, all these forms of aggression can have severe consequences for humans (Blackshaw 1991).

To be able to diagnose the motivation for aggression and begin behavior modification, it is

important to identify the circumstances in which the dog is aggressive. The dog's history may reveal if the aggression is associated with a specific place or item (Crowell-Davis 2008).

For resources that may help diagnosing canine aggression, see Crowell-Davis (2008), page 275, Blackshaw (1991), page 357–359, and Sueda & Malamed (2014), page 612–613, 616–622. Also see Hellgren (2005) page 2-6, for aggression types.

## Veterinary examination

If the evaluation reveals behavior problems, and before any type of aggression is diagnosed, the veterinarian should perform a thorough physical examination to rule out medical causes of aggressive behavior, such as neurologic disease, occult injury, infectious disease and pain. The conducted test will be indicated by the dog's age, behavior and clinical signs (Crowell-Davis 2008). Dogs may possess multiple or mixed motivations for aggression and multiple behavioral diagnoses are common (Sueda & Malamed 2014).

A number of physical conditions may cause pain, discomfort and irritability and result in an uncharacteristically aggressive behavior (Sueda & Malamed 2014). The veterinary should make a minimum database for patients presenting with aggression. It could include:

- Client history
- Behavioral history
- Clinical observations
- Review of prior medical records
- Complete physical examination
- Radiography
- Laboratorie data
- Complete blood count
- Blood chemistry
- Serum chemistry panel
- Total thyroid level
- Urinalysis

(Sueda & Malamed 2014; Crowell-Davis 2008)

Sometimes a dog has formed negative associations while it was previously ill and even if it is currently healthy the memory has influenced its

behavior (Sueda & Malamed 2014).

## Risk factors and assessment

All dogs have the potential to become aggressive and to bite, depending on the situation. Some dogs though present a greater risk. Therefore assessment of risk factors is important in deciding how to treat an aggressive dog. In some cases the staff will need help from a behaviorist (Crowell-Davis 2008). When evaluating an aggressive dog one needs to consider the type of aggression it exhibits and if it is aggressive toward a particular group. Confident dogs with territorial aggression present a greater risk for causing harm (Crowell-Davis 2008).

## After the behavioral evaluation and veterinary examination

Once medical causes of aggression have been ruled out, the evaluation lets the professional behaviorist differentiate between behavioral personalities and customize a treatment/handling plan for the dog. The plan should include risk assessment, management options, and reasonable treatment goals (prognosis) (Sueda & Malamed 2014). Through suitable treatment the shelter can help improve adoption success and reduce the risk of aggressive dogs endangering the community (Bollen & Horowitz 2008).

Classification of the dog's behavior is made from the behavior evaluation together with the historical findings and first-hand observation of the dog's body language and behavior differentiated. The underlying cause of the aggressive behavior is identified, be it fear or conflict related, possessive behavior, territorial behavior, redirected aggression, play aggression, predatory behavior or pathophysiologic (Sueda & Malamed 2014). Also borderline and unsocial dogs should receive a treatment plan since they are significantly more likely than no-issue dogs to exhibit aggression. They may be placed for adoption, but with great care (Bollen & Horowitz 2008).

Written instructions including diagnosis, recommendations and treatment plan, tailored to meet the individuals needs, should be available for the staff in the shelter soon after the behavior eva-

uation and veterinary examination is complete (Sueda & Malamed 2014). *For general handling methods, see appendix A.*

The treatment time varies from case to case depending on causes, how long the dog has exhibited the behavior, and the commitment and time spent to solve the problem (Hellgren 2005). Treatment should be monitored and documented (Sueda & Malamed 2014).

For severe cases or for those patients where treatment in the shelter does not have an affect, referral to a veterinary behaviorist should strongly be considered (Sueda & Malamed 2014). Euthanasia is only recommended when the dog is very dangerous and has caused severe damage to a human and when all treatment options had failed (Blackshaw 1991). The public health risk and the risk to the new owner should be taken in consideration. It is the veterinarian's job to advise the staff about this difficult decision (Crowell-Davis 2008).

If it is recognized in the follow-up that the dog's behavior does not improve with behavioral therapy it may be necessary to pursue further diagnostics (Sueda & Malamed 2014).

