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THE EFFECTS OF THERAPY DOG INTERVENTION ON DISTRESS IN ADULT PATIENTS UNDERGOING DENTAL PROCEDURES: A PILOT STUDY

by

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ABSTRACT

The Effects of Therapy Dog Intervention on Distress in Adult Patients Undergoing Dental Procedures: A Pilot Study

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Introduction: Fear of the dentist continues to be one of the top reported causes of anxiety in populations around the world. This anxiety is detrimental to the oral health of patients because they may avoid necessary dental treatment. In order to alleviate this anxiety, professionals use varying pharmacological and behavioral techniques to manage anxious patients. One technique that has been researched involves using therapy dogs with children, but this intervention has not been sufficiently studied within the adult dental anxiety population. **Objectives:** The purpose of this pilot study is to assess the efficacy of a therapy dog intervention for dental anxiety on self-reported anxiety and comfort levels. This study will explore the satisfaction of therapy dog intervention. **Methods:** Adult patients that reported dental anxiety were consented and randomized into a standard control (SC) group or a therapy dog group (DOG). Both groups, data collection included a psychological and physiological (e.g., Heart Rate Variability (HRV)) assessment. For two dental appointments, the SC group received routine dental treatment, while the DOG group subjects were exposed to a therapy dog for 10 minutes before the start of each appointment. **Results:** In this continuing study (N=17; 10 DOG, 7 SC), there was a statistically

significant difference in reported comfort scores between groups after dental visit two (p =0.031) but none at dental visit one (p=0.184). There was no statistically different score for current level of anxiety after treatment for the groups at visit one (p=0.432) or visit two (p=0.214).

Conclusions: Participants were satisfied with the use of therapy dogs in this pilot study and this intervention may be considered as another technique to employ for patients with reported dental anxiety.

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LIST OF ABBREVIATIONS

AAT	Animal-Assisted Therapy
AEGD	Advanced Education in General Dentistry
CBT	Cognitive Behavioral Therapy
CDAS	Corah's Dental Anxiety Scale
DHQ	Dental Health Questionnaire
ECG	Electrocardiographic
GAD	Generalized Anxiety Disorder
HF	High Frequency
HIPAA	Health Insurance Portability and Accountability Act
HRV	Heart Rate Variability
IDAF-4C	Index of Dental Anxiety and Fear
IRB	Institutional Review Board
IVCS	Intravenous Conscience Sedation
LF	Low Frequency
MDAS	Modified Dental Anxiety Scale
NPDS	Naval Postgraduate Dental School
OHIP	Oral Health Impact Profile
PHQ	Patient Health Questionnaire
RMSSD	Root Mean Square of the Successive Differences
SC	Standard Care
TSS	Therapy Satisfaction Scale
VAS	Visual Analog Scale

CHAPTER 1: Introduction

Dental anxiety. Dental phobia. Fear of the dentist. Odontophobia. All of these are different terms used to describe patients who feel nervous, anxious, scared, or experience distress from some aspect of a visit to their dental provider. Various research has shown that dental anxiety is the 5th most common anxiety people experience on a daily basis.[1-3] The anxious feelings that patients encounter is not rare either. Across the world, research has shown that many countries have similar figures for patients noting dental anxiety ranging from: 11% in Germany, 24.3% in the Netherlands, and in the United States it can range from 50-80% for mild to severe dental anxiety.[4-6] With these numbers, it is vital for dental providers to recognize and acknowledge anxious patients that will arrive to their offices on a daily basis and be able to provide exemplary care for each one.

Fear is an everyday aspect of society, but having dental anxiety and dental fear can be far more detrimental to patients. Dental anxiety causes patients to avoid appointments and delay treatment until their pain is unbearable, thus needing more extensive treatment. Numerous research studies have labeled this as a "vicious cycle" of treatment avoidance and increase in symptom severity, leading to much more invasive and anxiety producing interventions. [1, 5, 7-14]. In the United States it is stated that 5% to 10% of adults will avoid treatment due to significant anxiety [6, 8], with one study showing that patients with anxiety had not attended an appointment over an average of 12 years. [15] Dentally anxious patients continue this cycle throughout their lives and it not only impacts their oral health, but has shown to decrease their overall quality of life with feelings of embarrassment and fear of reproach for their poor oral health. [4, 15, 16]

In 2020, COVID-19 was announced to be a worldwide pandemic by the WHO.[17] The pandemic disrupted numerous aspects of society, to include the dental community and access to care for patients. With these changes in the safety of providing and receiving dental care during a pandemic caused by an airborne virus, there has been an increased interest in research that explores the effect this has had on the dental community.[17-20] In the survey completed by Gonalez-Olmo in Madrid, they had 961 patients and found that 30.9% of respondents were afraid to visit the dentist due to fear of contracting COVID-19. This same population stated that 43.7% would not seek dental services during the pandemic.[18] In Italy, Aquilanti et al. also conducted a survey during the pandemic that included the question, "How will or would you behave if you have scheduled appointments at the dentist?" The responses (n=1003) included: "I would undergo oral care without any problem" (59.1%), "I would undergo oral care with fear" (22.6%), "I would postpone the appointment" (16.9%), and "I would cancel the appointment" (1.4%).[17]

Another survey conducted in Brazil (n=595 found that 44.2% would go to an appointment only in the case of an emergency and 17.5% would not go for any reason during the pandemic.[19] The vicious cycle of missed appointments and declining oral health could continue to perpetuate even further with the presence and impact of the pandemic. In a survey completed by Pylinska-Dabrowska et al., 80.7% of 175 patients who had to undergo dental surgeries during high restrictions reported trying to cope with dental pain using home methods, and 59.2% reported using at home methods even after restrictions were lifted.[20] Each of these recent studies demonstrate the actual and potential consequences of COVID-19 and its impact on patients who might identify with having dental anxiety, thus avoiding dental care and propagating a decline in their own oral health.

In order to help alleviate patients' worries and fears, it is important to have a better understanding of why these feelings are present. Dental anxiety is not always linked to one cause; it is usually multifactorial in nature and therefore important to identify each patient's unique background contributing to their fear. These contributing factors range from endogenous to exogenous sources in a patient's life. [9, 14, 21] Endogenous factors are labeled as such because these patients usually present with generalized anxiety or neuroticism and are more likely to also display dental anxiety. [1, 8, 9, 22, 23] More of the common sources of dental anxiety come from exogenous sources including the negative portrayal of dentistry in the media, past negative experiences at the dentist, and parental fear passed down to their children through observational learning. [4, 9, 12, 24, 25] Many patients might not have a negative history with dental treatment, but are still anxious about certain aspects of the appointment including: fear of injections, loss of control, unpredictable treatment, poor communication, and generalized fear of pain. [1, 7, 9, 26] Understanding each patient will help the dentist to tailor their approach to improving their patient's overall experience, thus hoping to break the vicious cycle of avoidance.

Just as there are various reasons for patients to have dental anxiety, there are just as many ways to help patients overcome their fear. In some cases, things as simple as scheduling morning appointments, ensuring minimal wait time, friendly front desk staff, cooler temperatures, and a lavender scent can help patients feel more comfortable and alleviate some anxiety. [7, 22, 27] With many of these patients, other direct interventions will need to be employed by the provider to ensure a smooth appointment. These can include: relaxed breathing, muscle relaxation, guided imagery, systematic desensitization, hypnotherapy, distraction techniques, and many others. [1, 4, 7, 12] Cognitive behavioral therapy has shown great success, but, along with the

other techniques listed above, can be time consuming for the patient and provider and require significant training in order to be effective. [1, 4, 11, 13, 28]

Pharmacologic interventions are another common resource for providers to introduce to their patients to alleviate dental anxiety. A well-documented conscious sedation technique for patients is the use of nitrous oxide. Nitrous oxide has shown a reduction in pain perceived during endodontic access and injection, and also a decreased perceived anxiety score postoperatively.[3] Two other methods of conscious sedation include sedative drugs (benzodiazepines) and intravenous sedation. Each of these methods have slightly higher risks, require more time for the patient in office, and intravenous access requires more training and skill for the practitioner. [29] For patients with severe and debilitating anxiety, general anesthesia is another option. General anesthesia is used to ensure that treatment can be completed, but does not necessarily result in a decrease in anxiety at future appointments. [12] This technique is also the most intensive pharmacologic intervention for the patient, can be financially burdensome, is the most medically risky, and requires specialty training for the provider to facilitate the treatment. [30]

While all of the above techniques have shown some success with patients suffering from dental anxiety, they all have their individual flaws. Some are not adequate enough for patients with high anxiety, while others require extensive training for the provider to include in standard care. Many of these techniques will need to be used as concurrently to better accommodate patients' needs and to relieve dental anxiety. Since each patient is unique, it is important for providers to ensure that they have a variety of options in their repertoire to help their patients.

