Feasibility of Canine Support in Pediatric Dentistry
a pilot study

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Animal–Assisted Interventions

Human-animal interaction (HAI) is an explicit interaction between humans and animals that is reciprocal, bi-directional, and persistent

- (Hosey & Melfi, 2014; Risley-Curtiss, Rogge & Kawam, 2013; Russow, 2002)

The inclusion of an animal in a structured intervention, designed to accomplish outcomes believed to be difficult to achieve without the animal

- (Nimer & Lundahl, 2007)
Location: why the dentist?

Health Risk (Becker & Haas, 2007; Sinner, Becke, & Englehard, 2014)

Family financial burden (Casamassimo et al., 2009; Lee, Vann, & Roberts, 2002; Rasheksy, Parameswaran, Sloane, Ferguson & Epstein, 2012; Kanellis, Damiano & Momany, 2000)

Association with academic scholarship (Carpino, Walker, Liu, & Simmer-Beck, 2016; Lewis & Stout, 2010; Seirawan, Faust, & Mulligan, 2012)

Caries, commonly known as cavities, was recognized as a public health concern in 1990 and remains the most common chronic childhood disease in the United States (Chellappah, Vignehsa, Milgrom & Lam, 1990; CDC, 2016).

When not removed by brushing, remnants of the substrate can cause deterioration, abscess, or infection (CDC, 2016).

- Factors that contribute to caries formation: lack of good oral hygiene practices in the home, poor nutrition, vertical transmission, nutrition, child age, and low family socioeconomic status (Harris Nicoll, Adair & Pine, 2004)

And... the dentist is a common location for AA&SF
Introduction

To explore the relationship between mild to moderate anticipatory anxiety and situational fear (AA&SF) experienced by children with dental caries, 8 to 12 years of age, and the potential to integrate animal-assisted intervention (AAI) as an innovative, non-pharmacological behavior management strategy.

Animal-Assisted Intervention: The inclusion of an animal in a structured intervention, designed to accomplish outcomes believed to be difficult to achieve without the animal (Nimer & Lundahl, 2007).

Situational fear (SF) is expressed within a range of normal responses, often referred to as fight-or-flight, to a perceived and impending, threatening stimuli (AppauKuttan, 2016; Diercke et al., 2012).

Anticipatory anxiety (AA) is the feeling of dread or lack of control over one’s experience in response to thinking about being exposed to an impending negative environmental stimulus (Diercke et al., 2012).
Research Questions

1. What is the feasibility - specifically desire, acceptability, and safety - for a structured animal-assisted intervention with the certified therapy dogs from the Pet Pals program?

2. What is the feasibility of collecting whole saliva to assess oxytocin?
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<tr>
<th>Area of focus</th>
<th>The feasibility study asks . . .</th>
<th>Sample outcomes of interest</th>
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| Acceptability| To what extent is a new idea, program, process or measure judged as suitable, satisfying, or attractive to program recipients? | • Satisfaction  
• Intent to continue use  
• Perceived appropriateness  
• Fit within organizational culture  
• Perceived positive or negative effects on organization  
• Actual use  
• Expired interest or intention to use  
• Perceived demand |
| Demand       | To what extent is a new idea, program, process, or measure likely to be used (i.e., how much demand is likely to exist?) | • Degree of execution  
• Success or failure of execution  
• Amount, type of resources needed to implement  
• Factors affecting implementation ease or difficulty  
• Efficiency, speed, or quality of implementation  
• Positive/negative effects on target participants  
• Ability of participants to carry out intervention activities  
• Cost analysis |
| Implementation| To what extent can a new idea, program, process, or measure be successfully delivered to intended participants in some defined, but not fully controlled, context? | • Degree to which similar outcomes are obtained in new format  
• Process outcomes comparison between intervention use in two populations |
| Practicality | To what extent can an idea, program, process, or measure be carried out with intended participants using existing means, resources, and circumstances and without outside intervention? | • Perceived fit with infrastructure  
• Perceived sustainability  
• Costs to organization and policy bodies  
• Fit with organizational goals and culture  
• Positive or negative effects on organization  
• Disruption due to expansion component |
| Adaptation   | To what extent does an existing idea, program, process, or measure perform when changes are made for a new format or with a different population? | • Intended effects of program or process on key intermediate variables  
• Effect size estimation  
• Maintenance of changes from initial change |
| Integration  | To what extent can a new idea, program, process, or measure be integrated within an existing system? |                             |
| Expansion    | To what extent can a previously tested program, process, approach, or system be expanded to provide a new program or service? |                              |
| Limited efficacy | Does the a new idea, program, process, or measure show promise of being successful with the intended population, even in a highly controlled setting? |                                                                 |

**Bowen’s Model for Feasibility**
Phase 1: Surveys

Surveys (N=278) administered to: 1. caregivers (n=199); 2. dental professionals (n=79, 53%)

Administered in the clinic between June 2017 and August 2018

Sample

- Power analysis was conducted based on the total number of families that visited the pediatric clinic in the prior calendar year.
  - In 2018, 574 unique families completed appointments at the clinic
- At the mid-point of data collection, completed surveys were analyzed
  - unbalanced ratio of 3:1
- The power analysis was rerun with the power at 0.80, a moderate effect size (0.5), and alpha of 0.05
  - Thus, a minimum of N=183 surveys were necessary to ensure a confidence level of 95% with a margin of error +/-6 to minimize type-2 error and ensure generalizability.
Findings

Desire: 68% (n=118) of caregivers responded that they would like to have a therapy dog at a future appointment.
- 67% (n=124) of caregivers responded that their child would like a therapy dog at a future appointment.
- Desire for CSPD was negatively associated with children’s fear of dogs ($r = -0.292$, $p = 0.01$, $n=179$) - caregivers who reported their child’s fear of dogs, also reported a preference for no CSPD intervention.

