

2018

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Recommended Citation

Rehrig, A. N., Napolitano, D. A., & Monsour, C. P. (2018). Assessment and Treatment of Self-Injurious Behavior in a Dog. *Journal of Animal Behavior Technology*, 8(2), 42-47. Retrieved from <https://www.associationofanimalbehaviorprofessionals.com/journal>

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Assessment and Treatment of Self-Injurious Behavior in a Dog

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Abstract

Canine acral lick dermatitis (ALD) is the outcome of self-injurious behavior (SIB) characterized by excessive licking and biting most often of the dorsal forelimbs. In this single-subject study, the covert SIB of a ten-year-old Rottweiler/Shepherd mix was assessed to determine the variables controlling the occurrence and maintenance of the behavior. Following the assessment, the efficacy of non-contingent toys, contingent and non-contingent petting, and protective equipment were evaluated to reduce self-injury hypothesized to be maintained by automatic reinforcement. To eliminate the protective equipment (e.g., Elizabethan collar), two methods were investigated to remove the

component while maintaining low levels of ALD. The treatment plan successfully reduced, and subsequently ameliorated the dog's ALD for a year following the intervention. More work is needed to determine the applicability of these methods and to identify additional effective behavioral strategies to treat this, often debilitating, condition in dogs.

Introduction

Canine acral lick dermatitis (ALD) is the outcome of self-injurious behavior (SIB) characterized by excessive licking and biting most often of the dorsal forelimbs (Rapoport, Ryland, & Kriete, 1992). When chronic, the behavior can lead to fur loss, lesions, thickening of the skin, and infection (Beale, 2012). Fortunately, ALD is rarely life threatening, but can be painful and interfere with a dog's daily activities.

Unfortunately, there is a paucity of published peer-reviewed research concerning the treatment of ALD in dogs aside from investigations of medical approaches, mainly pharmaceutical interventions (Mills & Luescher, 2006). As such, traditional treatment approaches recommended by veterinarians include the use of physical deterrents (e.g., muzzles, Elizabethan collars), topical therapy, analgesics, and anti-anxiety medications (e.g., fluoxetine, clomipramine) (Beale, 2012; Rapoport et al., 1992). Although these interventions are effective in some cases, some dogs remain resistant to treatment or have a relapse following treatment (Rapoport et al., 1992). For example, White (1990) evaluated the efficacy of the narcotic antagonist naltrexone in treating canine ALD. Though 7 of the 11 participants had a decrease in ALD while on the medication, when treatment stopped, the behavior returned in all seven participants.

Treatment can be especially challenging in cases where SIB is covert. That is, ALD is present, but the self-injuring behavior is rarely, if ever, observed. In those cases, the variables controlling the behavior, including antecedent stimuli and consequences, may be unidentified making the behavior difficult to assess and manage successfully

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(Vollmer, 1994). Furthermore, when automatic reinforcement is suspected, it may be unknown whether the self-injury is maintained by automatic positive reinforcement (e.g., “feels good”) or automatic negative reinforcement (e.g., relieves pain). Although assessment of covert SIB may be difficult, it has been successfully evaluated in humans using video monitoring (Long, Miltenberger, Ellingson, & Ott, 1999) and measured via permanent products of the targeted behavior (e.g., observable injuries) (Iwata, Pace, Kissel, Nau, Farber, 1990). The current single-subject study combined these assessment techniques while also evaluating a comprehensive treatment package to reduce covert SIB in a ten-year-old dog.