A technique that has not been researched enough in the dental community is the use of therapy dogs to help improve patients' overall anxiety levels in regards to their dental appointments. Therapy dogs have been studied most with children and in the hospital environment. One study of 21 children found that 83% of children said that a dog made them feel more relaxed for their MRI, while 100% stated that they would like a dog again on their next visit. [31] Dogs are shown to have physiologic benefits such as a decrease in blood pressure for anxious patients, along with an overall feeling of decreased anxiety levels. [32] Patients in another study showed a 35% decrease in anxiety during their emergency room stay (n=93). In that same study only 2.5% of those patients opted to receive opioid pain medication during their stay in comparison with the average 17.5%. [33] The use of therapy dogs is similar to other distraction techniques like video games or music in which mirror neurons reflect the friendly behavior of the dog, thus reducing anxious thoughts. [32, 34] The biophilia hypothesis states that if humans see animals at rest or in a peaceful state, then humans more likely will adapt their feelings to a sense of safety. [35] Despite not understanding the exact reason for therapy dog's effectiveness, the studies tend to show that patients who choose to interact with the dogs want them back again and would recommend the dog therapy to other patients. [31, 34]

Overall, the importance of this study is to explore an alternative intervention that is available for dentists to help alleviate patients' dental anxieties. This study would be one of the few that has investigated the use of dogs within the dental clinic and with an adult patient population. The aim of this study is to determine if the use of therapy dogs as an intervention treatment will contribute to a decrease in anxiety levels and an increase in reported comfort during dental appointments. Outcomes will be assessed using standardized self-report measures.

The more resources dental providers have the more effective the dental community will be at stopping the vicious cycle that occurs with dental anxiety. Each patient needs to have their own individualized treatment in order to gain their trust in the dental personnel, the dental procedure, and the overall experience. So, it is time for the dental provider to employ every technique in their power to help.

CHAPTER 2: Materials and methods

This study was reviewed and approved by the Walter Reed National Military Medical Center Institutional Review Board; IRB #WRNMMC-2016-0016.

Participants:

The participants of the study were patients seen at the Naval Postgraduate Dental School (NPDS) Comprehensive Dentistry program, a two-year Advanced Education in General Dentistry (AEGD) training program, or in the one-year AEGD program. Participants were eligible if the treatment plan completed by individual providers included the following treatments: endodontic therapy, periodontal treatment, oral surgery, prosthodontic or other restorative procedures. The patients were required to have at least three future treatment appointments and were being treated by a current resident in the Comprehensive Dentistry or AEGD training programs.

Participants were identified by a program patient coordinator during the first pre-treatment screening. These individuals had completed the Dental Health Questionnaire (DHQ) standard form for treatment and reported "nervousness." This helped to identify potential participants for this pilot study. The pre-treatment screening determined if the study criteria were met. These criteria included: patients aged $\geq$ 18 years, have at least three separate dental appointments, and identified themselves as having dental anxiety, generalized or situational anxiety. The exclusion criteria included: pregnant or breastfeeding women, history of schizophrenia or other chronic psychotic disorders, acute psychiatric symptoms that impair ability to function in non-psychiatric setting, fear and/or dislike of dogs, and severe dog allergy.

When the potential study patient met all the criteria and stated interest in becoming a participant in the study, informed consent was reviewed and signed by the study participant.

Once included in the study, the participants were randomly assigned to either the Standard Care (SC) group or the intervention (DOG) group. The participants assigned to the SC group were considered a wait-list control condition and all participants were able to interact with a therapy dog after two initial dental treatment sessions.

Study Procedures: (Figure 1)

At the patient screening visit, the written informed consent was obtained following IRB/HIPAA guidelines by all eligible participants. When consent was completed, the participants were given the following forms to complete to include: Demographics Questionnaire (Appendix A), Generalized Anxiety and Patient Health Questionnaire (Appendix B), Oral Health Impact Profile (Appendix C), and Index of Dental Anxiety and Fear-4C (IDAF-4C, Appendix D). These forms helped to determine the baseline assessment of dental anxiety and fear. The participants were assigned to a one or two-year AEGD resident to complete their subsequent treatment appointments involved with the study.

The first two dental treatment appointments were the intervention sessions of the study. Self-report measures were completed by all study participants in the clinic waiting area prior to the start of treatment. The Bodyguard Heart Rate device (Firstbeat Technologies, Ltd, Jyvaskyla, Finland) was placed on the patient after they were brought into the operatory. The DOG group participants spent 10 minutes with a therapy dog in the operatory who was accompanied by the dog handler and the study personnel before the initiation of dental treatment.

SC group participants were given 10 minutes to rest quietly (reading books, etc.) in the operatory prior to the initiation of treatment. After completion of the 10-minute sessions (for both groups), all participants completed the Index of Dental Anxiety and Fear-4C (IDAF-4C) form. At the completion of each dental appointment, each participant completed the study Visual Analog Scale (VAS, Appendix E), which measures anxiety and comfort level. The DOG group participants also filled out the Therapy Satisfaction Scale (TSS, Appendix F) after each of the 2 intervention visits.

At the third and final study session, the DOG group participants started by completing the study self-report measures in the clinic waiting area. When the participant was brought to the operatory the Firstbeat ECG device was attached. At the end of the dental appointment, the DOG group participants completed the VAS and the TSS forms. This concluded the study for these participants, and they were released and thanked for their participation. All treatment completed by the provider during the study was documented in the participant's dental treatment record.

For the participants in the SC group, they were able to interact with a therapy dog during their third and final intervention session. The study self-report measures were first completed in the clinic waiting room by all SC group participants. The Firstbeat ECG device was attached when the patient was brought to the dental operatory. The therapy dog was available to interact with the SC group participants for 10 minutes. Before the initiation of dental treatment, the IDAF-4C was completed by the participants. When all dental treatment was completed, the participants completed the VAS and the TSS. The participants were released from the study and

thanked for their participation. All treatment completed by the provider during the study was documented in the participant's dental treatment record.

