



## Introduction

Dental anxiety in children may lead to challenges when it comes to their treatment. Several behavior management techniques exist to try and address these challenges and properly treat their oral health needs. One behavior management modality not yet studied is that of guided meditation.<sup>[6]</sup>

Meditation serves as the training ground for learning mindfulness. Mindfulness simply means the act of being fully present or aware. Several different types of meditation exist. Some of these include guided meditations, non-guided meditations, music, storytelling, movement, and breath-work.<sup>[3]</sup> Meditation is non-invasive, cost-effective, and proves to be beneficial in all aspects of the child's life if implemented at home. The American Academy of Pediatrics (AAP) highly encourages parents to meditate with their kids at a young age in order to engrain these skills early on.<sup>[1][2][4]</sup> One of the many proven benefits of meditation in children is an increased sense of calmness and relaxation and decrease in stress and anxiety—an ideal situation if accomplished in a dental setting.<sup>[1][2][4]</sup> Finding significance in this mind-body therapeutic approach as a behavior management modality could be significantly beneficial to pediatric dentists and patients. In addition, by offering meditation resources to families we can help better the lives of these children.



## Study Objectives

The aim of this study is to test if guided meditation prior to the start of operative dental procedures significantly decreases dental anxiety in children. Finding significance in this mind-body therapeutic approach as a behavior management modality in a dental setting could be significantly beneficial to both pediatric dentists and their patients.

## Methods

### Subjects

Patients ages 5-12 who are ASA I or II, Frankl Scale II, III or IV, and require operative dental treatment (class I, class II, class III, class IV, class V restorations, or pulpotomies and stainless-steel crowns) were the subjects of this study. Patients needed to have at least two quadrants requiring operative procedures. A total of 11 subjects and 22 appointments were completed.

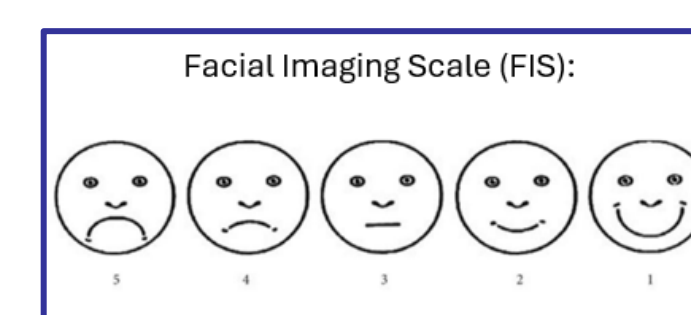
### Patient Selection

**Inclusion Criteria:** Patients between the ages of 5-12 (ASA I or II; Frankl Scale II, III or IV) with at least two operative procedures in their treatment plan. Other demographic factors, including gender and ethnicity, will not be used to determine inclusion.

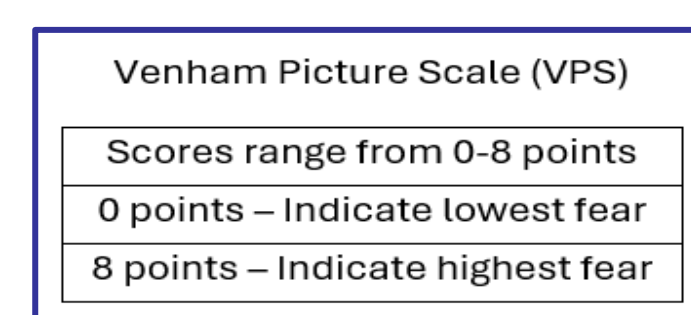
**Exclusion Criteria:** Patients younger than 5 and older than 12 years old. Patients who fall under Frankl Scale category I. Subjects who become uncooperative mid-treatment and will require more advanced behavior management modalities such as nitrous/sedation.