## High risk breeds, genetics and early experience

Some breeds are reported more aggressive than others: German Shepherds, Rottweilers, Bull Terriers, Cattle dogs (Blackshaw 1991), Golden Retriever, Dalmatians and Cocker Spaniel (Hellgren 2005). "High risk" breeds had higher odds for failure in behavioral tests. (Bollen & Horowitz 2008). Other breeds showed aggression mainly in specific situations.

There are genetic differences between aggressive and non-aggressive dogs which makes the inherited influence important (Larsson 2012). The degree of aggressiveness exhibited by an individual is in addition to its genetic component also shaped by early experience (socialization) and learning (Bollen & Horowitz 2008).

## The physical reaction of anger

Several physiological processes start when an animal is exposed to an acute stressing situation. The symphathetic nervous system is elevating the body's capacity for handling stressful situations. There are mainly three strategies: flight, fight or fright (being passive, "freezing"). Serotonin is a mediating nerve transmitter in aggression. Aggressive dogs usually have more serotoninreceptors than non-aggressive dogs (Larsson 2012). Other irregular findings regarding cholesterol, triglycerides, HDL and HTR2A has been found in aggressive dogs (Vermeire et al. 2011; Pentürk & Yalçın 2003).

## Adoption

A dog with aggressive tendencies can be adopted but, depending on the dog's issues, sometimes with strict restrictions for the families adopting them. That is; no children, an experienced owner, consultation with behavior staff prior to adoption, and mandatory training class (Bollen & Horowitz 2008).

Gobbo & Zupan (2020) has shown that the owners personality traits can influence aggressivity in the owned dog. Aggressive dogs more often have owners who are less emotionally stable, more distant and less clingy and controlling, have low conscientiousness, and an insecure, anxious and avoidant attachment to their dogs. When rehoming a dog with aggressive tendencies it could be important to look for a new owner who has the opposite personality traits.

After adoption, frequent communication between the behaviorist/staff and new owner is essential for successful management of the dog's aggression. Follow-up may be conducted through appointments, phonecalls, e-mail, letters and/or video. The more frequent communication the better potential prognosis. During the first week the contact is recommended at least once and then every 1–2 weeks thereafter. In-person recheck appointments are recommended approximately 8 weeks after the initial appointment, depending on improvement and need. If the treatment was combined with medication, eight

weeks is usually sufficient time to determine its effectiveness (Sueda & Malamed 2014).

## Educating owners

”The right dog to the right owner” is an essential preventive measure for dogs with a problem behavior (Hellgren 2005).

To prepare new owners they should receive education regarding why the dog is aggressive and how the treatment plan works, how to recognize signs of anxiety, fear and aggression in the dog, modeling positive-reinforcement techniques, canine body language, advocating appropriate behavioral intervention, the need for early socialization in puppies (Sueda & Malamed 2014). This knowledge is preparing the owners to manage their dog’s behavioral health for the rest of their lives. The owners need to avoid situations that have triggered aggressive behavior in the past and to follow a strict routine when other less familiar persons interact with the dog (like sitting before petting). Ongoing behavior modifications and training may be a necessary, tolerable and preferable alternative to relinquishment or euthanasia (Sueda & Malamed 2014).

Aggression is never cured. The goal for a successful treatment should always be that the dog’s behavior is manageable and acceptable. Depending on how severe the dog’s aggression initially was, how easily the aggressive behavior is triggered, how well the shelter staff or the new owner can manage the dogs treatment, and the dog’s response to treatment, there is always some risk for future aggressive behavior (Sueda & Malamed 2014).

See also:

- Clinician’s role in preventing human-directed canine aggression, s 624 (Sueda & Malamed 2014).
- Tuber et al. 1999, p 384.

## Recommendations

Based on scientific research the best way to address aggressive behavior problems in shelter dogs is to follow these steps:

Before the dogs arrival to the shelter

1. Enrich the environment in the shelter.
2. Educate the staff in handling aggressive dogs: physical reaction, risk factors, breeds, aggression types, handling methods...

After the arrival of the dog to the shelter

1. Evaluation.
2. Veterinary check.
3. Handling plan and documentation.
4. Follow-up and adjustments/modifications.

Adoption

1. Education of the new owner.
2. Follow-up.

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## Appendix A

### General handling methods

Before initiating treatment of dogs with a history of aggression these aspects must have been considered; type of aggression, risk factors, the legal issues involved, and the alternatives. (Crowell-Davis 2008). It is highly advisable to treat aggression in dogs with advice from a behavior-specialist and/or professional trainer. With their knowledge and experience they can often pick up on very subtle clues and triggers that most of us are unable to discern, and they can provide valuable insight into dog behavior. A professional trainer will also help determine what type of new home and environment the dog needs to be successful (SPCA 2021).