Method

Participant and Setting

Jenny, a ten-year-old Rottweiler/Shepherd mix, participated in this study. She lived with her new family for approximately two years at the start of the evaluation. Jenny shared the home with her owners and two male dogs. The previous owners reported that she had a long history of ALD with moderate to severe wounds on both forelimbs (Figure 1). The previous owners also reported that Jenny had been confiscated from her original owners and had spent long periods of time alone and confined to a crate (i.e., up to 12 hours a day). In her current home, Jenny continued to self-injure despite no longer being confined to a crate and no longer being left alone for long periods of time. Since the behavior was rarely observed, the new owners did not have the opportunity to interfere with the behavior (e.g., say “no” or physically stop her from licking). They also did not punish Jenny when wounds were found though it is possible that wound treatment could have been experienced as an aversive event even though it was paired with treat feeding. Jenny’s ALD was resistant to topical treatments and analgesics (e.g., tramadol, gabapentin). Prior to the start of the study, Jenny was examined by a veterinarian and no medical problems were identified other than the physical injuries associated with ALD. In regards to enrichment available in the home, Jenny had continuous

access to a variety of toys and bones, was walked several times per week, and also had several opportunities each day to explore the large fenced-in back yard. All observations and treatments were conducted in Jenny’s home.



Figure 1. Severe self-inflicted wound on Jenny’s forelimb.

Assessment and Response Measurement

Since self-injury was rarely observed by the owners, observations were completed using video monitoring with the target behavior being *leg licking*. Based on video observations, *leg licking* was defined as repetitive licking or biting of the forelimbs between the elbows and paws with a duration of 5 seconds or longer. The definition excluded licking or biting the bottom of the front paws or other body parts since no injuries occurred in those places.

During baseline, a camera was placed in the bathroom where Jenny rested alone and engaged in leg licking as evidenced by fresh wounds when she exited the room. Video recordings were collected over six consecutive days from 6-9 PM. From the video, the rate and duration of leg licking was recorded. Antecedent, Behavior, Consequence (ABC) data were also recorded during leg licking. At the request of the owners, video was not gathered during the intervention or follow-up conditions. However, lesion ratings and photographs were recorded throughout the entire study. ALD was rated by the experimenter each evening using a five-point scale developed by the author specific to Jenny’s wounds (Table 1) with the most severe wound serving as the basis for the rating. Additionally, photos were taken in the evening by the experimenter of each leg to document injuries. Photographs were collected daily during baseline, approximately two times per week during the intervention, but only once during the follow up period since there were no

wounds to document. Follow-up wound ratings were completed by the experimenter at the end of each month for 11 months following the intervention.

Table 1. *ALD Rating Scale*

Rating	Description of Injuries
0	Normal condition; fully furred.
1	No observable injury; includes wet fur, hardened skin, or fur loss.
2	Injury present; scabs.
3	Injury present; minor bleeding.
4	Injury present; moderate bleeding requiring veterinary intervention.

Treatment Evaluation

Based on the results of the video and the ABC data, a multi-component intervention package was developed to address potential antecedents, consequences, and to identify appropriate replacement behaviors. During the intervention, Jenny had restricted access to the rooms (e.g., bathroom, master bedroom) in which she engaged in SIB unless supervised by her owners. Since it could not be determined if Jenny's SIB was maintained by oral or tactile stimulation, intervention components were selected that could potentially compete with both behavior functions. Noncontingent access to toys was made available to Jenny at all times (oral stimulation); whereas, contingent and noncontingent petting was offered in the evenings (tactile stimulation). The toys used were identified as preferred by her owners and were rotated at least weekly to reduce the likelihood of satiation (DeLeon, Anders, Rodriguez-Catter, & Neidert, 2000). Petting was provided by the owners anytime Jenny requested it (e.g., contingent on nudging the owner's hands). If petting was not requested, it was provided noncontingently two times per evening for at least 5 min. Any time Jenny was unsupervised (e.g., during the work day and overnight), noncontingent protective equipment (PE), an Elizabethan collar, was used to block leg licking as a preclusion procedure. Jenny was desensitized to wearing the collar before the start of the study.

The collar did not hinder Jenny's activities including eating and drinking; however, it did restrict normal grooming behavior. When minor lesions were detected, the owners used an antiseptic wash to clean the wounds and monitored for signs of infection. More serious wounds were to be brought to the attention of a veterinarian, but none occurred during the intervention. Daily communication with the owners verified that the intervention was consistently implemented.