### Data Collection

Participants were assigned a number and were their own control. A coin was flipped to determine which of the two dental visits would be the control visit versus the study visit. The study visit began with a guided meditation (3-minutes on "Headspace" app dependent on age of patient) while the control visit was commenced without any form of meditation. Treatment was conducted in the same manner: tell-show-do, use of 20% topical benzocaine, delivery of local anesthetic, bite block, and isolation device. No nitrous was used. Two measurements, both subjective and objective, were also taken. A self-report measuring dental anxiety was done by the patient using the Venham Picture Scale (VPS) and Facial Image Scale (FIS). For the control group, this was done before and after treatment. For the study group, the patient completed both tests three times: before the guided meditation, after the guided meditation, and after completion of treatment. For both groups, their heart rate was monitored and recorded at 5-minute intervals starting after consent/assent obtained until completion of the procedure.



\*For both subjective measures, a lower #/score indicates less fear or anxiety reported\*



### Statistical Analyses

The data collected was analyzed using repeated measures ANOVA. Data was collected from heart rate monitor readings and both VPS and FIS reports. The data was compared and analyzed between the two treatment visits. Data was collected from 11 test subjects with 2 visits each.

## Results

### 1. Subjective Dental Anxiety Measurement

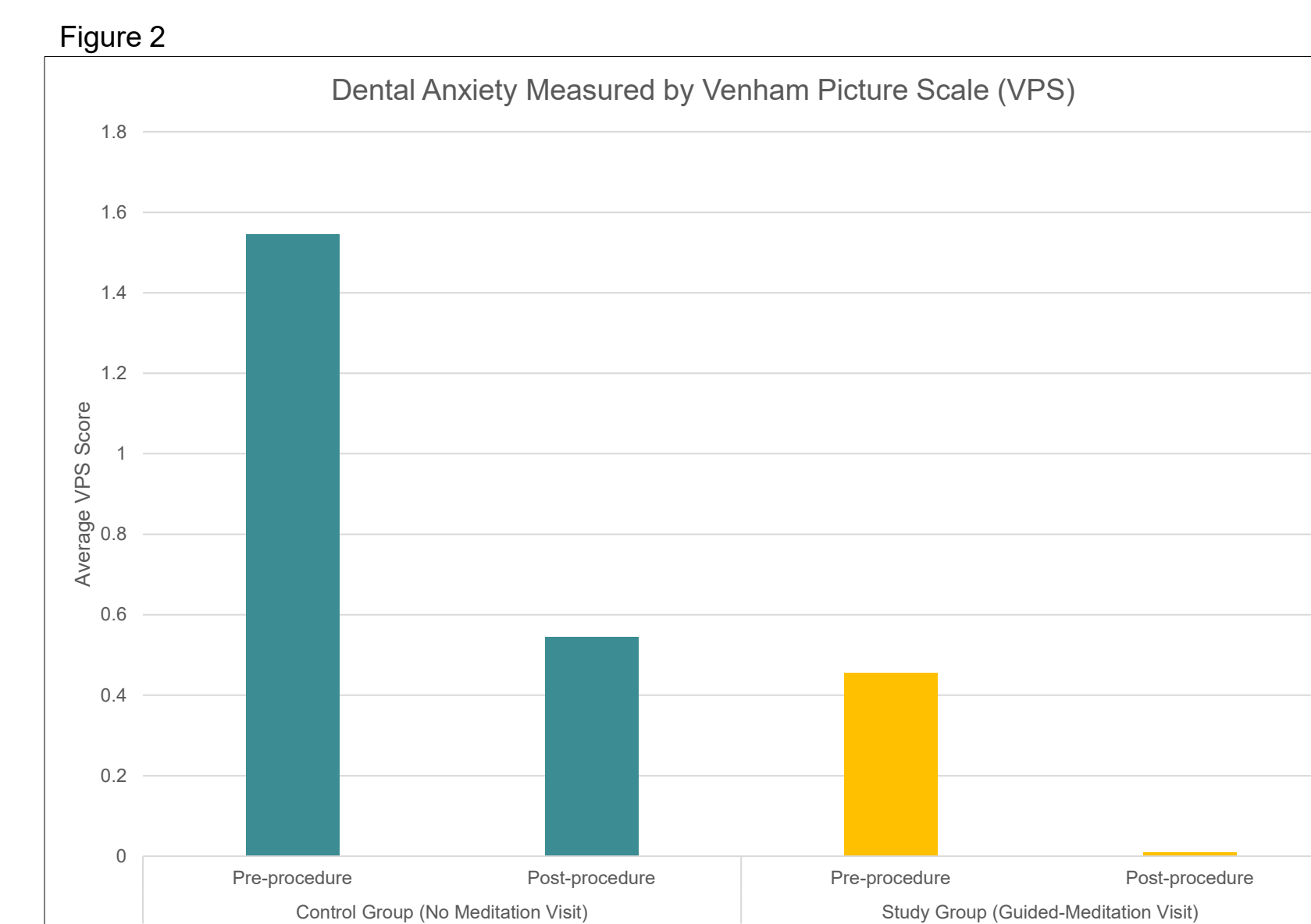
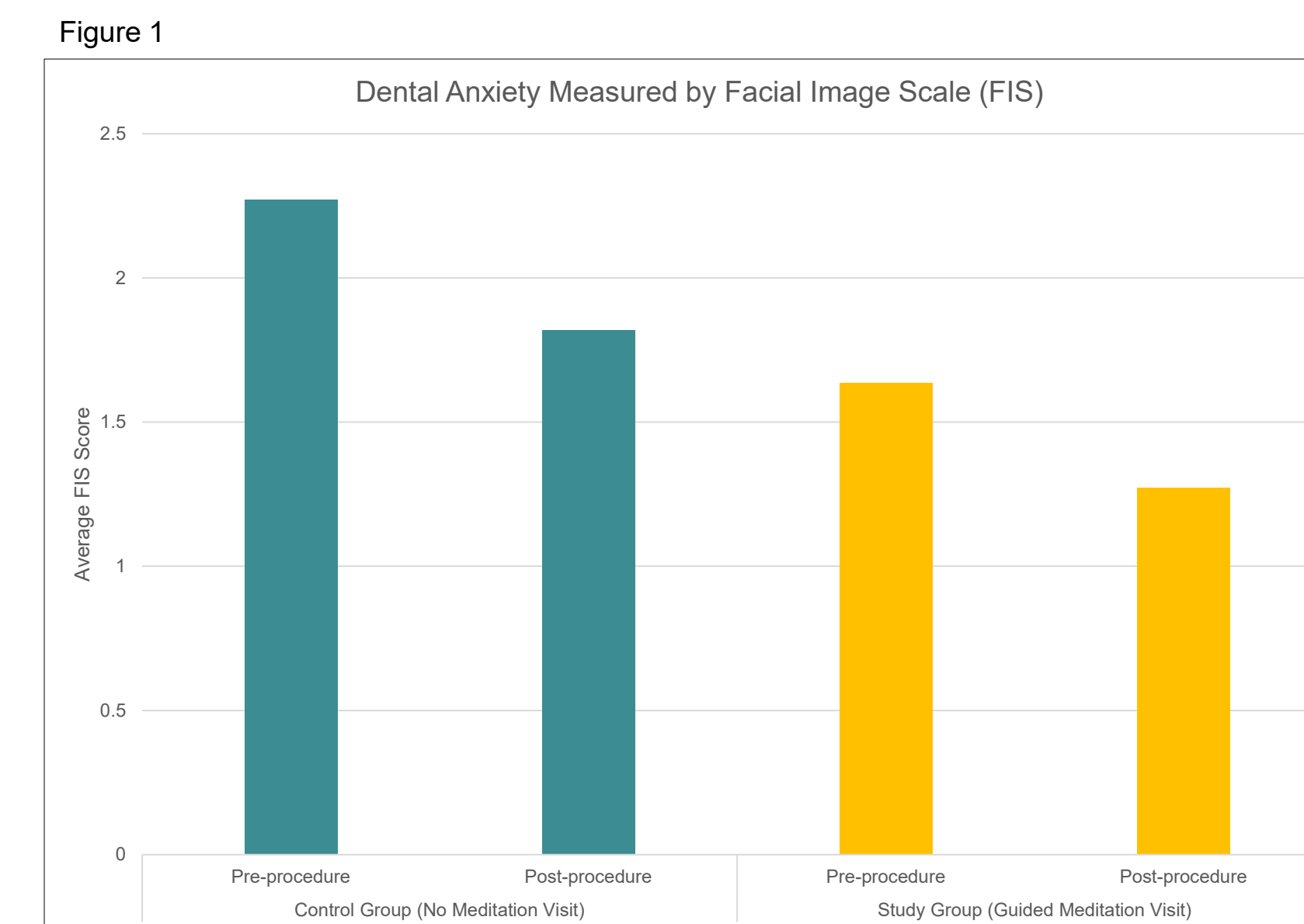