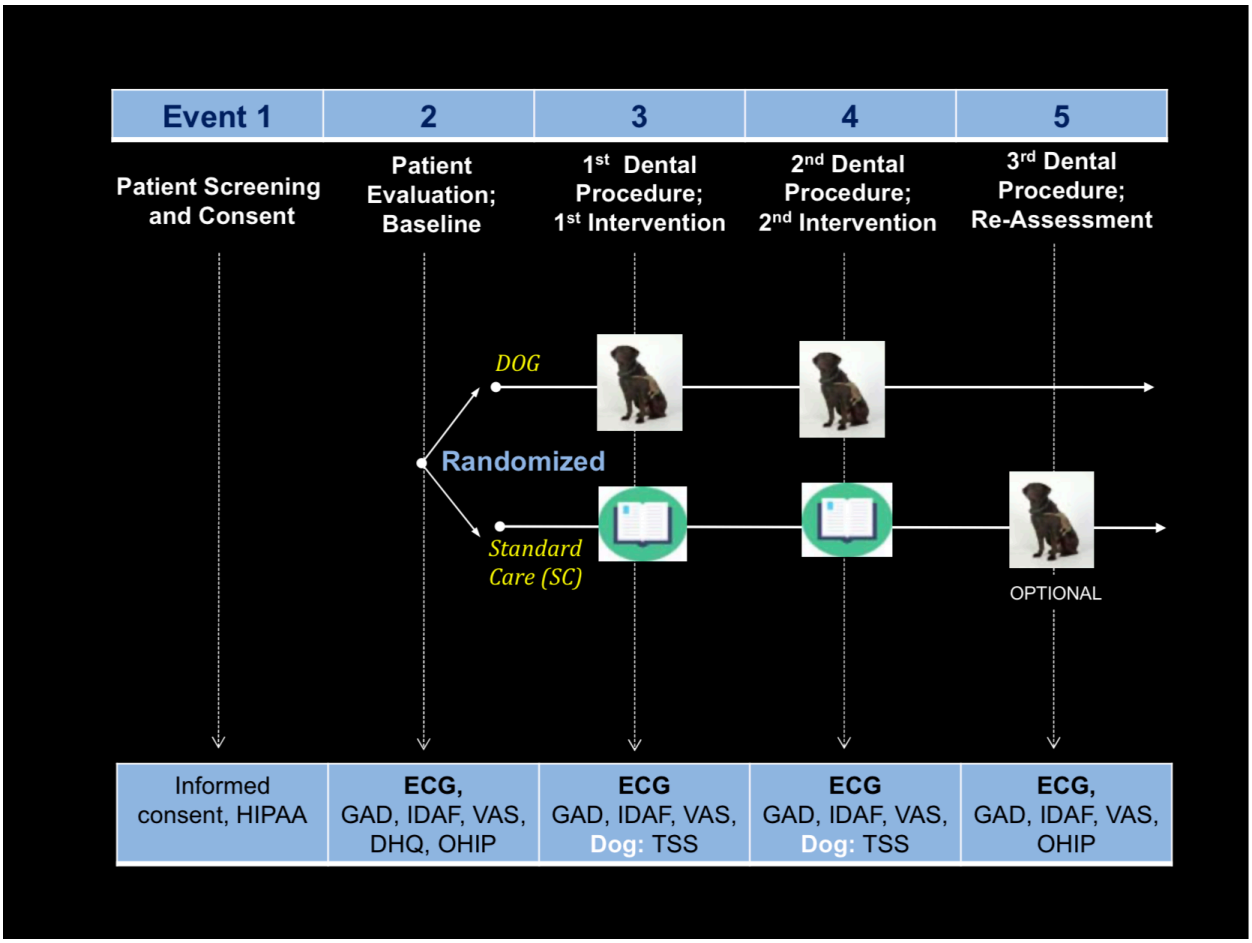

Figure 1. Recruitment, Intervention and Assessment Timeline. ECG – Electrocardiogram; GAD-Generalized Anxiety Disorder-7; IDAF-Index of Dental Anxiety and Dental Fear-4C; VAS-Visual Analog Scale; DHQ-Dental Health Questionnaire; OHIP-Oral Health Impact Profile-14; TSS-Therapy Satisfaction Scale

Event Details:

1. Patients were screened for participation in the study.
    a. The consent was completed for patients who met the inclusion and exclusion criteria.
2. Participants were assigned a resident to complete the baseline assessment and develop a dental treatment plan.
    a. The baseline assessment included resting ECG using Firstbeat Bodyguard devices and self-report measures.
    b. When assessment was completed, random assignment into the DOG or SG groups was completed for each participant.
3. The DOG group participants were introduced to the therapy dog and given 10 minutes to interact in the operatory prior to the start of treatment. SC group participants spent 10 minutes quietly resting (reading books, etc.) prior to dental treatment.
    a. Self-report measures were completed by both groups before and after their respective interventions and after treatment (Figure 1).
4. The DOG group participants at the second dental visit were again given 10 minutes with a therapy dog prior to their treatment. As described in step 3a above, both groups completed the self-report measures.
5. All participants repeated the baseline assessment at the third appointment. The SC group participants were provided the 10-minute therapy dog intervention at the third appointments.

Intervention Details:

DOG group. Participants assigned to the DOG group interacted for 10 minutes with the therapy dog, dog handler, and study personnel in the operatory prior to the start of dental treatment during two study sessions. The handler was allowed to give the participant dog treats to facilitate an interaction during the intervention. To avoid any confounding interactions, the dog handler did not interact with the patient any further.

The therapy dog coordinator was informed of the scheduled treatment session for the DOG group participants to confirm that a dog and handler were available for the scheduled appointment. Only one therapy dog was allowed in the operatory room with each participant at a time. The study had access to six therapy dogs, which limited up to six participants to be randomized into the DOG group concurrently.

The dog handler was instructed to wait and standby for each participant's scheduled appointment. Once the participant completed the self-report measures, was brought back to the operatory, and had the Firstbeat device attached, the handler came to the operatory to introduce herself or himself and the therapy dog. Each handler was instructed to stand at the foot of the operatory chair due to limited space in the operatory. Each individual therapy dog displays different personalities, which led to slight variations in the specific interactions with the patient and the dog. Due to this, the specific therapy dog used at each treatment session was recorded.

The dog handler gave specific instructions to each participant in the dog condition that went as follows: "You may sit with, pet, feed, hug, kiss, and interact with the dog as you like for

10 minutes. When the 10 minutes are up, we will begin your dental treatment." After the 10-minute visit with the therapy dog and prior to starting dental treatment, the participants completed the IDAF-4C to assess their current dental fear/anxiety.

SC Group (wait list control). Study participants assigned to the SC group completed 10 minutes of "rest" time in the operatory to include reading books or magazines (or scrolling through their phone??). After the 10 minutes was completed, the provider proceeded with the accepted dental treatment plan. The SC group participants were given the opportunity to interact with the therapy dog at the third dental treatment visit (Event 5). The same procedures that were completed for the DOG group during the first two dental treatment visits (Events 3 and 4).

Psychological and Physiological Assessment

The assessments included in this study were self-report measures and heart rate. In order to obtain heart rate (ECG) data, Bodyguard (Firstbeat Technologies, LTD.) was the product used in the study. The Bodyguard is a two-lead portable heart rate recording device. The device was attached to each participant at the beginning of each study assessment event after the participant completed the first self-report measures. The Bodyguard recorded ECG data from the beginning of the therapy dog intervention or SC group resting period through 45 minutes of the dental treatment appointment.

Self-report measures

Each participant completed the following self-report measures. The details for the frequency of each self-report measure are displayed in Figure 1. The self-report measures are found in the Appendices (B-F).

Pre-consent screening

All potential participants were screened for the study inclusion and exclusion criteria prior to obtaining informed consent. The screening involved reviewing the 'nervousness' box on the Dental Health Questionnaire and a verbal inquiry about dental anxiety specifically. The potential participants were asked about a potential dog allergy, fear of dogs, and dislike of dogs. If the patients answered yes to any of these inquiries, then they were no longer eligible to participate in the study. All possible participants were informed of the nature of the study, the time-commitment involved, and risk and benefits of participating prior to obtaining written informed consent. For eligible participants who wished to enroll in the study, written informed consent and HIPAA Authorization was obtained.

Demographics and Health History Questionnaire: Appendix A

A brief demographic and health history questionnaire were completed by each participant after completed study enrollment. The information collected from these forms included: race, ethnicity, job status, marital status, dental and medical history, current medications, and their use of supplements that were not prescribed by a medical professional.

Index of Dental Anxiety and Dental Fear (IDAF-4C): Appendix D

The IDAF-4C form used in this study has 23-items to measure and assess dental anxiety, fear, phobia, and the feared dental stimuli. [36, 37] It also provides information on the physiological, behavioral, emotional, and cognitive components of the fear and anxiety response. All measures are reported on a 5-point Likert scale. This measure calculates a total score and four subscale scores (physiological, behavioral, emotional, and cognitive). With repeated test-retest reliability, consistent validity, and internal consistency, the IDAF-4C continues to be a reliable measure for dental anxiety assessment.[36, 37]

Oral Health Impact Profile short form (OHIP-14): Appendix C

The OHIP-14 measures psychological and social impact of oral health on general well-being using a 14-item form.[38] Seven domains are included with two measures from each domain to include: physical pain, physical disability, social disability, handicap, psychological disability, functional limitation. Each measure is answered on a 5-point Likert scale. The higher the total score, the higher likelihood that their quality of life is related to poorer oral health (the higher likelihood that their oral health is impacting their quality of life). The OHIP-14 has been used clinically throughout the world and continues to display valid results.[38]

Generalized Anxiety Disorder GAD-7: Appendix B

The GAD-7 is a 7-item measure used to determine the presence of generalized anxiety symptoms in the past two weeks.[39] This measure is another commonly used assessment to determine psychometric properties for clinical and research applications.[39]

Patient Health Questionnaire-9 (PHQ-9): Appendix B

The PHQ-9 is a 9-item measure of the presence and severity of depressive symptoms over the past two weeks.[40] The scores of 5, 10, 15, and 20 correlates to mild, moderate, moderately severe and severe symptoms. Test-retest reliability, internal consistency, and convergent validity have been established.[40]

VAS Measures: Appendix E

The included VAS (Visual Analog Scale) measures were completed by each study participant after the completion of dental treatment on the intervention days. The VAS measures assessed level of comfort and level of anxiety. The VAS included 100mm lines with descriptors anchored at each end.

Therapy Satisfaction Scale: Appendix F

Patients rated their satisfaction with the intervention program using a 5-point scale which ranged from "strongly agree" to "strongly disagree". The measure included eight items to assess the participant's satisfaction and their perceived impact of the intervention for their dental anxiety.[41]

Physiological Measures:

Each participant had their heart rate variability monitored with the Bodyguard Heart Rate device in order to assess their physiological response during the study. The Bodyguard is a portable heart rate measurement device with an extended storage capacity for up to 14 days.

