The Importance of Assessing Behavioral and Physiological Stress in Therapy Dogs

McCullough A*, Ruehrdanz A, Jenkins M and Ganzert R

American Humane Association, USA

*Corresponding author: McCullough A, American Humane Association, 1400 16th St. NW, Suite 360, Washington, DC 20036, USA

Editorial

Animal-Assisted Interventions (AAIs) are adjunctive modalities that include trained animals (commonly dogs) as integral participants in traditional forms of therapeutic treatment, and hold promise for improving human health and well-being. Not only are AAIs accessible and affordable, but research suggests that animals can provide important health-related benefits (e.g., increased physical activity, decreased blood pressure, longer lifespan, etc.) for populations from all walks of life [1-4]. Nevertheless, the majority of findings have largely been anecdotal and the AAI field has consistently struggled with conducting rigorous research [5,6]. Notably, few studies have attempted to measure the effects of participating in AAI sessions for the therapy animals themselves, even though the potential for significant stress has been suggested [7].

While several studies have examined the correlation between behavioral and physiological stress in dogs [8-10], very few have done so within an AAI context. One such study includes research recently conducted by Glenk et al. [11]. In their pilot study with adults receiving substance abuse treatment and AAIs, they found that certain therapy dog behaviors, such as lip licking and body shaking, were positively correlated with a significant decline in canine salivary cortisol, the primary glucocorticoid associated with the stress response in dogs [12].This finding challenges the (controversial) notion that these behaviors are indicative of canine distress, and may even indicate that these behaviors help manage stress, as Glenk et al.[11] and others [12] suggest.

Given this current lack of clarity, American Humane Association calls for human-animal bond researchers to implement rigorous study designs that measure the effects on both the human and therapy animal participants. To help address this research gap, American Humane Association and Zoetis have launched innovative research – the Canines and Childhood Cancer (CCC) Study- to determine the relationship between the therapy dogs' behavior and their physiological stress levels during therapy sessions with pediatric oncology patients and their families across multiple hospital settings. In addition to measuring human health outcomes, canine behavior is being quantitatively assessed from videotapes of each therapy session, and the dogs' physiological response is being measured using cortisol.

Salivary cortisol concentrations have shown to correlate well with plasma concentrations [13-14], making saliva collection a relatively non-invasive and less stressful alternative to plasma collection when proper handling methods and materials are utilized [15-17].

The first primary instrument being used to assess canine stress in the CCC Study is an ethogram consisting of 26 typical canine behaviors. The behaviors are divided into two domains based on whether they are typically stress-related (e.g., lowered posture and attempt to leave the room) or affiliative-related (e.g., play stance and tail wagging). The frequency of each behavior is coded from the videos and a score is determined for each domain by adding the coded scores.

The second primary instrument to analyze canine stress during the AAI sessions in the CCC Study is measurement of post-session salivary cortisol levels. Therapy dog handlers are trained regarding proper methods of obtaining saliva samples from their dog using an 8mm-diameter inert polymer cylindrical swab. The swab is long enough (125 mm) to allow the handler to hold one end while the dog chews on the other. Approximately 1-5 ml of saliva can be collected within five minutes, with 0.3 ml being sufficient for duplicate analyses of cortisol concentration. The swabs are placed in polypropylene conical tubes/vials and frozen at -20ºC by the site until dry ice shipment for analysis. Cortisol concentrations are measured by Salimetrics, LLC, a CLIA-certified laboratory that specializes in the processing and analysis of a broad range of salivary hormones. Their highly sensitive enzyme immunoassay for cortisol has a lower limit of sensitivity of 0.007 µg/dL, standard curve range from 0.012 µg/dL to 3.0 µg/dL, an average intra-assay coefficient of variation of 4.6%, and an average inter-assay coefficient of variation of 5.9%.

A series of five saliva samples taken at prescribed times are averaged to produce a baseline cortisol level for each dog. Post-session saliva samples are taken 20-30 minutes after initiation of an AAI session. The appearance of free cortisol in saliva lags release into serum by 20 minutes [18] and has a slow dissipation rate [13], so this sample collection timing captures cortisol produced throughout a session. Post-session cortisol concentrations are reported relative to each dog's baseline.

Three additional instruments are used to characterize therapy dogs, describe sessions, and interpret behavioral and cortisol data. Upon enrollment, participating handlers complete a demographic report about their therapy dog, including breed, age and number of years registered. Additionally, participating handlers complete the Canine Behavioral Assessment and Research Questionnaire (C-BARQ), a 101-item online instrument developed by the Center for the Interaction of Animals and Society and known for its reliability and validity, to establish a baseline temperament and behavioral score for their dog [19]. Finally, after each session, the handler completes

a survey that covers session length, a catalog of session participants, and a checklist of activities that took place during the session.