Figure 3(a)

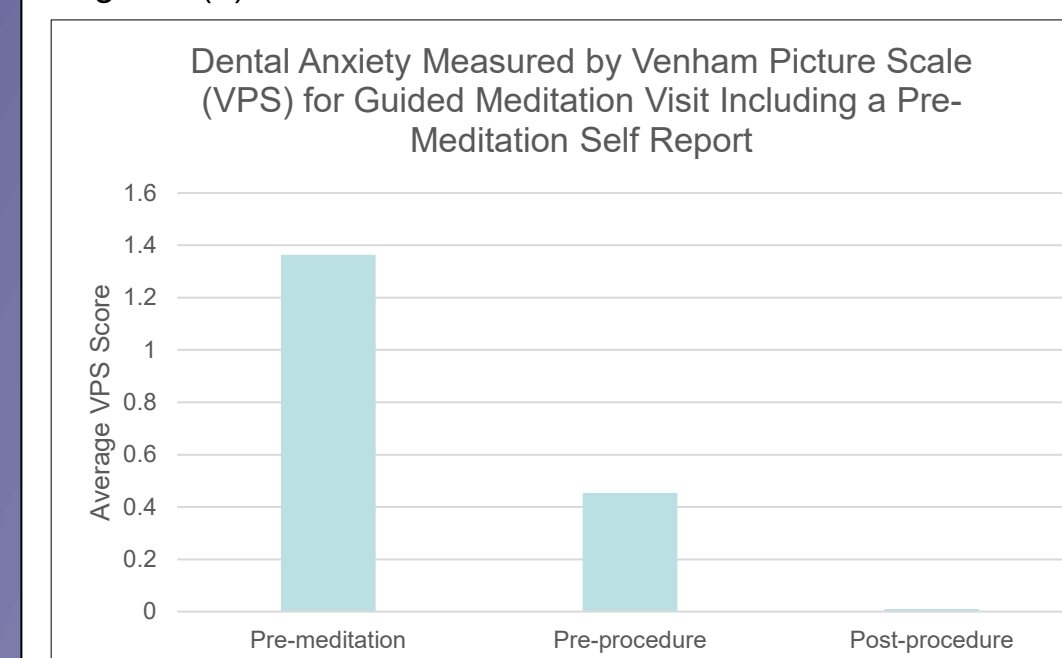