This is beneficial since the ECG has limited versatility and data storage. The Bodyguard has many advantages to the traditional Holter monitors to include: smaller size, easier to connect, and the use of two disposable surface electrodes. The Bodyguard has been used previously for research and clinical applications.[42] Firstbeat Athlete Software (version 2.1.0.8(3.1.3ov) is used to analyze the heart rate recordings. This software scans the recorded ambulatory RR interval data through an artifact defection filter to perform an initial correction of falsely deleted, missed, and premature heart beats. The HRV analyses are completed using the Nevrokard Advanced HRV analyses software (version 10.1.0) for time and frequency domain analyses (Nevrokard Kiauta, k.d., Slovenia). In this study, time-domain root mean square of the successive differences of the NN intervals (RMSSD) values will be calculated along with the frequency domain FFT non-parametric HRV values in normalized units (LF, HF, and LF/HF ratio).

Data Analysis Plan

Sample Size Estimation:

This pilot study has the goal of evaluating 34 eligible subjects (17 in each group), but requested a total target enrollment of 44 participants in order to account for attrition. This number of participants will assess the feasibility of the physiological measurements and the dog exposure treatment. This study assumes that the number of participants involved will not provide adequate power to address the aims, but will act as a baseline for future studies. With the baseline information from this study, future research can then expand and address this study's aims and collect more data to determine the intervention's effect on physiological reactivity and self-reported measures.

Data Analysis

Subject enrollment and data collection are ongoing for this study. The data analysis presented here is based on 17 subjects who have completed the study. Once a sufficient number of subjects complete the study, the data will be presented using the guidelines of the CONSORT statement as follows since the patient selection was randomized:

1. A flow diagram of the participants' progress through the phases of the clinical trial (e.g. enrollment, intervention, allocation, follow-up, and data analysis) will be presented.
2. All data will be analyzed primarily as intention-to-treat.
3. Overall patient levels of dental anxiety and dental fear and generalized anxiety disorder will be reported. Similarly, overall patient oral health and patient health will be reported.
4. **Specific Aim 1.** By using the results from the IDAF-4C, some aspects of dental care that are reported as most anxiety-inducing for dental patients will be identified. These data will be helpful for designing future studies to determine which intervention(s) will be most effective at relieving or reducing dental anxiety.
5. **Specific Aim 2.** This study will also begin to look at any possible associations among those patients with reported dental anxiety and the presence of generalized anxiety and/or depression during the past two weeks based on the completion of GAD-7 and PHQ-9. Due to the limited number of participants, the results might not show a direct correlation at this time, but could open up the possibility for future research to further study the correlation between mental health disorders and dental anxiety.
6. **Specific Aim 3.** The effectiveness of the therapy dog intervention will be evaluated by comparing the self-reported VAS scores for comfort and anxiety levels that were completed by both the DOG group and the control group. The data will be used to either

reject or accept the null hypothesis that there is no difference in reported anxiety or comfort in the DOG and control (SC) groups.

7. **Specific Aim 4.** The 5-point Therapy Satisfaction Scale will also be analyzed to determine the participants' overall positive or negative experience with the therapy dog intervention. If this evaluation determines a positive experience for the participants, this will another determinant in deciding if a larger study should be conducted with the participation of therapy dogs for dental anxiety.

CHAPTER 3: Results

This ongoing study was started in April 2017 with a target enrollment of 44. To date seventeen (n=17) participants have completed this study, with seven randomly assigned to the SC group and ten randomly assigned to the DOG group. Due to the COVID-19 pandemic, new enrollment in this study has been on hold since March 2020, with temporary limitations on delivering non-emergent dental care, as well as ongoing and current base health protections conditions limiting access of the therapy dogs to the clinic. It is anticipated that as restrictions are lifted and the therapy dogs are once again allowed to serve in the health care setting, study enrollment will resume.

From the 17 participants who have completed the study, 3 (18%) are male and 14 (82%) are female. The mean age of the participants is 33.3 years, with a range of 19-51 (SD=10.4). The self-report questionnaires have been analyzed for all participants that have completed the study. The interventions or events 3 and 4 have been labeled dental visit 1 and dental visit 2, respectively.

The analysis of the Index of Dental Anxiety and Fear-4C scores are shown in Figure 2 for both dental visit 1 and dental visit 2. The DOG group participants (n=10) mean scores for dental visit 1 were 3.89 (SD=1.1) and 3.52 (SD=1.3) for dental visit 2. The SC group participants (n=7) mean scores for dental visit 1 were 3.48 (SD=0.7) and 3.52 (SD=0.9) for dental visit 2.

The most common dental anxiety triggers are also assessed using the IDAF-4C form. In Figure 3, the results from the DOG and SC group are shown at dental visit 1. For the DOG group, the highest scores (greater than 2.5) were: pain 4.00 (SD=1.3), lack of control 3.30

(SD=1.7), unkind dentist 3.20 (SD=1.9), needles 3.10 (SD=1.6), embarrassed 2.80 (SD=1.8), and gagging/choking 2.70 (SD=1.6). The highest scores reported in the SC group included: pain 4.43 (SD=0.8), needles 3.86 (SD=1.7), lack of control 3.57 (SD=1.6), not knowing 3.14 (SD=1.5), and gagging/choking 3.00 (SD=1.7). There was no statistically significant difference (all p-values >0.05) between the groups at dental visit 1.

The IDAF-4C results after dental visit 2 for dental anxiety triggers are shown in Figure 4. The highest scores reported for the DOG group at dental visit 2 (scores greater than 2.5) included: pain 3.70 (SD=1.6), lack of control 3.20 (SD=1.6), unkind dentist 3.20 (SD=1.9), gagging/choking 2.70 (SD=1.5), needles 2.60 (SD=1.8), and embarrassed 2.50 (SD=1.9). The highest reported scores for the SC group included: pain 4.14 (SD=1.1), lack of control 3.57 (SD=1.4), needles 3.40 (SD=1.6), not knowing 3.00 (SD=1.3), unkind dentist 3.00 (SD=1.0), and numbness 2.80 (SD=1.4).

Both the SC group and the DOG group results from the IDAF-4C between dental visit 1 and dental visit 2 were compared within each group. In Table 1, the DOG group results were compared and there were no statistically significant differences found between dental visit 1 and 2 (all *p*-values >0.05). In Table 2, the SC group results were compared between dental visit 1 and 2, and there was only a statistically significant difference found in the anxiety trigger for numbness (p=0.045, F=6.53).

The results from the general anxiety disorder (GAD-7) self-report questionnaire, which assessed patients for symptoms of generalized anxiety over the previous two weeks, are shown in

Table 3. The mean scores were less than 10 for both groups at dental visit 1 and dental visit 2. The results from the patient health questionnaire (PHQ-9) which assesses for symptoms of depression over the previous two weeks, are shown in Table 4. The SC group scores were 7.1 (SD=7.7) and 4.1 (SD=3.6) and the DOG group scores were 8.0 (SD=8.5) and 7.3 (SD=8.0) at dental visits 1 and 2, respectively.

The Visual Analog Scales (VAS) which were completed for anxiety and comfort at the completion of each dental visit for the DOG and SC groups are displayed in Figures 5 (anxiety) and 6 (comfort). The mean level of anxiety for the DOG group reported after dental visit 1 was 3.5 (SD=2.2) and 3.8 (SD=2.5) after dental visit 2. The SC group reported mean levels of anxiety to include: 4.2 (SD=1.6) after dental visit 1 and 5.2 (SD=1.9) after dental visit 2. The VAS for level of anxiety after completed dental treatment for both the DOG and SC groups showed no statistically significant difference between them for both dental visit 1 (p=0.432) and dental visit 2 (p=0.214).

The mean reported level of comfort on the VAS scale for the DOG group after dental visit 1 was 6.9 (SD=2.2) and was 6.9 (SD=2.0) after dental visit 2. For the SC group, the mean reported level of comfort after dental visit 1 was 5.4 (SD=2.3) and was 5.1 (SD=1.0) after dental visit 2. For dental visit 1 there was no statistically significant difference between the two groups (p=0.184), while dental visit 2 showed a statistically significant difference between the SC and DOG group (p=0.031) with higher post-treatment comfort level in the DOG group.

Only the participants randomly assigned to the DOG group completed the Therapy Satisfaction Survey (TSS) at the end of both dental visit 1 and 2. These results are shown in Figure 7, with the survey having a scaled of 0-35 with the highest scores correlating with higher level of satisfaction with the therapy dog intervention. The mean reported scores were 33.8 (SD=3.8) and 34.7 (SD=4.3) for dental visits 1 and 2, respectively. These high scores suggest that the mean number of participants were highly satisfied with the presence of a therapy dog as a type of intervention.