After Jenny's legs healed, the most intrusive component of the intervention, the PE, was removed. Following a relapse which caused a wound to the left leg, the PE was reinstated until Jenny's leg healed again. The second attempt to withdraw the PE was completed in a gradual systematic manner. Based on Jenny's response, the amount of time she was allowed to be unsupervised without wearing the PE was increased using the following fading hierarchy: 5 min, 10 min, 20 min, 30 min, 40 min, 60 min, 4 hours plus overnight, and no PE. Each step in the fading hierarchy was implemented when Jenny's behavior stabilized at the current step (Figure 2). Specifically, the next fading step was not implemented until wound severity dropped and remained stable for at least four days. One exception occurred when unsupervised time was increased from 10 to 20 min. In this instance, Jenny's wounds were identified as very minor and the next step was implemented. Fading continued until the PE was no longer part of the treatment package.

Interobserver Agreement

Interobserver agreement was conducted by an independent observer who evaluated 31% of the observations for Jenny's legs. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100. Percent agreement was 93% (range, 93% to 100%) across conditions.

Results

The results of the video and the ABC analysis suggested that Jenny's ALD was

both the reduction in ALD and the maintenance of behavior change over time. By blocking access to the rooms in which Jenny engaged in leg licking, an antecedent event known to occasion SIB was removed while the owners simultaneously provided a setting rich in reinforcement more conducive to appropriate behavior. In the enriched environment, access to preferred toys and petting may have served as an abolishing operation, decreasing Jenny's isolation and leg licking behaviors. Additionally, the toys and petting may have matched the sensory consequences of Jenny's SIB improving their ability to compete against the response (Piazza, Adelinis, Hanley, Goh, & Delia, 2000). By utilizing PE, leg licking was blocked when Jenny could not be supervised. Blocking leg licking may have resulted in extinction of the automatic reinforcement maintaining the behavior or acted as an aversive event resulting in suppression of the behavior (Mazaleski, Iwata, Rodgers, Vollmer, & Zarcone, 1994). Since the collar was applied non-contingently, extinction appears to be the behavioral mechanism likely responsible for the eventual amelioration of Jenny's SIB (Smith, Russo, & Le, 1999).

Though the dependent measures used in this single-subject study captured the changes in Jenny's behavior, there are several limitations that should be addressed in future work. First, the wound ratings were subjective in nature. The ALD wound rating scale provided less precise data than continued video monitoring or a more accurate and validated wound rating scale; however, the measurement system did provide a practical solution to guarantee the owners' continued participation in long-term monitoring of Jenny's ALD. Future evaluations should use objective measures throughout the intervention to observe behavior change and a more robust measure to score wound severity. For example, video monitoring could be continued throughout the intervention or readily available software could be used to precisely measure wound surface area (Wilson, Iwata, & Bloom, 2012). Future studies should also employ a reversal design to demonstrate experimental control. Since Jenny had the potential to cause grievous injury to herself, withdrawing treatment was not

appropriate in this case. Lastly, the social acceptability of the restrictive PE was also a potential limitation. Though PE may be a necessary component to treat ALD, other forms (e.g., paper collars) should be investigated which may be more acceptable to dog owners.

In summary, this case study demonstrates a preliminary demonstration of the assessment and treatment of covert SIB in a dog using a behavioral approach, a topic for which little published data exists. The descriptive assessment was successful at identifying the salient variables controlling the occurrence and maintenance of the behavior to a level of precision suitable in an applied setting. Furthermore, the comprehensive treatment plan successfully reduced, and subsequently ameliorated, Jenny's ALD for a year following the intervention. More work is certainly needed, however, to determine the applicability of these methods, as well as to identify additional effective and humane assessments and treatment strategies to treat this, often debilitating, condition in dogs.

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