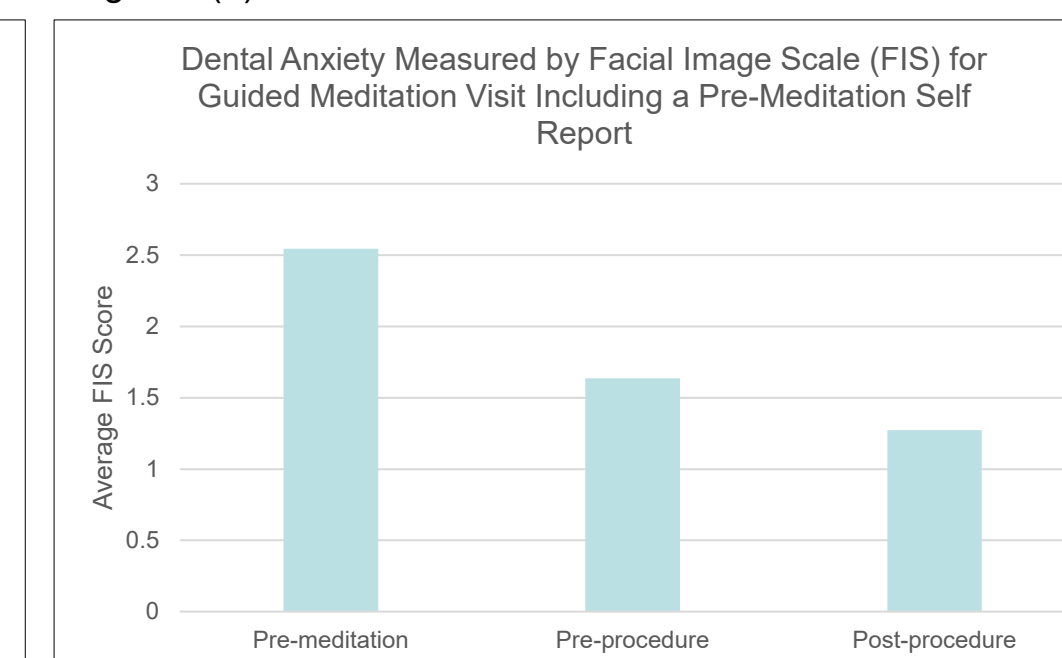
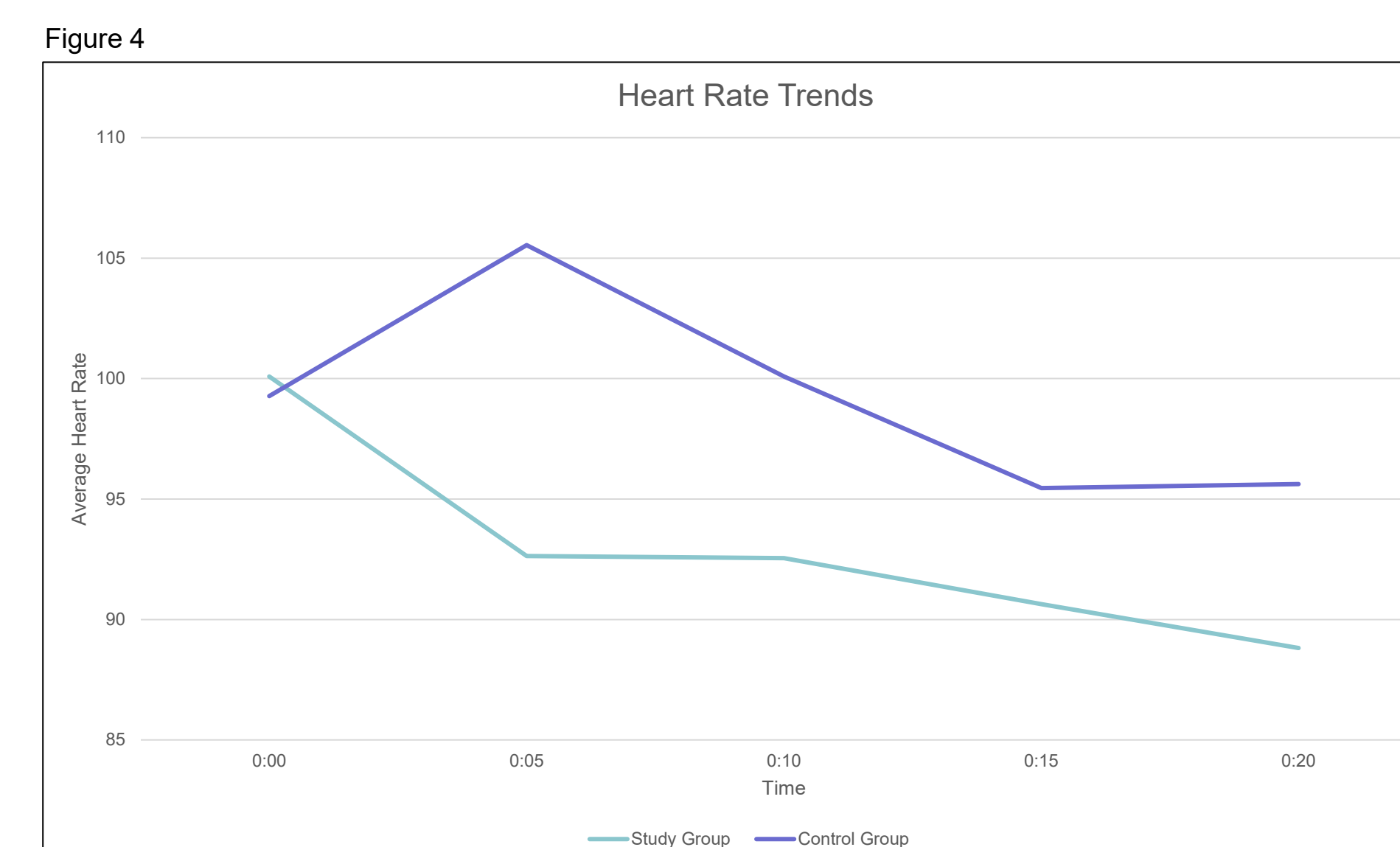