Due to the insufficient number of participants that have completed the pilot study, the results from the oral health impact profile (OHIP-14) self-report questionnaire have not been analyzed and will be reported in future study reports. This questionnaire aims to determine the social and psychological impact of oral health on general well-being.

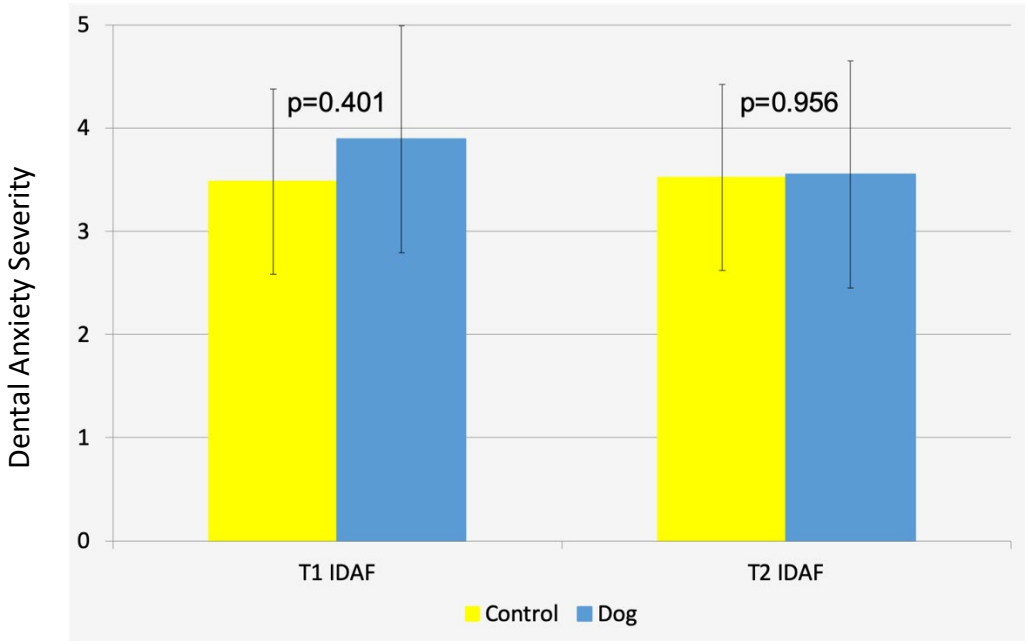

Figure 2. Index of Dental Anxiety and Fear-4C mean (and standard deviation) dental anxiety scores by group. A 5-point scale is used with scores ≥ 2.5 reflecting high dental anxiety and fear.

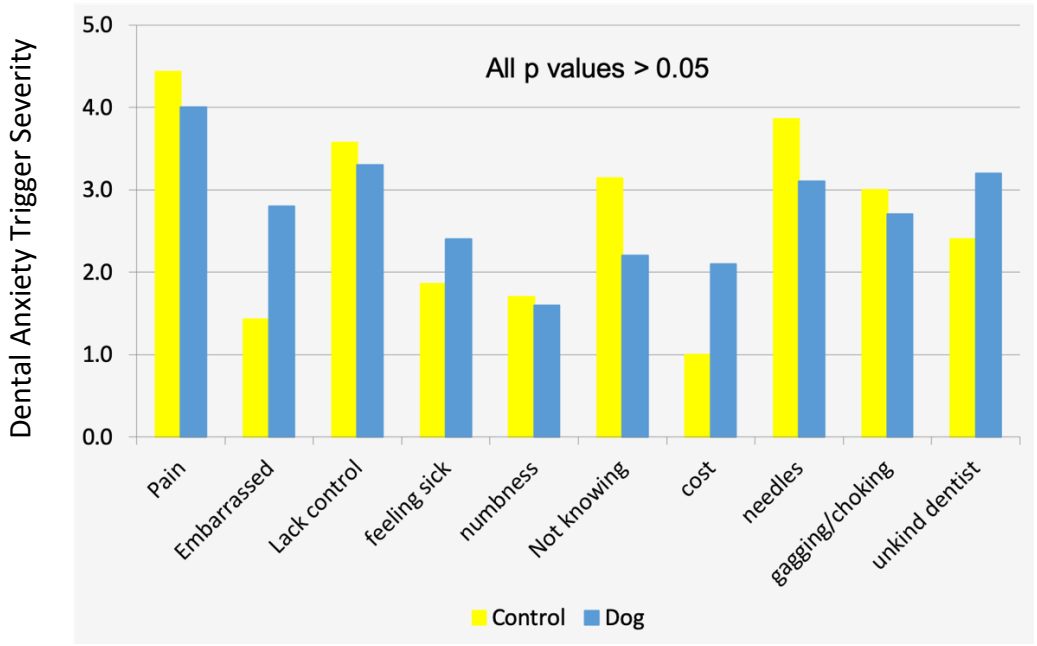

Figure 3. IDAF-4C mean scores for 10 most common dental anxiety triggers at dental visit 1 by groups.

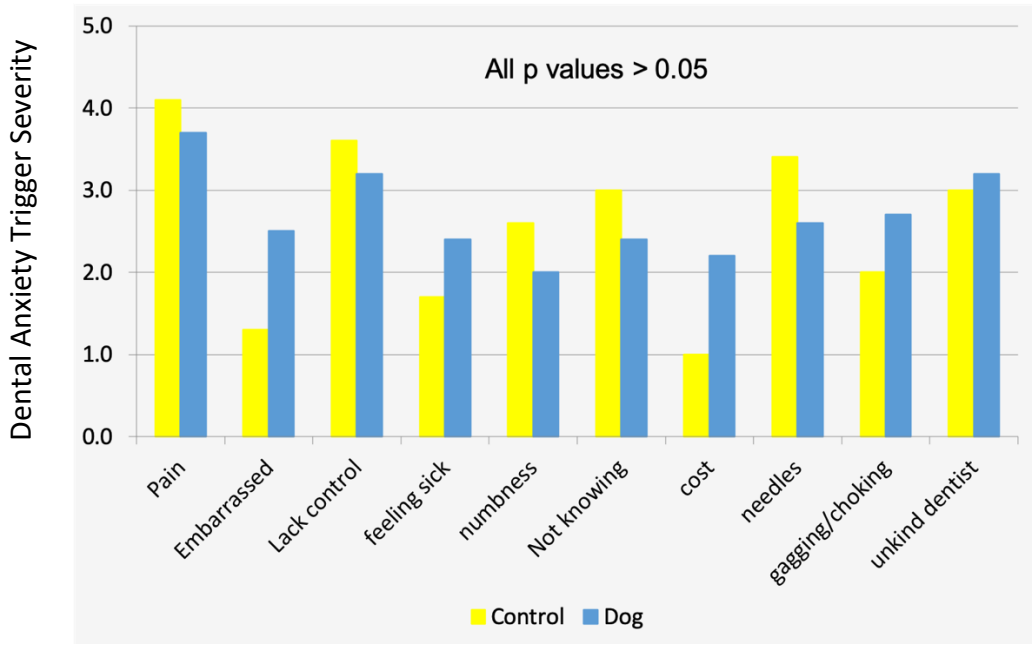

Figure 4. IDAF-4C mean scores for 10 most common dental anxiety triggers at dental visit 2 by group.

Table 1. *IDAF-4C dental anxiety triggers at dental visit 1 and 2, DOG group only. (Mean values (standard deviation). Ten most common dental anxiety triggers are evaluated in IDAF-4C.*

Dental Anxiety Trigger	Visit 1	Visit 2	F	*p* value
Pain	4.0 (1.3)	3.7 (1.6)	1.98	0.193
Embarrassed	2.8 (1.8)	2.5 (1.9)	0.67	0.434
Lack of control	3.3 (1.7)	3.2 (1.6)	0.06	0.811
Feeling sick or queasy	2.4 (1.4)	2.4 (1.2)	0.00	1
Numbness	1.6 (1.4)	2.0 (1.6)	3.27	0.104
Not knowing what dentist is doing	2.2 (1.6)	2.4 (1.6)	0.31	0.591
Cost	2.1 (1.8)	2.2 (1.8)	1.00	0.343
Needles/Injections	3.1 (1.6)	2.6 (1.8)	3.46	0.096
Gagging/Choking	2.7 (1.6)	2.7 (1.5)	0.00	1
Unkind or unsympathetic dentist	3.2 (1.9)	3.2 (1.9)	0.00	1

Table 2. *IDAF-4C dental anxiety triggers at dental visit 1 and 2, SC group only. (Mean values (standard deviation). Ten most common dental anxiety triggers are evaluated in IDAF-4C.*