The CCC Study, which will conclude in 2016, aims to add to the AAI field's promising knowledge base by being the first to measure therapy dog physiology and behavior during AAI sessions in pediatric oncology settings. In order to be considered effective and humane modes of adjunctive treatment, AAIs should be mutually beneficial for both people and the therapy animals that provide this service. To that end, we call for all human-animal bond researchers to better understand the stress-related effects of AAI sessions for therapy animals through rigorous research methods.

References

1. Endenburg N, van Lith HA. The Influence of Animals on the Development of Children. The Veterinary Journal. 2011; 190: 208-214.

2. Fine AH. Handbook on Animal-Assisted Therapy: Theoretical Foundations and Guidelines for Practice. 3rd edn. San Diego, CA: Elsevier Inc. 2010.

3. Marcus DA, Blazek-O'Neill B, Kopar JL. Symptom Reduction Identified after Offering Animal-Assisted Activity at a Cancer Infusion Center. American Journal of Hospice and Palliative Medicine. 2014; 31: 420-421.

4. Nimer J, Lundahl B. Animal-Assisted Therapy: A Meta-Analysis. Anthrozoös. 2007; 20: 225-238.

5. Kazdin AE. Methodological standards and strategies for establishing the evidence base of animal-assisted therapies. Fine AH, editor. In: Handbook on animal-assisted therapy: theoretical foundations and guidelines for practice. San Diego, CA: Elsevier Inc. 3rd edn. 2010; 519-546.

6. Johnson RA, Odendaal SJJ, Meadows RL. Animal-Assisted Intervention Research: Issues and Answers. Western Journal of Nursing Research. 2002; 24: 422-440.

7. Serpell JA, Coppinger R, Fine AH, Peralta JM. Welfare considerations in therapy and assistance animals. Fine AH, editor. In: Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice. San Diego, CA: Academic Press. 2010; 453-474.

8. Beerda B, Schilder M, van Hooff J, de Vries HW, Mol JA. Behavioural, Saliva Cortisol and Heart Rate Responses to Different Types of Stimuli in Dogs. Applied Animal Behaviour Science. 1998; 58: 365-381.

9. Dreschel NA, Granger DA. Physiological and Behavioral Reactivity to Stress in Thunderstorm-phobic Dogs and their Caregivers. Applied Animal Behaviour Science. 2005; 95: 153-168.

10. Bergamasco L, Osella MC, Savarino P, Larosa G, Ozella L, Manassero M, et al. Heart Rate Variability and Saliva Cortisol Assessment in Shelter Dog: Human–Animal Interaction Effects. Applied Animal Behaviour Science. 2010; 125: 56-68.

11. Glenk LM, Kothgassner OD, Stetina BU, Palme R, Kepplinger B, Baran H. Salivary Cortisol and Behavior in Therapy Dogs during Animal-Assisted Interventions: A Pilot Study. Journal of Veterinary Behavior. 2014; 9: 98-106.

12. Pastore C, Pirrone F, Balzarotti F, Faustini M, Pierantoni L, Albertini M. Evaluation of Physiological and Behavioral Stress-Dependent Parameters in Agility Dogs. Journal of Veterinary Behavior: Clinical Applications and Research. 2001; 6: 188-194.

13. Beerda B, Schilder MBH, Bernadina W, van Hooff JA, de Vries HW, Mol JA. Chronic Stress in Dogs Subjected to Social and Spatial Restriction. II. Hormonal and Immunological Responses. Physiology & Behavior. 1999; 66: 243-254.

14. Vincent IC, Michell AR. Comparison of Cortisol Concentrations in Saliva and Plasma of Dogs. Research in Veterinary Science. 1992; 53: 342-345.

15. Beerda B, Schilder MB, Janssen NS, Mol JA. The Use of Saliva Cortisol, Urinary Cortisol, and Catecholamine Measurements for a Noninvasive Assessment of Stress Responses in Dogs. Hormones and Behavior. 1996; 30: 272-279.

16. Kobelt AJ, Hemsworth PH, Barnett JL, Butler KL. Sources of Sampling Variation in Saliva Cortisol in Dogs. Research in Veterinary Science. 2003; 75: 157-161.

17. Dreschel NA, Granger DA. Methods of Collection for Salivary Cortisol Measurement in Dogs. Hormones and Behavior. 2009; 55: 163-168.

18. Salimetrics. Personal communication of unpublished studies in dogs. 2012.

19. Hsu Y, Serpell JA. Development and Validation of a Questionnaire for Measuring Behavior and Temperament Traits in Pet Dogs. Journal of the American Veterinary Medical Association. 2003; 223: 1293-1300.