Figure 3(b)



### 2. Average HR Trends during 20-Minute Procedures With and Without the Use of Guided Meditation



## Discussion

There is a statistically significant difference for FIS ( $F=7.752, p<.05$ ) and for the VENHAM ( $F=8.265, p<.01$ ) when comparing both groups before and after their operative procedures. (Fig. 1 and 2) This suggests that guided meditation before starting an operative procedure does in fact have a positive effect on a patient's subjective report of anxiety.

On average, a decrease in HR was seen after completing the guided meditation followed by a stable HR reading throughout the entirety of the procedure for the study visit. Heart rate average on the control visit showed similar starting points as the study visit, followed by an increase in HR after beginning the procedure, and then dropping to a stable HR at the end of the procedure. (Fig. 4) Although this trend is suggestive of objective signs of decreased stress in the study group, analysis shows no statistical significance.

If the project is continued, subjective reports (FIS and VPS) would be a better measure instead of HR/time since procedure lengths, time of administration of anesthesia, and start and end time of meditation will vary per appointment.

A trend is also evident when comparing FIS and VPS before the guided meditation and after the guided meditation was complete. (Fig 3(a) and 3(b)) Although no statistical analysis was completed to test for significance, data suggests a decrease in anxiety after the guided meditation was complete. It is important to note that most patients' initial subjective reports showed having low dental anxiety to begin with (VPS: avg score of 1.5/8 and FIS: avg score of 2.5/5). These measures suggest our subjects were more-so Frankl IV and III patients. If study were to continue, should attempt to include more Frankl II patients.

## Conclusions

Guided meditation could be an effective behavior management modality in pediatric dentistry. Patients demonstrated decreased dental anxiety when guided meditation was completed before the start of the procedure. It would be beneficial to continue research in this area over a longer period of time with more subjects.

## Study Limitations

- Small sample size and short duration of research
  - The need for two visits per patient. Due to high no-show rates, patients who did not return for second visit were not included in the study.
  - Confounding factors: The patient's mood that day, time of day the appointment takes place (morning vs. afternoon); order of appointments (guided meditation vs. no meditation) and previous experience; provider's behavior management skills
  - Different age groups have different heart rates ranges (the younger the patient, the higher the baseline heart rate will be).
- It is also likely to see an increase in HR when local anesthetic is being administered (associated with stress and/or epinephrine).

## References

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