Dental Anxiety Trigger	Visit 1	Visit 2	F	*p* Value
Pain	4.4 (0.8)	4.1 (1.1)	0.632	0.457
Embarrassed	1.4 (0.5)	1.3 (0.8)	0.300	0.604
Lack of control	3.6 (1.7)	3.6 (1.4)	0.000	1.000
Feeling sick or queasy	1.9 (1.5)	1.7 (0.8)	0.079	0.788
Numbness	1.7 (1.0)	2.8 (1.4)	6.53	0.045
Not knowing what dentist is doing	3.1 (1.5)	3.0 (1.3)	0.079	0.788
Cost	1.0 (0.1)	1.0 (0.3)	1.000	0.999
Needles/Injections	3.9 (1.7)	3.4 (1.6)	0.794	0.407
Gagging/Choking	3.0 (1.7)	2.0 (1.7)	5.25	0.062
Unkind or unsympathetic dentist	2.4 (1.5)	3.0 (1.0)	2.40	0.172

Table 3. *Generalized Anxiety Disorder-7 at both dental visits by group. Mean values (standard deviation). Scores of >10 reflect presence of symptoms of generalized anxiety over previous two weeks.*

Group	Visit 1	Visit 2	F	*p* value
Dog Group	8.7 (7.8)	8.0 (7.5)	0.846	0.382
Control Group	6.0 (4.4)	5.7 (2.6)	0.103	0.760

Table 4. *Patient Health Questionnaire-9 at both dental visits by group evaluating presence and severity of depression symptoms over previous two weeks. Mean values (standard deviation). Mild, moderate, moderately severe, and severe symptoms are reflected in scores of 5, 10, 15, 20, respectively.*

Group	Visit 1	Visit 2	F	*p* value
Dog Group	8.0 (8.5)	7.3 (8.0)	1.47	0.257
Control Group	7.1 (7.7)	4.1 (3.6)	3.20	0.124

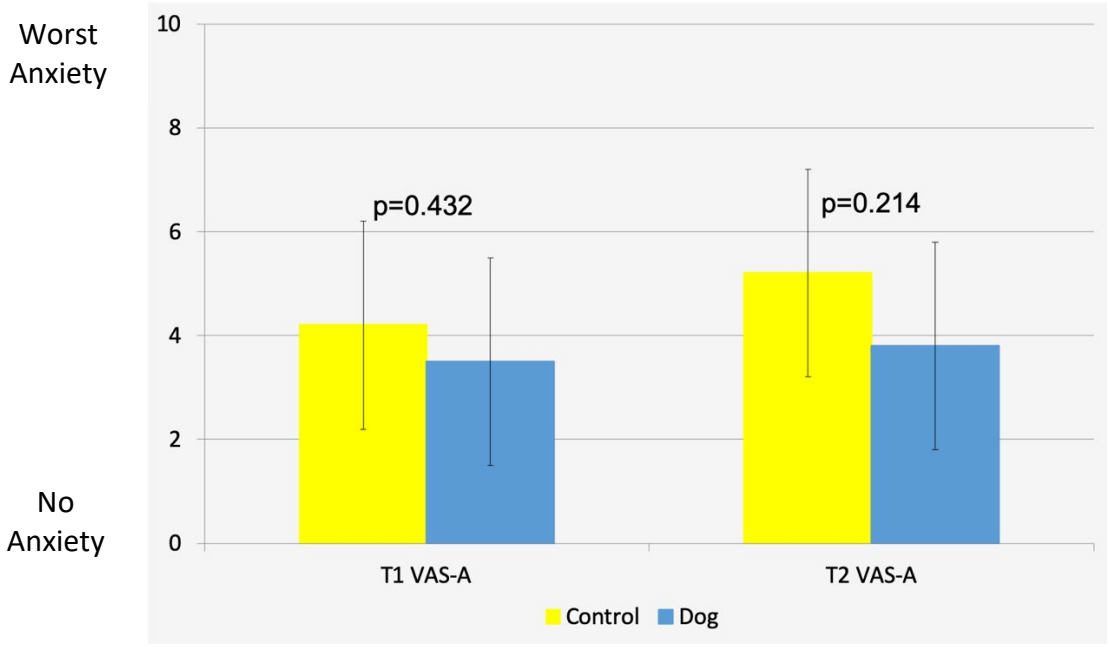

Figure 5. Visual Analog Scale for anxiety level. Mean (and standard deviation) scores for anxiety after procedure by group for both dental visits. Higher scores indicate greater anxiety.

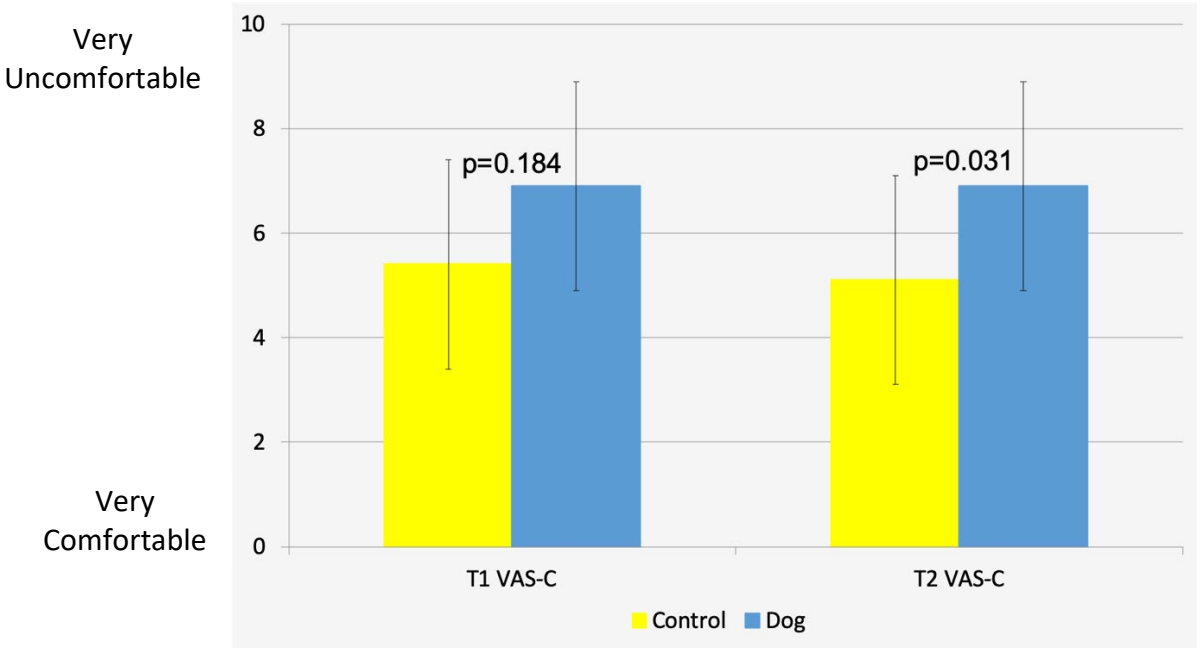

Figure 6. Visual Analog Scale for comfort level. Mean (and standard deviation) scores for comfort after procedure by group for both dental visits. Higher scores indicate greater comfort.