Caregivers who expressed fear of dogs (10%, n=19) were significantly correlated with reporting fear of dogs for their children ($r=0.581$, $p = 0.001$, $n=180$).

Within group t-test, homes with a dog (n=97, $M = 4.56$, $SD = 1.09$) were more likely to desire CSPD ($t = 4.47$, $df = 190$, $p = 0.001$).

Though not significant, women were more comfortable with CSPD across all domains.

A Pearson’s correlation yielded significant correlation between respondents with minimal to no fear of dogs, with desire of CSPD ($r = 0.1412$, $p = 0.007$).

Expressed concerns with therapy dogs:
- Infection control (53%, n=76)
- Risk of accident (36%, n=75)
- Clinic efficiency (33%, n=75)

These concerns can be addressed through implementation of clear protocol for procedures of practice to guard against potential issue.

Trends important to clinical staff included the finding that 62% of dental staff CSPD, aligning with the desire expressed by parents (68%) and children (67%).
Measures

Social science is accustomed to conversations about cortisol
- cortisol coupled with alpha-amylase
- stress → deficit based

Oxytocin is “new” in social science research
- Hypothesized to be the mechanism of
  - affiliative bonding, relaxation, and happiness → strengths-based
  - Supports understanding the positive implications of interactions and interventions.
- Feasibility included refined methodology for salivary oxytocin collection and analysis
  - beta-site for refined salivary measure
Methods: Analysis

A pilot study (N=18) of a certified therapy dog intervention was conducted using the framework of *Bowen’s model* (1995) for feasibility of new healthcare interventions, which evaluates acceptability, adaptation, and expansion, was used as framework for study design.

Measures of acceptability included observation, self- and parent-report regarding perception of experience pre- and post- questionnaires and pooled-saliva sampling.

- Salivary cortisol, alpha-amylase, and oxytocin levels were measured before the intervention (T0) and at two time-points during the intervention (T1=10 minutes and T2=15 minutes)

Adaptation and expansion was assessed by the post-treatment dentist report regarding changes needed to augment the treatment room.
Demographics: child patients

N=18 total cases

10 (56%) were recruited and either did not show up for their appointment or cancelled in advance

N=1 decided participation after arriving at the clinic and completing consent

Females (n=12), males (n=6)

White (n=9, Black n=6, and Other n=3)

Though the age range was 8 to 12 years, the majority of the patients were on the younger end of the spectrum

Demographics: dogs

Solicited through Pet Pals

N=9 different therapy-dog teams volunteered with breeds including: Maltipoo, Labrador, Golden Retriever, German Shepherd, and Cavachon

Certifications: Bright and Beautiful Therapy dogs, Therapy Dogs International, or Pet Partners

Participation: 1-3 times

All handlers consented to participating in the study, including maintaining confidentiality regarding patient care
Photostory
Results

Acceptability & Demand
- The intervention as deemed acceptability by guardians with a very high rate of 83%.
- Guardians further supported the intervention with 100% stating that they liked the therapy dog’s presence for their child on their post-survey.

Adaptation & Expansion
- No safety issues were observed.
- Additional chairs were used during all dental treatments; one chair for the dog-handler, and the other chair for dog.

Biofeedback
- All saliva samples were successfully collected and analyzed at all three time points, for all patients.
- The average changes of each biomarker were as follows:
  - cortisol (T0-T1: -0.002pcg/mL, range -0.05-0.067, T1-T2: -0.02, -0.079-0.022)
  - alpha-amylase (T0-T1 14.80pcg/mL, -75-224.90, T1-T2: -19.58, -156.60-49.90)
  - oxytocin (T0-T1: 1.36pcg/mL, -11.98-25.14, T1-T2: 5.15, 8.25-21.79)
Results

**Figure 1**
Visualization of change throughout intervention per case

**Quadrant 1** Oxytocin samples were tested in triplicate and median readings are reported.

**Quadrant 2.** Alpha-amylase samples were tested in duplicated, mean readings are reported.

**Quadrant 3.** Cortisol samples were tested in duplicated, mean readings are reported.

**Note.** Each color designated an independent case. The same color is applicable for all three analytes (i.e. blue in oxytocin is the same as is blue in cortisol and blue in alpha-amylase.
Discussion

Aims were successfully achieved

- To evaluate the feasibility of CSPD in a controlled environment using self-report survey.
- To evaluate the feasibility of bio-indicator collection in a controlled environment using saliva collection kits.

The certified therapy dog intervention is feasible in the pediatric dentist clinic. Collection of saliva and measurement of salivary cortisol, alpha-amylase, and oxytocin levels is a practical method that can be used to evaluate biological change in emotional regulation of dental anxiety and fear during the therapy dog intervention.

Bowen’s model provided an effective and efficient framework for evaluating: acceptability, demand, adaptation, and expansion
Acknowledgements & Contact

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