The dog's habitat may have shaped the behavior. Common causes behind a problem behavior is that the owner sets too high or too low demands, unclear leadership, too many/too few or unclear rules, bad routines, communication problems, over-/under- or wrong stimulation, bad experiences, lack of selfconfidence, insufficient or incorrect learning, reinforcement of wrong behaviors, and instinctive behavior (Hellgren 2005).

A treatment plan to manage and reduce the dog's aggression must be formulated (Sueda & Malamed 2014), and it should be built on consistent, positive and predictable interactions (Polo et al. 2015; Sueda & Malamed 2014). The behavior treatment must be adapted for the particular dog and often includes various methods in combination (Blackshaw 1991). Even so, it is impossible to guarantee that a dog will not bite. (Crowell-Davis 2008).

The first step for treating behaviour problems in the evaluated dog is to ensure that the person who is handling it has been properly educated (Sueda & Malamed 2014).

Here follows some general advice about the handling of aggressive dogs:

#### **Avoidance**

Stressors including methods that implicate

confrontation or flooding must be avoided when dealing with aggressive behavior (Sueda & Malamed 2014).

Also any circumstances or situations that are likely to trigger aggressive behavior should be avoided while the underlying motivation for the aggression is treated (Sueda & Malamed 2014; Crowell-Davis 2008). If the stressors and triggers are difficult to avoid, aggression often worsens because the dog practices the unwanted behavior (Polo et al. 2015).

The staff and new owner should be instructed on how to effectively avoid triggers and manage the dog safely. It is the most important part of the treatment plan (Sueda & Malamed 2014).

Walk the dog in locations and at times when uncontrolled encounters with other dogs are less probable (Crowell-Davis 2008).

#### **Punishment and dominance**

Negative handling methods and physical punishment should be avoided at all cost (Laule & Desmond 1994; Reinhardt 1992). Physical punishment, confrontational training or confinement for curbing aggressive behavior may severely negatively impact the dog's welfare, might trigger aggressive behavior and further increase the risk of human-directed aggression (Sueda & Malamed 2014). Attempts to dominate an animal is generally exacerbated if the dog has fear-aggression (Crowell-Davis 2008). It should immediately stop if it previously has been used on the dog (Sueda & Malamed 2014). Dogs trained using punishment also overall exhibit more problematic behaviors (chewing household objects, stealing food, over-excitement...) (Laule 2005; Hiby et al. 2004).

All "positive" punishment when dealing with aggressive behavior (that is hitting, kicking, forcing the dog to lie down, pinning the dog on his or her side – "alpha roll", or staring at the dog) do not teach the dog anything useful but may instead elicit aggressive behavior.

Punishment is not recommended, but for avoiding confrontation and further aggression, nega-

tive punishment by withdrawing attention and isolating the dog in a safe, quiet room for a short period of time (social isolation) is a more humane approach (Sueda & Malamed 2014) though its use should be minimized (Laule & Desmond 1994; Reinhardt 1992). In the initial phases of the training the handler should ignore a nervous or aggressive behavior in the dog (Odore et al. 2020).

### **Muzzle**

During the early phases of treatment use of a basket muzzle may be useful (Crowell-Davis 2008). The muzzle should be gradually introduced and worn. Combine the muzzle with eating treats or engage in a desirable activity (for example going for a walk) so that the dog associates it with pleasant experiences. Only when the dog is totally accustomed to wearing the muzzle, gradual introduction of aggression-triggers might be initiated (Crowell-Davis 2008).

### **Positive Handling Methods**

We should adopt a positive reinforcement approach to the handling and training of captive animals. (Laule & Desmond 1994; Reinhardt 1992) together with behavior modification techniques (Sueda & Malamed 2014).

Dogs trained exclusively using reward-based methods are significantly more obedient than those trained using either punishment or a combination of reward and punishment (Laule 2005; Hiby et al. 2004).

We need to recognize the motivation behind non-compliance, and adjust our behavioral objectives accordingly. If the motivation is fear specific techniques of positive reinforcement training can be used, including habituation and desensitization (Laule 2003).

In studies with primates a technique called “cooperative feeding” has been shown to have dual effect of reducing aggression and increasing affiliative behaviors (Bloomsmith et al. 1992).