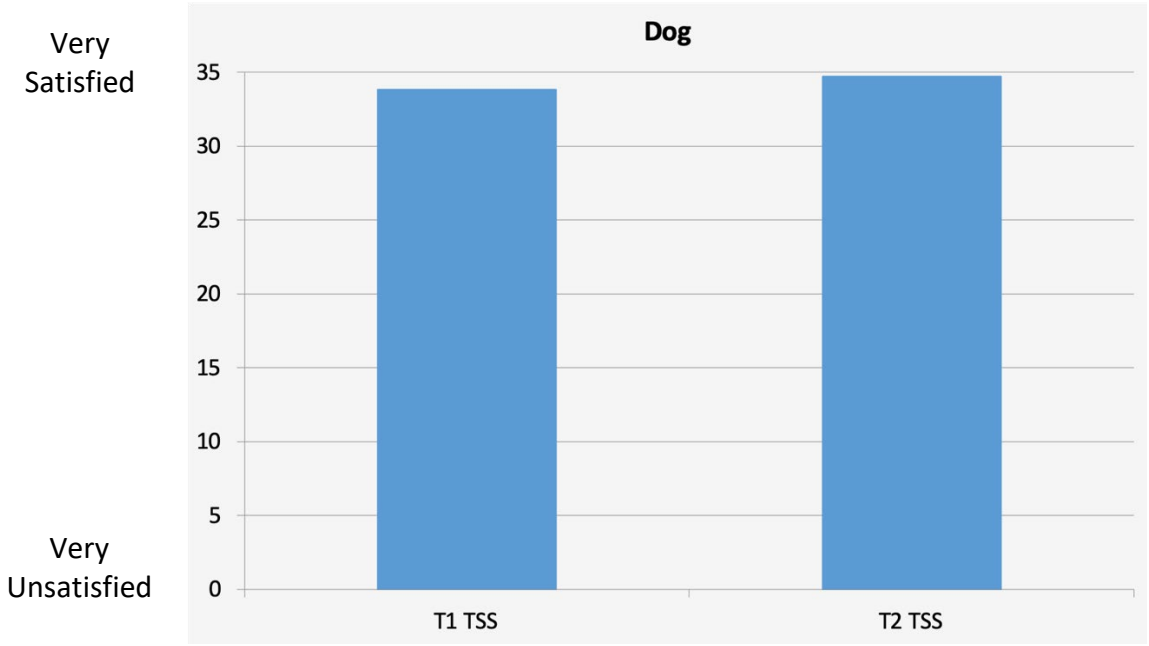

Figure 7. Therapy Satisfaction Scale at both dental visits for the DOG group only. Scores are based on 5-point scale with higher scores (sum total 35 point maximum) indicating satisfaction in the animal-assisted therapy.

CHAPTER 4: Discussion

The first results in this study that are of importance come from the Index of Dental Anxiety and Fear-4C (Figure 2). This form was completed by all participants and helped to determine the level of dental anxiety and fear that was present. A score of $\geq$2.5 this indicates high dental anxiety and a score $\geq$4 indicates the presence of dental phobia.[36] All participants displayed a score of >2.5 on the IDAF-4C form at both dental visits. This indicates that all the participants were proper subjects to be involved in a study focused on dental anxiety.

The IDAF-4C results also revealed which aspects of the dental visit are the most triggering for patients, thus increasing their level of anxiety. This was the first aim of the study because in order to properly treat these patients at an appropriate comfort level and design a proper intervention, it is important to understand the source of their dental anxiety. The IDAF-4C has measures that ask the patients which exogenous factors of their dental treatment are causing their anxiety.[9, 24] For this study, the exogenous factors that scored the highest with the participants included: pain, lack of control, not knowing what will happen, needles, and the fear of having an unkind dentist. These are all common fears that have been noted in previous research throughout the years.[4, 12, 25] The current results from this study revealed no statistically significant difference in the DOG group for any of the factors between dental visit 1 and visit 2. With the SC group, though, there was a statistically significant difference noted between visit 1 and 2 in their response to their fear of numbness (p=0.045). At this time in this research, the results do not display many significant findings in the sources of fear for the participants, but with the addition of more participants in this study and future studies, this data could be further analyzed. In order to better treat patients and prevent the vicious cycle of neglect for their dental

care, the results from the IDAF-4C are vital in identifying what aspects of the dental treatment should be a target for any anxiety-reducing intervention. [1, 7]

The second aim of this study was to look at any possible associations among those patients who report dental anxiety and the presence of generalized anxiety and/or depression during the past two weeks. Previous studies have discussed the correlation between these variables and consider this to be an endogenous source of dental anxiety, instead of the patients who only report dental anxiety due to their fear of needles, pain, etc.[8, 9, 22, 23] In order to assess this correlation, all participants were assessed for symptoms of both generalized anxiety and depression. This study's results at this time showed participants with mild symptoms of depression and no clinically significant results for generalized anxiety disorder in the two weeks before the dental visit. Although there was no significant correlation between depression and general anxiety disorder, the study is ongoing and these analyses will be repeated when more participants complete the study. Similarly to exogenous sources of dental anxiety, identifying patients that display generalized anxiety disorder or depression in a dental practice is vital to the safety and well-being of patients. Understanding patient's mental health and how to best treat them for their dental needs can help promote an overall improvement in their oral health and motivation to return for all their dental needs, not just when they are in pain.[43]

Data collected from the VAS scores that the participants from both groups completed at the end of dental visit 1 and 2, which looked at their perceived levels of comfort and anxiety addressed the third aim of this study. The VAS results are an important aspect of this study because it articulates the patient's own feelings about their emotions and reactivity at the end of

each dental treatment appointment. For both groups, there was no statistically significant difference between dental visit 1 (p=0.432) and dental visit 2 (*p*=0.214) in reported anxiety levels. The only statistically significant difference noted in comfort levels was seen at dental visit 2 (p=0.031) with the DOG group (6.9) and the SC group (5.1). While these findings are preliminary and based on a limited sample size, this result is the start of further discussion for the need for an intervention to improve comfort levels for dental patients with anxiety. If a patient reports a higher comfort level, then they are less likely to miss appointments and avoid dental treatment completely.[6] Previous research has looked at numerous options for intervention to include: cooler temperatures in the office, lavender scents, music, and pharmacologic interventions. [3, 12, 44] The higher level of comfort noted by participants that were exposed to the therapy DOG intervention in this pilot study could be one of the first indications that this intervention is another avenue that should be further studied in the pursuit to alleviate dental anxiety for patients.

The final aim of this study was to determine if a therapy dog intervention was an acceptable and positive experience for the participants. If patients were not interested in the presence of therapy dogs, then the effectiveness of the intervention on alleviating their dental anxiety and improving their comfort level is null and void. The participants in the DOG group completed the Therapy Satisfaction Scale and the results suggest that their overall satisfaction with the intervention was high with scores at 33.8 (dental visit 1) and 34.7 (dental visit 2) out of a total of 35. With results that indicate a very high satisfaction among the participants, it is even more indicative that this therapy intervention has the potential to benefit patients who report dental anxiety. One of the highest reported exogenous fears of the dental appointment reported

from this study via the IDAF-4C was lack of control for both the SC (3.57) and DOG (3.20) groups. For patients and future participants that would indicate no exclusionary factors to interacting with a dog, this type of intervention could possibly reduce this aspect of their fear. They would be able to indicate their needs for the presence of a therapy dog and/or any other specific intervention during their appointment such as control of the music played during treatment, thus regaining some semblance of control.

There are limitations to this study and future studies with the involvement of therapy dogs. There are numerous factors that must be considered when introducing dogs to an environment that is meant to provide infection control protocols during dental treatment. In order to limit the amount of contamination that could occur during the intervention the following protocols were followed: all of the therapy dogs followed a strict grooming protocol in order to be present in medical areas, the sterilized packs were either covered completely or unopened while the dogs were present, and the dogs were not allowed in the treatment room during treatment. Despite all of these protocols in place, there are some challenges and concerns that are noted in the article by Gussgard et. .[45] Their literature search included four general categories of hazards that could be encountered with therapy dogs in a dental clinic to include: exposing patients to a possible allergy to dogs, the dog as the source of a pathogen, unwanted animal behavior, and hazards to include falls associated with a crowded treatment room.[45] These are all things that must be considered prior to implementing a therapy dog intervention in a dental clinic. The article also indicated certain protocols to implement that range from hand hygiene before and after contact with the dogs to ensuring the dogs are bathed immediately prior to interactions with patients.[45] The results from this study and future studies could indicate that

these risks are worth the reward for patients, as long as dental offices follow infection control and safety protocols.

This study's main limitation at this time is the stalled recruitment of participants into the study. Without an adequate number of participants, the data is unable to be analyzed fully, thus providing more solid indications for future research and validity in the therapy dog intervention. The study was placed on hold when the COVID-19 pandemic restricted all patient care for numerous months, then only allowed necessary dental treatment in order to protect patients and providers. Once patient care at the participating facility of the study returned to routine appointments, there was still the limitation of the therapy dogs. Due to COVID-19 restrictions that have yet to be lifted the therapy dogs have not been allowed to return to the medical facilities in any capacity. This has halted all recruitment of patients in order to ensure a fair and randomized collection of participants to participate in both the DOG and SC groups. Once these restrictions have been lifted, the study will resume its recruitment and complete its goal number of participants. This will then allow for further data collection and analysis to publish future results of all the measures completed in this study.

CHAPTER 5: Conclusions

Based on preliminary data collected in this ongoing study, there are some promising aspects to the implementation of therapy dogs as an interventional treatment for patients who report having dental anxiety. One of the most important reasons for continuing to investigate more diverse options for alleviating dental anxiety is that patients continue to show an avoidance of dental treatment because of their fears, despite currently available behavioral and pharmacological interventions to mitigate this anxiety. In order to encourage these patients to attend dental treatment appointments and maintain their oral health, providers ideally have many options available to alleviate their patients' fears and anxiety. Since COVID-19, the newest research is starting to show the possibility of an increased number of patients who could potentially become part of this already significant number of patients with dental anxiety and avoidance of care. It is vital that the dental community understand the causes of each individual patient's dental anxiety and tailor their practice to accommodate these patients in the future. Therapy dog intervention has the potential to be one of those fundamental tools.

APPENDIX A

Demographics

1. **What is your gender?** ☐1 Male ☐2 Female

2. **What is your date of birth?** ___ ___ / ___ ___ / ___ ___ ___ ___
   Month *Day* *Year*

3. **What is your current age?** _____

4. **What is your height and weight?** _____ feet _____ inches _____ pounds
5.
6. **Do you consider yourself to be of Latin or Hispanic origin?**

   ☐1 Yes

   ☐2 No

6. **What is your race/ethnicity?** (check all that apply)

   ☐1 White/Caucasian

   ☐2 Black/African American

   ☐3 American Indian or Alaska Native

   ☐4 Asian

   ☐5 Native Hawaiian or Other Pacific Islander

   ☐6 Other (specify): _____

7. **Are you…** (check one)

   ☐1 Currently married

   ☐2 Currently living with partner

   ☐3 Separated

   ☐4 Divorced

   ☐5 Widowed

   ☐6 Never married

8. **What is your current employment situation?** (check all that apply)

☐Working:	☐$_1$ Full time at job	☐$_2$ Part time at job
☐ On Leave:	☐$_3$ On leave with pay	☐$_4$ On leave without pay
☐ Not employed:	☐$_5$ Seeking work	☐$_8$ Not seeking work
	☐$_6$ Receiving disability	☐$_9$ Not self-supporting
	☐$_7$ Homemaker	☐$_{10}$ Retired
☐ Student:	☐$_{11}$ Full time	☐$_{12}$ Part time

9. **What was the highest grade of school that you completed?**

☐$_1$ Less than 8th grade

☐$_2$ 8th to 11th grades

☐$_3$ High school graduate or equivalent (GED)

☐$_4$ Technical or vocational school

☐$_5$ Some college

☐$_6$ College graduate

☐$_7$ Post-graduate degree

10. **Have you taken any medications or natural supplements in the past 2 weeks?**

☐$_1$ Yes IF **YES**, Please specify below.

☐$_2$ No IF **NO**, Skip to **14**.

	Drug/Supplement	Dose	Since
(Pain)	_____	_____	_____
(Sleep)	_____	_____	_____
(Heart)	_____	_____	_____
(Birth Control)	_____	_____	_____
(Hormones)	_____	_____	_____
(Other)	_____	_____	_____
(Other)	_____	_____	_____

11. **Males skip to 16: How would you characterize your menstrual status during the last 12 months?**

☐1 Still having periods and not going through menopause

☐2 Still having periods but possibly going through menopause

☐3 Still having periods and on hormone replacement therapy

☐4 Going through menopause

☐5 Postmenopausal (no periods for at least 1 year)

☐6 Was pregnant

☐7 Other (please specify): _____

☐8 Don't know

12. **When was your last menstrual period? (check one)**

☐1 1-7 days ago

☐2 8-14 days ago

☐3 15-21 days ago

☐4 22-35 days ago

☐5 More than 35 days ago

☐6 My menstrual periods have stopped (no periods for at least 1 year)

13. **Have you had surgery before?** ☐1 Yes ☐2 N

If yes, when? Date(s) For what?

14. **Have you ever had a disease lasting longer than 2 months?** ☐$_1$ Yes ☐$_2$ No

If yes, when? Date(s) For what?

APPENDIX B

Generalized Anxiety and Patient Health Questionnaire

Over the last two weeks, how often have you been bothered by the following problems?

	Not at all	Several Days	Over Half the Days	Nearly Every Day
Feeling nervous, anxious, or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3
Worrying too much about different things	0	1	2	3
Trouble relaxing	0	1	2	3
Being so restless that it's hard to sit still	0	1	2	3
Becoming easily annoyed or irritable	0	1	2	3
Feeling afraid as if something awful might happen	0	1	2	3
Little interest or pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3
Trouble falling or staying asleep, or sleeping too much	0	1	2	3
Feeling tired or having little energy	0	1	2	3
Poor appetite or overeating	0	1	2	3
Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
Moving or speaking so slowly that other people could have noticed. Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3

How difficult have these symptoms made it for you to do your work, take care of things at home, or get along with other people? ❑ Not difficult at all ❑Somewhat difficult ❑Very difficult ❑ Extremely difficult

APPENDIX C

Oral Health Impact Profile

HOW OFTEN have you had the problem during the last year?

	NEVER	HARDLY EVER	OCCAS-IONALLY	FAIRLY OFTEN	VERY OFTEN	DON'T KNOW
1. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
2. Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
3. Have you had painful aching in your mouth?	0	1	2	3	4	5
4. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
5. Have you been self-conscious because of your teeth, mouth or dentures?	0	1	2	3	4	5
6. Have you felt tense because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
7. Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
8. Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
9. Have you found it difficult to relax because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
10. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5

11. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
12. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
13. Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5
14. Have you been totally unable to function because of problems with your teeth, mouth or dentures?	0	1	2	3	4	5

APPENDIX D

The Index of Dental Anxiety and Fear (IDAF-4C)

The following questions relate to how you feel about going to the dentist.

1. How much do you agree with the following statements?	Disagree	Agree a little	Somewhat agree	Moderately agree	Strongly agree
(a) I feel anxious shortly before going to the dentist.	1	2	3	4	5
(b) I generally avoid going to the dentist because I find the experience unpleasant	1	2	3	4	5
(c) I get nervous or edgy about upcoming dental visits	1	2	3	4	5
(d) I think that something really bad would happen to me if I were to visit a dentist.	1	2	3	4	5
(e) I feel afraid or fearful when visiting the dentist.	1	2	3	4	5
(f) My heart beats faster when I go to the dentist.	1	2	3	4	5
(g) I delay making appointments to go to the dentist	1	2	3	4	5
(h) I often think about all the things that might go wrong prior to going to the dentist.	1	2	3	4	5

2. Do the following statements apply to you?	Yes	No
(a) Going to the dentist is actively avoided or else endured with intense fear or anxiety.	1	2
(b) My fear of going to the dentist has been present for at least 6 months.	1	2
(c) My fear, anxiety or avoidance of going to the dentist significantly affects my life in some way (dental pain, avoiding eating some foods, embarrassed or self-conscious about appearance of teeth or mouth, etc.).	1	2
(d) I am afraid of going to the dentist because I am concerned I may have a panic attack (abrupt fear with sweating, pounding heart, fear of dying or losing control, chest pain	1	2
(e) I am afraid of going to the dentist because I am generally highly self-conscious or concerned about being watched or judged in social situations.	1	2

3. To what extent are you anxious about the following things when you go to the dentist?	Not at all	A little	Somewhat	Moderately	Very much
(a) Painful or uncomfortable procedures.....	1	2	3	4	5
(b) Feeling embarrassed or ashamed.....	1	2	3	4	5
(c) Not being in control of what is happening.....	1	2	3	4	5
(d) Feeling sick, queasy or disgusted.....	1	2	3	4	5

(e)	Numbness caused by the anesthetic.....	1	2	3	4	5
(f)	Not knowing what the dentist is going to do	1	2	3	4	5
(g)	The cost of dental treatment.....	1	2	3	4	5
(h)	Needles or injections	1	2	3	4	5
(i)	Gagging or choking.....	1	2	3	4	5
(j)	Having an unsympathetic or unkind dentist.....	1	2	3	4	5

APPENDIX E

Visual Analog Scale

Please place a slash (/) on the line below to indicate your present level of **comfort**:

Very uncomfortable	Very comfortable

Please place a slash (/) on the line below to indicate your present level of **anxiety**:

No anxiety	Worst anxiety

APPENDIX F

Therapy Satisfaction Scale

Please circle the number that best describes your satisfaction with the intervention.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	I am satisfied with the quality of the intervention I received.	1	2	3	4	5
2.	My needs were met by the intervention.	1	2	3	4	5
3.	I would recommend the intervention to a friend.	1	2	3	4	5
4.	I would return to the intervention if I needed help.	1	2	3	4	5
5.	The therapy dog was friendly and warm towards me.	1	2	3	4	5
6.	I am now able to more effectively deal with my dental anxiety.	1	2	3	4	5
7.	I thought the intervention was an appropriate length.	1	2	3	4	5

8. How much did the intervention help you deal with your dental anxiety? (check one)

Made things a lot better	____
Made things somewhat better	____
Made no difference	____
Made things somewhat worse	____
Made things a lot worse	____

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