### **Desensitization**

A humane treatment approach is the use of pro-

gressive desensitization for the trigger situation (for example the sight of other dogs) and counterconditioning (Crowell-Davis 2008).

During these sessions there is gradually higher frequencies of less assertive postures, at successively closer distances. It is important that the rehabilitation dog are exposed to friendly dogs and that the dogs are commanded to sit or make eye contact with the handler. If the dog is showing aggressive signals (like staring and growling) they should be interrupted by using a head-collar to direct the dog's head and body away from the stimulus dog (Orihel & Fraser 2008). Depending on the aggression-intensity in the dog's reaction one could also move the dog away or decrease the trigger intensity until the dog calms (Sueda & Malamed 2014). The trigger intensity should always be kept below the dog's threshold for aggressive behavior, but when the dog is making progress the trigger intensity may be gradually increased over multiple training sessions (Sueda & Malamed 2014).

Appropriate calm and relaxed behavior is rewarded intermittently (Sueda & Malamed 2014) with positive reinforcement like verbal praise and food treats (Orihel & Fraser 2008).

In the study made by Orihel & Fraser (2008) almost 70 % of the dogs in the rehabilitation group showed a decline in aggression using desensitization (Orihel & Fraser 2008).

### **Obedience- and attention training**

Obedience training can be useful to train self-control and frustration management (Odore et al. 2020). It will be much easier to manage or rehome a dog who responds to basic cues such as “sit”, “stay”, “come” (SPCA 2021), and “lie down”. The dog might be uncertain as to the most appropriate behavior response in some situations, and the basic behaviors can provide the dog with clarity and safety if the behaviors have been trained and practiced in a clear and consistent manner (Polo et al. 2015). The desirable behavior (when the dog performs them in a calm way) should be associated with positive feelings and rewarded (Odore et al. 2020; Polo et al. 2015).

Increase the time between exercise execution and reward gradually. Teach the dog to look at the eyes of the handler on command to obtain a treat or to get their attention (Odore et al. 2020).

### **Exercise and problem-solving activity**

Plenty of physical exercise (taking the dogs on more walks or doing agility-exercises) can discharge excess energy that might otherwise manifest as aggression and frustration (SPCA 2021). Also let the dog engage in problem-solving activities like snuff tracks or shell-scent game (Odore et al. 2020).

### **Pheromones**

The use of pheromones may decrease barking, but it usually fails to reduce aggressive behavior (Sueda & Malamed 2014).

### **Diet**

Analysis shows that there is an association between dog aggression and gut microbiome structure (Kirchoff et al. 2019). A low-protein diet (with about 18% protein) supplemented with the amino acid tryptophan has shown to have a good impact on dominance(conflict) or territorial aggression (Sueda & Malamed 2014). Also glutenhypersensitivity has shown to worsen aggression. When other common causes for behavioral abnormalities has been ruled out, modification of diet should be considered since it is a simple and safe attempt of treatment (Suñol et al. 2020).

### **Surgery**

Castration has yielded variable results in research studies. Some dogs benefit from being castrated and show reduced aggression but in some cases spaying may worsen aggressive behavior. In the study of Sueda & Malamed (2014) approximately only 30% of dogs exhibiting aggression toward family members improved by more than 50% (Sueda & Malamed 2014). In some cases castration can be aided with progestins (hormones) (Blackshaw 1991).

### **Medication**

Sometimes medication are used effectively in the treatment of aggressive dogs (Crowell-Davis

2008). On some occasions it can be necessary to combine behavior modification program with medication. But medications should in such cases not be used alone but always in conjunction with behavior modification (Sueda & Malamed 2014). Though there are no licensed drugs for treating dog aggression pharmaceutical drugs that increase serotonin, norepinephrine, dopamine, and GABA may decrease aggression, anxiety and reactivity in some dogs (Sueda & Malamed 2014). One study by Odore et al. (2020) shows that Luoxetine (fluoxetine) (1,5 mg/day) is effective, together with behavior treatment, in controlling canine aggression over a six-month period (Odore et al. 2020).

When medication is used (together with behavior modification), the medication may be gradually tapered to a lower dose every 1 to 2 weeks, usually a 25% reduction every time (Sueda & Malamed 2014).

See also:

- "General treatment recommendation for human-directed canine aggression", page 606, and "Treatment recommendations" on pages 614–616 (Sueda & Malamed 2014).
- Tuber et al. 1999, pp 383–384.
- Polo et al. 2015, pp 530–531.